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THEORETICAL AND PRACTICAL

COURSEBOOK. CASE STUDIES

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JOANNA GIRZELSKA

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Theoretical part
Chapter 1

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Introduction

This study is aimed at students of the first degree of Nursing. It consists of two parts. The thematic scope is consistent with the curriculum of the first degree of full-time studies in Nursing at the Lublin Academy of WSEI. Each chapter ends with a list of references.

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1. The development of nursing worldwide and in Poland

Joanna Girzelska

1.1. Philosophical trends in nursing

The history of professional nursing goes back to the 19th century. The period of the **19**th century is the time when this profession was usually charitable and auxiliary in its character. Patient care was primarily exercised by nuns, including Daughters of Charity, Sisters of St. Elizabeth, Sisters of Mercy of St. Borromeo, Franciscans, Lutheran Deaconesses.

Over the years, nursing has changed in many dimensions. The metamorphosis concerned not only the methods of care but also education standards or the required attire. The process of the development of nursing depended on certain ideas that were guided by philosophical and cultural trends, fashionable at the time, such as:

- ascetism,
- romance,
- pragmatism,
- humanism.

IMPORTANT

Ascetism – the expression of this philosophical trend was self-sacrifice, sacrifice of one's life to God and to fellow human beings. Nursing, which was influenced by this trend, was a vocation to fulfil the will of God.

Romanticism – is idealization of life, bravery and heroism. This trend was manifested through a romantic perception of care activities towards the care recipiente. For many women, nursing was an activity that enabled them to devote themselves to the romantic idea of working for others, a work full of dedication but also pride and satisfaction.

Pragmatism – the manifestation of this trend was a practical way of thinking, acting, and usefulness. In nursing, pragmatism was reflected in instrumental and technical activities towards the patient, useful activities and satisfying the therapeutic and nursing needs of the patient. This way of thinking resulted, among other things, in the improvement of professional qualifications of nurses.

Humanism – a manifestation of this trend was concentration on Man, emphasizing His values and dignity. This philosophical trend exerted the deepest influence on the development of nursing, especially if the subjectivity of the patient and his importance in the therapeutic team are taken into account.

1.2. Pre-modern and modern nursing

In the development of nursing, one may distinguish pre-modern and modern nursing:

- pre-modern period,
- modern period.

The pre-modern nursing period used to be quite lengthy and quite diverse. Its history dates back to antiquity.

In ancient Egypt, medicine was taught in temples. Doctors belonged to the caste of priests. All care activities for children and family members were performed by women.

In ancient India, people believed in supernatural forces and their influence on human life. The influences of these beliefs are also present in modern times. The knowledge of treatment, prevention and care was included in the holy books of the Vedas. Even then the first hospitals were created and the people working there had to have technical qualifications and high moral standards.

In ancient Greece, Hippocrates (460-377 B.C.), known as the father of medicine, became extremely famous. His work **“Corpus**

Hippocraticum” is considered to be the first textbook of medicine containing, among others, the basics of physiology, general and detailed pathology as well as therapy.

The great merit of Hippocrates was the introduction of the principles of medical ethics contained in the so-called Hippocratic oath, with the principle of ***primum non nocere*** (first of all, do no harm), which not only doctors but also nurses abide.

Hippocrates stressed the importance of nursing care and an individual approach to the patient and his observation.

Christianity had a significant impact on the development of nursing. In its approach to Man, it emphasized the attitude of mercy, introducing this aspect into care.

In the Middle Ages, care was mainly handled by various religious congregations, also lay people. Women from aristocratic families especially participated in this process. Over time, care of patients took an institutionalized and organised form.

Religious groups specializing in the care of the sick were established, such as the Hospitaller Brotherhood of the Holy Spirit and the Hospitaller Order.

Over time (16-**19**th century) gradually the care of the sick was taken over by lay people, whereas clergy departed from hospitals. Clergymen were replaced by unprepared people, often with a low level of morality, which was also influenced by the ideas proclaimed in the Reformation and Counter-Reformation movement.

The activities of the Franciscan, Vincent à Paulo (1584-1660), in organizing help and care of the sick and the poor, were of little help. Vincent à Paulo founded the Congregation of the Sisters of Charity in France, which brought together young unmarried girls who, by making one year vows, pledged to care for sick, homeless people. In 1652, the Sisters of Charity arrived in Poland, which was the beginning of the development of hospital nursing care.

An important figure in the development of nursing was the activity of minister Theodor Fliedner, who in the years 1780-1800, initiated the reform movement among the Protestant deacons (lay members of the women’s association in Protestant churches).

These actions concerned the reform and improvement of the programme of theoretical and practical training with regard to the care of deacons.

The period of modern nursing begins in 1860, when the first professional nursing school at St. John's Hospital was established in St. Thomas Hospital in London by Florence Nightingale (1820-1910).

The rules in the school education conducted by Florence Nightingale were as follows:
- the first year of the education was at school,
- the next two years of study took place in the hospital, as an internship,
- the study ended with an exam, and since 1877, with a diploma.

In nurses' education, attention was paid to:
- selection of candidates for the profession with regard to age (21-40 years of age), nature, education,
- shaping ethical attitudes among students, personal culture, teamwork skills,
- choice of institutions for the implementation of practical education,
- ensuring the quality of education through a good theoretical and practical curriculum.

Florence Nightingale created a model of nursing education based on scientific rights and the need for scientific research in nursing, which differentiated the goals of nursing care from the objectives in medicine. This model was adopted worldwide, largely determining further development of modern nursing.

An important milestone in the development of nursing was the establishment of the International Council of Nurses (ICN) in the United States in 1899 as an initiative of Bedford Fenwick Ethel.

IMPORTANT

The aim of the ICN (1099) was:
- stimulation of the development of professional nursing around the world,
- representation of nurses on the international arena.

The tasks of the ICN at that time included:

- raising the status of nurses and legal regulation of the nursing profession,
- assistance in the development of national nursing associations,
- development of principles of professional ethics,
- exchange of professional experience.

The development of modern nursing especially in Europe was influenced by the establishment of the European Federation of Nurses Associations (EFN) in Brussels in 1971.

In Poland, throughout the 19th century, nursing had primarily an auxiliary function. It was identified with charitable activities. The sick were mainly handled by nuns from various Christian congregations.

In Poland, the development of professional nursing is mainly associated with the establishment of the first nursing schools and the first professional organization of nurses. The training of lay nurses began in the 1980s of the **19**th century. Teaching took the form of a course, lasting merely several months.

The first school of nursing was opened in the Polish lands in 1895 in Lvov under the Austrian partition. It was established at the city's General Hospital and is listed in official documents under the name of a caretaker school.

At the end of 1911, a nursing school was opened in Krakow (School of Vocational Nurses of the Association of St. Vincent de Paul), in which science lasted about two years, and female students studied anatomy, physiology, hygiene, nursing, principles of prevention of infectious diseases, first aid, nutrition, household, cooking.

The establishment of the first so-called modern nursing school in Kraków in 1911 is considered to be the beginning of professional nursing in Poland. It is also a manifestation of significant development of nursing in Poland. The school functioned until 1921. The inter-war period (1918-1939) saw intensive development of nursing education.

More nursing schools were established. In several cases, they were run by American nurses. At that time a total of 11 nursing schools was established in Poland.

By the outbreak of World War II, these schools had educated 2,851 nurses, or 42.7% of all representatives of this group, the rest being nuns.

An important development of nursing was the creation of the first professional nursing organization in Poland, namely the Polish Association of Professional Nurses (PAPN) (1925-1939), which was founded on the basis of an association of graduates of nursing schools operating at that time. The initiator of the establishment of this organization was Helen Bridge. The Association was founded in April 1925, and in the same year it was admitted to the ICN (1899), which permitted to take advantage of patterns and experiences of international nursing.

The development of Polish nursing was influenced by the results of the Polish Association of Professional Nurses (PAPN) activities:
- an introduction of the profession representative to the Healthcare Department of the Ministry of the Interior in 1926 (the so-called Independent Nursing Department is created - this position is taken up by Maria Babicka-Zachertowa),
- appointment of voivodeship nurses,
- issuing a professional magazine “Polish Nurse” (1029),
- establishing a legal basis of the profession (Nursing Act of 21 February 1935).

Another historical period in the development of professional nursing is the years of war and occupation:
- the work of Polish nurses facing difficult and life-threatening conditions,
- organizing secret nursing and sanitary training,
- heroic service in the units of the Polish Armed Forces on all fronts, in guerilla warfare and during the Warsaw Uprising, in ghettos and concentration camps.

  The war witnessed the death of around 2,000 Polish nurses.

The development of nursing in the times of People’s Poland (1945-1989) was influenced by:
1. The establishment of the Polish Nursing Society (PNS) in 1957. The PNS has been a social organization affiliating nurses and midwives. It refers to the programme assumptions of Polish Association of Professional Nurses.

   The Polish Nursing Society influenced the development of Polish nursing by striving for:

- harmonization of vocational training for nurses and ways of accessing the profession,
- reactivation of ICN membership – which was only achieved in 1961,
- creating opportunities for training nurses at an academic level, achieved in 1969,
- creation of an independent position in the Ministry of Health, responsible for the care of nurses, achieved in 1981,
- developing professional ethics principles for nurses (1973 and 1984),
- amendment of the law on the nursing profession – the adoption of the amended law of 1935 on the professions of nurses and midwives took place only in 1996,

2. The establishment of the Nursing College in Lublin in 1969; a university-based institution transformed in 1972 into a nursing department of the Medical Academy. Identical departments at the Medical Academies were also created in other cities (Katowice, Poznań, Kraków, Wrocław).

A key event for the development of nurses during this period was the establishment of the Local Government of Nurses and Midwives, which was founded under the Law on the Self-Government of Nurses and Midwives in 1991. The organizational unit of the Local Government of Nurses and Midwives is the Supreme Council of nurses and midwives. 45 District Chambers of Nurses and Midwives were established.

The goals of the local government include:

- keeping a register of nurses and midwives,
- issuing the right to exercise the profession,
- setting standards of professional ethics.

The development of nursing at the turn of the century concerned mainly:

- the development of international cooperation,
- the dissemination of higher education for nurses combined with the modification of curricula (transfer of education to a university level),
- improvement of didactic and scientific qualifications of the academic staff of nursing departments,

- development of the post-graduate training system for nurses and midwives; the establishment of the Centre for the Education of Nurses and Midwives in Warsaw, in 2012,
- implementation of the theory of nursing care into nursing practice,
- development of scientific and research activities of nurses,
- mobility of nursing students and academic teachers,
- legal regulation of nursing as an independent profession,
- strengthening the nursing self-government.

1.3. Factors affecting the development of nursing practice

The position and shape of modern nursing are determined by a number of factors of different nature, often seen in professional and non-professional contexts. The determinants of nursing development are the factors and conditions which have caused changes in nursing, shaping the development of nursing at both theoretical and practical levels.

IMPORTANT

The factors determining nursing development can be divided into two groups:

1. Not professional factors:

- Epidemiological and demographic factors;
- Medical factors;
- Technological factors;
- Socio-cultural factors;
- The structure and functions of the family;
- Increased awareness of the recipients of nursing services and their guaranteed rights;
- Cultural diversity of patients and the environment, in which the nurse works;
- Political and economic factors;
- Factors determining the development of nursing.

2. Professional factors:
- Identity factors;
- Scientific research;
- Transformation of nurse education, both at a primary and post-graduate level,

and innovative teaching methods;
- Involvement of leaders affiliated in professional and scientific organizations of nurses

Epidemiological, demographic and medical factors have a significant impact on the trends in nursing, both in terms of science, education and practice.

Epidemiological factors deal with the health situation of society. The epidemiological analysis shows that:
– cardiovascular diseases are the first cause of death in Poland,
– the number of cancers, which are currently the second cause of death in Poland, is increasing and will become the main cause of death in the near future.

Among the demographic factors, a significant position is occupied by an increase of the ageing trend of the Polish and global population along with a simultaneous decrease in the proportion of children.

Disturbing epidemiological and demographic data influence, among others, the development of:
- geriatric nursing,
- development of nursing in primary healthcare,
- need to focus on promoting healthy and active ageing.

Technological factors - advances in medicine and in other scientific fields, and especially a huge development of technology provide new opportunities for diagnosis, treatment and rehabilitation (e.g. life-supporting devices, organ transplantation and genetic interference innovations), which results in, among others, a demand for highly qualified nurses.

Socio-cultural determinants of the development of nursing, among which special place is taken by the changes that are observed in the system of values and patterns of human behaviour, i.e.:

- in the area of the lifestyle of an individual,
- in the structure and functioning of the family,
- in the development of social institutions,
- in raising patients' awareness of his rights,
- on the issue of increasing multiculturalism of societies - recipients of nursing services.

An individual's lifestyle can be defined by listing the most characteristic behaviours in which his philosophy is expressed.

The lifestyle that is unfavourable to health is the primary cause of the so-called diseases of civilization. Lifestyle also determines metabolic diseases or emotional and mental disorders. The lifestyle of individuals is one of the factors determining the development of nursing and nursing tasks.

The nursing tasks include:

- educational tasks in the area of health,
- health promotion.

The structure and functioning of the family is a factor determining the development of nursing

Changes in the structure and functioning of the family include:

- a strong relationship of a small family with simultaneous loosening of kinship ties between generations or distant family members;
- changing the traditional division of family roles into female and male ones, with a departure from the patriarchal family model;
- decreasing family fertility rate.

In order to meet the changes in the family there is a need for intensive development of family nursing.

The work of a family and environmental nurse is, among others, aimed at:

- prevention and health promotion,
- working with periodically or chronically ill people,
- working with patients in the terminal phase of their illness.

An increase in awareness of the recipients of nursing services as for the rights guaranteed to them makes it necessary for a nurse to take on the role of a defender of the patient's rights, especially in

those situations where the patient cannot defend himself. This applies to unconscious patients, mentally ill, minors, elderly people.

The factor determining the development of nursing is the cultural diversity of patients and the environment in which the nurse works. The multiculturalism of societies is a growing phenomenon. There is an urgent need to intensify research work in this area, as well as developing training programmes for nurses in the area of multicultural care.

The purpose of these activities, among other things, is
- shaping the cultural sensitivity of nurses,
- developing their cultural competences.

The political and economic determinants of the development of nursing care result mainly from health policy, the economic situation of individuals and societies, the situation of nurses in the healthcare system. Their impact on the development of nursing care is a consequence of, among other things, intensified health problems in the mental health of citizens, which affects an increase in demand for specialist care as well as determining the development of psychiatric nursing.

IMPORTANT

Professional factors in the development of nursing include:
- Identity factors;
- Scientific research;
- Transformation of nurse training;
- Cooperation in professional and scientific organizations; national and international.

Identity factors - internally they influence the development of the nursing profession through actions taken by nurses themselves. There is an evolution of nursing at different levels.

Professional identity is understood as an identification of an employee with his/her own professional group and occupation.

Throughout history, the professional identity in nursing has been and is shaped by the symbolism of the profession.

The symbols of nursing are clear signs regarded as significant for nursing:
- nursing cap - humility and desire to serve others, hair protection, information (I am a nurse),
- nursing uniform,
- nurse anthem,
- olive lamp - “Nightingale lamp”.

Traditions refer to specific ceremonies and rituals, e.g.:
- offering a “cap” (the first cap received by a student of a nursing school at a cap ceremony as the first degree of initiation into the profession);
- “striping” (ceremony of putting a velvet stripe on the cap, six months before graduation; according to the Ministry of Health Circular Letter of 5 February 1950, nurses could wear a black stripe 2, midwives - red, and dieticians - blue).

Currently there are miniature metal cap badges worn on clothes.

Scientific research - nursing is one of these health sciences, which has been developing very intensively in recent decades through extensive research. Nurses conduct their own research according to their own methodology and work in interdisciplinary research teams.

Transformation of nurse training

The factor influencing the development of nursing is the transformation of nurse training, both at a primary and post-graduate level.

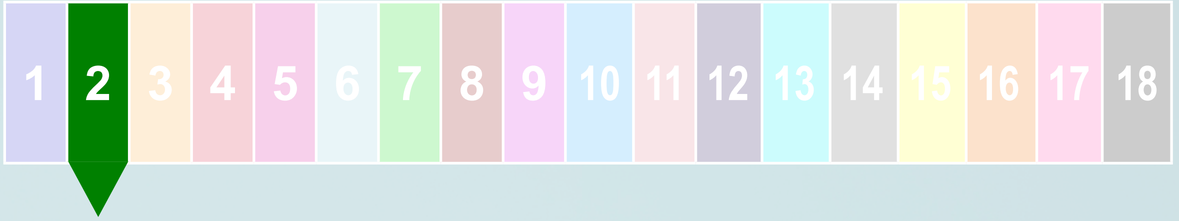
<u>Trends in educational changes</u>

The directions of changes in nursing education are determined by a number of factors, among which the following are mentioned most frequently:
- demographic change (patients, nurses),
- a variety of care providers,
- very rapid development of technologies used in the education process, e.g.: high fidelity simulations, globalization of society

worldwide, the occurrence of alternative therapies, gene therapies and palliative care,
- education for needs of population care and the increasing complexity of patient care.

The development of nursing is also determined by:
- improving innovative teaching methods,
- improving the assessment of acquired competences,
- using the latest technology in the educational process (e.g. development of simulation centres).

The future of nursing is:
- the need for care in an increasingly controlled patient environment,
- documenting care in central health information systems, which are ultimately intended to ensure that health information is available to both patients and care providers.



2. The nature of nursing and nursing care

Joanna Girzelska

IMPORTANT

According to. the *World Health Organization* (WHO), (2016) "nursing encompasses ***autonomous and collaborative*** care of individuals of all ages, families, groups and communities, sick or well and in all settings".

Nursing is a profession, science and art, a professional activity focusing on a holistic perception of a person. It provides healthcare by nurses - providers of actions that contribute to maintaining health, preventing and coping with an illness.

According to the American Nurses Association (ANA), nursing is:

- protection, promotion and optimization of a person's health and abilities,
- prevention of diseases and injuries,
- facilitating recovery,
- alleviating suffering by diagnosing and treating human reactions,
- support for individuals, families, groups, communities and populations in care.

This definition includes the goal of nursing, i.e. optimizing health.

According to the Encyclopedia Britannica, nursing is a profession that assumes responsibility for the continuous care of the sick, the injured, the disabled, and the dying (2016).

According to the "Encyclopedia for Nurses" ed. by Bogush, written by Poznanska, *nursing* is a term used to describe:

- different types of job tasks and activities,
- art,
- knowledge,
- science.

This indicates the multidimensionality of nursing - practice, education, art, science.

One of the most characteristic aspects in the native determination of the essence of nursing is the perception in nursing of the attributes of applied humanistic discipline.

From the perspective of the functioning of society, nursing is a profession and should be understood as a practical, individualized activity, treated as an art which refers to ethical and moral values.

IMPORTANT

The purpose of nursing practice is:

1) health promotion,
2) disease prevention,
3) restoring health/assisting in recovery,
4) help in coping with disability or death.

Nursing care covers a wide range of activities, from carrying out complex technical procedures to seemingly simple behaviour such as holding the patient's hand.

Nursing is a combination of science and art:

- The science of nursing is the basis of knowledge about health.
- The art of qualified nurses is to apply this knowledge to help others achieve maximum health and quality of life.

1. Nursing as a profession - a set of activities learned and performed for which remuneration is received.
2. Nursing as a profession because:
   – it is a social service,
   – it possesses a wealth of specific knowledge,
   – it conducts scientific research,
   – education is provided at an academic level,
   – it has active organizations (PNA, ICN, and structures in WHO, ILO).
3. Nursing as a science - scientific research.
4. Nursing as an art - apart from technical efficiency, it requires, from the nurse, creativity and safe innovation, often supported by a critical analysis of scientific research and own experience.

Nursing is a profession that focuses on a holistic perception of an individual receiving health services. It is a unique ‘contribution’ to preventing illness, maintaining health and contributing to the restoration of health.

Nursing understood as a professional activity of nurses is based on planning and providing care for the patient according to the assessed condition.

It combines both techniques of performing skills, described in procedures, standards of care, and based on scientific findings.

The origin of professional nursing is assumed to be 1860 - the date of opening the first nursing school in London - organized and scheduled by Florence Nightingale.

Nursing, regarded as a profession, is usually performed by nurses on the basis of an employment contract with the employer.

Nursing as a profession

A profession is a special kind of a job which is characterized by the performance of professional tasks officially by its representatives:

- on the basis of relevant professional qualifications,
- in a responsible manner,
- professionally autonomous.

Regarding Polish nursing as a profession is linked to the achievement of the basic attributes of the profession, which include, among others:

- providing social service of vital importance to human health and well-being,
- having certain specific nursing knowledge (monopoly powers) and undertaking scientific research,
- providing comprehensive education at a university level that allows an acquisition of high competence in nursing as well as developing the skills,
- having a code as a guide to ethical nurse’s behaviour,
- a high level of professional autonomy - nurses monitor and evaluate their own practice, improve its quality, provide education,
- functioning of nursing organizations which affiliate a representative number of members of the profession - the professional self-government of nurses, nursing unions, nursing associations.

Nursing as a science

Science is difficult to define due to the ambiguity of the term.

The basic understanding of science indicates:

- activity of persons/researchers/nurses,
- the social dimension of science,
- the outcome of this activity is defined as a set of theories and assumptions and statements that are justified and verified in accordance with applicable scientific principles.

The science of nursing, especially the Polish one, is not well established.

The first Polish centre formally authorized to conduct scientific research in nursing (except basic educational activity) was established in 1969 within the structure of the Medical University of Lublin under the name of the Nursing Department.

Nursing as a science performs two basic functions: cognitive and practical.

IMPORTANT

Within the area of cognitive nursing, four basic concepts are defined:

- Man,
- environment,
- health,
- nursing

as well as explaining the relationships between them, which leads to formulating statements about the nurse's role.

Nursing as an art

The concept of nursing as an art was introduced by Nightingale. In her notes she wrote: "Nursing is an art: and if it is to be made an art, it requires an exclusive devotion as hard a preparation, as any

painter's or sculptor's work; for what is the having to do with dead canvas or dead marble, compared with having to do with the living body, the temple of God's spirit? *Nursing is one of the fine arts (...), Nursing was a good job done with a brave hand, guided by a clear mind, inspired by a loving heart.*"

Only the last 30 years has witnessed a greater interest in the issue of nursing understood as an art.

The essence of nursing in the art dimension focuses on emphasizing the activity that requires the nurse's creative imagination, with an individual person and his environment, health, illness, problems placed in the centre.

In the determination of nursing as an art, both the qualities of the participant's relationship patient-nurse and its nature are predominant.

3. Health and disease versus nursing

Joanna Girzelska

The concept of health is characterized by a variety of definitions. Since the mid-80s of 20th, the concept of health has appeared regularly in scientific publications, official documents and regulations of WHO. The definition of health proposed by the World Health Organisation in 1946 is as follows:

NOTE

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

The interest in the concept of health is an expression of the search by medicine for new ways to improve the health of society, and at the same time a symptom of the changes, the transition from the "medical" to the "post-medical era", whose main assumption is to

- *shift the burden of the fight for health from medical institutions to institutions of social life and an individual behaviour of individuals.*

Nowadays, health is more and more often described in a holistic and complementary way, which makes the new definitions of health reflect not only the essence of the issue, but also the broader context of its meaning.

In the European culture, one of the first men to organize all views on health was **Hippocrates,** "the father of European medicine."

According to his views:

– health is well-being,
– illness is a malaise, depending on the balance between our surroundings and ourselves.

The external balance between Man and the environment allows for an internal balance.

According to Hippocrates, health as a category of "good and bad mood" allows a lot of subjectivity, which narrows down the concept of health to an individual feeling and perception of the environment.

Hippocrates' views on health were proclaimed until the emergence of new Cartesian philosophy, which is a mechanistic view of the world and Man.

According to the Cartesian theory, the human body was compared to a large machine, operating with great perfection and precision.

The Cartesian concept led to:
- human cognition,
- becoming acquainted with Man's functions,
- perfect repair of human health as a damaged biological machine, without seeing Man,
- biomedical paradigm of health.

The biomedical paradigm for medical science in the **19**th and 20th centuries is referred to as the biomedical model.

NOTE

In the biomedical model, Man is treated as a subject. His multidimensionality and an integral bio-psycho-physical entirety are ignored. Medicine focuses on a diseased organ, disregarding the patient.

A disease is a disorder of body functions. Health, on the other hand, "provides background for a disease, which constitutes a major medical scope of interest".

In the biomedical model, health and disease are mutually exclusive.

Thus, a statement is formulated that a person may be ill or healthy, yet an intermediate condition cannot exist in medicine.

Biomedical model

Features:

- In the biomedical model, corrective medicine plays an important role, which makes it possible to receive help when there are health problems, i.e. when the disease is diagnosed.
- Health should be taken care of when it collapses, thus there is no place for health promotion and disease prevention in the biomedical model of health.
- The biomedical health model highlights the role of a doctor and a nurse in a situation of illness.
- The patient's role is to remain passive*,* being subject to a medical intervention in a therapeutic process.

When analysing the determinants of the biomedical model, it should be stated that:

- subjective health criteria are not important in health assessment,
- health is beyond the control of Man. Other factors that affect health are often not taken into consideration,
- only a doctor or a nurse know what is best for health and only they can provide guidance,
- the patient's participation in the treatment process is based only on compliance with the recommendations.

Health in the concept of salutogenesis

After the biomedical model, the concept of salutogenesis appears in the studies on health and disease. The creator of the model is Antonovsky, who posed the basic question during the research:

- Why do people, despite being exposed to many stressors (pathogens), stay healthy and recover quickly if their health breaks down?

Antonovsky assumes that a person's normal state of functioning is his internal and external balance, but also a lack of this balance.

Therefore, there is a constant adaptation of the body to stimuli (stressors) in order to create an optimal opportunity for the foundations of health.

NOTE

Health is associated with stress and constant balancing of requirements and resources. It is a constant process of coping with stress.

These resources are natural, material, socio-cultural. To some extent, they include body assets, for example, the mental sphere of an individual which is important in the process of dealing with stress.

NOTE

The concept of salutogenesis is a concept of resistance to health-oriented stressors.

Antonovsky also discovered the principle of the functioning of generalized immune resources, i.e. a global life orientation called a sense of coherence.

IMPORTANT

The sense of coherence consists of three correlated components, which include:

- a sense of comprehensibility,
- a sense of resourcefulness,
- a sense of meaningfulness.

According to Antonovsky, people with a developed sense of coherence choose a specific stress management strategy that is most appropriate to the stressor in question, thus maintaining their health.

Health in the holistic model

In the second half of the 20th century a multidimensional health theory was developed, based on a holistic perception of Man.

IMPORTANT

In the holistic model, there was a systemic approach to health and illness, in which a human being appears in the surrounding reality, while the human body itself is an integrated system of mutually interacting dimensions:

- biological,
- social,
- psychological,
- spiritual

which interacts with the physical and socio-cultural environment.

Man in the holistic model is treated subjectively and constitutes a certain distinctiveness as an autonomous element of the structures of reality.

He is capable of living His own existence, managing life, anticipating future events. He is also changing His position in achieving health objectives so that **He can take active and responsible actions for health.**

Health, in the holistic model, is understood as a process of a dynamic balance.

The attribute of health is the ability to achieve balance, including physical and mental dimensions of the body and an interaction with the outside world – natural and social.

Health, in a generally holistic approach, is “complete, physical, mental and social well-being of a person, and not just an absence of an illness or a disability”.

It is a definition included in the WHO programme, constituting an open version, which means that a disease is not a static concept, established once and for all. It expresses the current state of medical knowledge about phenomena reflecting pathological processes taking place in a human body.

The value of life is clearly enriched here, because health means the ability to lead a meaningful and creative (productive) life that brings satisfaction to a given person.

On the other hand, a disease occurs when there is a lack of ability to restore balance and biopsychosocial body integration.

The holistic model focuses on health, indicating that it is important in human life.

A disease, in this model, occurs when there is a disturbed state of a dynamic equilibrium in the relationship between Man and the environment.

Socio ecological model

The turning point in the perception of health was entering the areas of medicine, apart from social sciences and ecology.

The development of complex human-environmental relations on the basis of holistic understanding of health has become a socioecological model of health called the socioecological paradigm.

IMPORTANT

The socioecological paradigm develops on the assumptions of holism and focuses on:

- a holistic treatment of Man,
- a relationship of an individual with all living organisms in organizations of social life,
- integration of communities into the natural world.

The socioecological paradigm is referred to as the mandala of health, i.e. human ecosystem model, developed in the 1980s of 20th century by Hancock and Perkins.

The mandala of health represents a multi-level approach to health, which is graphically depicted in the form of circles surrounding an individual, symbolizing health determinants.

A central place in the mandala of health is occupied by Man in His biological (body), emotional (spirit) and intellectual (reason) unity, in an interaction with the surrounding biosphere and environmental, social and cultural factors.

An innovation of the socioecological system is to draw attention to the lifestyle and environment as important health determinants. This model is based on the understanding of human ecology in an interaction with the environment and products of human culture. Health is understood comprehensively, and therefore it includes the dimension of the body, mind and spirit.

The socioecological model of health refers not only to the mandala of health but also to the concept of Lalonde health fields, in which the determinants of an individual's health are as follows:

- lifestyle and individual behaviour of a person (about 50%),
- environment - environmental factors (20-25%),
- biological factors - all biological and genetic characteristics, age and gender (15-20%),
- organization of medical care - quality of care, human resources (10-15%) (Lalonde, 1978).

NOTE

The holistic and socioenvironmental paradigms underline *a significant role of the care recipient in achieving, maintaining and protecting health.*

The responsibility for the health of the individual is shifted here from professional to individual. According to the concept of the above-mentioned paradigms, a multifactorial model of health was recognised. It creates new opportunities for a multidimensional perception of cognitive-social and ecological determinants, influencing the maintenance of Man's biopsychosocial balance that determines maintaining health. Failure to maintain this balance is a cause of a disease. Disease, in a clinical approach, is a characteristic set of subjective and objective symptoms and abnormalities in additional examinations, taking into account the cause and location of organ lesions.

According to the socioecological paradigm, the basic form of healthcare is self-care, while professional healthcare systems should support an individual in maintaining and improving his health.

The emergence and formulation of the socioecological paradigm of health was also a breakthrough in the understanding of a disease as an element that can appear at any stage of health, and vice versa, health is present at every stage of a disease.

The nurse's activities specific for the holistic and socioecological concept of health are as follows:

- having an attitude that accepts a wide range of unconventional methods of helping,
- seeing the individuality and complexity of the patient,
- supporting the patient in gathering strength to deal with a disease in a relation with the loved ones,
- promoting health and preventing diseases, by seeking answers to the question of how people live,
- mobilizing the patient's internal capacity and abilities for self-care and self-healing,
- teaching patients self-care, coping with their own problems,
- organizing patient-friendly conditions (small hospitals, family homes).

4. Caring - touch, helping, caring support. Support and its types in nursing

Joanna Girzelska

According to the WHO (1956) nursing is "the care of the ill, prevention of illness and promotion of health."

IMPORTANT

According to Henderson (1960), nursing is "caring for individuals, sick or well, (...) to assess their responses to their health status and to assist them in the performance of those activities contributing to health or recovery or to dignified death that they would perform unaided if they had the necessary strength, will, or knowledge and to do this in such a way as to help them gain full of partial independence as rapidly as possible". This definition has been approved by the International Council of Nurses.

Helping is making an effort for another person to do what he or she needs, manifested in actions aimed at increasing the person's internal and external capacity.

In addition to helping, the essence of nursing is to provide social support, which is a form of assistance aimed at a human being. It makes it possible to overcome one's own problems, difficulties. Nursing is further divided into the following types: emotional, assessing, informational and instrumental.

Touch is a form of non verbal communication. It also gives a sense of security. Through touch it is possible to communicate one's presence, closeness, especially in contact with people suffering from visual and hearing impairments. Touch helps to establish a personal relationship, as well as showing respect or acceptance. One can distinguish the following types of touch: care, procedural, protective (a variation of a procedural touch is a therapeutic one).

Empathy is a form of facilitating the communication process with the patient. It also helps nursing. It is perceiving and understanding another person's condition and compassion.

Presence means being with another person, reacting to their needs and expectations, watching over someone.

Care is a specific activity of the caregiver towards the patient manifesting itself through:
- meeting the super subjective needs of the care recipient,
- continuity of care determined by objective requirements of cyclicality and constancy of satisfaction of needs,
- unselfishness of care (it is important in interpersonal care to altruistically satisfy psychosocial needs, mainly the emotional ones),
- making an asymmetrical welfare relationship,
- the guardian's compensatory responsibility undertaken consciously and voluntarily, as well as the responsibility of the care recipient to acquire a predisposition to function independently in life,
- subject responsibility, i.e. whether and how efficiently the caregiver meets the needs of the care recipient.

IMPORTANT

Due to the nature of the preparation of the caregiver to provide care activities, care actions can be divided as follows:

1. Unprofessional care which is performed by persons who have no professional preparation for this type of action.
2. Self-care, which consists in independent, non-professional decision-making by a human being as well as conducting activities with regard to his health and life (choice of medicines, treatment, support during an illness). It is the basic form of the healthcare system in everyday life.
3. Professional care, exercised in compliance with established standards, policies, procedures, based on legal grounds and the knowledge gained as a result of systematic education as well as continuous improvement in terms of care actions.

5. Nursing caregiver - the nurse. Legal basis of the nursing profession

Joanna Girzelska

A nurse is a professional title of a person who belongs to a group of health professionals, and whose independent occupation is called nursing. The profession of a nurse is regulated by various legal acts, including in Poland the Act of 15 July 2011 on the occupation of nurses and midwives.

NOTE

A nurse is a person who completed a binding training programme for nurses at a primary level and obtained a professional title and the right to work as a nurse in the country in which he/she practices.

One of the first articles of the Act states that the profession of a nurse is an independent medical profession and the content of the profession is the provision of healthcare services, whose scope is limited by the nurse's qualifications and competences.

A nurse may execute the occupation within the framework of an employment contract, business relationship, on the basis of a civil law contract, volunteer work, professional practice (individual, individual specialist practice, group practice of nurses) or in non-public healthcare institutions. According to the Act Polish of 15 July 2011 about the occupations of nurses and midwives, apart from the benefits for recipients of nursing, conducting the occupation of a nurses can rely on teaching the profession of a nurse or a midwife, carrying out work for the training of nurses and midwives; conducting scientific research in nursing; directing and managing teams of nurses and midwives; performing activities related to the preparation, organization and supervision of providing healthcare benefits in administrative positions; conducting tasks in entities required to finance healthcare services from public funds; employment in the public sector, in which the scope of activities includes supervision of health professionals; providing service in the organizational units of the Polish Armed Forces and the Prison Service.

It is insufficient to obtain qualifications certified by a diploma of graduation to be able to practise as a nurse. It is necessary to acquire the right to practise the profession as confirmed by the Professional Self-Government of Nurses and Midwives. The profession is linked to the concept of qualifications and competences.

NOTE

Professional qualifications are a dynamic set of knowledge, skills and attitudes that determine the performance of professional tasks.

NOTE

Competence is a scope of powers and powers of attorney given to take action. A professional role is a relatively stable, internally consistent system of behaviours, which is a reaction to the behaviour of other people, following an established pattern.

NOTE

A professional role is a relatively stable, internally consistent system of behaviours, which is a reaction to the behaviour of other people, following an established pattern.

The professional role of a nurse is to undertake such professional conduct for the benefit of health in the broadest sense of the word, which is socially expected. At the same time, it complies with the binding standards and is significant for the nurse's professional and social status.

6. Professional functions of a nurse

Joanna Girzelska

IMPORTANT

A professional function is defined by a set of complex and detailed professional tasks which are undertaken for a clearly defined common purpose. The task includes professional activities to achieve the goal.

The basic functions of nursing are as follows:

- providing and managing care,
- teaching patients and staff involved in healthcare,
- implementing a role of a member of a healthcare team,
- activities for the development of the nursing practice.

IMPORTANT

Professional functions of a nurse:

- care function,
- educational function,
- health promotion function,
- preventive function,
- therapeutic function,
- rehabilitation function,
- educational function,
- scientific research function.

Care function - this is a specific range of tasks expressing the essence of professional nursing. With regard to the adopted division of tasks in the care system, this range of tasks is ascribed to nursing and is only carried out by nurses. It includes tasks aimed at assisting, helping and supporting the patients in solving health and life problems.

Educational function - these are tasks whose aim is to influence motivation, beliefs, attitudes, teaching and shaping desired health behaviours, a sense of responsibility for one's own health, the health of loved ones and the environment.

Health promotion function - tasks aimed at promoting pro-health behaviours and health-enhancing lifestyles in society and in relation to individuals; advising others how to strengthen health, create conditions for patients to lead lifestyles that are conducive to maintaining and strengthening health.

Preventive function - tasks aimed at planning and carrying out activities preventing health problems or reducing the risk of their occurrence as well as assessing the effects of these activities, recognizing the state of threat due to accidents, disasters (in the place of residence, study, work) of individuals, families, various social groups.

Therapeutic function - tasks whose aim is to involve the nurse in the assessment of the patient's condition for the purpose of establishing a medical diagnosis, in the performance of commissioned procedures, drugs and activities in conditions of threat to the patient's health and life.

The scope of detailed examinations and treatments that can be performed by a nurse in the process of diagnosis, treatment and rehabilitation (on doctor's order and without such an order) is defined by the regulation of the Minister of Health and Social Welfare. The competence of a nurse in this area is determined by her level of education, completion of required courses and acquisition of specific specializations.

Rehabilitation function - this is a set of tasks whose aim is to help the patient to become independent and capable of coping with a changed life situation, arising due to various reasons, e.g. development, illness, injury.

Educational function: these are tasks accomplished in the process of vocational training of candidates for the profession, but also investing in one' own professional development. These tasks are part of the professional role of each nurse and not, as it is commonly be-

lieved, only of teachers working at universities that educate nurses. The scope and nature of the tasks performed depends on the nurse’s place of work and the position held.

Scientific research function - these are tasks related to the recognition of the need for the type, scope and nature of research in nursing and for nursing.

7. Theories and models of nursing

Joanna Girzelska

IMPORTANT

Nursing is an area of healthcare where nurses ensure optimal quality of care on the basis of their knowledge and skills, with empathy and the use of professional experience.

One can distinguish two essential elements of nursing:
- knowledge,
- action.

Knowledge is:
- justification for action,
- nursing fundamentals.

Types of knowledge

One of the basic typologies of knowledge comprises its division into:
- science,
- philosophy,
- structured activity.

Science is observation, identifying, describing, investigating and explaining events and phenomena that are perceived in the surrounding world, which constitutes a source of knowledge.

Nursing as a science is knowledge of nursing.

Philosophy - is the study/search for wisdom, basic knowledge and processes used to develop and construct individual perceptions of life. Each nurse's philosophy, developed through education and practice, forms the basis for providing nursing care. Values and beliefs about concepts such as kindness, health, illness, responsibility and ethics are in line with the nurse's personal and professional philosophy.

A structured performance is a series of actions, tasks or transformations that are intended to lead to a desired result. During the process of nursing care, systematic and continuous efforts are made to achieve the goal while using evaluations and comments from current, direct activities.

The actions and activities of a nurse are undertaken in accordance with theoretical assumptions or conceptual structures. The implementation of nursing care is determined by a specific conceptual framework and nursing theories defining Man (patient), environment, health and nursing.

NOTE

A theory is a phenomenon and specific knowledge of a discipline, in an orderly form reflecting the regularities of reality, providing information on how it can be used in practice.

The theory consists of a group of definitions forming concepts that describe a pattern of regularity.

Definitions as certain ideas are abstract impressions organized in symbols of reality.

Through definitions, concepts describe:

- objects,
- their qualities,
- events,
- relationships between them.

NOTE

Knowledge, philosophy and theory are components of every scientific discipline, while their arrangement in a specific, logical way is called a paradigm.

The paradigm, introduced into the philosophy of science by Kuhn in the twentieth century, is often called the “matrix of scientific discipline”.

The paradigm includes what is common to a given community of scientists, and above all the views on:

- resolving the fundamental scientific problems,
- basic criteria for scientific validation of knowledge,
- scope and limits of a scientific experiment,
- research methods and techniques used in the investigation into the truths of science.

The modern nursing paradigm is referred to as postmodern and includes a philosophy of nursing that is imbued with the idea of humanism.

The paradigm is that nursing is seen as a profession based on

- thorough empirical knowledge,
- beliefs,
- values,
- experience of nursing representatives.

NOTE

The first theory of nursing appeared in 1860. It was created by Florence Nightingale.

Due to the scope of application of the theory in practice, the following distinction was made:

- grand theories, the so-called large conceptual models, which are formulated at a high level of abstraction and cover a wide range of content, e.g. Nightingale's theory;
- middle-range theories that are developed at a lower level of abstraction; the concepts introduced and the relations between them have a more specific scope, e.g. Orem's theory, Neuman's theory;
- local-level theories on the degree of nursing practice are developed on the basis of observation and dialogue with nurses who exercise a high degree of expertise and experience. They provide guidance in professional decision making, e.g. Kolcab's comfort theory.

IMPORTANT

Due to the genesis of the leading contents of the theory, they have been grouped into the following categories:

- environment (Nightingale),
- needs (e.g. Henderson, Orem),
- systems (e.g. Roy, Neuman),
- human interaction (e.g. Peplau, Watson).

Theoretical concepts and theories cover all stages of the nursing process, including data collection and planning, implementation and evaluation of nursing care, as well as describing and explaining the desired results and outcomes of the care.

The main assumptions of the selected model or a nursing theory provide guidance for each stage of the nursing process.

7.1. The model of nursing by Florence Nightingale

Picture 1. Florence Nightingale

Source:https://www.alamyimages.fr/photos-images/Florencenightingale.html?sortBy=relevant [accessed: 20.05.2020]

Florence Nightingale (1820-1910) was born on 12 May 1820 in a wealthy aristocratic English family of Edward and Frances during their European trip around Florence (Italy).

In 1860, owing to her efforts, the first nursing school was established at King's College Hospital in London, which became a model for the creation of nursing education around the world.

IMPORTANT

The celebration of Nightingale's merits turned into:

- establishing her birthday, 12 May, as the International Nurses Day,
- the establishment of the International Foundation named after Florence Nightingale; the Foundation supports research,
- decorating distinguished nurses with the Florence Nigthingale Medal.

Picture 2. Florence Nightingale Medal

Source: https://onebid.pl/pl/odznaczenia-medal-florence-nightingale-przyznany-polce/242523 [accessed: 20.05.2020]

Nursing theorists believe that Florence Nightingale's Model is visionary and formed the basis for the development of a nursing theory. Nursing became a science when Nightingale identified the principles of care, known as the canons of health or nature, or defined as the canons of nursing with the greatest role for observation as a source of information and rational change.

The nursing canons regulate specific areas of care, taking into account the specificity of Nightingale's assumptions, i.e.:
- physical environment,
- psychological environment,
- comfort and safety,
- nutrition,
- continuity of care.

A person in view of Nightngale's theory

Nightingale defined a person bearing a patient in mind. The person, i.e. patient, is part of nature. He/she contains components that form a unique whole, greater than the sum of their parts (holistic perception of a human being).

According to Nightingale, health is not only an absence of disease, but also the ability to make a rational use of all the forces that Man can have for his own development and well-being.

Health is conditioned by the environment that functions in accordance with the laws of nature, mainly by making changes in this environment with regard to:
- cleanliness of the environment and removal of waste,
- cleanliness of water,
- proper nutrition,
- humidity and air movement,
- light.

On the other hand, a disease is the body's repair process. It is caused by environmental factors and can provide an opportunity for spiritual growth.

The Environmental Theory by Florence Nightingale

In determining the environment of a human being, Nightingale rejected the discoveries of disease-causing microorganisms, thus denying the essence of aseptic and antiseptic conduct.

The Nursing Theory of Florence Nightingale

Nursing provides a human being with the least possible involvement, environmental conditions, which are necessary to en-

sure that nature does not encounter any obstacles in ensuring health for the patient.

The theoretical model of nursing, expressed graphically, is a circle. It is referred to as a concentric model. It was developed by nursing theoreticians primarily on the basis of thirteen canons in order to reflect the fundamental assumptions of the theory. The model is of general character, making it possible to be used in a wide variety of conditions, especially with regard to individuals. It determines the impact of environmental factors on forecasting, removal or reduction of certain health problems.

IMPORTANT

Florence Nightingale's 13 Cannons:

1. Ventilation and warming.
2. Health of houses.
3. Petty management.
4. Noise.
5. Variety.
6. Taking food.
7. What food?
8. Bed and bedding.
9. Light.
10. Cleanliness of rooms and walls.
11. Personal cleanliness.
12. Chattering hopes and advices.
13. Observation of the sick.

7.2. The model of nursing by Virginia Henderson

Theoretical model by V. Henderson contains four major concepts:

1. A single person - a healthy or sick person must be treated as an independent whole.
2. A nurse - a person who assists a healthy or ill person in achieving independence (replacing or helping).

3. Health - ability and/or skill to function independently = a possibility to meet 14 needs.
4. Independence - the skill of a person to meet needs independently, both in health and illness.

Linear care model according to V. Henderson

1. nursing is helping and assisting a single person,
2. the purpose of a nurse's action is to make a single person feel independent,
3. a single human being who is taken care of might be in a state of health or illness,
4. a sick person should be allowed to recover, and if that is not possible, to have a peaceful death,
5. Man has the necessary strength, knowledge and will to be independent.

V. Henderson in her theory describes four leading concepts, namely:

- Person,
- health,
- environment,
- nursing.

An individual is treated as an independent entity, characterized by 14 universal needs that are satisfied by everyone in their own peculiar lifestyle, in a fully individualized manner.

IMPORTANT

Universal human needs, necessary to live and develop, precisely defined by V. Henderson, are as follows:

I. Biological needs:

1. Normal breathing;
2. Proper nutrition and body hydration;
3. Elimination of metabolic products (excretion);

4. Exercise and maintaining proper body position;
5. Sleep and rest;
6. Proper dress and a possibility of dressing and undressing ;
7. Maintaining normal body temperature;
8. Keeping the body clean;
9. Avoiding risks from the external environment and other people.

II. Psychological, social and spiritual needs:

1. Communicating with others, expressing emotions, needs, fears, opinions;
2. Freedom of religion according to the faith;
3. Work which gives a sense of achievement;
4. Entertainment and participation in various forms of recreation;
5. Learning, satisfying one's own curiosity as essential factors of human development and health.

Health, in Henderson's theory, is the skill and/or ability of a person to function independently, manifested in the ability to satisfy 14 needs. As variables conditioning the possibility of satisfying needs, it indicates the strength, knowledge and Man's will, taking into account his age, temperament, social state, biological and intellectual condition.

The "Environment" is all that affects human health and determines the fulfilment of Man's needs.

The environment is made up of such factors as:

- human interaction with the environment,
- the communication between Man and His surroundings,
- family,
- human communities,
- social and living conditions in which a person lives (place of residence, education, work).

IMPORTANT

“Nursing” involves assisting and helping a person (healthy or ill) to perform those activities which are important for maintaining or recovering health and ensuring the conditions for a peaceful death. Helping concerns all the activities that a person might be able do alone without the help of a nurse, if he had the strength, will, knowledge to do so. The assistance given by a nurse should be provided in such a way that a person could do without it as soon as possible.

IMPORTANT

Professional nursing care is a continuous, systematic and logical activity.

Stages of nursing care:

1. Gathering information about the patient;
2. Planning;
3. Implementation;
4. Evaluation.

NOTE

The stages are characteristic of what we nowadays describe as the nursing process.

Owing to V. Henderson, emphasis was made on the necessity to supplement her diagnosis with 14 needs and 12 states, which directly affect the nurse's scope of care and role.

They are as follows:

1. Water-electrolyte imbalance (e.g. vomiting, diarrhoea);
2. Hypoxia;
3. Shock, collapse, haemorrhage;
4. Impaired consciousness;
5. Thermoregulatory disorders due to the influence of high temperature environment;
6. High body temperature due to various reasons;
7. Skin damage;
8. Infectious diseases;
9. Pre-operative state;
10. Post-operative state;
11. Immobilisation;
12. Pain.

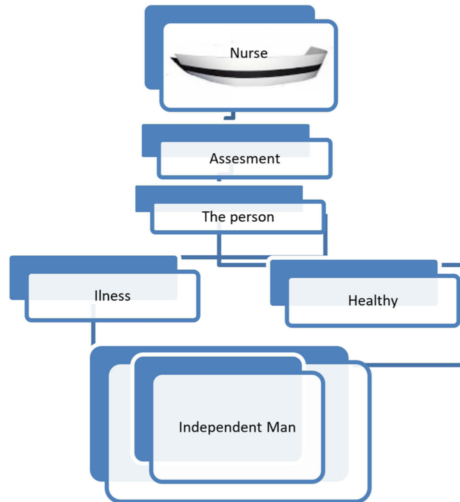


Figure 1. The model of V. Henderson

Źródło: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. T. 1,2. Wyd. PZWL, Warszawa 2017.

7.3. The model of nursing by Dorothy Orem

Picture 3. Dorothy Orem

Source: https://en.wikipedia.org/wiki/Dorothea_Orem [accessed: 15.05.2020].

NOTE

Self-care - human action initiated and carried out independently in relation to oneself and others.

Purpose of self-care - maintenance of health, life and provision of well-being.

- A conscious, learned activity aimed at satisfying needs.
- Individual ability to take care of themselves changes with age, stage of development, acquisition of life experience.

Categories of needs in D. Orem's concept

- Universal needs - common to all, necessary to maintain health and well-being.
- Development needs - depending on the period of human development.
- Common development needs - related to the need to maintain health, normal development in different periods and stages of life.
- Specific development needs - occur in situations which may adversely affect Man's development.
- Needs in situations of health disorder - arise during deterioration of health, illness, disability.

The nursing system in D. Orem's theory - measures which provide assistance to people with self-care deficit. These actions may involve:

- ensuring education,
- assistance in carrying out activities which a person is incapable of doing,
- performing all activities that guarantee life, health, in a person completely incapable of self-care.

IMPORTANT

The nursing system in D. Orem's concept:
- supporting and learning - used by people with self-care capabilities but who need support to motivate, make decisions, transfer knowledge,
- partially compensatory - used in persons with incomplete self-care capacity, resulting from e.g. physical limitations,
- wholly compensatory - used in patients who are completely dependent on a nurse and are unable to take care of themselves.

The nursing theory in D. Orem's concept

The basic need of every human being is to care for his health, life and well-being.

Maintaining life and health is connected with the need to meet the needs common to all people, connected with the stage of life or transition from one stage to another, crisis situations or events that can negatively affect human development, needs arising in situations of ill health.

7.4. The nursing model by Calista Roy

Picture 4. Calista Roy

Source: https://www.linkedin.com/in/thenursetheorist [accessed: 16.05.2020].

NOTE

Callista Roy's Adaptation Model focuses on changes experienced by human beings as they respond to environmental stimuli to maintain their integrity. The goal of Roy's Adaptation Model nursing is promotion of an integrated level of adaptation for individuals and groups that can advance wellness, the quality of life, and death with dignity.

The model illustrating Callista Roy's assumptions

- is based on the principles of holism, interdependence, activity, creativity, purpose, control and value,
- consists of the following elements: Man, environment, health, nursing, which are all linked by adaptation, understood as a process and a state.

Basic assumptions:

1. **Person - human being**
   - Callista Roy's model refers to a holistic approach to an individual, who is understood as a system, i.e. a whole consisting of particular parts.
   - It focuses on Man as a "biopsychosocial being, who is in constant interaction with a changing environment".

Roy describes a person as "a holistic adaptive system, equipped with a regulatory and cognitive subsystem to maintain adaptation in four areas; physiological functions, self-concepts, roles and interdependencies".

Roy defines an individual as a recipient of care. He also understands a family, a group or a community.

Man remains in a constant interaction with the environment. Man is constantly affected by stimuli, coming from the external or internal environment. Under the influence of stimuli, Man activates defensive

mechanisms. Some are innate, e.g. producing antibodies against antigens, while others are learned in the course of human development (e.g. disinfecting a wound and putting on a dressing).

Roy introduced her own concepts: the so-called regulator subsystem to define these defence mechanisms. They are separate, although they complement each other. The regulator subsystem is related to physiological processes. In response to a stimulus, various chemical substances (transmitters), the nervous and the endocrine systems are involved. In order to maintain the integrity of an individual, it is necessary to maintain cooperation between the two subsystems.

The result of activating control mechanisms is specific behaviours that lead to a full adaptation. In the absence of effective behaviours, there is an inability to integrate into the environment.

2. Adaptation

Roy defines adaptation in two ways:
- As a process;
- As a state.

The process of adaptation consists in constant undertaking actions to achieve integration. It follows a pattern, beginning with the activation of a stimulus through triggering defensive mechanisms, and finally causing specified behaviours. Another meaning of adaptation is a state of dynamic equilibrium with the environment, which is a result of the process of adaptation, enabling Man to achieve His personal goals.

As a state, adaptation is a result of a working stimulus and Man's ability to adjust, i.e. an ability to react appropriately in a specific scenario.

As a result of the accumulation of various types of reactions to stimuli, a person reaches a certain level of adaptation. The higher it is, the greater is the ability of Man to generate an adaptive response in the future.

According to Roy, a human being aims to achieve an adaptive state in four dimensions:
- Physiological (e.g. oxygen supply, nutrition, excretion);
- The Self-Concept Mode ("one's own physical being, ideal self, rational self, moral, ethical, spiritual self");

- Performed roles **-** define social interactions between the individual and other people. Roy distinguishes three types (levels) of social roles: primary roles determined by age, gender, development status (e.g. the role of a mother, son), secondary roles - undertaking tasks related to the performance of primary roles (e.g. professional roles) and tertiary roles - voluntarily selected roles (e.g. related to the implementation of tasks, a hobby);
- Interdependencies - this sphere includes interpersonal relations with other people or relations between groups. Achieving integrity in this area allows satisfying emotional needs of a person.

Environment

Roy defines the environment as "all conditions, circumstances and external factors that affect the development and behaviour of Man".

Environment affects Man through stimuli (internal and external).

Health

Roy describes health as "a state of being and becoming integrated", with integration corresponding to the achievement of an adaptive state, which is a result of an individual adaptation process. The integration of person as a whole includes integration in the four areas mentioned above: physiological, self-concept, performed and interdependencies. Health is therefore defined without any reference to a disease. It means a full integration and well-being of a human being.

Nursing

In her views on nursing, the author combines scientific and practical approaches.

Scientific nursing should describe and explain the processes of human life, which encompass regulatory processes, thinking, judging, relationships, feeling and actions. On the other hand, nursing practice should be based on scientific explanations and focus on recognizing effective and ineffective adaptive responses as well as on interventions that support the process of adaptation both in health and in illness.

7.5. The model of nursing by Betty Neuman

Picture 5. Betty Neuman

Source: *https://nursing-theory.org/nursing-theorists/Betty-Neuman.php* [accessed: 15.05.2020].

Betty Neuman is considered to be a pioneer of community nursing in mental health.

Basic concepts used for Neuman's theory:

Man is seen as an integral whole, an open system that maintains a regular and constant contact with the environment;

Environment - is understood as all internal and external factors as well as environmental influences recognized by an individual patient or a group of people who are treated as an open system in this theory.

Betty Neuman distinguishes three types of environments:

- internal environment (i.e. factors, forces and influences originating from the inside of the patient's system),
- external environment (external influences on the human system),
- created environment (includes internal and external environments, which are individually diversified in terms of mobilization of human functioning areas, which are as follows: physiological, psychological, sociocultural, developmental, spiritual, and energy resources of the basic structure of the organism to ensure balance within the limits of the functioning of the human system.

Each of the described environments influences the system of human functioning through stressors, which can have a positive and negative impact. Betty Neuman gives the following definition of stressors: these are any environmental stimuli, problems or conditions that

are capable of disturbing the stability of the system by damaging at least a normal defence line. Defence lines play a role in protecting the basic structure of Man's energy source. There are five of them.

Three of them, lying the closest to the basic structure, are immune lines. Their damage is most often associated with an imbalance of the immune system, posing a threat to human life.

Next is the normal defence line - the body's most constant defence. It guarantees a sense of stability and an integration of the system.

The outer layer is a flexible defensive line, called a buffer or a filter. It is characterized by the relatively highest individual variability, determined by various circumstances (for example, malnutrition or fatigue). Damage to the flexible defensive line does not mean an imbalance in the system.

IMPORTANT

The stressors can be divided into:

- ***intrapersonal,*** derived from the internal environment,
- ***extrapersonal***
- **interpersonal**, which stem from the external environment.

Betty Neuman also introduced two important concepts: **entropy and negentropy.** They are related to the human energy economy, which is affected by stressors.

Negentropy is a situation where a human system produces more energy than it is able to use for the needs of body functioning, which is close to Man's feeling, i.e. well-being as a whole.

Entropy, in turn, is defined as reduced energy production in relation to the body's needs, being equivalent to an illness. When the system loses too much energy, such a situation can lead to death.

NOTE

According to Betty Neuman, ***nursing*** is a unique profession, focusing on all factors influencing the individual responses of an organism, which reacts to stress.

Nurses should carefully assess the patient's need for care, which is determined by the type and severity of the stressors, and can be provided in three areas of actions:

- ***primary prevention***, consisting of such actions of the nurse, which aim to strengthen the body's defence lines, reduce the strength of the stress stimuli or eliminate them completely;
- ***secondary prevention***, consisting in an early detection of disease signs, reduction in intensity of these symptoms, prevention of complications of the disease. The entire defensive structure of the body and deprivation of energy can potentially lead to a loss of life;
- ***tertiary prevention***, consisting in the provision, by a nurse, of multidirectional rehabilitation activities aimed at restoring health.

The practical application of Betty Neuman's theory is based on a systematic, continuous and logical conduct in accordance with the assumption of the nursing process, which takes into account the holistic complexity of the patient.

8. Traditional and individualized care. Primary nursing - the essence and differences

Joanna Girzelska

IMPORTANT

We distinguish the following care patterns:

1. Traditional care:
   - subject to the doctor's decision,
   - subordinated to the nurse's functional specialization,
   - a piecemeal approach.
2. Personalised care.

Traditional care is the care:

1. Subordinated to the doctor's decisions - they are characterized by limited (usually to medical orders) and dependent (depending on the treatment determined by the doctor) nursing.
2. The actions taken by the nurse for the benefit of the care entity are conditioned by the doctor's decisions. It is understood narrowly - primarily as helping the doctor to treat, and the patient to recover, by carrying out medical orders.
3. Subordinate to the nurse's "specialization" in function. The work of a nurse is determined by the activities, actions she has to perform on the patient. What the nurse will do (e.g. dressings) is decided by the ward nurse. In nursing that is subject to functional "specialisation", each nurse in the ward is responsible for certain predetermined and "assigned" activities, actions and tasks.
4. Fragmented care - forced by the adopted (e.g. in a healthcare institution) or imposed (by decision-makers) model of care - is a complete denial of rational care, focused on the subject of care.

Personalised care - otherwise known as the nursing process.

The birthplace of personalised care - United States of America. In Poland, the beginnings of interest in individualised care go back to the late 1970s. The 20th century. The nursing process is organizing assumptions for a professional nursing practice. Its complexity is very similar to the stages used in scientific understanding and problem-solving. Critical thinking is an essential part of the nursing process.

A complementary concept to the nursing process is *Evidence-Based Nursing* (EBN), which consists of basing the nursing practice on scientific research and critical evaluation. Individualization in relation to a person is about paying attention to the characteristics that distinguish them from other people. Personalised care is included in the concept of rational care. It is adapted to the expectations and requirements of the care entity and the conditions under which the nursing care (nursing) is provided. That means: "independent activity of a nurse, based on a rational theoretical basis, general rules of conduct and ethical principles."

Primary nursing

Many nursing centres assume that one of the most important achievements of nursing is the development of Primary Nursing assumptions and their implementation in practice.

Primary Nursing is a manifestation of activity and commitment of the nursing community, an expression of the desire to achieve better and better results in nursing. At the core of Primary Nursing there is the awareness of the autonomy of nursing, including nurturing. Primary Nursing is a solution that uses the nursing process for its purposes. In modern nursing, Primary Nursing and the nursing process (and nursing theories) are seen as significant and complementary elements.

Primary Nursing is an English language term, not translated into Polish from the beginning. The terminology of world nursing appeared in the 1970s. The English term was adopted in many countries in the 20th century.

The author of the first definition of Primary Nursing is considered to be Marie Manthey (the United States), who already in 1970 stated that it is a type of patient care (from admission to hospital to discharge) in which the patient is controlled by one nurse, called Primary Nurse.

The nurse has a team of several nurses at her disposal, with whom she takes care of a certain number of patients (usually several).

Primary Nurse is a person fully prepared:

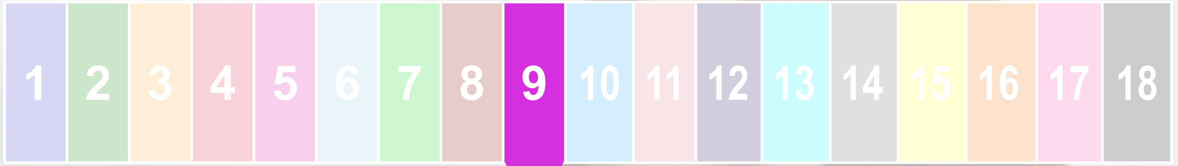
- to make decisions on nursing matters,
- to bear individual responsibility for the consequences of decisions and actions taken (e.g. an unsuccessful change in the patient's current condition).

Primary Nurse is characterized by:

- high level of independence and professional responsibility,
- versatility, openness, flexibility,
- decisiveness.

Personalised care

Individualised care is defined as the competence to recognise the patient as a fully-fledged partner and as a determining party in the provision of coordinated and empathic care. This care is to be based on respect for patient preferences, values and needs.



9. Nursing process as a nurse’s working method

Jolanta Dziewulska

NOTE

The nursing process is a proposal for such nursing care that uses the conscious application of the recognition of the biological, mental and social state of an individual and the environment, as well as taking deliberate and planned actions to contribute to maintaining or changing the existing state and evaluating the results obtained.

In the nursing process, the nurse acts as:

- independent of other professionals in matters relating to the care of individuals or entire groups,
- interdependent of the members of the therapeutic team to coordinate the work undertaken for the patient and the environment.

IMPORTANT

Features of the care process:

- multi-stage,
- continuity and dynamism,
- logic and timing,
- holistic approach to the nurtured,
- wide range of possibilities of the care process.

IMPORTANT

Stage I – Diagnosis - is the collection of data about the patient and environment. These data come from different sources. At the diagnosis stage, a nurse's diagnosis is formulated on the basis of the collected data, which are analysed and synthesized.

Stage II – Planning - is to decide what and how it should be done for the patient, by the patient or with the patient in order to achieve an optimal state. This stage includes an element of identifying existing resources, both human and material.

Stage III – Implementation - is the practical application of a pre-determined care plan. If, for specific reasons, some of the planned tasks are not carried out, this fact must be recorded and justified.

Stage IV – evaluation - is the result of comparing the condition recognized in stage I with the one obtained by undertaking targeted and planned professional activities.

The four-step care process is a cycle that can be repeated many times. The number of repetitions depends on, among other things, the frequency of changes occurring in the patient's condition and environment and the effectiveness of the care measures taken.

Sources of data and methods of data extraction

1. Sources of data - each patient is a carrier of data about himself. We can deduce a great deal from the external appearance and its immediate surroundings. Family or people close to the patient also play an important role here.
2. Data acquisition methods - to obtain information necessary to formulate a diagnosis of the patient's condition and the environment the following can be used: nursing observation, history, measurement and analysis of documents with which a person enters the health care system.

NOTE

Nursing diagnosis - these are the conclusions from the data on the patient, the formulation of the diagnosis is of fundamental value for individual and purposeful nursing, because it clearly shows the condition of the patient the nurse is dealing with.

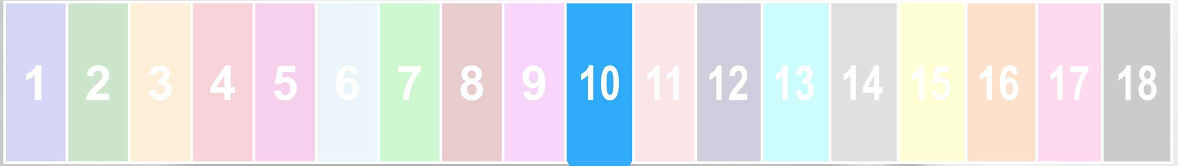
And so, e.g. she can recognise various states, such as: overweight, lack of motivation for the to-date manner of nutrition, etc.

The determination of a certain state requires specific decision making actions. That means the nurse must decide:

- whether a change in the recognized condition should be sought,
- or should it be kept at a recognized level.

The assessment in question may be expressed as a percentage:

- the target has been achieved in full - 100%,
- the target was only partially achieved - 50%,
- the target was not reached - 0%.



10. Patient in a healthcare facility

Joanna Girzelska

A health care institution provides health services to the population of a specific area or a specific group.

The benefits are provided free of charge, for a partial payment or for a fee on the terms set out in the Acts, in separate regulations or in a civil-law contract, only by persons exercising a medical profession and meeting health requirements. The head of the health care facility is responsible for ensuring the proper provision of health services.

The healthcare team is obliged to keep medical records of the persons using the facility's services and ensure protection of data concerning the patient's health condition and treatment method.

Health care facilities include:

- **Hospital -** patient admission to the hospital can be planned and urgent. The planned mode - on the basis of a referral issued by a doctor of a primary or specialist care. The urgent mode - takes place around the clock. Emergency patients are admitted if there is an sudden threat to health or life.
  The hospital provides the admitted patient with health services, pharmaceuticals, medical materials, room and board appropriate to his or her condition.

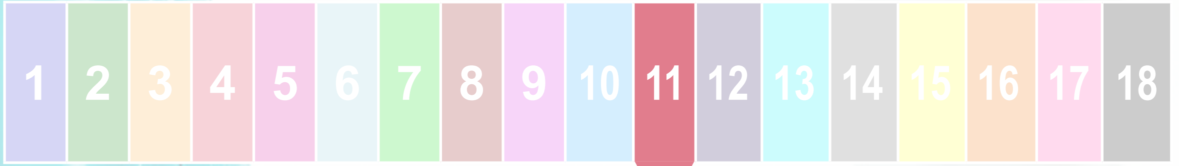
- **The Care and Treatment Centre** provides 24-hour health services to patients in the following areas: care, physiotheraphy, pharmacological treatment, health education of these persons and their family members. The establishments provide care to 25-40 patients over a period of 3-6 months. If necessary, this period may be extended to 12 months or even 2-3 years.
  Due to the nature of the health services provided, these facilities are intended mainly for patients in the period of convalescence after hospital treatment and having difficulties with self-service.

- **Ambulatory, health center, clinic** - provide health services which may include basic and specialised health care in outpatient or home settings, at the place of residence or stay of persons in need of such services.

- **Daily care and support centres for chronically ill patients and their carers** - persons admitted to a day care home are patients immediately after their hospitalization, whose condition requires increased nursing care, supervision of pharmacological therapy, comprehensive improvement measures.

- **Social welfare home** - provides care services, in terms of livelihood needs, support services, in terms of educational needs.

- **Hospice** - its history is connected with the figure of Cicely Saunders (1918-2005) and provides care for patients in the terminal stage of the disease. The forms of hospice care can be varied. This can be home care, outpatient, inpatient, day care and family support groups. The care provided is free of charge for the patient and his family.



11. Prevention of infection in healthcare

Joanna Girzelska

The nurse must know and respect the basic requirements of safe and hygienic work and prevent or eliminate hazards, exposures and nuisances of the working environment. The essential element of such work is the hygiene procedure, i.e. a defined in a detailed manner of conduct concerning the performance of each patient-related activity, including medical procedures, hygiene of medical personnel, medical instruments and equipment, surfaces, nutrition and food.

Contaminated hands of healthcare workers are the cause of endemic infections.

IMPORTANT

Infection (*infectio*) – the incursion of pathogenic microorganisms into the body.

Decontamination is a process leading to the removal or destruction of microorganisms.

Decontamination methods include sanitization, disinfection and sterilization. In hospital settings, the correct choice of decontamination methods is dependent on the risk of transmission:

Sanitization – is the removal of visible dirt and contamination and with it the removal of most microorganisms (washing, vacuuming, painting).

IMPORTANT

Disinfection – the process by which the vegetative forms of the organism are destroyed (bacterial spores and so-called "slow" viruses remain). In addition to the vegetative forms, high-level disinfection also destroys tuberculosis mycobacteria, enteroviruses and certain spores.

IMPORTANT

Sterilisation – the process leading to the destruction of all living forms of micro-organisms.

IMPORTANT

Antiseptics – disinfection of skin, mucous membranes, damaged tissues using preparations which do not harm human tissues.

IMPORTANT

Aseptics – a procedure designed to prevent tissue contamination of sterile surfaces. Healthcare workers' hands or gloves may be contaminated with Gram-negative sticks, Staphylococcus aureus, enterococci or Clostridium difficile bacteria even if they perform "clean procedures" or only touch the skin of hospital patients.

Non-compliance with proper hand hygiene is considered to be a major cause of healthcare associated infections and the spread of multiantibiotic-resistant strains, as well as a contributor to outbreaks. The main and effective ways to maintain/control hand hygiene are hand washing and disinfection.

Reducing the risk of infection transmission can be achieved by:
- washing hands under running lukewarm water and/or with liquid soap,
- wiping hands with a disposable towel,
- disinfection of hand skin with alcoholic antiseptic solution,
- hand protection with gloves.

The WHO recommendations on hand hygiene indicate that disinfection is to be the dominant activity, rather than washing hands, as is generally accepted. Wash your hands with water and soap:
- when they are dirty or contaminated (after exposure to blood and body fluids),
- after using the toilet,
- if a patient is suspected or confirmed to be infected with Clostridium difficile.

Equipment and surface disinfection.

We distinguish between disinfection:

- thermal,
- chemothermal,
- chemical.

Thermal disinfection – is carried out using hot water (93-95°C) or steam at an overpressure of 0.5 atmosphere and a temperature of 105-110°C. It is used to disinfect underwear, dishes or sanitary equipment.

Thermal-chemical disinfection – is a combination of chemical and heat (60-65°C). This method is used to disinfect heat-sensitive equipment.

Chemical disinfection – is carried out at a room temperature using chemical solutions with different properties. The active substances are: phenol derivatives, chlorine compounds, aldehydes, peroxide compounds, quaternary ammonium compounds, alcohols.

One of the most important activities related to the aseptic procedure is sterilization - a process leading to the destruction of all living forms of microorganisms.

Preparations used in antiseptic:

- alkohle,
- chlorhexidine,
- triclosan.

12. Selected clinical conditions

Joanna Girzelska

Thermoregulation disorders

Hyperthermia is an uncontrolled increase in body temperature that exceeds the body's compensation capacity. It is recognized when the body temperature is higher than 38°C. In hyperthermia, the thermoregulatory centre in the hypothalamus remains unchanged.

The cause of hyperthermia is endogenous heat production (malignant hyperthermia) or exogenous exposure to heat (heat stroke).

In hyperthermia, unlike fever, there are no pyrogenic substances (endotoxins produced by bacteria, viruses, etc., which stimulate the secretion of proinflammatory cytokines from monocytes and macrophages as part of an early immune response).

Cytokines can also alter the hypothalamic temperature setting in the absence of exogenous pyrogens and are referred to as internal (endogenous) pyrogens, e.g., situations related to injury, burn.

Fever is the most common symptom of infection, however, as much as 25% of its cases are not associated with it, moreover, the infection can also proceed without fever.

IMPORTANT

Symptoms indicating a fever are:

- hot skin,
- increased sweating,
- headaches and dizziness,
- increased thirst,
- losing appetite,
- tachycardia,
- accelerated breathing,
- shaking, feeling cold.

An increase in body temperature to 40°C leads to an increase in the minute capacity of the heart and oxygen demand of about 34%.

A temperature increase of 1 degree causes water loss due to perspiration **of about 1 litre and accelerates the heart rate by 10-20 beats per minute.**

Vomiting

Nausea and vomiting occur in response to physiological and pathological stimuli. The vomiting reflex is controlled by a vomiting center located in the extended core and a so-called chemoreceptor zone. A distinction is made between acute (1-2 days) and chronic (more than 7 days) vomiting.

NOTE

Diarrhoea

Diarrhoea is a condition in which the patient gives stools that are too loose (liquid or semi-liquid), at a higher frequency (more than 3 per day) and/or in an increased amount (more than 200 g per day).

Diarrhea classification:

1) depending on the duration:
   - sharp (no more than 10-14 days),
   - chronic (over 2-4 weeks),
1) depending on the infection factor:
   - infectious (viral, bacterial, parasitic, fungal),
   - infectious (metabolic, allergic),
2) depending on the severity:
   - mild,
   - medium severity,
   - heavy,
3) depending on the pathogenesis:
   - osmotic,
   - secretive.

NOTE

Constipation

Constipation means too little bowel movements (less than 3 per week) and/or the patient's reported symptoms such as difficulty in bowel movements, hard, dry bowel movements with effort, often accompanied by a feeling of incomplete bowel movements.

Cause of constipation:

1. Dietary factors:
   - Reduction of food intake, too little intestinal content
   - Insufficient intake of fibre
   - Insufficient fluid intake
2. General condition and conditions of care:
   - Immobilisation
   - Low physical activity
   - Dependence on caregivers
   - No intimacy during defecation
3. The drugs used:
   - Inactivating hydrochloric acid
   - Iron, calcium supplements
   - Anti-emetics
4. Mechanical or functional obstacles within the digestive system:
   - Colorectal cancer
   - Tumour of adjacent structures oppressing the intestine
5. Ascites Iatrogenic gastrointestinal damage (radiotherapy, chemotherapy, surgery)
6. Metabolic and hormonal disorders:
   - Diabetes mellitus
   - Hypothyroidism
   - Hypercalcemia
   - Hypokalemia
7. Neurological diseases:
   - Parkinson's disease
   - Spinal cord injury or tumour

8. Disorders and mental factors:
   - Depression

IMPORTANT

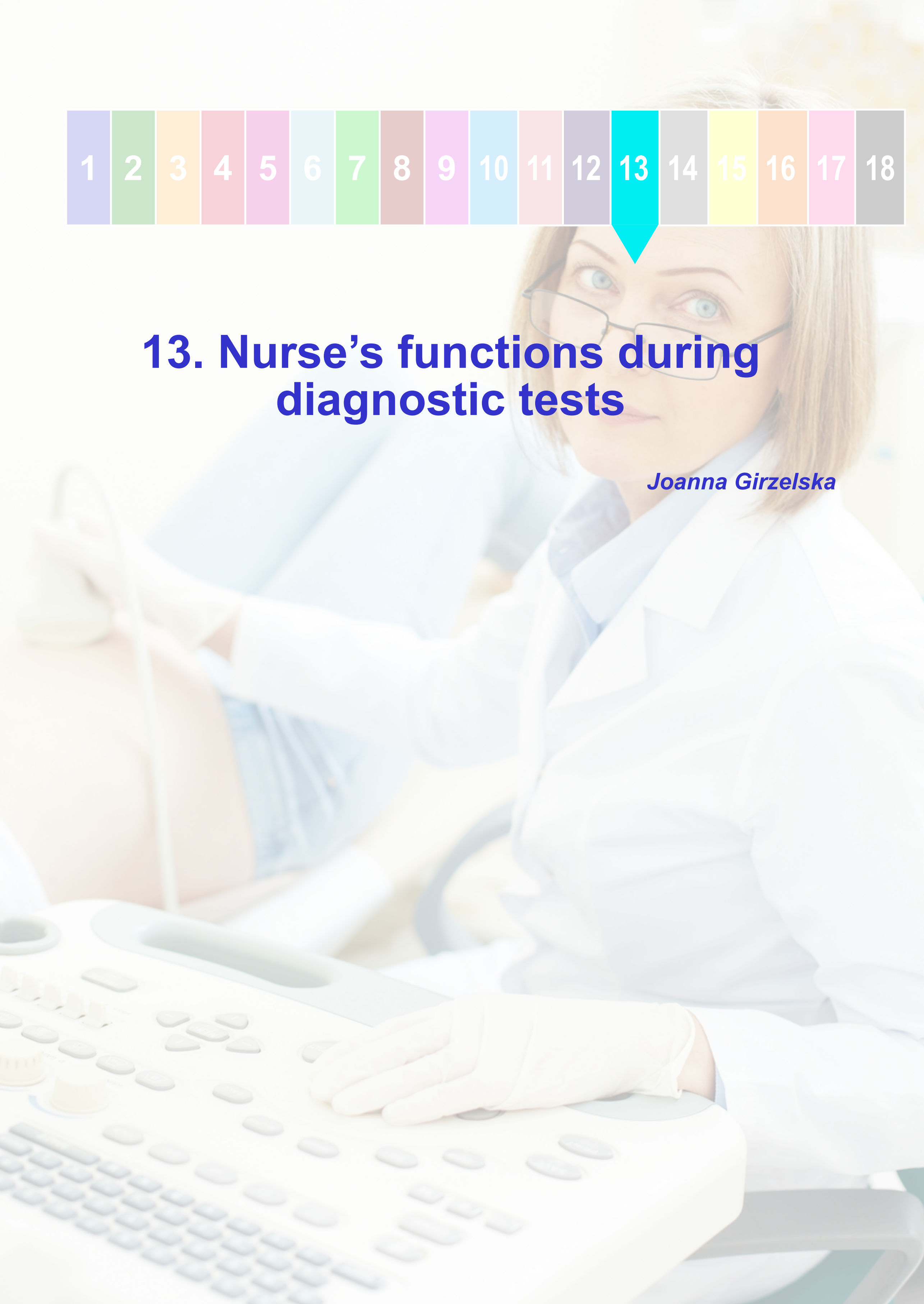
Constipation symptoms:
- feeling of fullness in the rectal ampulla
- palpable faecal matter in the rectal ampulla
- feeling the pressure within the rectal ampulla
- abdominal repression
- difficulties in stooling
- reduction of stool volume
- changes to the defecation scheme
- reduction in the frequency of bowel movements
- hard, moulded stool

Oedemas

Oedemais the accumulation of fluid in the extracellular and extravascular space of tissues and organs.

They are usually the result of one of the 4 mechanisms:
- hydrostatic pressure increase in the venous section of capillaries,
- decrease in plasma oncotic pressure, e.g. due to hypoalbuminemia in the course of malnutrition, liver damage, nephrotic syndrome,
- difficult lymphatic drainage,
- increased permeability of capillary walls, e.g. inflammatory oedema.

Oedemas can be divided into:
- **local:** inflammatory, allergic (e.g. Quincki's oedema), venous outflow disorders (e.g. deep vein thrombosis, venous insufficiency), lymphatic outflow disorders (e.g. rose),
- **in hypothyroidism**, oedemas from malnutrition (e.g. protein deficiency, vitamin B1, cachexia), pregnant oedemas, drug-related oedemas (e.g. in glucocorticosteroid treatment), idiopathic.



13. Nurse’s functions during diagnostic tests

Joanna Girzelska

The nurse's competence relevant to the participation in the diagnostics of a patient is regulated by the Regulation of the Minister of Health of 28 February 2017 on the type and scope of preventive, diagnostic, therapeutic and rehabilitation services provided by a nurse or midwife independently, without a medical order (Dz. U. of 2017, item 497) and the Regulation of the Minister of Health of 20 October 2015 on the list of active substances contained in medicines, the list of foods for special nutritional purposes, the list of medical devices and the list of diagnostic tests (Dz. U. of 2015, item 1739).

Imaging examinations

Radiological tests (X-ray)

Radiological examination (X-ray) is an imaging diagnostic method using the differences in the absorption of X-ray beams by different organs and tissues.

Objectives of X-ray examination: to obtain an image of the examined structures of body parts or organs.

Patient preparation:

- inform the patient about: the purpose and course of the examination, the necessity to remain still during the examination, to remove and leave all metal-containing objects/goods outside the X-ray room (mobile phone, keys, magnetic fasteners); the possibility of contact with the examining persons during the examination,
- obtain the patient's written consent to perform the examination and provide a contrasting agent.

Preparation:

- **For an x-ray of the abdomen and spine:**
  The day before the examination the patient should follow an easily digestible diet (excluding vegetables, fruit, dark bakery products, carbonated drinks), take Espumisan (3 × 2 capsules), the patient should be fasting on the day of the examination (minimum time since the last meal: 6 hours), pass the stool, should not smoke or chew gum.
- **For x-rays of the esophagus, stomach and duodenum:**
  The patient should be fasting on the day of the examination (minimum time since the last meal: 6 hours), should not smoke or chew gum.

- **For urography:**
  - the patient should follow a semi-liquid diet (excluding vegetables, fruit, dark bakery products, sweets, sodas) for two days prior to the examination,
  - on the day before the examination the patient should take Fortrans (4 sachets dissolved in 4 litres of non-carbonated water),
  - the patient should be fasting on the day of the examination (minimum time since the last meal: 6 hours), shouldn't smoke cigarettes and chew gum, should urinate,
  - the patient should have access to the peripheral vein on the day of the examination by inserting a cannula of PVC type.

Computed tomography is a diagnostic examination using ionizing radiation (X-rays) to obtain images (tomograms) of examined structures of body parts or organs, which can be performed with or without the use of aqueous iodine shading agents.

The purpose of the CT scan:
Obtaining an image of the examined structures of body parts or organs.

Patient preparation:
- inform the patient about: the purpose and course of the examination, the necessity to lie still, the duration of the examination (the examination lasts an average of 5-20 minutes); the necessity to remove and leave all metal-containing objects/goods outside the CT room (cell phone, keys, magnetic fasteners); the possibility of contact with the examining personnel during the examination,
- ask the patient if he/she has been fasting (the minimum time since the last meal is 6 hours); if he/she has taken the medication according to regular medical orders (except for patients with type 2 diabetes treated with metformin, which has to be put aside for 48 hours. before the examination, and patients taking nephrotoxic drugs - mannitol and loop diuretics, which must be put aside at least 24 hours before the administration of aqueous iodine shading agents); whether he/she has drunk at least 1.5 liters of fluids in the 12 hours preceding the examination (for the examination requiring the administration of aqueous iodine shading agents),

- obtain the patient's written consent for the examination and administration of an aqueous iodine shading agent. From the woman, get a signature on a statement confirming no pregnancy,
- provide access to the patient's peripheral vein by inserting a cannula PVC type.

Magnetic resonance - is a diagnostic test that uses electromagnetic field and radio frequency waves to obtain images with high contrast resolution of examined structures of body parts or organs. The test can be performed using a contrasting agent based on gadolinium compounds (paramagnetics, superparamagnetics, ferromagnetics).

The purpose of the MRI test:

To obtain detailed information on the structures of body parts or organs to be examined.

Patient preparation:

- inform the patient about: the purpose and course of the examination, the necessity of: lying still during the examination (the examination lasts on average 30-60 minutes), removing and leaving all metal-containing objects/goods outside the room of the RM laboratory (cell phone, keys, magnetic fasteners); staying in light clothing that must not contain metal elements (zippers, baleens); the possibility of contact with the examining personnel during the examination,
- ask the patient if he is fasting (minimum time since last meal: 6 hours); whether he took medication according to regular medical orders; whether he drank at least 1.5 liters of fluids in the 12 hours preceding the examination (in case of an examination requiring the administration of a contrast agent); whether he has no make-up, nail polish or hairspray,
- obtain the patient's written consent for the examination and contrast agent. Get a signature from the woman on a statement confirming no pregnancy,
- provide access to the patient's peripheral vein by inserting a cannula PVC type.

In addition:

- for abdominal RM: use peristalsis inhibitors (e.g. Buscopan), empty the bladder immediately before the examination.

Ultrasound examination - is a method of imaging the body interior using acoustic waves. The ultrasound can be repeated at short intervals in the same person. This is a non-invasive, atraumatic, painless and safe test.

The objectives of the ultrasound:

- diagnosis of soft tissue disorders,
- Intraoperative diagnostics,
- diagnosis and/or treatment (e.g. percutaneous fine needle biopsy under ultrasound control, percutaneous drainage),
- diagnostics of rheumatic diseases,
- infertility diagnostics,
- monitoring the pregnancy.

Patient preparation:

- inform the patient about: the purpose and course of the examination; the need to cooperate with the doctor; the date of receipt of the description/result of the examination; the need to remain stationary during the examination if not asked to change position,
- to remind the doctor of the need to provide the results of previous tests of this type.

No special preparation is required for most ultrasound examinations. However, for some studies, preparation is necessary because it may have a major impact on the quality of the examination or patient safety, e.g:

Endoscopic examination

Endoscopic examination is a diagnostic and therapeutic examination of the lumen of the gastrointestinal tract, respiratory tract, urinary tract and body cavities with the use of an endoscope which allows for viewing their interior, precise collection of tissue material and performing minor procedures.

Upper gastrointestinal sighting

The examination consists in inserting a fibroscope into the gastrointestinal tract through the patient's mouth - a device enabling visualization of the upper gastrointestinal section. This examination allows for an accurate diagnosis of the upper gastrointestinal tract and the

performance of minor procedures (inhibition of hemorrhages, closure of esophageal varices, collection of clippings, removal of polyps).

Objectives of endoscopic examination of the upper gastrointestinal tract:

- assessment of the upper gastrointestinal mucosa for pathological changes,
- evaluation of organ work, fluid content in the stomach and duodenum,
- taking material for cytological, histopathological, bacteriological examination,
- to combine a diagnostic test with a treatment.

Patient preparation:

- inform the patient about: the purpose and course of the examination; the necessity of: staying on an empty stomach for 6 hours before the examination; taking the drugs taken regularly on the day of the examination (especially hypotensive, antiarrhythmic, β-blockers, anticonvulsants), except for hypoglycemic drugs; removal of dentures and glasses before the examination; the necessity of cooperation with the doctor during the examination; providing information in a non-verbal way due to the lack of possibility to speak,
- obtain the patient's written consent for the examination.

Colorectal endoscopy

This examination consists in the introduction of a device into the gastrointestinal tract through the rectum enabling the visualization of the entire large intestine. This examination allows for an accurate diagnosis of the lower gastrointestinal tract and the performance of minor procedures (taking clippings, removing polyps, inhibiting bleeding).

The goals of an endoscopic examination of the large intestine:

- evaluation of the lower gastrointestinal mucosa for pathological changes,
- taking material for a histopathological examination,
- to combine a diagnostic test with a treatment.

Colonoscopy

Patient preparation:

- inform the patient about: the purpose and course of the examination; the necessity to: cooperate with the doctor and report any disturbing symptoms (abdominal pain, nausea, dyspnoea); eliminate from the diet 3 days before the planned examination stone fruits, nuts, bread with grains, linseed, poppy seeds and protein (meat, dairy products, fish, eggs); apply liquid diet for 24-48 hours. before the examination; observing the schedule of talking oral laxatives; taking on the day of the study of the drugs taken on a daily basis (especially hypotensive, antiarrhythmic, β-blockers, anticonvulsants), except for hypoglycemic drugs,
- Instruct the patient to drink still water up to 4 hours before the examination,
- give the patient, on the doctor’s order, sedatives and diastolic drugs, 30-60 minutes before examination,
- obtain the patient’s written consent for the examination.

Bronchoscopy - visual assessment of laryngeal, tracheal and bronchial mucosa. During the examination, material for bacteriological examination and mucous membrane cuttings can be taken.

The goals of the bronchoscopy:

- taking broncho-alveolar lavage fluid,
- biopsy of the mucosa, lymph nodes and lung,
- determining which bacteria cause the disease, such as pneumonia,
- assessment of vocal cords, trachea, bronchi,
- diagnosing the disease process,
- determining where the bleeding is,
- evacuation of secretions, blood, oil, foreign bodies from the airways,
- stopping the bleeding.

Patient preparation:

- report: the purpose and course of the study; the need to give up food intake 4 hours before the study and fluids 2 hours before the study,
- perform blood tests for clotting system (APTT, INR, platelet count); HBs; arterial blood gasometry (patients with respiratory failure), chest X-ray, ECG, spirometry,

- administer bronchodilators to asthma patients on the order of a doctor,
- provide access to the peripheral vein by inserting a PVC,
- obtain the patient's written consent for the examination,
- Administer at the doctor's request 60 minutes before the examination of sedatives and sleeping pills as well as cough and painkillers.

14. Methods of diagnosing airways

Jolanta Dziewulska

Breathing - a gaseous exchange process in the body to take up oxygen and eliminate carbon dioxide. The respiratory centre is in the extended core.

IMPORTANT

The respiratory rate in a healthy person is 12-15/minute. In pathological situations, conditions such as:

1. Hyperventilation - above 40/min in an adult - leads to hypoxia.
2. Hypoventilation - below 8/min. in an adult - leads to hypoxia.

Care problems related to respiratory pathology:

1. Changes in **respiratory** rate taking into account the frequency, quality of breathing (scent) and rhythm of breathing. The causes of respiratory distress may be the result of abnormalities:
   - composition of the inhaled air,
   - respiratory tract obstruction,
   - respiratory capacity,
   - the transport of oxygen and carbon dioxide,
   - cellular respiration,
   - functioning of the respiratory centre.
2. **Increase in body temperature**
3. **Shivers** - defined as a deficiency of heat in the body caused by the change of thermoregulatory medium to a higher temperature, which gives the subjective impression of cold. The small muscle spasms (shivers) generate heat and compensate for deficiencies.
4. **Shortness of breath** is a subjective symptom, which is the feeling of lack of air.

Signs of dyspnea :

- increased work of additional respiratory muscles,
- upright stance,
- breathing swish (stridor),
- cyanosis,
- anxiety.

It stands out due to its respiratory phases (inhalation - exhalation):
- Inspiratory dyspnea - the patient has difficulty in introducing air into the lungs, accompanied by the share of auxiliary inspiratory muscles (waist, shoulder, intercostal, nose wings muscles), it is characteristic to lifting the chest up.
- Expiratory dyspnea - the patient has difficulty expelling air from his lungs. Exhaust is elongated and deepened with a characteristic swish accompanying it. The patient often exhales through the so-called “laced mouth”.
- Inspiratory and expiratory suffocation - the difficulty concerns the inspiratory and expiratory phases.

5. **Cyanosis -** blue or bluish red colouring of the skin and mucous membranes caused by increased content of haemoglobin reduced in capillary blood.
6. **Cough -** this is the body’s defensive reflex, which consists of a sudden exhalation with a contraction of the respiratory muscles and diaphragm with violent ejection from the lungs. It is a complex reflex, which consists of removing the substances remaining in the lungs and bronchial tree (mucus, blood, foreign body) with the exhaled air.
7. **Sputum -** an exudative substance, exceptionally transudative, expectorated from the respiratory system.

The diagnosis of patients with pulmonological problems often requires the use of bronchoscopy, which is an invasive examination of the respiratory system, during which vocal cords, trachea, main, lobe and segmental bronchi can be seen using a flexible bronchoscope or bronchofiberoscope.

It can be performed for diagnostic purposes:
- macroscopic evaluation of the respiratory wall,
- sampling material (secretion, cuttings) for testing: histological, cytological, microbiological
- bronchio-alveolar lavage (BAL) - selected bronchi are rinsed with 0.9% NaCl, thanks to which material from peripheral bronchi and alveoli can be collected.

For medicinal purposes:
- removing the foreign body from the airways;
- suctioning out the remaining secretion;

- stopping the bleeding;
- treatment of large bronchial constriction.

Preparing the patient for the examination:

- explaining the purpose and course of the examination,
- obtaining the patient's consent for the examination,
- the patient must remain on an empty stomach for about 4 hours before the examination,
- inserting the cannula in the peripheral vein,
- administering premedication: anticough medicine with codeine (2 tabl. Thiocodin), Relanium 5 mg, Dolcontral 1 amp, Atropine 1 amp.,
- local anesthesia: 10% Lidocine for the palatal arches and rear pharyngeal wall, laryngeal infusion with Xylocin 2%, Xylocin 2% 20 ml intrbronchially,
- SaO2 should be monitored during the survey,
- the examining team must have access to the resuscitation equipment.

After the test:

- the patient should be connected to oxygen for about 30 minutes,
- recommendations of not eating hot meals, smoking and having the first meal two hours after the examination should be given,
- in case of the sore throat, inform the patient that it will resolve spontaneously and recommend sucking the tablets e.g. Tantum Verde.

15. Risk factors – primary, secondary and tertiary preventive care - nature of nursing interventions. Education, BMI, Fagerström Test, Schneider Test, AUDIT

Jolanta Dziewulska

NOTE

Prophylaxis, or prevention, is a preventive measure, mainly medical, aimed against diseases. In the preventive approach, the starting point is disease, the goal is to avoid disease and the affected group is a high risk group.

Prevention also means raising public awareness through health education about sources and routes of infection, factors influencing the disease, health and social effects of the disease, about medical centres conducting diagnostics and therapy.

NOTE

Health education - concerns mainly knowledge, but also beliefs, behaviours and lifestyles that aim to maintain health at a certain level through: changing the way of thinking about health in the sense of promoting it, increasing the effectiveness of the influence and control over one's own health.

- **First phase prophylaxis** - efforts to reduce the likelihood of morbidity by counteracting harmful conditions before they are able to cause the disease
- **Second phase prophylaxis** - is used when early symptoms of the disease are detected. Its purpose is to stop the disease by detecting its causes and diagnosing.
- **Third phase prophylaxis** - aims at preventing the effects of the disease and preventing its recurrence. It is supposed to minimize possible complications of the disease.

The first phase of prophylaxis includes actions against a healthy person, but potentially at risk of disease, with the aim of enhancing and strengthening health. The second and third phase of prophylaxis includes early detection of diseases, prevention of further adverse consequences for human life, as well as restoring the ability to take up employment, maintain psychophysical and occupational activity.

Levels of prevention

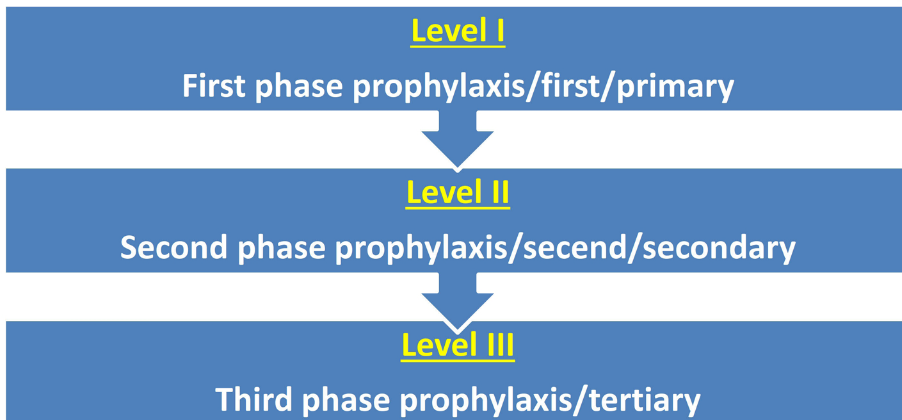


Figure 2. Levels of prevention

Human health is affected by many factors, those that cause its deterioration, illness, disability or death, are referred to as risk factors.

IMPORTANT

Risk factor is a feature, condition or behaviour that increases probability to get sick or be injured.

They often coexist and interact with each other. For example, lack of physical activity can lead to increased body weight, high blood pressure and high cholesterol concentrations. The common impact of

these three factors increases the possibility of chronic heart disease and other health problems.

The risk factors can generally be divided into the following groups:

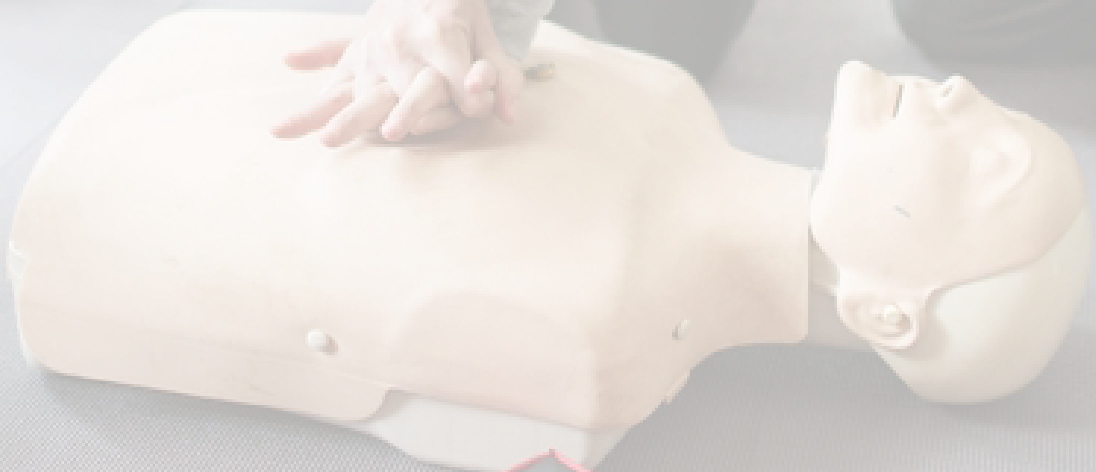
- behavioural - related to the behaviour of individuals. so they can be eliminated, reduced by making certain changes in lifestyle or behaviour,
- physiological,
- demographic,
- environmental,
- genetic.

In relation to behavioural risk factors, the elimination of which depends on personal behaviour, it seems important to provide tools that can help to change habits and health behaviour. Such tools include, for example:

1. **The Fagerstrom test**, which allows for an indicative assessment of the depth of biological dependence on nicotine.
2. **Schneider test,** used to test your readiness to stop smoking.

16. First aid in life-threatening situations

Joanna Girzelska



First aid is defined as the initial action and behaviour to assist both in acute medical conditions and injuries.

The aim of first aid is to protect life (in the broad sense of the acute condition - prevention of sudden cardiac arrest and irreversible organ complications) and thus to create the best possible conditions for recovery by preventing possible complications.

A very important element of first aid:

- is to call the emergency services to the scene as soon as possible, not necessarily medical professionals,
- providing brief information on the condition of the victim (vital functions) - to which the updated guidelines of the Committee of the European *Resuscitation Council* (ERC) 2015, as well as the definition of first aid contained in the Emergency Medical Services Act, refer once again.

IMPORTANT

> Life-threatening condition a *condition in which suddenly or in a short period of time symptoms of deterioration of health may develop, resulting in damage to vital functions or even loss of life and requiring immediate action in the field of medical rescue and treatment* (Journal of Laws 2006 No 191, item 1410 as amended).

Chain of Survival is a sequence of consecutive **rescue** steps to enable the patient who has suffered cardiac and circulatory arrest to survive.

In this case, the following are extremely important:

- early diagnosis of the problem and calling medical services as soon as possible,
- early cardiopulmonary resuscitation,
- early defibrillation (V entricular Fibrillation (VF) or Ventricular Fibrillation (VT) or Ventricular tachycardia (VT),
- the quickest possible post-resuscitation care, i.e. early advanced assistance.

The links of the survival chain

1. The first link in **the survival chain** is **the recognition of a** cardiac arrest and heart rate and then the call for help. These two activities*(reconnaissance and emergency call*) are the first link in **the survival chain**.
2. The next step in the survival chain is **cardiopulmonary resuscitation**, i.e. an attempt to restore breathing and heart rate by means of artificial respiration and heart massage.
3. The third link in **the survival chain** is early **defibrillation.** It is only helpful for certain types of cardiac arrest. However, the rule is that it is better to do the defibrillation unnecessarily than not to do it at all.
4. The next and last link in **the survival chain** is to provide the patient with **post-resuscitation care** as soon as possible. This means that the patient should be in hospital as soon as possible, where specialist care will be provided and where there is equipment to support the heart and circulation.

Figure 3. The chain of survival links

Source: https://www.henfieldresponders.org.uk/chain-of-survival.html [available on: 28.07.2020]

Life-threatening tasks

1. The first task in a life-threatening condition is an accurate and consistent assessment of the patient's condition. Help should be called and appropriate actions taken as soon as possible to prevent sudden cardiac arrest. Sudden cardiac arrest is one of the first causes of death.

IMPORTANT

Reversible causes of sudden cardiac arrest:

5H

1. Hypoxia
2. Hypovolaemia
3. Hypothermia
4. Hydrogen-ion acidosis - Metabolic acidosis
5. Hypo./Hyper Hypo./Hyper Hyperthyroidism Metabolic Dis-order (hypo-hierglycemia, - kalmia

5T

1. Toxins -Attacks
2. Tension pneumotorax - Compression relief
3. Trombosis - Pulmonary embolism
4. Trombosis - coronary embolism
5. Cardiac tamponade - Pericardial tamponade - **is Beck's triad:**
   - Pressure drop 60/90 mmHg
   - Low heartbeat
   - Filled jugular veins

CPR - cardiopulmonary resuscitation - a syndrome of activities used in a victim who is suspected of sudden cardiac arrest, i.e. cessation of heart activity with loss of consciousness and apnoea.

The purpose of resuscitation is:

- maintaining blood flow through the brain and heart muscle and
- to restore his own cardiovascular function.

Immediate initiation of CPR by witnesses to the event increases the probability of survival **three times.**

Reanimation- a set of rescue activities used in patients with sudden cardiac arrest:

- restoration of circulation and respiration, (cardiopulmonary resuscitation),
- to restore consciousness and function of the central nervous system.

CPR is the second link in the survival chain. Cardiopulmonary resuscitation includes:

- BLS – (*Basic Life Support*) - Basic resuscitation treatments,
- ALS – (*Advanced Life Support*) - Advanced resuscitation treatments.

Basic Life Support (BLS) includes instrumentless

(except for personal protective equipment) keeping the airways open and maintaining breathing and circulation.

The Basic Life Support (BLS) algorithm includes:

- assessment the patient's state of consciousness,
- mouth-to-mouth breathing,
- chest compressions.

ALS quality COC

- Press hard > 5 cm and fast > 100 pressures per minute allowing the chest to return to its original state
- Minimize compression breaks
- Change every 2 minutes

In the absence of advanced airway protection, the ratio of cage compressions to inhalation is 30:2

- Capnographic recording **>40mmHg**
- Relaxation (diastolic) phase pressure **>20mmHg**
- Advanced respiratory protection
- Epiglottis tube
- Endotracheal intubation
- Capnographic recording to confirm placement and monitor the position of the endotracheal tube
- 8-10 breaths per minute with continuous chest compression

Drug therapy

- An intravenous dose of epinephrine: 1 mg every 3-5 minutes
- Intravenous/intraosseous dose of vasopressin - 40 units possibly instead of a second dose of epinephrine
- Intravenous/ intraosseous dose of amiodarone: first dose: bolus 300mg
- Dose two: 150 mg

Picture 6. Medical defibrillator ALD

Picture 7. Hospital defibrillator

The rhythm which is an indication for defibrillation VF/VT – Ventricular **Fibrillation Rhythm**, VF/VT - Ventricular Fibrillation, Ventricular Flickering.

1) Early DEFIBRILATION - no reaction, we continue:
2) CPR for 2 min (venous or intraosseous access)
3) Rhythm analysis - a rhythm that is an indication for defibrillation
4) DEFIBRILATION - no reaction, we continue:
5) CPR for 2 min : administer 1 mg of epinephrine every 3-5 min, use respiratory protective devices
6) Rhythm analysis - a rhythm that is an indication for defibrillation

7) Defibrillation. No reaction. We're continuing:
8) CPR for 2 min
9) amiodarone 300mg.

IMPORTANT

When the rhythm is not for defibrillating then epinephrine every 3-5 minutes and CPR every 2 minutes.

IMPORTANT

Asystolia

- 1 mg of adrenaline iv immediately after intravenous access.
- Another dose every 3-5 minutes until spontaneous circulation returns.
- In asystole, 3mg of atropine can be administered once
- In case of doubtful diagnosis of low voltage VF, defibrillation is **NOT recommended**.
- Continue CPR for 2 minutes.

After repeating the loop three times, consider the administration of amiodarone (300 mg), possibly atropine.

Post resuscitation care - monitoring and supporting organ functions.

17. Protective vaccinations

Joanna Girzelska

17.1. Definition of vaccine, division and undesirable post-vaccination reactions

IMPORTANT

A vaccine is a preparation containing antigens that are capable of inducing the development of specific active resistance against an infectious agent or the toxins or antigens it produces.

The antigens of biological origin found in vaccines activate the immune system to produce acquired anti-infective immunity, comparable to natural immunity acquired after infection with a wild microorganism.

Vaccines in their composition may contain:
- living micro-organisms but without pathogenicity or undergoing a treatment that reduces their pathogenicity (attenuated) while maintaining antigenic properties,
- Inactivated (killed) micro-organisms chemically or physically without damaging their antigenic properties,
- antigens obtained from micro-organisms (by extraction, excreted by them or obtained by genetic engineering).

Live vaccines induce strong immunity even after a single dose. Inactivated (killed) vaccines require several doses.

Vaccines shall be divided according to the route of administration by the type of microorganisms contained, the method of manufacture and the origin.

We divide the vaccine by the route of administration:
1. Vaccines injected (intramuscularly or subcutaneously) - this is how most vaccines are administered.
2. Oral vaccines - this is how live vaccines are usually administered (attenuated rotavirus vaccine, attenuated cholera vaccine).

3. Inhalational vaccines, i.e. administered by spraying a nasal vaccine (live, attenuated influenza vaccine - not available in Poland).

We divide the vaccines into different types of microorganisms:

1. Bacterial vaccines are bacterial suspensions (live or inactivated) or bacterial toxins (anatoxins) obtained from protein toxins by minimising their toxicity.
2. Virus vaccines - produced from viruses bred in animal organisms, avian embryos (hen embryos), cell cultures and tissues or cell cultures that have undergone genetic modification.

We divide the vaccine into two types, based on the characteristics of the microorganisms:

1. Live vaccines - contain attenuated, i.e. weakened strains of pathogenic microorganisms with reduced virulence. Amongst them:
   - Bacterial vaccinations: against TB.
   - Virus vaccines against: measles, mumps and rubella (MMR - measles, mumps, rubella), chickenpox, rotavirus, live influenza vaccine (not available in Poland).
2. Inactivated (killed) vaccines - contain pathogenic bacteria or viruses that have been killed by heating or chemical agents (formaldehyde).

We divide them into antigens and microorganisms that vaccines immunize against:

- **Monovalent Vaccines** - contain antigens of one type of pathogenic micro-organism and immunize against one disease (e.g. hepatitis B vaccine, hepatitis A vaccine, tetanus vaccine).
- **Polyvalent** vaccines- contain from several to several dozen subtypes of antigens of the same species of pathogenic micro-organism (e.g. three- and four-component influenza vaccine, human papillomavirus vaccines - HPV); they immunize against one infectious disease caused by different serotypes of pathogenic micro-organisms.
- **Combined vaccines** (multivaccinations) - immunize against several infectious diseases simultaneously (e.g. tetanus, diphtheria and pertussis vaccine - DTP).

IMPORTANT

According to the definition developed by experts of the World Health Organisation (WHO), undesirable post-vaccination reaction is any medical symptom that is temporarily associated with vaccination.

Any symptom that occurs after vaccination should be considered in the vaccine adverse event direction, which does not mean that the symptom is the result of the vaccine administration or action. A doctor who suspects or diagnoses the occurrence of an adverse vaccination reaction is required, within 24 hours of becoming aware of the suspicion, to report such a case to the national district health inspector responsible for the place where it was suspected of occurring.

Side effects may be caused by factors that can be divided into three categories:

1. Vaccine related - is the result of an organism's reaction to vaccination, e.g. local reaction in the form of reddening and swelling, anaphylactic reaction after vaccination or fever up to 48 h after DTPa vaccination;
2. VAE due to vaccination error - irregularities in production, transport, storage or due to an error in the procedure itself;
3. VAE resulting from the co-existence of other symptoms or diseases - i.e. symptoms that are not the result of vaccination, but occurred within a certain period of time after the administration, most often infectious diseases or symptoms.

17.2. Organization of preventive vaccination in Poland

Organization of preventive vaccinations in Poland is regulated by the Act of 5 December 2008 on Prevention and Control of Infections and Infectious Diseases in Human Beings (Journal of Laws 2008 No. 234 item 1570) and executive regulations to the Act, including the

Notice of the Minister of Health of 28 March 2018 on the announcement of the uniform text of the Regulation of the Minister of Health on mandatory preventive vaccinations (Journal of Laws 2018 item 753). Mandatory protective vaccinations are carried out in accordance with the Protective Vaccination Programme **(PVP, the so-called vaccination calendar)** for a given year, announced by the Chief Sanitary Inspector in the form of a communication referred to in Article 17, section 11 of the Act of 5 December 2008 on preventing and combating infections and infectious diseases in humans.

PVP which is modified annually and announced by the Chief Sanitary Inspector in the form of a communiqué in the official journal of the minister in charge of health by 31 October of the year preceding the implementation of this program. The Minister of Health supervises the implementation of PVP in Poland.

This document organizes the age and scope of preventive vaccination and takes into account:

- **free (so-called obligatory) vaccinations** under the general health insurance without additional charges,
- **paid vaccinations (so-called recommended vaccinations)** - indicated to extend the scope of child protection or reduce the number of injections, but not reimbursed from the state budget. Parents must purchase the vaccine themselves at the point.

According to the current legislation, every child and adult who comes forward for mandatory or recommended vaccination must undergo a qualified medical examination, performed by a doctor.

A medical examination is valid for 24 hours and is intended to detect possible contraindications to vaccination, delay the execution of vaccination, modify the vaccination schedule. The purpose of vaccination eligibility is to ascertain the indications and to rule out contraindications to vaccination.

The qualification consists of a subjective (interview) and objective (physical) examination.

IMPORTANT

The vaccination is the responsibility of the nurse.

Vaccination site: medical surgery (surgical, intended for vaccination) equipped with medicinal products, medical devices, medical apparatus and equipment suitable for the type and scope of health services provided. The ambient temperature in the vaccination room should be appropriate for the child (20-22°C, and in infants 24-26°C for «kangarooing»), as this affects the pain sensation during vaccination.

The vaccination room should be equipped:

- a table with medical equipment for vaccination,
- CPR kit,
- pharmaceutical vaccine storage refrigerator continuously monitored by an electronic thermometer with a display outside the refrigerator,
- place of preparation of the infant for vaccination and/or administration of the vaccine,
- hand washing and disinfection point,
- a point with information material on vaccination,
- a point for keeping the necessary documentation,
- stable chairs for small children and parents.

17.3. Vaccination documentation

The basic documents that certify the performance of preventive vaccination in children are:

- immunization card (document stored in health care facilities),
- the child's health booklet (a document kept by the child's parents),
- vaccination booklet (a document kept by the child's parents).

These documents are put in the hospital in the neonatal ward

on the day the baby is born. The immunization card, containing the child's personal data, is sent from the hospital to the clinic of the family doctor/pediatrician indicated by the parent.

The immunization card is the most important document containing detailed information about the child's mandatory and recommended vaccinations, the cost of which is usually covered by the child's parents.

The following information is entered in the immunization card each time:

- name and batch number of the administered vaccine,
- the name of the manufacturer,
- date of vaccination,
- the name of the person ordering the vaccination (eligible for vaccination),
- name of the person performing the procedure,
- possibly the place and route of administration of the vaccination (this information is not obligatory, but is useful for intensified local post-vaccination reactions).

The Children's Health Booklet is an important part of medical records and is intended for children **from birth to the age of 19.**

In the child's health booklet, the nurse shall record the vaccination and enter the date of the next vaccination (in pencil). The health booklet is kept by the child's parents/guardians. As of 1 January 2016, parents who come with their child to a health care facility for all health services, including preventive vaccinations, are obliged to have and show their child's health booklet.

18. Transfusion of blood and blood products

Joanna Girzelska

18.1. Blood and group systems and blood preparations

NOTE

Blood is liquid tissue. It has a weakly alkaline reaction (pH 7,35-7,45).

Blood composition:
1. The liquid part is plasma;
2. Morphotic elements - blood cells.

To transfuse the blood, an exact determination of the two group systems is made:
1. of the ABO group system,
2. Rh group system.

The ABO group system has a specific antigen on the red blood cells: A, B. Based on the antigen, people were divided into 4 groups: A, B, AB, 0.

Plasma contains specific conglomerating antibodies (isohemoglutimines): anti-A and anti-B. Their presence is determined by the absence of the antigen against which they are directed, e.g. group B people (with B antigen on the surface of red blood cells) have anti-A antibodies in their blood plasma, group AB people (with A and B antigens on the surface of red blood cells) have no antibodies in their blood plasma, and group 0 people (with no red blood cell antigens on the surface of red blood cells) have anti-A and anti-B antibodies in their blood plasma.

The ABO blood group is determined by the presence or absence of agglutination.

Rh grouping system (name from the Macacus rhesus monkey species in which this agent was detected) - it is a blood grouping

feature determined by the indication of the presence or absence of C, c, D, d, E, e Rh antigens in the red blood cells. As the D antigen has the strongest immune activity (found in 85% of the population), the presence of D antigen is tested in recipients.

Its presence is described as Rh-positive, the lack of antigen is Rh-negative. Natural anti-D antibodies are not present in people with negative Rh, but may be formed as a result:
- to transfuse these people with Rh-positive blood,
- during pregnancy, if the foetus has inherited Rh-positive blood from the father and the fetus' blood cells, penetrating in small amounts during pregnancy and birth into the mother's blood-stream, they produce antibodies in the foetus that can penetrate the placenta into the foetus, destroying its red blood cells.

The following blood and blood products are currently used in transfusionology:
- Preserved whole blood (WB)
- Red blood Cell concentrate (RBCC)
- Platelet Cell Concentrate (PC)
- Granulocyte concentrate (GC)
- Fresh frozen plasma (FFP)
- Cryoprecipitate is a concentrate of coagulation factors (VIII, XII, von Willebrand, fibrinogen, fibronectin)
- Albumins are proteins
- Immunoglobulins are preparations of immunological antibodies obtained from plasma.

18.2. Organization of treatment with blood and blood components in Poland

The organization of treatment with blood and blood components in Poland is regulated by the Act of 22 August 1997 on public blood service. (Journal of Laws 1997 No. 106, item 681) and the executive regulations to the Act, inter alia, the Regulation of the Minister of Health of 16 October 2017 on treatment with blood and its components in therapeutic entities providing medical activities such as stationary and 24-hour health services (Journal of Laws 2017, item 2051)

The tasks of doctors and nurses or midwives carrying out transfusion-related activities include:

1. filling in the order for immunohaematological tests and orders for blood and its components - applies only to the doctor;
2. placing an order for blood and its components;
3. taking blood samples from the patient to perform a blood group and compliance test;
4. informing the patient about the risks and benefits of the transfusion - applies only to the doctor;
5. identification of the blood recipient on the basis of the data and check of the medical records before the transfusion;
6. a transfusion;
7. observe the patient during and after the transfusion and take appropriate action if an adverse reaction occurs.

Only a blood group result based on two determinations from two blood samples taken from the same patient at different times can be reliable.

18.3. Nurse’s tasks during the transfusion

The primary duties of a nurse/midwife related to the transfusion of blood and its components are:

- taking blood samples from the patient to perform a blood group and/or compliance test and the necessary samples to explain the cause of the adverse reaction,
- to transfer to a blood bank signed by the doctor’s office a demand for blood or a blood component,
- confirmation of the compatibility of the blood or blood component with the recipient,
- identification of the recipient and control of documentation before the transfusion,
- a blood transfusion or a blood component,
- to observe the patient during and after the transfusion,
- informing the doctor about symptoms during and after the transfusion that may indicate an adverse reaction or event,
- take appropriate action if an adverse reaction occurs.

18.4. Identification of the patient

Immediately prior to sampling, the nurse shall uniquely identify and verify the identity of the patient.

The following data shall be entered on the label of the test tube, in the presence of the patient, on the basis of the data obtained from the patient, and if this is not possible, data obtained from the identification mark used by the medicinal entity:
1. the patient's surname and first name (in capital letters),
2. the patient's PESEL number or, if there is no PESEL number, the patient's date of birth,
3. date and time of blood sampling.

If it is not possible to obtain patient data on the label and on the order on the blood grouping test should be entered with the symbol 'NN', gender, general ledger number or unique patient identification number.

Nurse's entitlement to blood transfusions

The nurse/midwife most frequently performing the transfusion of blood and blood components must have the appropriate certification following training by a public blood service. These powers shall be valid for 4 years.

18.5. Start of transfusion and transfusion time

IMPORTANT

Platelet, thawed plasma and thawed cryoprecipitate transfusions should be started **immediately, i.e. without undue delay, after their release from the blood bank**.

The transfusions of the WB, PRBCs, GCs should start no later than 30 minutes after their release from the blood bank.

Individual units of blood or blood components should be taken from the blood bank in succession.

If the time to start a WB or PRBCs transfusion is expected to be more than 30 minutes after blood bank discharge, it should be stored in a refrigerator dedicated exclusively for this purpose, where the storage process has been validated, at a temperature between 2°C and 6°C, with the temperature in the refrigerator checked and recorded at least 3 times per day (every 8 hours).

Planned transfusions should take place during the period when the doctors and nurses or midwives of a unit or organisational unit of a treatment facility are fully staffed.

The blood components are transfused using disposable sterile sets. Medicinal products may not be added to transfused blood or blood components.

IMPORTANT

You cannot transfuse one unit of whole blood or packed red blood cells for more than 4 hours and one unit of platelet concentrate, plasma and cryoprecipitate for more than 30 minutes.

You cannot reconnect a recipient of the same set or the same blood component container after disconnection.

One blood pack or blood component can be transfused through one set during one treatment.

Blood or its components that are not used entirely must not be transfused to another patient.

The containers with the residual blood component after the transfusion, together with the transfusion kits, described by the patient's

name and surname and the date and time of the transfusion, must be stored at 2°C to 6°C for 72 hours in a specially designed refrigerator and then disposed of in such a way that the patient's personal data cannot be obtained by unauthorized persons.

NOTE

The doctor responsible for the transfusion **is present** at the start of the transfusion of the contents of each container of blood or its components.

IMPORTANT

Measurements - measurements of temperature, heart rate and pressure should be made:

1. Right before the transfusion.
2. 15 minutes after the start of the transfusion of each unit of blood or blood component.
3. After the transfusion.

Deterioration of the patient's general condition, particularly between 15 and 20 minutes after the start of transfusion of each blood unit or component, may be a symptom of an adverse reaction.

18.6. Adverse post-transfusion reactions

IMPORTANT

An adverse post-transfusion reaction (complication) is an unintended reaction in a patient during a blood transfusion or its components, which may lead to life threatening, death, loss of efficiency, illness and hospitalisation or prolonged hospitalisation.

Early and late undesirable post-transfusion reactions can be distinguished.

Early serious adverse reactions after transfusion, the symptoms of which occur within 24 hours of transfusion, include in particular:

1. A haemolytic reaction;
2. A bacterial infection;
3. An allergic or anaphylactic reaction;
4. Acute post-transfusional lung damage, hereinafter referred to as 'trali';
5. post-convulsant dyspnea;
6. A non-hemolytic febrile reaction;
7. post-transfusional circulatory overload (taco).

Delayed adverse reactions include in particular:

1. A hemolytic reaction;
2. A post-transfusion purpura;
3. A post-transfusional graft versus recipient disease (ta-gvhd);
4. A transmission of biological pathogens.

If a patient has symptoms that give rise to the suspicion of an early adverse reaction, including a serious adverse reaction, you should:

1. immediately stop the transfusion and notify the doctor;
2. disconnect the blood component container with the transfusion kit, maintaining the vein puncture, and slowly transfuse the pa-

tient - through the new sterile kit - 0.9% sodium chloride solution (NaCl) until appropriate treatment is implemented;
3. secure the detached blood component for possible further testing;
4. measure the patient's body temperature, heart rate and blood pressure;
5. further treatment should be made dependent on the severity and type of symptoms.

NOTE

1) You can't:
   - add medicinal products to blood transfusions,
   - transfuse one unit of whole blood or packed red blood cells for more than 4 hours and one unit of platelet or plasma for more than 30 minutes,
   - after disconnection, reconnect the same transfusion kit or blood component to the patient,
   - transfuse more than 1 unit of whole blood or PRBCs through one transfusion kit,
   - transfuse one unit of whole blood or PRBCs for more than 4 hours,
   - after the transfusion is complete, use the same infusion fluid kit,
   - to transfuse an unused blood component to another patient,
2) The doctor responsible for the transfusion should be present at the start of the transfusion of the contents of each container of blood or blood component.

Training of knowledge – part I

The knowledge training consists of single-choice and multiple-choice open and closed test questions, with a four-department and three-department cafeteria. The content of the questions and their chronological order allow you to verify the degree of mastery of selected issues from the Fundamentals of Nursing course - the part carried out in the form of lectures and exercises.

1. **The Florence Nightingale Medal is the highest award for nurses who have excelled in helping the wounded and sick in times of war and peace. Which organization established the Florence Nightingale Medal?**

   A. World Health Organisation
   B. International Council of Nurses
   C. International Red Cross Movement
   D. European Federation of Nurses

2. **Which of the following nursing theorists believed that a nurse should make her diagnosis by analysing 14 basic needs.**

   A. Fl. Nightingale
   B. D. E. Orem
   C. V Henderson
   D. C. Roy

3. **Which term does not define Evidence-Based Nursing?**

   A. Is a concept of care consisting in nursing practice based on scientific research
   B. Is a concept of care which involves basing the nursing practice on critical appraisal of scientific research
   C. Nursing subjected to the doctor's decision
   D. Is a concept of care that complements the nursing process

4. Which of the following does not characterize Primary Nurse:

A. High level of professional independence and responsibility
B. Versatility, openness, flexibility
C. Decisiveness
D. Subordination to the nurse's functional specialisation

5. Which of the care patterns does not belong to traditional care:

A. Nursing subjected to the doctor's decision
B. Nurse's functional specialisation
C. Care resulting from the doctor's orders and assigned tasks
D. Personalised care

6. Which of the following terms do NOT define the nursing process?

A. Traditional
B. Continuous
C. Individual
D. Overall

7. Elements of the care process

A. Recognition → planning → implementation → evaluation
B. Planning → implementation → evaluation
C. Evaluation → Planning → Implementation → Diagnosis
D. Implementation → planning → identification→ evaluation

8. The diagnosis is:

A. The conclusions of the patient data
B. The result of the comparison of the recognised condition with the obtained
C. The result of the comparison of the documentation data from the observed data
D. Examination of the patient's condition

9. Stage of the nursing process - recognition of the patient's condition. It does NOT contain a phase:

A. To identify human resources, physical resources
B. Data collection
C. Analysing and synthesising data
D. Nursing diagnosis

10. The second stage of the nursing process includes:

A. Setting the purpose of care, selecting actions, formulating a plan of care for the patient and his environment
B. Target setting, care planning
C. Formulation of the care plan, selection of actions
D. Patient care planning

11. What is the first stage of the planning process?

A. Imputation of responsibility
B. Assessment of results
C. Target setting
D. Scheduling

12. The Polish PVP contains information about:

A. Diseases against which children and adults should be vaccinated, taking into account age
B. Persons at particular risk of infection
C. Dates of vaccination, intervals between vaccinations, types of vaccines and methods of administration
D. All the above answers are correct

13. A child can be tested for vaccination:

A. Only by a doctor with the necessary knowledge of preventive vaccination
B. By any doctor
C. By a doctor and a nurse specialist in a particular field of nursing
D. Exclusively by the paediatrician

14. Vaccines must be stored and transferred:

A. In accordance with Good Distribution Practice procedures
B. In accordance with the procedures of Good Distribution Practice and the requirements laid down by the vaccine manufacturers
C. In accordance with the requirements laid down by the vaccine manufacturers
D. At a stable temperature

15. The document certifying the performance of preventive vaccination in children, stored in the vaccination office is:

A. The vaccination and child health booklet
B. The vaccination booklet
C. The children's health booklet
D. Immunization card

16. The following information is NOT entered in the immunization card each time:

A. Name and batch number of the administered vaccine
B. The name of the manufacturer
C. The name of the parent of the child participating in the procedure
D. The date of vaccination

17. After the child has been vaccinated, parents should remain at the GP/pediatrician's outpatient clinic for post-vaccination observation by:

A. Approximately 5 minutes
B. 20-30 minutes
C. Post-vaccination observation is not required for school-age children
D. Only parents of a child with an allergy for approximately 1 hour

18. Protective vaccines may contain:

A. Chemically or physically inactivated (killed) micro-organisms without destroying their antigenic properties
B. Live pathogen-free micro-organisms with the destruction of their antigenic properties
C. Antigens obtained from micro-organisms by extraction or obtained by genetic engineering
D. All the above answers are correct

19. Live vaccines include:

A. Tuberculosis, measles, mumps and rubella vaccine and inactivated seasonal influenza vaccine
B. Vaccination against measles, mumps, rubella, chickenpox, rotavirus
C. Vaccination against tuberculosis, meningococcus, pneumococcus
D. Vaccination against measles, mumps, rubella, chickenpox and cervical papilloma virus

20. When qualifying for vaccination:

A. A qualified medical examination must be carried out at least 3 days before administration of the protective vaccine
B. A qualified medical examination for preventive vaccination may be carried out by a doctor for each speciality
C. It is necessary for a qualification test to be carried out by a doctor with the necessary knowledge of preventive vaccination, indications and contraindications for vaccination as well as undesired post-vaccination reactions
D. No medical examination is necessary, but only vaccination by a person trained in preventive vaccination

21. Adverse Vaccination Event:

A. Is a disorder of health that occurred within 4 weeks after administration of the vaccine
B. Is a health condition that occurred within 10 weeks after administration of the vaccine, including BCG vaccination
C. It occurs only as a result of the individual response of the vaccinated person to the vaccine itself
D. Is solely the result of an incorrect vaccination performance or a defect in the administered vaccine

22. The right temperature for transporting platelet cell concentrate is:

A. 2-10°C
B. 2-6 ^{o}C
C. 20-24 ^{o}C

23. A reliable result of the patient's blood type test is:

A. The result entered in the card of the Honorary Blood Donor
B. The result of a test from a serological or transfusional immunology laboratory or a result entered in a blood chart,
C. Blood card or Honorary Blood Donor card

24. The maximum time for transfusion of Platelet Cell Concentrate and plasma is maximum:

A. 30 minutes
B. 60 minutes
C. 4 hours

25. A check of the patient's parameters in connection with the transfusion should be performed and documented in the following cm of time:

A. Immediately before and after the completion of the transfer
B. Before and after the transfusion, 15 minutes after the start of the transfusion
C. Every 15 minutes during the entire transfusion of the blood component

26. The time from the admission of a platelet cell concentrate to the ward to the start of the transfusion should be no longer than:

A. 5 minutes
B. 30 minutes
C. The transfusion should start immediately after the component is transferred to the ward

27. In the case of a 1-unit transfusion of a patient, the recipient's compliance with the blood component should be checked before the transfusion:

A. Only before the first RBC unit to be transfused,
B. Only before the first and the last transfused unit of RBC,
C. Before each RBC unit transfused

28. The patient parameters to be controlled for the transfusion are:

A. RR, body temperature, heart rate,
B. Only body temperature,
C. Only RR and heart rate

29. If an early complication is reported, we take blood samples from the patient after transfusion:

A. From the same puncture site where the blood component was transfused
B. From a different puncture site than the one where the blood component was transfused
C. It doesn't matter from where the puncture was made

30. The maximum time for transfusion of Red Blood Cell Concentrate (RBC) is maximum:

A. 30 minutes
B. 60 minutes
C. 4 hours

31. If a patient has symptoms suggesting a suspicion of an early transfusion complication, it is the duty of the nurse to be the first to do so:

A. Immediately stop the transfusion by tightening the drain on the transfusion kit and notify the doctor responsible for the transfusion
B. Disconnect the ingredient container and observe the patient
C. Measure the patient's RR, temperature and heart rate and inform him about the possibility of a complication

32. 75% of pressure ulcers develop in the area

A. Occipital, pinna
B. Trochanter, ankles, heels
C. Shoulder blades, knees, elbows
D. Shoulder, iliac plate

33. Full-thickness lesion of skin with connective tissue. Limited wound edges, swelling of the subcutaneous tissue. The bottom of the wound is filled with red granulation tissue. According to the Tarrance scale, you will classify a pressure ulcer with these features as:

A. I degree
B. II degree
C. III degree
D. IV degree
E. IV degree

34. Mistakes made by a nurse at the application stage, which are leading to a nursing diagnosis, may concern, for example:

A. Lack of observation
B. False cause
C. Omission of symptoms
D. Wrong measurement

35. The basic features of observation include:

A. Purposefulness, objectivity, selectivity
B. Subjectivism, continuity
C. Continuity, creativity, reliability
D. Systematic, staged, dynamic

36. The risk of pressure ulcer development is assessed using scales

A. ADL, Barthel, Mini MAC
B. Torancea, Bobath, HAD
C. CBO, Braden, Waterloo
D. IADL, Torancea, IZZ

37. The main routes of respiratory tract infection are:

A. Staff hands
B. Dirty air
C. Contamination of respiratory therapy devices

38. Massage of the back skin is performed:

A. From the center to the perimeter
B. From the circumference to the center
C. It doesn't matter

39. As a result of sterilization, the following is destroyed:

A. All microorganisms with spore forms
B. Destruction of bacteria and viruses

40. Nosocomial infections include:

A. Personnel
B. Patients
C. Families

41. The care plan should include

A. All care activities planned and carried out by the nurse
B. All activities performed by nurses, including medical orders
C. Coordinated actions of the therapeutic team
D. Medical orders

42. Assessment in the nursing process should be made:

A. By individual nurses according to their own frame of reference
B. At the request of the authorities of the care institution by coordinating nurses
C. Systematically, as a team, individually and by people who prepare a care plan
D. By the ward nurse

43. We understand nursing diagnosis

A. Assessment and prioritization of the patient's / client's bio-psycho-social needs
B. Assessment of the bio-psychosocial state, threats and possibilities of a person, family, group
C. Assessment of the health problems of the patient, family and social group
D. Assessment of biological aspects of health

44. The scope of data necessary for a nurse to determine a patient's biological condition should:

A. Indicate how individual systems function in order to apply appropriate further specialist diagnostics
B. Indicate dysfunction of the systems in order to apply an appropriate pharmaceutical therapy
C. To what extent the functions of a given organ have been disturbed and what limitations result from this fact for the patient
D. Include data of basic parameters for observation cards

45. Various types of diagnosis are used in nursing:

A. Therapeutic, rehabilitation, and promotion
B. Causal, prognostic, classification, phase, meaning
C. Biological, mental and social
D. Individual, causal and for the purpose of hospitalization

46. In the case of using the D. Orem model, the nursing diagnosis will consist in:

A. Assessment of the degree of satisfaction of basic needs
B. Assessment of the impact of stimuli on adaptation processes
C. Self-care deficit assessment
D. Assessment of problems in the aspect of everyday activities

47. The self-care deficit is a qualitative and quantitative difference between:

A. Nursing care system and patient's activities
B. The therapeutic requirements of self-care and the patient's self-care
C. Universal needs and the needs resulting from health disorders
D. Actions of the nurse and the actions of the patient

48. The analysis of the self-care deficit is made through the assessment of three groups of needs according to D. Orem. Belong to them.

A. Biological, mental and social needs
B. Socio-cultural, spiritual and developmental needs
C. Universal, developmental and health-related needs
D. Physical, socio-cultural and developmental needs

49. Identifying the different types of stimuli according to C. Roy will allow the nurse to plan an intervention to help a person in the adaptation process in the following dimensions:

A. Cultural, spiritual, existential
B. Role fulfillment, self-concept, interdependence and physiological
C. Family, educational, health and social
D. Biological. Communication, transcultural

50. C. Roy distinguishes three types of stimuli that are important in the adaptation process

A. Situational, stimulating and cognitive
B. Regulatory, cognitive and stimulating
C. Compensatory, regulatory, focal
D. Contextual, focal, residual (residual)

51. The change in the professional role of a modern nurse results from:

A. The act on the profession
B. Polish accession to the EU
C. Changes in patients' expectations and the definition of health
D. Expectations of the organizers of the system

52. The current WHO definition of nursing was formulated by:

A. Fl. Nightingale
B. Polish Nursing Society
C. V. Henderson
D. J. Watson

53. International Nurses Day - is celebrated on May 12 on the anniversary of:

A. Establishing the first nursing school
B. Establishment of ICN - the International Council of Nurses
C. Birthday of Fl. Nightingale
D. The birth of M. Rogers

54. Using phase diagnosis allows you to:

A. Quick determination of the effects of caring activities
B. Qualifying the patient for long-term care
C. Classifying a given state into a specific phase
D. Assessment of the patient's subjective feelings

55. ICN is:

A. Abbreviation used in diagnostics
B. Abbreviation of specific nursing care
C. Name of the disinfectant
D. Abbreviation of nursing organization

56. The theory of B. Numean belongs to the groups of theories:

A. The needs
B. Systems
C. Interpersonal interactions
D. Transcultural

57. The theory of C. Roy belongs to the groups of theories:

A. The needs
B. Systems
C. Interpersonal interactions
D. Transcultural

58. The Polish Nursing Society was founded in:

A. 1860
B. 1925
C. 1935
D. 1957

59. The Polish Association of Professional Nurses was established in:

A. 1860
B. 1925
C. 1935
D. 1957

60. In Poland, the education of nurses at the tertiary level began in:

A. 1925
B. 1935
C. 1969
D. 2005

61. WHO stands for:

A. Department of Holistic Care
B. World Health Organization
C. World Nurses Association
D. Answers A, B, C are wrong

62. The Florence Nightingale Medal was established:

A. 1860
B. 1899
C. 1912
D. 1925

63. The first nursing journal published in Poland is:

A. Polish nurse
B. Problems of Nursing
C. Nurse and Midwife
D. Nurse and Midwife Magazine

64. The nursing journal published today by PNS is:

A. Problems of Nursing
B. Nurse and Midwife
C. Nursing of the 21st Century
D. Polish nurse

65. International Foundation. F. Nightingale (Florence Nightingale Interational Foudation) - as an agency of the International Council of Nurses, was established in:

A. 1945
B. 1932
C. 1934
D. 1948

66. The first school of modern nursing in Poland, “School of Vocational Nurses”, was established:

A. 1911 in Krakow, on the initiative of a group of women members of the St. Vincent a ‘Paulo
B. 1909 in Krakow, on the initiative of a group of women members of the St. Vincent a ‘Paulo
C. 1910 in Warsaw, on the initiative of a group of women members of the St. Vincent a ‘Paulo
D. 1913 in Warsaw, on the initiative of a group of women members of the St. Vincent a ‘Paulo

67. Do you agree with the following statement that the Polish Association of Professional Nurses, which was part of the International Council of Nurses, was established in 1925:

A. Yes
B. No

68. A patient prepared for surgery is very nervous and asks many questions about the course of treatment. The nurse, explaining the patient’s doubts, holds her hand. What is the type of touch?

A. Procedural touch
B. Protective touch
C. Nursing and caring touch
D. Therapeutic touch

69. The patient is being prepared for discharge from the hospital. He asked the nurse to talk to him about the lifestyle he should follow after leaving the hospital. Together with the patient, the nurse determines the list of activities to be performed at home. What kind of support does the nurse provide?

A. Emotional support
B. Information support
C. Material support
D. Instrumental support

70. Care is the activity of the caregiver towards the charge, which is not manifested by (indicate the correct answer):

A. Satisfying the needs of the student / ward
B. Continuity of care
C. Disinterestedness
D. Establishing a symmetrical relationship

71. The least desired trait of the tutor is (indicate the correct answer):

A. Empathy
B. Compassion
C. Authenticity
D. Tolerance

72. Which of the following models does the subject treatment of a patient?

A. Biomedical model
B. The holistic model
C. Socio-ecological model
D. None of the above

73. The Polish Preventive Immunization Program provides information on:

A. Diseases against which children and adults should be vaccinated, taking into account age
B. People particularly vulnerable to infection
C. Dates of vaccinations, intervals between vaccinations, types of vaccines and methods of their administration
D. All of the above answers are correct

74. Nursing is:

A. An independent profession
B. An independent medical profession
C. A profession related to medicine
D. A profession inferior to the doctor

75. Nursing is:

A. An occupation, profession, science, art
B. Occupation, practice, science, profession
C. Occupation, science, profession
D. Practice, art, science, profession

76. The qualifications necessary to practice as a nurse in Poland are confirmed by (indicate the correct answer):

A. Diploma from a nursing school in any European country
B. University diploma in nursing
C. Diploma of graduation from first-cycle studies at the faculties of health science
D. Diploma of graduation from first and second cycle studies at medical universities

77. The right to practice the profession of a nurse in Poland obtains (indicate the correct answer):

A. After graduating in nursing and starting work in the profession
B. After graduating from university and completing a professional internship
C. After graduating from nursing school and demonstrating impeccable ethics
D. After obtaining the diploma of graduation and entering into the Central Register of Nurses and Midwives, when he meets the conditions specified in the Act of 15 July 2011 on the professions of nurse and midwife

78. The most specific and autonomous tasks for the nursing profession include the following functions (indicate the correct answer):

A. Health promotion, curative, education
B. Caring, educational, management
C. Preventive, rehabilitation, research and development
D. Medicinal, health promotion, rehabilitation

79. Hyperpyrexia is an increase in temperature above (indicate the correct answer):

A. 38.5°C
B. 40°C
C. 41.5°C
D. 42°C

80. The patient reports that she has not passed a stool for 4 days. Indicate which of the following actions should be proposed by the nurse to the patient.

A. Encourage the elimination of raw vegetables and fruits from your diet
B. Encourage increasing fluid intake to 2.5 liters per day
C. Recommend self-massage of the abdominal muscles in a clockwise direction
D. Recommend giving an enema as soon as possible

81. For visual acuity testing, the following should be used:

A. Pseudo-isochromatic arrays
B. Snellen tables
C. Ishihara tablets
D. Lovett tables

82. For the examination of color vision, the following should be used:

A. Distance and near tables
B. Snellen tables
C. Ishihara tablets
D. Lovett tables

83. Basic hearing tests are performed using:

A. Speech
B. Whisper
C. Reed
D. All answers are correct

84. When preparing the patient for rectal colonoscopy, you will arrange the large intestine Patient in positions:

A. Trendelenburg
B. High, half-high
C. Knee-elbow, lateral
D. On the abdomen

85. When preparing the patient for pleural puncture, you will instruct him to assume the position:

A. Lying on the side with the arm pointing upwards, sitting with the limbs supported
B. Upper
C. On the abdomen, knee-elbow
D. Safe, Trendelenburg
E. On the back, on the stomach

86. In accordance with the competences, the nurse in the course of abdominal puncture:

A. Independently plans the puncture
B. Participates and assists in the procedure performed by the doctor
C. Independently plans and performs the procedure
D. Orders a puncture

87. Feeling sorry for the other person's problems is:

A. Altruism
B. Empathy
C. Sympathy
D. All false

88. According to Orem, the purpose of nursing is:

A. Obtaining self-care
B. Ensuring an optimal environment
C. Caring for the patient
D. Combating the spread of hospital-acquired diseases

89. The essence of the professional activity of a nurse in the Polish health care system is (indicate the correct answer):

A. Helping the doctor in treating the patient
B. Helping a hospital patient with the care process as prescribed by physicians
C. Providing care services, primarily in the field of diagnostics, therapeutic and preventive treatments in relation to sick people
D. Providing nursing, preventive, diagnostic, treatment, rehabilitation and health promotion services to people in various conditions

90. A 3-month-old infant staying at home under the care of his parents, healthy - proper psychomotor development, breastfed, vaccinated according to the vaccination schedule. Who takes care of the child in the home environment on behalf of POZ?

A. Primary healthcare midwife
B. Primary healthcare nurse
C. Primary healthcare nurse and midwife
D. Due to the lack of health problems, the child is not under the care of a GP nurse / midwife

Answers

Question	Answer	Question	Answer	Question	Answer
1	**C**	31	**A**	61	**B**
2	**C**	32	**B**	62	**C**
3	**C**	33	**C**	63	**A**
4	**D**	34	**B**	64	**A**
5	**D**	35	**A**	65	**C**
6	**A**	36	**C**	66	**A**
7	**A**	37	**A**	67	**A**
8	**A**	38	**A**	68	**C**
9	**A**	39	**A**	69	**B**
10	**B**	40	**B**	70	**D**
11	**C**	41	**A**	71	**D**
12	**D**	42	**C**	72	**A**
13	**A**	43	**B**	73	**D**
14	**B**	44	**C**	74	**B**
15	**D**	45	**B**	75	**A**
16	**C**	46	**C**	76	**B**
17	**B**	47	**B**	77	**D**
18	**D**	48	**A**	78	**B**
19	**A**	49	**B**	79	**C**
20	**C**	50	**D**	80	**B**
21	**A**	51	**C**	81	**B**
22	**C**	52	**C**	82	**C**
23	**B**	53	**C**	83	**D**
24	**A**	54	**C**	84	**C**
25	**B**	55	**D**	85	**A**
26	**C**	56	**B**	86	**B**
27	**C**	57	**B**	87	**B**
28	**A**	58	**D**	88	**A**
29	**B**	59	**B**	89	**B**
30	**C**	60	**C**	90	**A**

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Fundamentals of nursing

Practical part
Chapter 2

Editor:
Joanna Girzelska

Lublin 2023

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PART I

1. Organisation of the nurse's station. Procedure of hygienic handwashing

Noemi Jaszyna

The organization of the nurse's station is of particular important for the nurse's work. Due to its specific character, it is equipped with all kinds of medical equipment, usually sharp pointed, which leads to a great degree of risk of bodily injuries in this sector. A special position in this area is in compliance with procedures aimed at preventing the spread of infections.

Procedure of hygienic handwashing - it mainly consists in washing off organic pollutants and dirt from the skin surface of the hands as well as partial elimination of transient and permanent flora (including pathogenic bacteria such as *Staphylococcus Aureus*, *Escherichia coli*, etc.). The microorganisms which reside on the hands need to be eliminated by proper washing and disinfecting.

In order to reduce the risk of infection transmission, it is essential to:

- protect hands using gloves,
- wash hands in running lukewarm water with /without soap,
- disinfect hands with an alcoholic solution of an antiseptic preparation,
- use a disposable towel to dry hands.

Patient's zone: it refers to the patient himself/herself and the surfaces they are in direct contact with.

Medical worker's zone: these are all hospital surfaces outside the patient's zone. It also includes other patients' zone and a hospital environment.

Medical post: the zone embraces a patient, a health care worker and a health care site.

IMPORTANT

Five moments, in which hand hygiene, is absolutely essential:

1. Before touching a patient;
2. Before clean/aseptic procedures;
3. After body fluid exposure/risk;
4. After touching a patient;
5. After touching patient surroundings.

In any other case the procedure of hand hygiene should include disinfection, i.e. using a product which contains alcohol.

In the first moment, it is necessary to perform hand hygiene or disinfection immediately before contact with a patient.

In the second moment, it is necessary to perform hand hygiene or disinfection immediately before the clean/aseptic procedures.

In the third moment, one should perform hand hygiene or disinfection immediately after exposure to body fluids before touching anything from the patient's environment, e.g. after changing a dressing change, blood sampling for tests, sucking secretion.

In the **fourth moment, it is necessary to** perform hand hygiene or disinfection or a after contact with a patient and their immediate surroundings, e.g. after putting on an oxygen masks, greeting, taking blood pressure.

In the fifth moment, it is necessary to perform hand hygiene or disinfection after direct contact with the objects in the patient's immediate environment, e.g. after touching the patient's bed or a cupboard.

Prior to taking any nursing and medical actions, the medical personnel have to prepare hands to start work. The preparation includes:

- removing all jewellery - a ring/rings, a watch,
- cutting nails short so that they do not go beyond fingertips,
- dressing any abrasions or cuts on the skin.

Procedure of hygienic hand washing

The aim of the procedure is to hygienically wash the hands to prevent infections transmitted by contact and by body fluids. The algorithm of proper conduct must be compatible with the Polish Norm PN-EN 1499. It consists of three stages: hand washing, rinsing and drying.

1. Moistening hands in lukewarm running water.
2. Cupping hands, pressing a liquid soap dispenser and taking 3-5 ml soap from the dispenser (to cover an entire palm surface).
3. Rubbing hands (open palms) - 5-times.
4. Rubbing the palm of the right hand against the upper surface of the left hand, then changing hands and repeating the motion - 5 times.
5. Interlocking fingers of both hands, moving and rubbing them in-between - repeat 5 times.
6. Rubbing the upper surface of bent fingers of one hand under bent fingers of the other hand - both left and right - repeat 5 times.
7. Making rubbing rotating movements of the right thumb against the inside part of the left hand, then switching hands and repeating the motion - 5-times.
8. Making rubbing circular motions with the right hand fingertips and the inner palm of the left hand, and repeating the motion analogously - 5 times.
9. Rinsing the hands under running, warm water (15 s).
10. Drying hands with a disposable paper hand towel.
11. Closing a tap with a disposable towel or with the elbow when the faucet is turned on in such a manner.
12. Discarding a used towel in a medical waste bag.

Procedure of hygienic hand disinfection

Hygienic hand disinfection proved to be more effective. It should be performed as follows:

- before touching a patient,
- before handling invasive devices in patient care no matter whether protective gloves are used or not.
- after contact with body fluids, secretions, mucosa, affected skin or dressings,
- passing from an infected part of the body to another part of the patient's body.
- after contact with surfaces and inanimate objects (medical equipment) located in the immediate vicinity of the patient.
- before a clean, aseptic procedure.
- after contact with the patient's surroundings before and after interacting with the patient.
- after touching a patient,
- after contact with the patient's surroundings before and after interacting with the patient.

The aim of the procedure is to correctly perform hygienic hand disinfection. Hand disinfection removes microorganisms belonging to the transient microflora and reduces permanent microflora. The algorithm of proper conduct must be compatible with the Polish Norm PN-EN 1500.

NOTE

The product is rubbed only into dry hands, The whole process lasts 30 seconds.

1. Extract 3-5 ml of hand sanitizer from a dispenser, using the elbow.
2. Rub the preparation into the hand and wrist skin for 30 seconds, using the same technique as in hygienic hand washing (in accordance with Ayliffe). The preparation must cover the entire surface of the hand.
3. It is necessary to disinfect both hands by rubbing the preparation 5 times.
4. It is essential to pay attention to fingertips, the hollows between the fingers and thumbs as the places are often not properly washed.

   Rubbing ends once the preparation dries out (min. 30s).

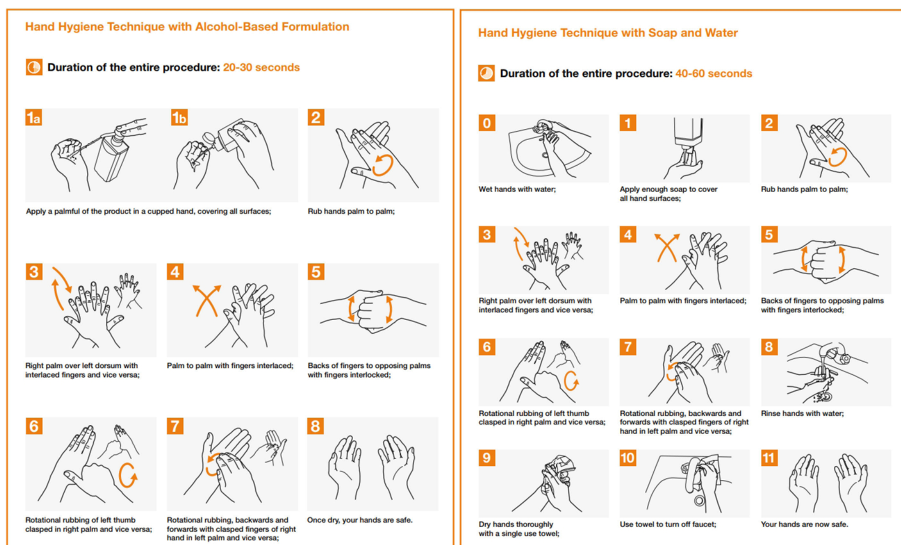


Figure 1. Hand hygiene technique

Source: https://safetyculture.com/checklists/hand-hygiene-audit/# [available: 18.07.2020]

2. Desmurgy - selected methods of bandaging

Noemi Jaszyna

NOTE

Desmurgy (gr. *Desmos* - bond band; *ergon* - work, action) - bandaging. Desmurgy used to be a field of surgery. It dealt with bloodless treatment by applying appropriate bands and dressings. In a literal meaning of the word - desmurgy is an art of applying bands.

2.1. Classical methods of bandaging

The aim of bandaging is to:

- immobilize joints or other parts of the body,
- fix a dressing,
- seal, insulation and fix a compress,
- protect and stabilize joints or other parts of the body after a surgery,
- press blood vessels and prevent venostasis, usually in varices of lower extremities - compression therapy.

When choosing a bandage, one should consider:

1. Which part of the body will bandaged?
2. What is the purpose of the bandage?
3. Will the bandage ensure convenience and comfort to the patient?
4. Are there any contraindications to use a particular bandage, for example an elastic one?

When selecting the right bandage, it is necessary to conduct a comprehensive interview with a patient and include medical records.

There are several groups of bandages:

1. Suspensory bandages- used for attaching dressings and preventing them from moving.
2. Stabilizing bandages - used for relieving and stabilizing sprains, overloads, sprains and other injuries of muscles, joints, tendons. They can also be used both for prevention for persons practising different sports.
3. Compression/pressure bandages - used in compression therapy.

A contraindication for bandaging is:

- a long-term use of a compression dressing.

Due to the nature of the used material, putting on a dressing is divided into:

1. A traditional
    - with a bandage,
    - with a triangular scarf.
2. Alternative:
    - using a sleeve (knitted or mesh).

Basic bandages:

Several basic bandaging techniques are used for different parts of the body. They occur independently or in a combination (e.g., when we must wrap the entire upper limb). Depending whether it is necessary to bandage around one or more axes, the following types of rolls can be distinguished:

- uniaxial- to bandage e.g. a forearm, thighs or a lower leg,
- biaxial - to bandage for example elbows and knees,
- triaxial - to bandage the head and heel.

It is possible to distinguish the following axes and body planes:

- body axes: vertical, transverse, sagittal,
- body planes: mid-sagittal, sagittal, frontal, transverse.

In view of the position of succeeding rolls of a bandage (band), it is possible to distinguish:

- **circular bandage**: each new layer overlaps the previous one; it is a roll which usually begins and terminates bandaging,

- **spiral bandage:** each new layer overlaps 2/3 of the preceding one, e.g. used in bandaging the lower leg.

Figure 2. Spiral bandage

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

- spiral **reverse bandage:** in the middle of the next turn, the band is folded with the bandage head down. Used on straight body sections,

Figure 3. Spiral reverse bandage

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

- **snake or serpent bandage:** the loops are applied obliquely to the preceding ones. The free space in-between is mainly used for fixing splints,

- **ascending spica bandage:** figure-of-eight dressing; with the bandage turns towards the heart (or upwards); used in hand bandaging,

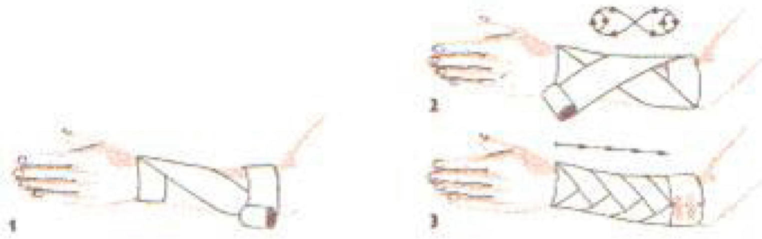


Figure 4. Ascending spica bandage

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

- **descending spica bandage:** similarly to the previous one, yet the crossings progress towards the heart (or down),

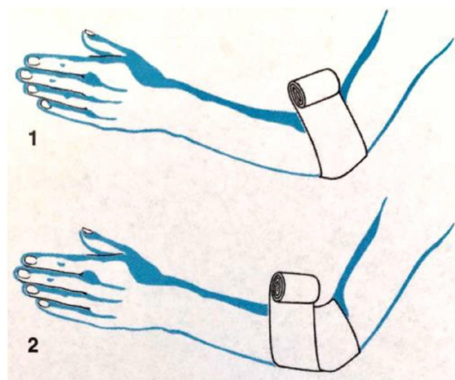
- **converging oblique dressing:** figure-of-eight loops crossing in the joint bend. We begin above or below the joint, and terminate in its centre. It resembles the shell of a tortoise. It is mainly used for bandaging the knee and elbow joints,

- diverging **oblique bandage: similarly to the previous one, yet the bandaging begins in the bend and ends above or below the joint.** It is used for bandaging the knee and elbow joints, ankles.

Based on the direction of the bandage against the body axis:

- **ascending:** bandaging starts in a place below, for example a dressing, and progresses upwards,

- **descending:** bandaging starts in a place above, for example a dressing, and progresses downwards,



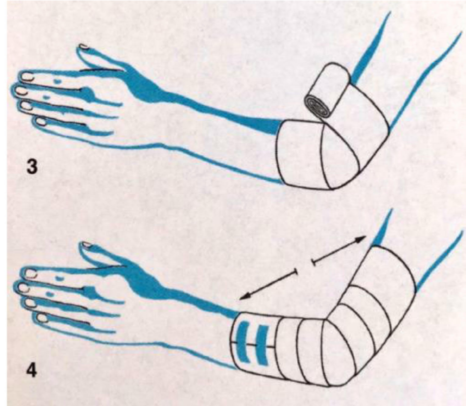


Figure 5. Diverging oblique dressing of the elbow

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

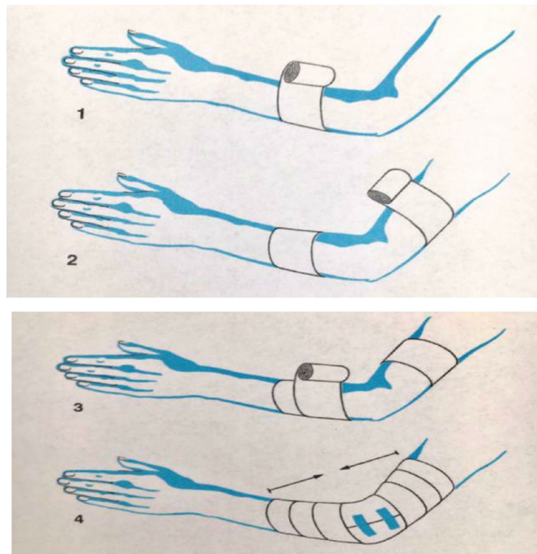


Figure 6. Converging oblique dressing of the shoulder joint

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

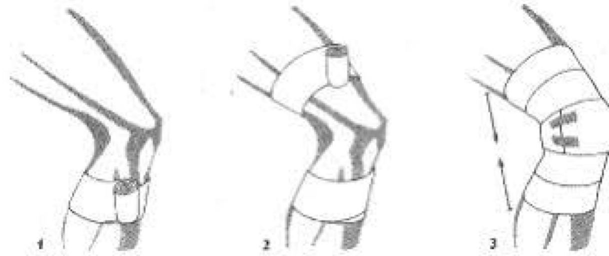


Figure 7. Converging oblique dressing of the knee

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

Figure 8. Diverging oblique dressing of the heel

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

Complete bandage of hand, using a spiral roll, like a glove
Right hand

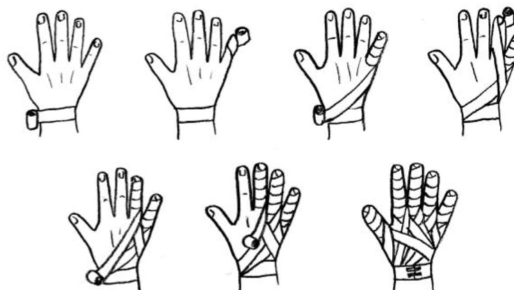


Figure 9. Complete bandage of right hand, using a spiral roll, like a glove

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

NOTE

In this type of dressing, the inside part of the hand is free from loops.

Left hand

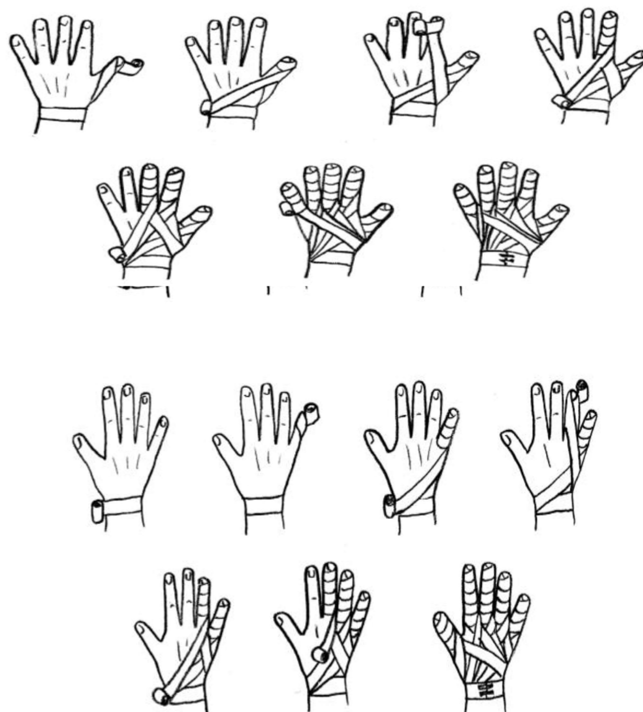


Figure 10. Complete bandage of left hand, using a spiral roll, like a glove

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

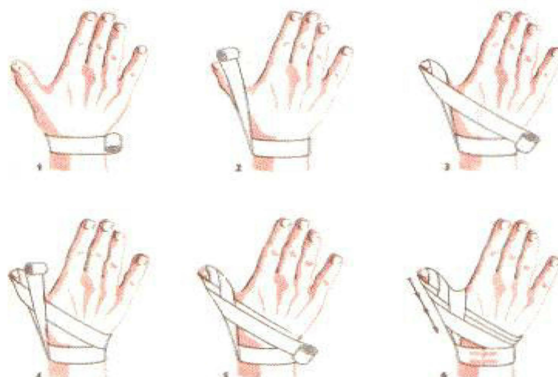


Figure 11. Complete thumb bandage, right hand using ascending spica

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

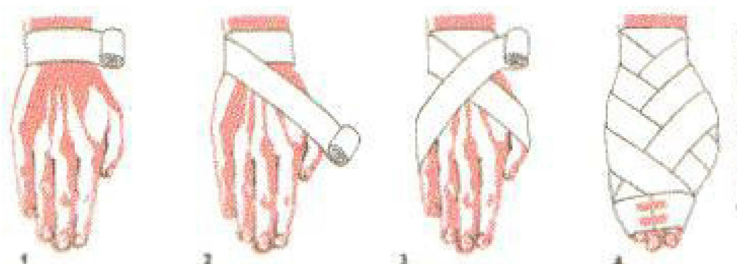


Figure 12. Incomplete hand bandage, using descending spica

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

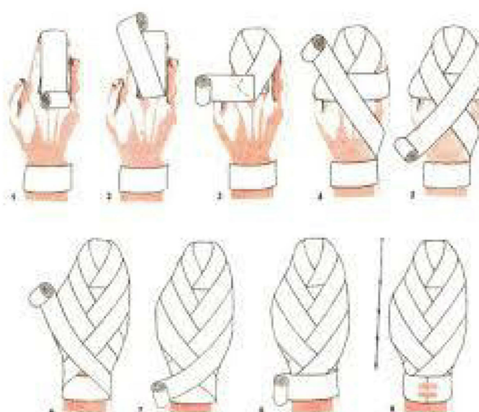


Figure 13. Complete hand bandage, using ascending spica

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

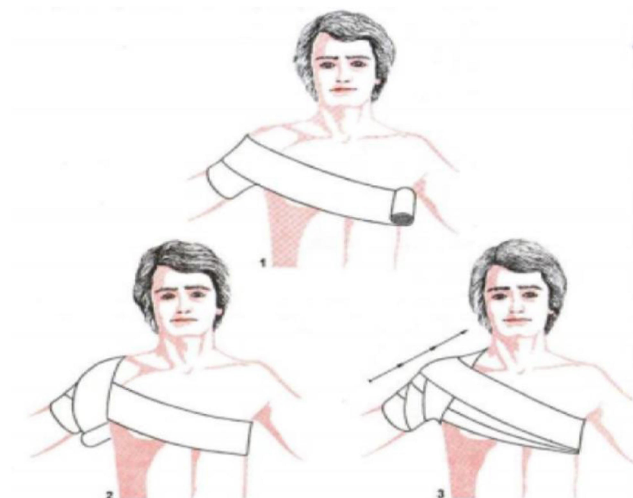


Figure 14. Ascending spica of the shoulder (single)

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

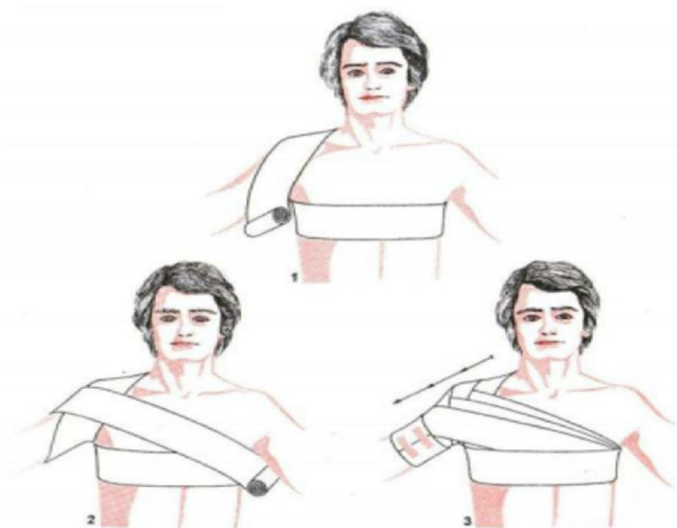


Figure 15. Descending spica of the shoulder (single)

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

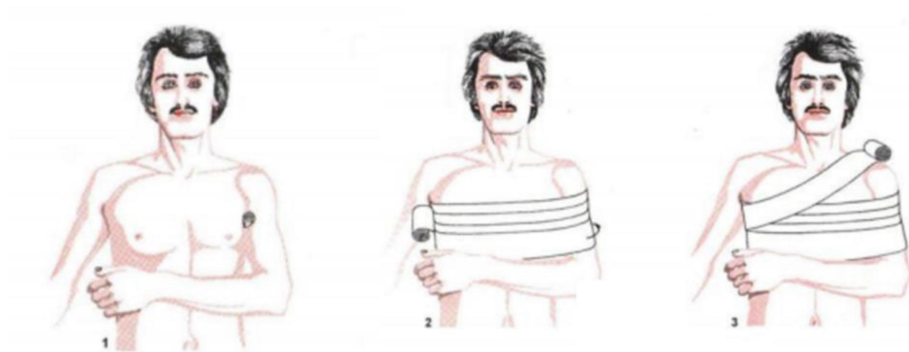


Figure 16. Desault bandage

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1

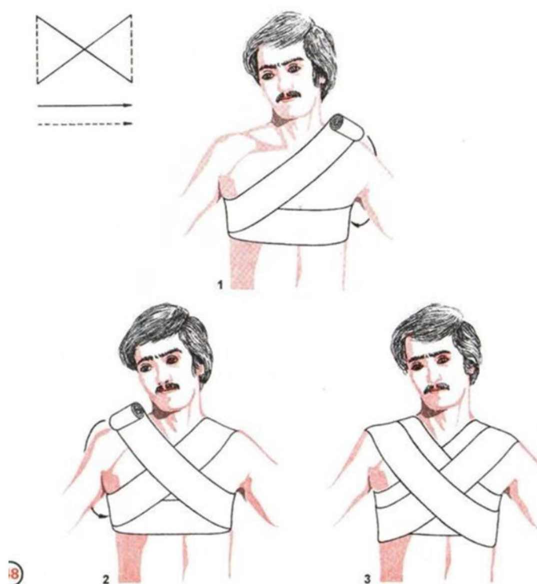


Figure 17. Bandaging of the back and chest: horizontal and vertical star

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

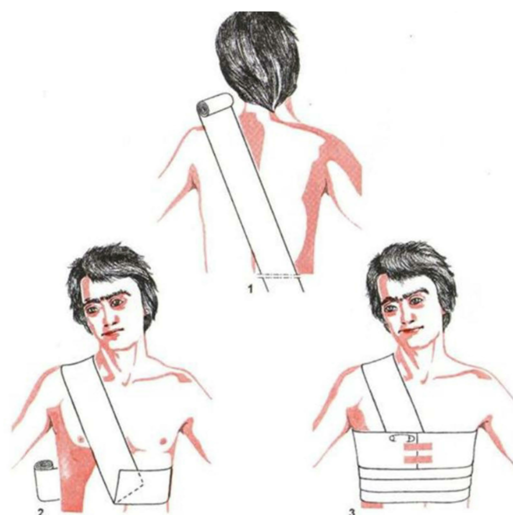


Figure 18. Bandaging the man's chest (boys), so-called "male bra"

Źródło: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

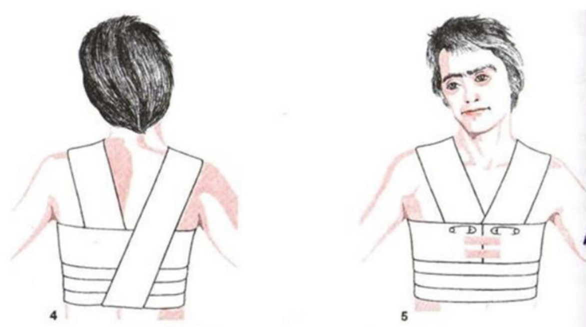


Figure 19. Bandaging the man's chest (boys), so-called "male bra"

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

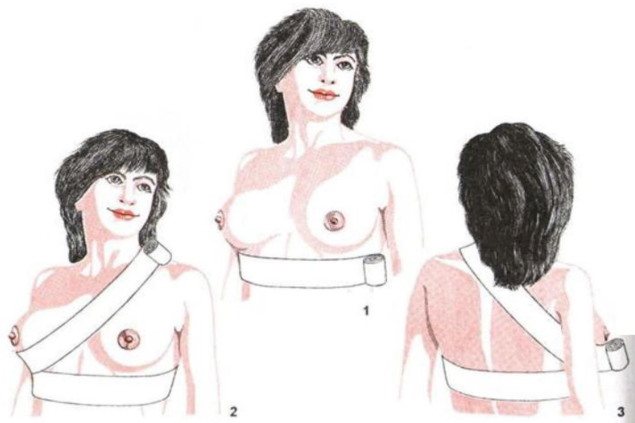


Figure 20. Bandaging the right female breast, so-called "one-side female bra"

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

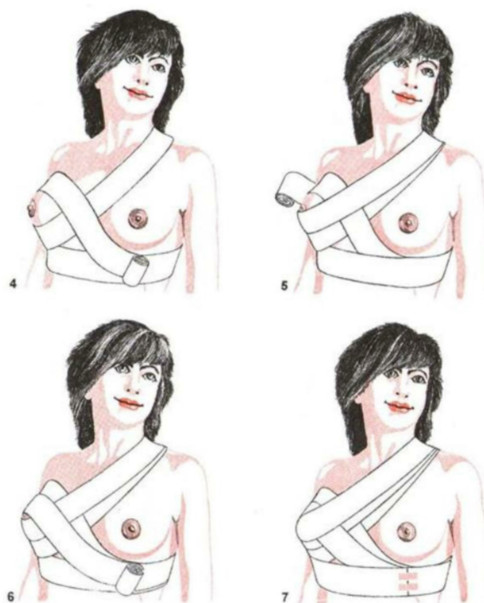


Figure 21. Bandaging the right female breast, so-called "one-side female bra"

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

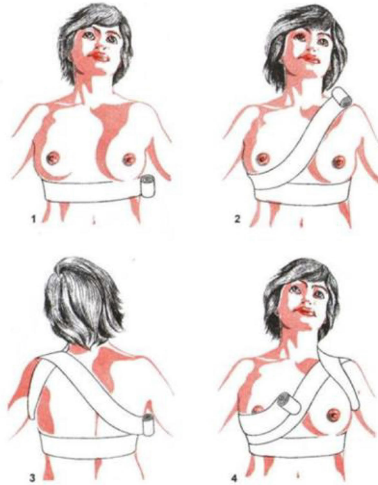


Figure 22. Bandaging the breast -
support and pressure dressing, anchored on the shoulder

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

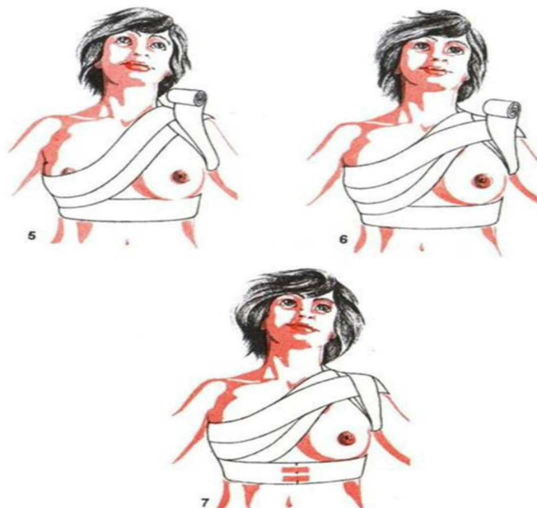


Figure 23. Bandaging the breast -
support and pressure dressing, anchored on the shoulder

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

Descending spica bandage of the thigh and hip

Both the thigh and lower leg can be bandaged using e.g. spiral, reverse spiral and descending spica. If we have to secure also the hip joint, then it is necessary to use other bandaging techniques as well.

Figure 24. Descending spica bandage of the thigh and hip

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

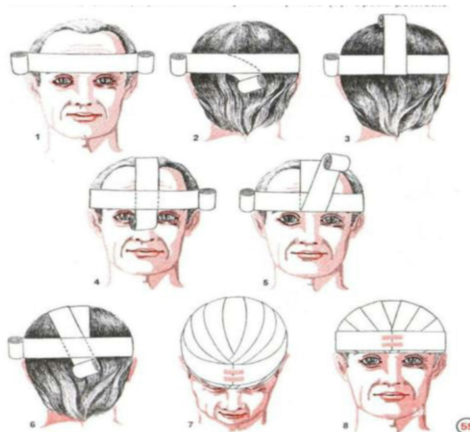


Figure 25. Hippocrates bandage of the head

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

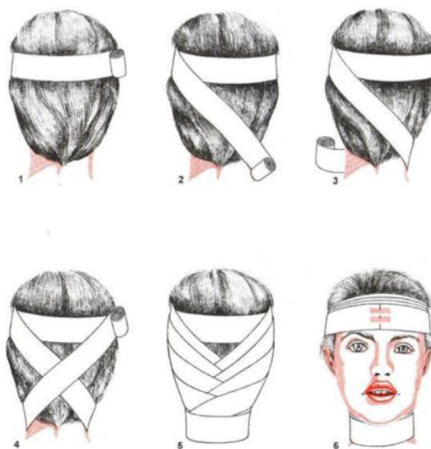


Figure 26. Spica of occiput (scalp)

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

2.2. Alternative methods of bandaging

Applying dressings with a triangular scarf

A triangular bandage is a piece of cotton material, triangular-shaped. It is a very useful material for fixing dressings.

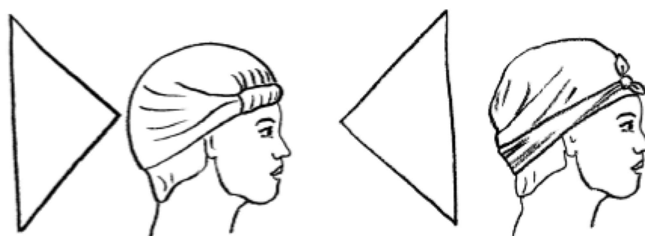


Figure 27. Bandage of head

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

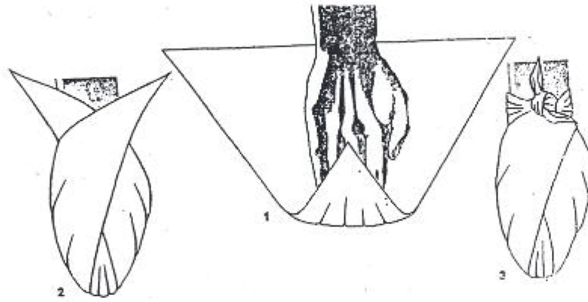


Figure 28. Bandage of hand

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

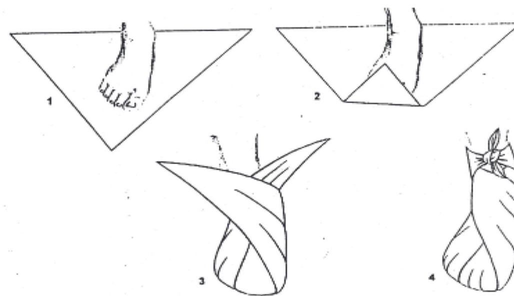


Figure 29. Bandage of foot

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 19

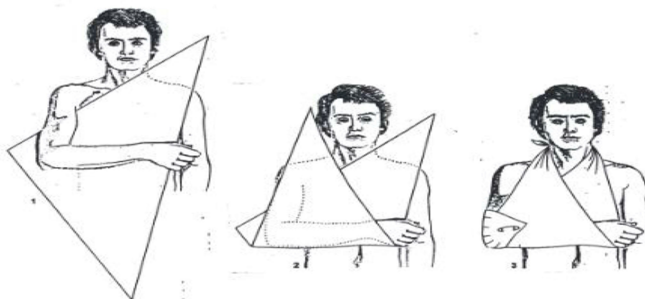


Figure 30. Sling

Source: Chrząszczewska A.: Bandażowanie. PZWL, Warszawa 1998

Fastening a dressing with the so-called sleeve

Bandage sleeves - the name comes from a shape, form, appearance of a seamless dressing.

There are two types of sleeves:

- knitted;
- mesh.

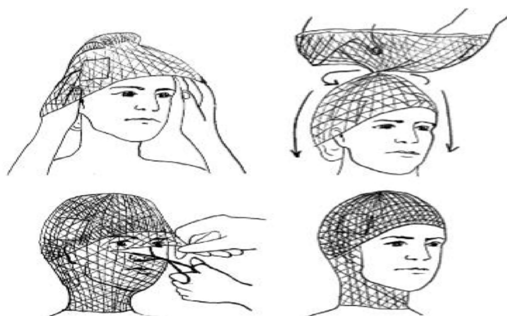


Figure 31. Mesh bandage of the head

Source: Budynek M., Nowacki C.: Wiedza o opatrunkach. Wydawnictwo Adi, Łódź 1999

1. Apply about 60 cm of a sleeve, simultaneously expanding and stretching to the base of the ears on the head.
2. The free end should be wrapped twice around its own axis and then pulled over the head, down to the neck.
3. Finally, it is necessary to cut the sleeve on eye level, 10 cm wide and stretch the lower part onto the chin.

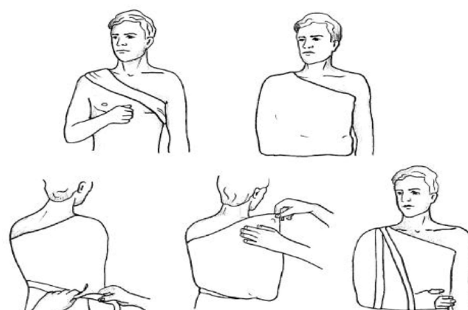


Figure 32. Knitted dressing on the shoulder, arm and chest - Dessault dressing

Source: Budynek M., Nowacki C.: Wiedza o opatrunkach. Wydawnictwo Adi, Łódź 1999

1. The sleeve must be adjusted to the chest measurement.
2. Initially the sleeve must be folded so as to form a double layer. Next it must be crinkled and then stretched over a healthy arm.
3. The dressing is now on a sick shoulder and a healthy armpit. The closed bandage end is at the top.
4. It must be rolled over a wounded body part. The sleeve must be carefully rolled over the bent shoulder and arm to the navel. Similarly to a sling, the sleeve must be folded below an armpit.
5. Then, between the elbow and the torso, it is necessary to pull the sleeve to a depth of 15-20 cm. The ends must be pulled out hard and a knot tied tight.
6. The dressing, which is over the sick shoulder, must be pulled up harder. The remaining tip must be pulled back and secured by means of a tape.
7. Additionally, the dressing must be strengthened by two extra tapes on the forearm. The sleeve must be cut so as to release fingers.

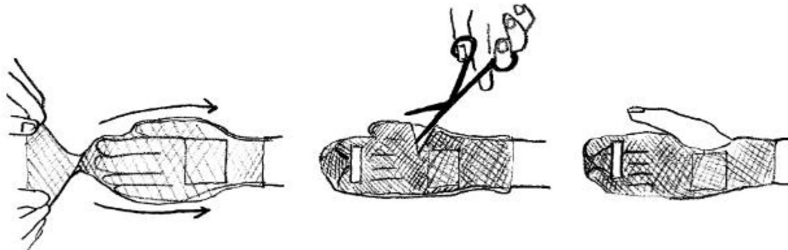


Figure 33. Mesh bandage of the hand

Source: Budynek M., Nowacki C.: Wiedza o opatrunkach. Wydawnictwo Adi, Łódź 1999

1. The next adjust the length of the sleeve to the hand. Then the dressing must be drawn onto on the hand, to the wrist, rolled twice around its own axis and stretched again onto the hand.
2. Cut the dressing at the base of the thumb and take the finger out (approx. 2cm).

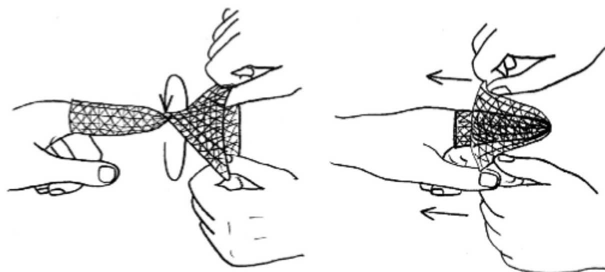


Figure 34. Mesh bandage of the finger

Source: Budynek M., Nowacki C.: Wiedza o opatrunkach. Wydawnictwo Adi, Łódź 1999

3. Moving and transporting the patient

Jolanta Dziewulska

Lifting and moving bed-ridden and seriously ill patients is often associated with ignorance and lack of principles or avoidance of use of rescue equipment. Consequently, it may lead to additional suffering of patients and motor disabilities in nurses. Lifting, moving as well as such basic tasks as pulling, pushing, reaching, rotating carry a risk of an injury and a back pain. Every lifting and moving carries a risk for both a nurse and a patient. Therefore, it is important to use the right techniques and equipment by the staff.

General principles of moving a patient:

1. Assess your physical abilities in relation to the health and weight of the patient. Do not try to lift/move/change the patient's position, if you realize that you are unable to do it yourself.
2. Wherever possible, use auxiliary equipment properly adjusted to match the weight and size of the patient.
3. The patient's body cannot limit the nurse's view.
4. Raising and lowering the patient should be carried out slowly. While maintaining the weight of the front of the body, avoid twisting or tilting the body.
5. Never hold the patient under the "armpits", because you may damage the shoulder joints.
6. Put your hands under the patient's armpits and grasp the blade bones.
7. Always work on bent legs - this way you reduce the load on the spine.

Rules of handling patients manually

Manual movement of patients should be allowed only in life-threatening situations for the patient, without constituting an injury to the life

and health of medical personnel. When moving/manually transporting the patient, it is essential to:
1. work on bent legs,
2. keep the spine erect,
3. slowly raise and lower the patient. While keeping the body weight in the front, avoid twisting or tilting the trunk,
4. avoid carrying - use centre of gravity,
5. work in close contact with the patient.
6. It is recommended to use light aid tools (e.g: easy slides, belts) and heavy equipment (lifts).

Methods and techniques of transportation using the equipment:
1. Moving manually is conducted by one or more persons who use their own muscle strength.
2. Moving by means of light equipment, e.g.,:
   - sliding systems: easy slides, and roller boards - Fig. 1,
   - ergonomic belts,
   - rotating disks.

Picture 1. Sliding systems

3. Moving by means of electromechanical heavy equipment, e.g.,:
   - upright lifts used when moving a patient from a sitting to a standing position, or any other sitting position,
   - walking assist devices - Fig.2,
   - powered toilet lifts,
   - ceiling mounted lifts.

Picture 2. Walking assist devices

The following auxiliary devices assist the patient in changing the position on their own, i.e. bed extension kits, hand grips, rope ladders.

Determining a proper techniques of moving the patient depends on:

- patient's physical ability - weakness, contractures,
- general condition,
- understanding commands,
- a medical disorder,
- body weight.

Moving the patient without the use of equipment:

Moving the patient from a lying to a sitting position

Objective - changing patient's position

1. Before seating the patient, adjust the bed height to your own height, above the middle part of thighs.
2. Stand on the level of the patient's waist (navel to navel).
3. Bend the patient's both legs, sliding the heels on the ground.
4. Work on bent legs, keeping your back straight.
5. Tilt the trunk with your closer hand, lay the other hand on the patient's stomach.

6. Keeping the spine erect, hold on to the thigh and shoulder.
7. In one motion, turn the patient to yourself.
8. Slide the legs over the bed edge.
9. Holding the patient's shoulder, place one hand below the shoulder blade and the other one on the hip.
10. Moving the weight of your body towards the bed centre, put the patient in a sitting position.
11. Spread the legs to stabilize the patient's position.
12. Stick to the commonly accepted rules.

4. Anti-inflammatory treatments

Marta Czekirda

4.1. Dry cold, damp cold

Anti-inflammatory treatments

An inflammation is a body reaction to a stimulus causing an inflammation. Inflammation (*inflammatio*) is a local response to a stimulus causing an inflammation. An inflammation is a body attempt to defend itself against a harmful agent.

Causes of inflammation:
– mechanical injury;
– exogenous chemical agents (acids, bases), and endogenous ones;
– physical agents, e.g. ultraviolet radiation;
– foreign bodies;
– biologic agents such as viruses, bacteria, fungi, necrotic tissue.

IMPORTANT

Symptoms of inflammation:
a) local: redness, swelling, increase in temperature, pain, impaired function of an affected organ,
b) general: increased body temperature, increase in blood cells and OB.

In nursing practice, the term poultice is often used interchangeably with the term compress - a treatment involving the local application of heat or cold.

For some authors, these terms are not synonymous, and the criterion for distinguishing a compress from a poultice is the number of layers of which they are composed:
1) poultice - two layers
2) compress - three layers.

Some authors differentiate between poultices and compresses.

Wrap:
1) treatment carried out with one layer of material (cooling compress),
2) two layers of material (drying compress),
3) three layers of material (warming compress).

Compress - a finished product, in the form of a bag of various shapes and sizes filled with gel.

There is a distinction between anti-inflammatory treatments using:
- dry cold and dry humid,
- dry heat, humid heat,
- incentives (cupping) to the patient's skin.

Table 1. Types of anti-inflammatory treatments

TYPE OF TREATMENT	GENERAL EFFECT	APPLIED FORMS	APPLICATION TIME	TEMPERATURE
Dry cold	Inhibits the development of inflammation, relieves pain, cools the skin at the site of application, reduces post-traumatic or post-operative swelling, lowers body temperature	Work with ice	20-30 minutes	0-15°C
		Gel compress	20-30 minutes	Cooled in the freezer to 0-15°C

Damp cold	Inhibits the development of inflammation, reduces swelling and congestion of the lumen, lowers body temperature, has a calming and analgesic effect	Cooling wrap	15-20 minutes	Cold water 8-20°C; water with ice cubes 5-10°C
		Drying pack	2-3 hours	Cool water 21-27°C
Dry heat	Accelerates wound healing, improves local circulation, relieves pain, causes muscle spasms to sub-side, and warms the entire body	Thermofor	20-30 minutes	Water 50-70°C
		Gel compress	20-30 minutes	Heated in water at 70-80°C
Moist heat	Increase cell power, decrease pain, decrease muscle power, accelerate rope formation, interrupt the inflammatory process, change blood vessels and lymphatics, accelerate metabolism	Warming wrap	6-8 hours	Cool water 21-27°C or summer 28-33°C

Source: Zalewska-Puchała J., Łatka J., Umiejętności kliniczne i techniki zabiegów przeciwzapalnych. [W:] Podstawy pielęgniarstwa. Tom 2. Wybrane procedury i procedury opieki pielęgniarskiej, (red.), Ślusarska B., Zarzyck D., Majda A., PZWL, Warszawa 2017

4.2. Cupping treatment with fire and without fire

Cupping treatment in patients is used in the form of traditional cups and cups without fire (becoming more widespread). The mechanism of the cupping treatment consists in arterial and venous congestion and cracking of superficial blood vessels, from which the blood

is released to tissues, acting as a xenogenic protein that leads to the production of immune bodies.

Fire cups are placed on the front and back of the chest, in rows, at a distance of about 1-2 cm from one another.

Cups without fire can also be placed on a lower part of the back, just above the buttocks next to the spine (neuralgic pains, inflammation of nerve rootlets, dysmenorrhoea), on an aching muscle (myalgia, muscular rheumatism).

IMPORTANT

Cups should not be placed: on the spine, collarbone, bridge, breast nipples, mammary glands, near the apex of the heart, stomach, kidneys, large blood vessels, in persons on very skinny shoulder-blades.

In the case of cupping without fire, it is necessary to warm them beforehand by immersing them in water at 40-42 °C.

5. Essence, aim, methods, manners and interpretation of measurement

Maria Pyć

5.1. Anthropometric measurements: measurement of body weight and growth, BMI, WHR and WHtR

Measurement of body weight and height, BMI, WHR and WHtR

Monitoring anthropometric testing allows a detection of deviations from the norm, determining the correct measurements with regard to age and gender, body build, state of nutrition, body proportions in order to ensure good health and well-being by undertaking early action to prevent permanent changes which impair health.

Objective: measurement; calculation of indexes and evaluation of anthropometric measures.

Measurement techniques for basic anthropometric characteristics:

A preliminary assessment of somatic development is conducted on the basis of five anthropometric measures: height (length), body mass, circumference of the body, chest and neck. The evaluation of these features allows defining the basic proportions of the body and the patient's state of nutrition:

- **Body weight** in adults is measured with levelled and tared medical scales. It not recommended to use bathroom scales due to their inaccuracy. The measurement is usually taken in the morning. Based on the measured value, one may subtract the approx

imate weight of clothes, e.g. assuming 0.1 kg for underwear and 0.5 kg for the rest of the clothes.

- **Body height** is measured with an anthropometer.
- **Head circumference** is measured with an anthropometric measuring tape.
- **Neck circumference** is measured at the base of the neck, in its widest point.

Anthropometric test methods:

The Body Mass Index (BMI) is defined as the body mass divided by the square of the body height:

NOTE

BMI = (body weight) ((kg)/(body height) (m^2)

Table 2. BMI Evaluation criteria

No.	Classification of nutritional levels	BMI (kg/m^2)
1	Malnutrition (stage III)	Under 16
2	Malnutrition (stage II)	16 – 16.9
3	Malnutrition (stage I)	17 – 18.4
4	Correct values	18.5 – 24.9
5	Overweight (obesity stage I)	25.0 – 29.9
6	Obesity (stage II)	30.0 – 39.9
7	Obesity stage III (severe, fatal)	40 and above

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. *T. 1,2. Wyd. PZWL, Warszawa 2017.*

Indicators of fat tissue distribution:

- **The waist-hip ratio (WHR)** is the circumference of the waist to that of the hips calculated as waist measurement divided by hip measurement. The correct WHR value for males equals (M) and for females - (F) . The waist circumference is measured midway in the distance of the lower edge of the last rib arch to the upper edge of the hip plate. The measurement should be made perpendicularly to the vertical line of the trunk at the end of a gentle exhalation. On the basis of the WHR index, two types of obesity have been distinguished: gynoid obesity (gluteal-femoral), occurring more frequently in women and android (abdominal) obesity, occurring more frequently in men.
- **The waist-height ratio (WHtR)** is calculated as waist measurement (cm) divided by height measurement (cm). The index enables a detection of abdominal obesity. It is assumed to be constant and equal for both sexes, being equal to WHtR=0.5, which means that abdominal obesity occurs when the waist circumference is greater than half the height of the body. The measurements are filed in an anthropometric report card.

5.2. Measurement of basic life parameters

IMPORTANT

Heart rate measurement consists in examining perceptible beats against the vessel wall, caused by the contraction of the heart and a flow of blood, flowing through the arterial system.

The pulse rate measurement is performed mostly on the radial artery on the wrist, as well as the temporal, angular, axillary, brachial, femoral, popliteal, dorsal foot arteries.

IMPORTANT

The correct pulse rate should be steady, well-toned, at a frequency of 60 to 90 beats per minute.

The heart rate (pulse) is a measurement commonly used in assessing the general condition of the patient and especially in people with cardiovascular diseases.

IMPORTANT

Pulse features:

1. Frequency **-** number of heart beats per minute.

Factors which increase the heart rate:

1. **Physiological:**
   - age (e.g. a baby, a child, an adolescent); emotional states (increased heart rate - tachycardia, bradycardia);
   - physical activity (increased heart rate - tachycardia, bradycardia), for example exercises performed by athletes;
   - position (measurement of a heart rate of a person lying down and standing shows a difference of 10 beats/min.);
   - stimulants (alcohol, nicotine).
2. **Pathological:**
   - fever (body temperature increase of 1°C corresponds to an increase of heart rate of 10 to 20 beats/min.);
   - cardiac diseases (heart failure, neurosis);
   - hypovolemia (loss of blood, dehydration)..

Factors leading to a decrease in heart rate:

1. **Physiological:**
   - sleep;
   - lying position;
   - in athletes;
   - stimulants (alcohol, nicotine).
2. **Pathological:**
   - increased intracranial pressure (e.g. brain tumour);
   - metabolic disorders (e.g. hypothyroidism);
   - poisoning of internal origin (uremia);
   - poisoning of external origin (e.g. fungi, digitalis overdoses).

2. **Pulse tone:**

The pulse tone is due to resilience of the vessel wall against pushing blood flow, or the force with which blood pushes the vessel wall. In terms of its force, the pulse can have:

- High tension;
- Soft tension, barely palpable, thready or imperceptible, e.g. During hemorrhage;
- Very high tension, hard, full, e.g. In atherosclerosis, hypertension;
- Rapid, characterized by a very short period of being palpable with fingers, quickly disappears;
- Decreased (e.g. It appears in aortic incompetence);
- Lazy, slow and barely palpable (e.g. In aortic stenosis);
- Strange (paradoxical), the pulse tone changes during an inhalation and exhalation (e.g. It decreases during an inhalation and increases during an exhalation), in case of a severe heart failure or pericardial and pulmonary adhesions that make it difficult for blood to reach the heart;
- Alternating, the tone is either better or worse (e.g. During severe heart damage).

3. **Rhythm of the heart (rate):**

Heart rate variability is evaluated by observing intervals between various waveforms. Heart rate may be subject to severe fluctuations that can accelerate or decelerate breathing, fatigue, abusing stimulants such as coffee, strong tea, alcohol, and pathological conditions, e.g. myocardial injury.

Pulse rate failure factors

- Irregular respiratory function during periodic acceleration and deceleration of the heart - it is not a pathological symptom;
- Regular single pulse beats (every 4-5 beats), e.g. After fatigue, coffee and alcohol abuse, or smoking a large number of cigarettes, the so-called missed beats;
- Perpetual arrhythmia which occurs in atrial fibrillation, which is often accompanied by pulse deficit (the pulse is slower than the heart rate counted at the same time);
- Extrasystolic arrhythmia (additional beats), in which there are additional heart beats that may be regular or irregular;
- Paroxysmal tachycardia over 160 beats/min.; it starts suddenly, lasts a few days, and suddenly disappears.

Method and place of pulse examination:

Pulse is usually examined by the palpatory method. One can use a stethoscope for this purpose during the auscultation of heart rate, after being connected to monitoring equipment, such as a cardiomonitor, or after making an electronic measurement. Usually pulse is examined on the radial artery. In emergencies - life threatening - pulse is examined on large arteries: carotid, femoral, brachial. In the peripheral circulation disorders, pulse is checked on the dorsal artery of foot, popliteal artery and posterior tibial artery.

IMPORTANT

Methods of pulse measurement:

In order to perform an examination, it is necessary to use a watch with a second hand. The patient must remain in a lying or sitting position. The examination is conducted in a quiet place.

- Fingers II, III and IV of the dominant hand (usually right) are placed along the radial artery. The pulse rate is measured for 15 sec and then the result is multiplied by 4 (e.g. 18x4 = 72 beats/min.) provided the heart rate is constant;
- In case of an irregular heartbeat, the pulse measurement is taken for 60 seconds;
- Fingers II, III and IV of the right hand can be placed in any place where the arteries run and they may become the measurement place;

The rhythm of the pulse can be confronted simultaneously with cardiac function (for the apex of the heart in V intercostal space in left midclavicular line, with a stethoscope).

Interpretation of heartbeat results:

Proper heartbeat is steady, rather high, with proper tension and equal on homonymous arteries. The heartbeat values depend on the age of an examined person. It is usually equal to:

- in a newborn: 136 - 140 beats/min.,
- in a one-year old child: 110 - 130 beats/min.,
- in youths: 80 - 85 beats/min.,
- in adults 66 - 76 beats/min.,
- in elderly persons: about 60 or 90-95 beats/min.

Blood pressure screening

This is a test to measure indirectly the amount of force with which the blood pushes against the walls of blood vessels.. The measurement can be made by means of spring apparatuses (clockwork), automatic and semi automatic. The measurement uses the Korotkoff sound technique, which consists in listening for sounds that occur during a release of an external oppression of the brachial artery. The blood pressure measurement is commonly used in prophylaxis and treatment of hypertension.

Purpose of measurement: determination and assessment of blood pressure, monitoring the effectiveness of treatment of arterial hypertension, diagnosis of arterial hypertension.

IMPORTANT

Contraindications to measure arterial blood pressure:

- Arterial blood pressure should not measured on a limb on the side of previously performed mastectomy or on the side with hemiplegia;
- Arterial blood pressure should not measured on a limb with arteriovenous fistula or spontaneous fistula;
- Arterial blood pressure should not measured on a limb which is connected to an intravenous drip infusion.

NOTE

Table 3. Classification of blood pressure according to the Polish Society of Hypertension

No.	Category	Systolic pressure	Diastolic pressure
1	Optimal	<120 mmHg	<80 mmHg
2	Normal	120 – 125 mmHg	80 – 84 mmHg
3	High normal	120 – 125 mmHg	85 – 89 mmHg
4	Stage 1 - high blood pressure	140 – 159 mmHg	90 – 99 mmHg
5	Stage 2 - high blood pressure	160 – 169 mmHg	100 – 109 mmHg
6	Stage 3 - high blood pressure	≥ 180 mmHg	≥ 110 mmHg

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (ed.): Podstawy pielęgniarstwa. T. 1,2. Wyd. PZWL, Warszawa 2017.

Measuring body temperature

Measuring the body temperature is determined using a thermometer scale for human body temperature. The body temperature can be measured by external methods (measurement in the armpit, and groin), without contact on forehead skin, and with internal methods (measurement in the anal, oral, ear canals and in the vaginal cavity). The temperature is measured to determine body temperature and identify any abnormalities with regard to the thermoregulation of the organism. Most often in nursing practice, the nurse deals with conditions of increased body temperature (such as subfebrile body temperature, mild fever, high fever).

IMPORTANT

Normal body temperature values depending on the place of measurement:

- in the armpit it equals 36.0 - 37.0°C,
- in the groin it equals 36.0 - 37.0°C,
- in the anal canal it is 0.5°C higher than in the armpit,
- in the oral cavity, it is 0.3°C higher than in the armpit,
- in the ear canal it varies depending on age:
  - in persons aged 11 - 65 years it equals 35.9 - 37.6°C,
  - in persons above 65 years of age, it is 35.8 - 37.5°C.

Classification of fever depending on temperature height:

- 37.5 - 38°C - subfebrile body temperature,
- 38.0 - 38.5°C - mild fever,
- 38.5 - 40.5°C - high fever,
- > 41.0°C - very high fever.

Boundary values of body temperature measurement:

- the highest maximum temperature ranges from 42 to 43°C; above this temperature proteins are denaturated,
- the lowest critical temperature is -26°C, causing a paralysis of the respiratory and angioneurotic systems, ultimately leading to death.

Measurement of breath

IMPORTANT

The measurement of breath consists in calculating the respiratory lung action, during which the lungs supply the body with oxygen and remove carbon dioxide.

The measurement is taken by observing the chest movements or feeling its movements by a hand adjacent to the chest, for 1 minute, while the patient is resting.

NOTE

Normal breathing in adults is rhythmical, not very deep, at a frequency of about 12 to 20 inhalations per minute, inaudible, odourless.

An exhalation is slightly longer than an inhalation. Examining a breath is part of general patient's checkup.

Purpose of examination: measurement and evaluation of breath.

NOTE

Values of correct breathing at rest:
- a newborn and a baby: 40 – 40/min.,
- child: 20 -2 5/min,
- adult: 12 – 20/min.

Factors accelerating breath:
- physiological: increased physical effort, emotional states (stress, anger, fear, joy),
- pathological: fever, decreased breath volume (lung diseases, chest trauma, decreased circulation, reduced amount of blood, reduced amount of oxygen in an exhaled air.

Factors decelerating breath:
- physiological: sleep, hyperventilation,
- pathological: intoxication with sleep-inducing drugs, cranio-cerebral trauma, hypothermia.

Features of correct breathing:
- regular,
- not very deep,
- effortless,
- odourless,
- inaudible,
- exhalation longer than inhalation.

Breath types:
- *bradypnoë* - slower breath, e.g. at rest, in a dream,
- *tachypnoë* - accelerated breathing, e.g. in states of excitement, diseases of the lungs (pulmonary edema, pneumonia),
- hyperventilation - excessive ventilation of the lungs, for example in mental disorders, during a hypovolemic shock,
- hypoventilation - reduced lung ventilation, e.g. in a depression, pneumothorax,

- inspiratory dyspnoea - laboured breathing associated with an inhalation, for example in chest injuries,
- expiratory dyspnoea - laboured breathing, for example bronchial asthma, bronchitis,
- *orthopnoë* - a disease symptom observed in e.g. chronic left-sided heart failure - due to severe dyspnoea the patient remains in a standing position and rests his/her hands against an object (e.g. window sill, bed), making it easier to breathe. *Orthopnoë* includes an increased number of breaths. It frequently occurs in the form of night-time asthma attacks, which are referred to as cardiac asthma.

Measurement of oxygen saturation

Description of measuring oxygen saturation:

Saturation is another expression for anoxia. The word derives from Latin "*saturato*", which means liquid saturation with a gas. In medicine it is referred to oxygen saturation in blood.

Test method:

The level of saturation may be tested in a safe and simple manner by means of a heart rate monitor. In the apparatus, a special sensor measures the absorption of radiation from the transmitter by red blood cells. The outcome of saturation is obtained in percentage. It is the amount of oxygen-saturated hemoglobin.

Place of fixing a heart rate monitor sensor:

- finger or toe,
- ear concha,
- wing of the nostril,
- forehead,
- in newborns on the foot or wrist.

Apart from examining saturation, the device can also measure and record pulse, or heart rate.

An impaired result is due to:

- factors impairing a flow of peripheral blood,
- ineffective tissue perfusion,

- taking a measurement in a cold place,
- lack of control over the body, e.g. convulsions,
- disorders of hemoglobin levels,
- type of light in a room,
- various changes on nails, e.g. a dark varnish or mycosis.

Saturation - norm

Proper oxygen saturation of blood equals approximately 95-98%. In patients undergoing oxygen therapy, the level of saturation is 98-100%. One should bear in mind that in smokers saturation is lower than in non-smokers. Saturation below the norm is a result under 90%. It usually indicates severe respiratory failure. It is important to remember, however, that even if saturation is high, the oxygen value on the oxygen level may be low. Examining saturation does not refer to the aerobic metabolism in cells.

IMPORTANT

Interpretation of the results of blood saturation

- Oxygen saturation of hemoglobin in arterial blood (SaO_2) is correct at a level of 95-98%; in patients over 70 years of age it is 94-98%; during an oxygen therapy it is as high as 99-100%.
- Saturation below 90% indicates respiratory failure.

6. Execution and evaluation of ECG

Mariusz Gnat

An electrocardiogram records the electrical voltage changes arising in the myocardium. The source of electric energy is any living cell of the myocardium.

Indications for making an electrocardiogram (ECG):
- Assessment of electrical activity of the heart in various diseases;
- Assessment of myocardial ischemia;
- Assessment of heart's conduction system;
- Assessment of arrhythmias;
- Assessment of an efficiency of a pacemaker.

The cardiac cycle: electrical and mechanical activation and return to baseline conditions of an individual cardiac muscle cell, or the entire heart.

Depolarization: A condition in which there is a slight difference between the electrical potential inside and outside of a cell. At rest, a cell is polarized with a negative potential inside in comparison with the environment. Depolarization initiates a current that changes the permeability of a cell membrane, allowing positively charged ions to migrate inside a cell.

Two phase wave: composed of two deflections: positive and negative.

Distal: located away from the starting point. Opposite of proximal.

Electrode: a conductive element that facilitates a flow of electricity, attached to the skin, connected to the ECG recorder.

Electrocardiogram (ECG): ECG recording, imaging the electrical activity of the heart.

Single phase wave: composed of two deflections: positive and negative.

Isoelectric line: a horizontal line on the ECG paper, i.e. baseline representing neither a positive nor a negative potential.

The PR segment: time from the onset of the P wave until the beginning of the QRS complex.

The ST segment: time between the end of the QRS complex and the start of the T wave.

The PR interval: time from the onset of the P wave until the beginning of the QRS complex. This interval shows the time from the onset of atrial activation to the onset of ventricular activation.

The QRS complex interval: the time from the onset to the end of the QRS complex, representing the time needed to stimulate ventricular cells.

The QT interval: the time from the onset of the QRS complex to the end of the T wave. It represents the time from the beginning of the ventricular excitation to the end of their repolarization.

Action potential: a positive electrical potential registered from inside of the cell which has been stimulated by an electrical current or an electrical impulse.

Point J: a place of connecting the QRS complex and the ST segment.

QS: single phase negative QRS complex.

Repolarization: a state in which the inside of the cell has a negative potential compared to the environment. Ion pumps located in the cell membranes are responsible for repolarization. It may be disturbed by an approaching wave of electrical excitation.

Diastole of the heart:
period during which the heart is at an electrical and mechanical rest. An electric diastole is called repolarization, whereas a mechani-

cal diastole is referred to as relaxation. During a mechanical diastole, the cardiac cavities fill with blood.

Systole of the heart:

the period of the heart rate, during which it is in the stage of activation, both in the electrical and mechanical sense. An electric systole is referred to as depolarization, a mechanical systole is a contraction of muscle fibers. During the contraction, blood is pumped out of the cardiac cavities.

NOTE

ECG wave: an electrocardiographic representation of activation phases or repolarization during the electrical activity of the heart.

P wave: the first wave of the ECG; it represents atrial stimulation.

Q wave: the negative wave at the onset of the QRS complex.

R wave: the first positive QRS wave in the QRS complex; it may appear at the beginning of the QRS complex or occur after the Q wave.

R' wave: the second positive wave in the QRS complex.

T wave: the last large wave in ECG during the cardiac cycle; it represents ventricular repolarization.

U wave: the wave appearing in some people just behind the T wave. It is usually tiny. Its origin is unclear.

The QRS complex: the second wave or a complex of waves appearing on the ECG during the cardiac cycle activity; it represents the ventricular excitation.

Figure 35. The QRS complex

It arises as a result of depolarization of muscle cavities. The complex comprises the Q wave (negative), R (positive), S (negative). The QRS complexes without the R wave are called QS.

Artifact: record of the ECG signal, whose source is not the cardiac muscle.

Anterior axillary line: a vertical line on the torso which runs through the front of the armpit.

Midaxillary line: a vertical line on the torso which runs through the top of the armpit.

Mid-clavicular line: vertical line on the torso which runs through the middle part of the clavicle.

ECG lead: connection of the body surface with a device registering electrical signals (electrocardiograph).

aV lead: a reinforced V lead; it uses a modified central tip of the inputs of two limb electrodes as a negative end and an electrode on the examined limb, as a positive end.

Enlarged ECG record with marked most important intervals and segments.

P wave

It is formed during depolarization of the atria; the ascending part - depolarization of the right atrium; the descending part - depolarization of the left atrium.

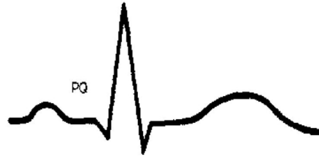


Figure 36. The QRS complex and P wave

PQ interval

It specifies the necessary time to pass stimulation from the sinus node through the atrioventricular node, the bundle branches and fascicles of His, Purkinje network up to the ventricles.

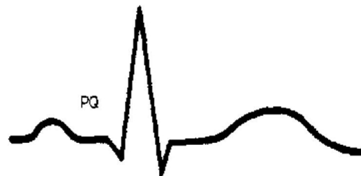


Figure 37. PQ interval

ST Segment

It is the image of the initial phase of ventricular muscle repolarization.

The location of the ST segment is assessed in relation to the TP segment in the ECG at rest with the *PQ* segment in a cardiac stress test.

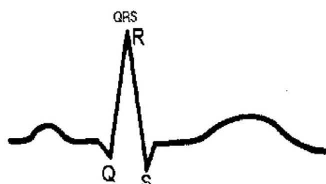


Figure 39. ST Segment

T wave

T wave is produced during the final phase of ventricular repolarization.

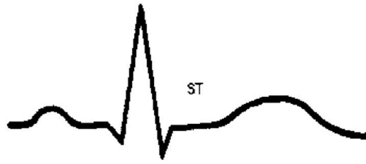


Figure 40. T wave

QT interval

It specifies the duration of action potentials in working fibres of the ventricles.

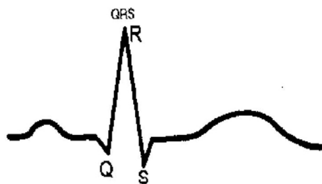


Figure 41. QT interval

IMPORTANT

ECG leads

<u>Standard bipolar leads (I, II, III)</u>

Lead I - the electrodes are placed on the upper limbs. The record shows a difference in potentials between the left and right hand.

Lead II - the electrodes are arranged on the right upper limb and the lower left limb. The record shows the difference between the right arm and the left leg.

Lead III - the electrodes are attached to the upper limb of the upper left and lower left limb. The record represents the difference in voltage between the left hand and the left leg.

Unipolar limb leads (aVR, aVL, aVF)

a V R - the examining electrode is placed on the right hand.
a V L - the examining electrode is placed on the left hand.
a V F - the examining electrode is placed on the left leg.

Unipolar precordial leads

V_I - IV intercostal space at the right sternal border.
V_2 - IV intercostal space at the left sternal border.
V_3 - half of the distance between V_2 and V_4.
V_4 - V intercostal space at the left mid-clavicular line.
V_5 - V intercostal space in the anterior axillary line.
V_6 - V intercostal space in the mid-axillary line.

7. The administration of drugs through the digestive tract

Maria Pyć

The drug administered through the digestive tract - (p.o) - **per os -** it may be absorbed through almost all sections: the oral mucosa, stomach, intestine; therefore the drug can be delivered per os, sub linguam, per buccalis or per rectum. The absorption takes place through epithelium lining the respective sections of the digestive tract.

Indications for the administration of drugs per os:

- diseases of the digestive tract, respiratory, urinary, nervous, vascular, reproductive, endocrine, musculoskeletal systems, sense organs and skin.

IMPORTANT

Contraindications for the administration of drugs per os:

- burns of the mouth, throat, esophagus,
- a narrowed esophagus,
- certain neuromuscular diseases,
- drug allergy,
- nausea and vomiting,
- drug hypersensitivity of the gastritic mucosa,
- enteritis during its exacerbation,
- aspiration of gastric contents,
- abolition of the peristalitic movements,
- gastroenterologic surgery
- unconscious patient.

PART II

1. Topical administration of drugs to the skin and mucous membranes

Jolanta Dziewulska

The drugs applied topically to the skin or mucous membranes, i.e. the conjunctival sac, eye, nose, ear and vagina. The skin and mucous membranes, due to their tasks and physiological properties may be an administration site of drugs. The topical administration of a drug is a direct application to a specific site onto a certain body surface for the treatment of diseases, a wide range of pharmacological groups such as drops, creams, plasters, gels, ointments, aerosols, solutions, powders, pastes.

Objective - applying an ointment/cream/powder/straps on affected skin

IMPORTANT

Recommendations:

- treatment of pain,
- local anaesthesia used in techniques of regional anaesthesia,
- elimination or mitigation of local symptoms caused by various reasons, i.e.: edema, congestion, keratosis, chafing, frostbite, ulceration, etc.,
- inflammation of the skin and its appendages.

Contraindications:

- contact allergy,
- hypersensitivity to the active substance,
- In numerous cases - the first trimester of pregnancy and nursing.

Administration of drugs into the conjunctival sac

The mucous membrane is very well supplied with blood. Thus, a drug is rapidly absorbed into the conjunctival sac - drops, ointments.

In practice, the most common eye drops are in the form of aqueous solutions, gels, and sterile ointments. The preparations may be administered externally to the surface of the eye or to the conjuctival sac.

Putting in eye drops

Objective - administration of a drug into the eye for local action.

Note: When administering a drug, one should avoid touching eyelashes with a dropper or a tube. It should be kept at a distance of approximately 1 cm from the eye.

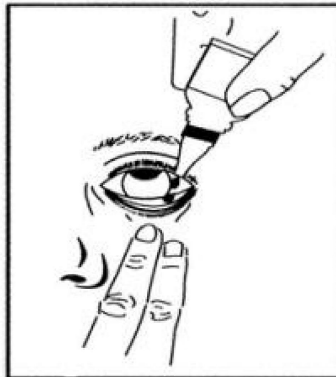


Figure 42. Putting in eye drops

Figure 43. Pressing lacrimal ducts

Drug administration into the nose

Nasal drugs can be administered in the form of: drops, sprays, gels.

Objective - administration of a drug into the nose for local action.

Indications for administration through the nasal route:
- nasal infections,
- nasal inflammation,
- inflammation of nasal sinuses,
- nasal polyps,
- acute otitis media,
- allergies.

Contraindications:
- drug hypersensitivity,
- pregnancy,
- children under 3 years of age - most drugs.

Administration of drugs into the ear - a therapeutic treatment which consists in applying pharmaceuticals - drops, ointments, aerosol, gel, into the external ear or the tympanic cavity. The drugs which are administered in this way become active after a few minutes.

Objective - administration of a drug into the ear for local action.
Indications for drug administration into the ear:
- infection of the organ of hearing,
- inflammation of the organ of hearing,
- boils of the external acoustic meatus,
- perforation of the tympanic membrane,
- softening hard earwax in the ear canal before rinsing.

Contraindications for drug administration into the ear:
- Hypersensitivity to the components of the preparation.

Administration of drugs through the vaginal route - therapeutic treatment based on the introduction of a drug into the vagina to a depth of 3-5 cm, preferably in the evening just before a rest. Vaginal drugs are in the form of intravaginal tablets, gels, creams, jellies, rinses.

Objective - administration of a drug into the vagina for local action.

Indications for drug administration into the vagina:

- inflammation of the reproductive organ,
- fungal, protozoan, candidal infections of the vagina and vulva,
- acute and chronic urinary tract infections,
- obtaining a regenerative or lubricating effect.

Contraindications for drug administration into the vagina:

- hypersensitivity to the active substance
- drug allergy,
- vaginal bleeding
- first trimester of pregnancy - some medicines.

Therapeutic baths - involve immersion of the body or its part in a substance at a specified temperature.

Objective: disinfecting the patient's skin

Effect of therapeutic baths:

- therapeutic effect - analgesia, improves blood circulation, enhances immunity,
- relaxation.

Directions:

- disinfecting wounds,
- treatment of miliaria and chafes in children.

Contraindications:

- acute cardiovascular diseases,
- extensive bleeding wounds,
- bladder or bowel incontinence,
- difficulties in proper cooperation.

2. Supporting respiratory function

Marta Czekirda

NOTE

Respiration - activities that contribute to the control of respiration, or elimination/reduction of factors which impair breathing. It can be defined as **respiration**, i.e. actions that will optimize the phases of inhalation and exhalation.

Objective:
- maintaining a physiological ventition,
- strengthening the force of exhalation,
- increasing the mobility of the chest,
- evacuation of secretions from the airways (cough effective),
- facilitating coughing.

Actions to support the patient:
1) Breathing exercises - breathing gymnastics (controlled inhalation and exhalation as well as maximum exhalations).
2) Supporting removal of secretions:
   a) effective cough (coughing or clearing the throat [consonant ‘r’],
   b) manually - by patting and shaking the chest.
3) Postural drainage in positions to facilitate the evacuation of remaining secretions:
   a) a horizontal position on the back,
   b) a horizontal position on the side,
   c) a horizontal position on the side, rotating forward,
   d) a horizontal position on the side, rotating backward.

The Trendelenburg position relating to all of the items mentioned above (additional bed inclination at an angle of 15-20° so that the head is below the lower limbs).

Figure 44. Lie on your back. Stretch your legs. Place the hands at your sides.

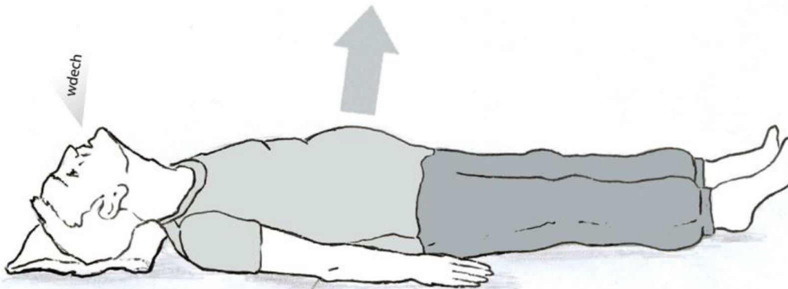


Figure 45. When breathing in, tilt your head back and push the belly forward.

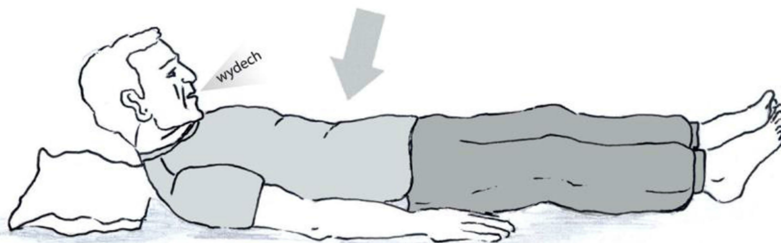


Figure 46. Make an exhalation, pulling the belly and raising the head forwards. Touch the sternum with your chin. Repeat the exercise 4-5 times.

Sit on a chair at the table. Set a lighted candle on the table at a distance of 15 cm from the face. Place one hand on the stomach.

Take a breath in. Next slowly and steadily exhale the air so that the candle flame is deflected all the time. Practise about 3 minutes daily.

Every day gradually increase the distance between a candle and the lips (up to a few dozen centimeters).

Figure 47. Breathing with resisted inspiration

Figure 48. Effective cough

IMPORTANT

Percussion - is a series of vigorous strokes performed with the masseur's hands, following one after the other, very quickly into a massaged tissue.

In percussion, the contact with the massage therapist's hand should be as short as possible, and the force of impact on the entire surface of the massaging hand should be distributed evenly.

Patting should be elastic, short, so as not to result in pain or lead to bruising, hematoma and angiorrhexis. There are two types of percussion:
- fast - 250-300 beats/min.,
- slow - 100-120 beats/ min.

Purpose of percussion

- Extensive congestion of the massaged surface; it improves the nutrition of tissues.
- Stimulation of smooth muscles and striated muscles to a contraction.
- Reduction of body fat through an acceleration of metabolism.
- Increasing the temperature of the tissues.
- In diseases of the respiratory system, percussion is used to detach the retained secretions in the lungs.

IMPORTANT

Contraindications to percussion:

- tumours in the chest area,
- severe osteoporosis,
- rib fractures and vertebral compression fractures,
- pneumothorax,
- pulmonary embolism,
- bleeding into the respiratory tract,
- serious heart arrhythmias,
- pain when tapping.

Patient's positions - active and passive drainage

Postural drainage is a type of rehabilitation of patients with difficulties in coughing up large amounts of retained bronchial mucus. The patient with a lung disease assumes such a position that a given section of the airway is above the so-called pulmonary hilus, which causes the secretion remaining in the patient's lungs to flow freely due to the gravitational force from smaller bronchi to large ones and further to the trachea from where it is being coughed up.

There are three types of drainage:

- static drainage - special positions of laying the patient,
- dynamic drainage - rhythmic tilting the trunk forwards and sideways,
- autogenic drainage - respiration in three phases and breathing volumes.

The aim of this treatment is to remove retained secretions.

Indications for using postural drain:

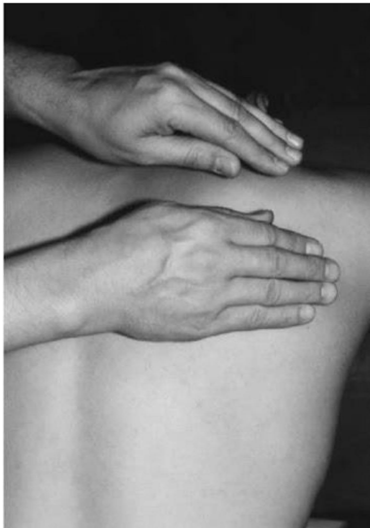
- disease processes in the respiratory system which hamper the evacuation of a secretion,
- inflammation of the lungs,
- preparing the patient for bronchography,
- preparing the patient for a surgery in the chest region.

Drainage positions:

- apical segments in the upper pulmonary lobes - in case of lesions in the rear part of the lobe, the patient is sitting reclined forward; in case of lesions in the front part of the lobe, the patient is reclined backward,
- forward segments in the upper pulmonary lobes - in case of lesions in the both parts, the patient is lying on the back, in case of lesions in the left side - on the back with the rotation of the torso to the right, and in the case of lesions in the right side - with the rotation of the torso to the left,
- back segment of the upper lobe of the right lung - the patient must lie on the left side with the torso rotation forward at an angle of approximately 40°,
- back segment of the upper left lung – the patient lies on the right side with the torso rotated forward at an angle of 40-45°; the torso is raised approximately 30 cm upwards,
- central lobe of the right lung - the patient lies on the back with the torso rotated to the left at 45°; the legs of the bed or of the mattress, on the side of the patient, are raised 30 cm upwards,
- lingula of the lung — the patient lies on the back with the torso rotation to the right at 40-45° and the legs of the bed or mattress, on the side of the patient, are raised 30 cm upwards,
- the upper segments of both inferior lobes– the patient lies on the stomach with a cushion under the pelvis; in case of left-sided lesions, a slight rotation of the torso to the right, in case of right-hand lesions, slight rotation of the torso to the left,
- frontal base segments of inferior lung lobes – the patient is lying on the back, the legs of the bed, on the side of the patient's feet, are raised 30–40 cm above the level. In the case of lesions in the

left side, the patient is lying higher, with a slight rotation of the torso to the left,

- side base segment of the left inferior lung – the patient is lying on the right side with a cushion under the pelvis and the lower part of the torso; the legs of the bed or of the mattress, on the side of the patient, are raised 30-40 cm upwards. In case of lesions in the side base inferior lobe, the patient is lying as above but on the left side,
- rear base segments of both lobes - the patient is lying on the stomach with a cushion under the pelvis and abdomen; the legs of the bed on the side of the feet, are raised by 30-40 cm; in case of lesions in the left side, the patient lies as above, with a slight rotation of the torso to the right; in case of changes in the right side - with a slight rotation of the torso to the left.



Picture 3. Percussion

3. Injections

Joanna Girzelska

One of the routes of drug administration is through tissues, by means of injections.

IMPORTANT

Injection (Lat. *iniectio,* Eng*. injection*), i.e. an introduction of a solution, a diagnostic agent, an administration of a medicament with a needle (cannula) into tissues, body cavities and blood vessels.

Injections are performed when the drugs received through an oral route irritate the gastric mucosa, or for example disintegrate in the digestive tract under the influence of digestive enzymes if the patient is unable to take drugs orally (vomits).

The drugs which are administered by an injection (parenteral route) are absorbed more quickly and are more potent. Besides, their dosage is usually more accurate than in case of an oral route (enteral route).

IMPORTANT

It is possible to distinguish the following types of injections:

- intradermal,
- subcutaneous,
- intravenous;intravenous;
- intra-arterial,
- intracardiac,
- intra-articular,
- intramedullary,
- intrathecal.

Intradermal subcutaneous, intramuscular, intravenous injections, intravenous drips are performed by a nurse under doctor's written orders.

Intra-arterial, intracardiac, intra-articular, intramedullary, intrathecal injections are performed by a doctor.

It is important to prepare and administer a medicine to an appropriate tissue in accordance with the manufacturer's instructions. **Failure to follow the manufacturer's recommendations may cause severe health complications, detrimental to the patient's life** (for instance introducing a suspension into a vessel can cause vascular occlusion; administering a heavily irritating drug into a subcutaneous tissue may lead to necrosis).

Some drugs can be administered to several tissue types (e.g. insulin).

Drug administration through injections requires adherence to aseptic procedures and compliance with the guidelines under The New Waste Act of 14 December 2012 (Journal of Laws 2013, item 21) and the Regulation of the Minister of Health of 6 June 2013 concerning occupational safety and health when performing work prone to acute injury through tool use in health sector (Journal of Laws, item 696).

3.1. Principles of Preparation of Medications

An administration of drugs by injections requires an adherence to rules relating to the preparation and administration of drugs:

1) A medical order of giving an injection must contain the following data:
   - information about a drug:
     - trade name and/or general,
     - drug dose, possibly drug concentration and drug volume.
   - route of administration, e.g. iv, sc, im, intravenously, subcutaneously, intramuscularly,
   - frequency of administration, possible time of administration, rate of flow, e.g. ml/min (in case of drip infusion), infusion time or daily dose quantity,
   - signature of a requesting physician and his/her stamp.
2) It is essential to observe the practices of control in the preparation of drugs: ampule content (vial/bottle), amount, concentration, route of administration, conditions, and storage temperature, expiry date, signs of decomposition (cloudiness, changes in the colour), mixing the drug in the suspension prior to its administration (e.g. long acting insulin).
3) If it is necessary to use two packs of medicaments, one should adhere to the principle that the medicament must come from the same manufacturer and it needs to be the same batch.
4) Injections and drip infusions must be prepared in a closed room on a surface which was disinfected with a sanitizer.
5) Different drugs must not be mixed in the same syringe. Aqueous and oleaginous solutions must not be combined. It also refers to medicaments on largely varying pH, or those whose combination results in changes noticeable to the eye (colour change, clouding, precipitation).
6) The medicaments must be taken in the syringe **immediately** before being injected. An ampoule, once opened, should not be stored for more **than 30 min.** Ampoules/vials partially used are to be disposed of in hardwall containers.
7) A mixture of a drug and an infusion liquid should be delivered as soon as possible after its preparation, in accordance with the manufacturer's instructions (quantity and type of liquid infusion, time of delivering).

8) During the administration of various infusion liquids through multi way faucets, it is necessary to pay attention to the compatibility of the solutions.
9) Drugs must not be added to blood components (PRBC, KKP, FFP) and blood products (immunoglobulin, albumin), fat emulsions, concentrated electrolyte solutions.
10) Photosensitive drugs (e.g. insulin, amphotericin, folic acid, nifedipine, nitroglycerin, vitamin C, thiogamma) should be protected from light.
11) Before preparing a drug, hands must be washed and disinfected. It is necessary to wear gloves, and possibly a mask/protective goggles during the preparation of drugs known to cause allergic reactions/skin damage, e.g. antibiotics/cytostatic agents.
12) The drugs can:
    - be prepared and administered in a treatment room,
    - be prepared in a treatment room, and administered in a ward;
    - when making use of hospital trolleys, they can be prepared and administered in a ward, *especially* when the patient's life is endangered.
13) Any adverse symptoms on drugs and medical equipment must be documented and reported, withdrawn from use: product batch number.

Procedures of handling equipment used during the administration of drugs through an injection:

- It is necessary to use **disposable equipment**.
- Medications and any equipment used for injections and any other purposes should be checked with regard to their expiry, damage, contamination and loss of sterility.
- Ampoules, vials, bottles should be disinfected prior to their opening. For disinfection, it is necessary to use antiseptic alcoholic preparations or use a ready non-woven gauze, saturated with isopropyl alcohol. The preparation must be allowed to act for at least 15-60 seconds (until it gets dry. Its excess may be wiped with a sterile gauze. Ampoules must be opened with a gauze.
- Prior to an injection, the patient's skin needs to be disinfected. For disinfection, it is necessary to use antiseptic alcoholic preparations or use a ready non-woven gauze, saturated with isopropyl alcohol. The preparation must be allowed to act for at least 15-60 seconds (until it gets dry. Its excess may be wiped with a sterile swab. One

should remember to properly moisten the skin with a disinfectant and to gather the excess of the preparation in a proper direction, by means of a sterile gauze (it is recommended to make sliding movements in one direction, single or circular. At the injection site, the skin must be cleansed 2.5-5 cm^2; the disinfected place must not be touched. In case of an accidental contact with the skin, it is obligatory to disinfect it, following the used procedures.

- One should bear in mind washing and disinfecting hands before and after an injection.
- It is necessary to select an optimal place of a needle insertion and drug administration or making an intravenous drip infusion.
- When performing injections, allergy tests in particular, antibiotics and fast-acting drugs should be prepared. Each time it is necessary to check completeness of a shock controller kit.
- For taking in the drug, it is necessary to use syringes of different volume, an appropriate amount of the drug as well as the volume of the administered solution. It is possible to distinguish the following syringes: 2 ml, 5 ml, 10 ml, 20 ml, 30 ml, 50/60 ml for infusion pumps and 100 ml, with a luer type cap (Picture 1) or a luer-lock type.

Syringes of 1-2 ml in volume are used for intradermal and subcutaneous injections.

Syringes of 2-5 ml in volume are used for intramuscular injections.

Syringes of larger sizes are used for administering medications intravenously, for adding drugs to infusion fluids, rinsing, for example cytostatic agents.

NOTE

For administration of antibiotics intravenously (iv), syringes with volume no less than 20 ml are used.

Picture 4. Syringe with luer type cap

Picture 5. Syringe with luer-lock type cap

- For the administration of medicaments by injection, also pre-filled syringes with an in-built needle, are used. They contain a ready-made drug, having a built-in needle for an injection (e.g. Lovenox).

Picture 6. Pre-filled syringe

- A packaging of a disposable syringe should be opened in a place recommended by the manufacturer (on the side of the piston); the

syringe has to be removed by separating the leaves of the packaging. The syringe should not be pushed through the packaging paper to avoid contaminating the cap.

- A needle in a sterile packaging must be removed in a protective shield by parting the packaging leaves in a place recommended by the manufacturer so as not to contaminate the needle cap.

- The needle cap in the shield should be connected with the syringe cap - the syringe must be extracted from its packaging with the dominant hand, cap up.

- Prior to taking in a drug, the needle should be removed from its casing. The bevel of the needle should be directed in the opposite direction to the syringe scale. The needle cap must be securely attached to the syringe cap.

- After an aseptic insertion of the needle inside an ampoule/vial, the bevel of the needle should be rested upon the inner bottom wall of the ampoule/vial to facilitate sucking in a drug into the syringe in a volume corresponding to the ordered dose. In this way, the syringe scale will also be more visible.

- Dissolving a drug in the form of a dry substance in the ampoule can be done only in a solvent, provided it has been attached to the packaging; or any other solvent recommended by the manufacturer (the information about the solvents is attached with the instruction for the drug).

- When taking in a drug from an ampule, it is advisable to use needles of the smallest possible diameter to avoid sucking in glass particles inside the syringe. Currently, it is recommended to use needle that enable secure taking in, dissolving and injecting medicaments with a side hole or a blunt needle with a membrane and a filter, 5 microns in thickness, to prevent penetrating of solid particulates into the syringe when taking in a drug. The membrane blocks approximately 98% solid particulates (manufacturer's data).

- For the preparation and taking in a medicine from a vial/bottle, it is advisable to use as thin a needle as it is possible, with a side hole, or with a blunt hole pierced vertically in a circle marked on the plug. Thick needles do not cut the rubber plug. They crumble and push it into the vial/bottle, contaminating its contents as well as causing the plug leak.

- In order to prepare a medicament using a solvent recommended by the manufacturer (e.g. 0.9% NaCl, i.e. or saline), one may use a bottle containing a solvent. The possibility of using it several times is achieved by the use of equipment for multiple drug/liquid extraction (the apparatus is fitted with an antibacterial filter, a plastic needle with a luer-type cap hidden in a tightly closed chamber), which allows **another sterile** drug/fluid extraction; **it is necessary to mark the date of the first taking in of the bottle's contents**; the contents should be fully used on the same day.

Picture 7. Mini spike, apparatuses fitted with an antibacterial filter for multiple drug/solvent drawing

- Empty ampules and vials can be disposed of after drug administration; they should be placed next to a signed syringe with a drug to prevent a mistake, for verification and control.

- When drawing in a drug in a liquid state from an ampoule, it is essential to note whether the ampule head contains the drug and then remove it (by slightly tapping the ampule's head with a finger, rubbing around the ampule against a table top surface); disinfect the ampule neck in the place of a factory incision (usually a white stripe on the neck or a dot of any colour on the ampule head) with a ster-

ile swab soaked with an antiseptic preparation; allow some time for the preparation to act; break off the neck of the ampoule with a dry sterile gauze (this will prevent injuries caused by glass splinters in case of the ampule breakage, safeguarding the drug sterility and preventing an antiseptic preparation being pressed into the inside of the ampoule); dispose of the vial in case pieces of glass get inside. If the drug proves to be expensive, it is recommended to draw it in by means of a syringe with a small diameter, using a needle with a filter, trying not to touch the bottom of the ampule.

- While drawing in the drug in a liquid form from an ampoule, it is necessary to grab the ampoule between the index and middle finger of the non-dominant hand, take the syringe with a needle as if it were a dart; if the hands are shaking, it is recommended to rest the elbows on the torso, wrist on wrist and in one motion insert the needle into the interior of the vial; the needle cannot touch the outer wall of the ampule as it will lose its sterility or will become contaminated (in case it happens, the needle must be replaced). Having inserted the needle into the vial with free fingers of the non-dominant hand, it is necessary to grab the syringe, remembering that the tip of the needle must be immersed in the medicament. The dominant hand must pull the piston upwards; the drug with the suction force flows into the syringe; after emptying the entire contents, with the dominant hand holding the syringe and the needle hub, in one motion the needle must be removed from the vial; the needle and the syringe cap should be protected from contamination (touching non-sterile equipment).

- When drawing in a drug in a liquid form from a vial/bottle, it is necessary to remove the metal or plastic cap; disinfect the rubber plug (always in case of a metal cap; in the case of a plastic cap only when the cap is contaminated during the opening); insert a needle with the syringe and draw a drug into the syringe, as above.

- When drawing in a drug in a dry form from a vial/bottle, it is necessary to remove the metal or plastic cap; disinfect the rubber plug (as above); draw in a solvent recommended by the manufacturer into the syringe, slowly introduce the solvent into the vial/bottle, wait for the drug to dissolve; draw in the drug into the syringe, following the guidelines.

- A syringe with a drug/vial with a drug/infusion fluid must be signed with regard to the existing procedures at the facility, taking care of the regulations on the protection of patient's personal data. The data typically includes the patient's surname and name (or initials), drug name, dose, route of delivery.

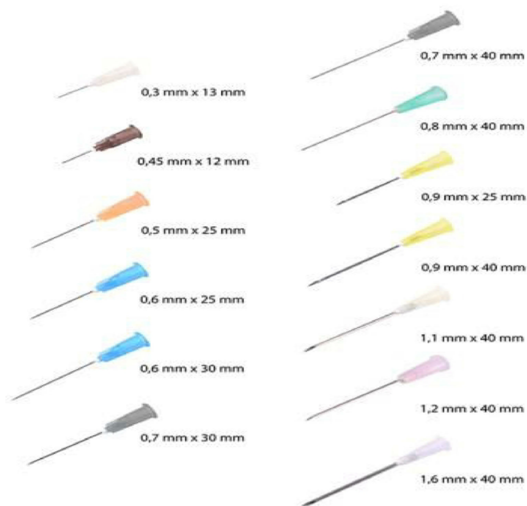
NOTE

Needles used for drawing in a drug/after an injection/for sewing, scalpels must be placed in a hardwall container.

- A syringe with a drawn medicament must be secured with a sterile syringe package, in accordance with the principles described above, or a sterile needle (if the package has been discarded/lost sterility). An intravenous injection through a cannula/central insertion /vascular access port does not require to connect a syringe with the needle for an injection. When performing an intravenous, intramuscular, intradermal, subcutaneous injection with a needle, it is necessary to connect the syringe with a needle for an injection. The needle's dimensions must be appropriate for the type of a performed injection.

- The needles used for drawing in a drug from an ampule or a bottle should not be used to make the injection. They can be used only when the patient's life is endangered.

- The selection of a needle for an injection in terms of its length and diameter is made depending on the type of an injection, type of drug, size of the subcutaneous adipose tissue and patient's age. The needle should be carefully fastened by making a half turn so that the mitre-cut needle should be on the side of the syringe scale; air must be removed from the syringe held vertically by carefully moving the piston upwards with the dominant hand (the index finger of the non-dominant hand rests on the needle cap; when venting, we do not lose contact with the needle); the drug must not be injected in the air; droplets of the drug should appear at the tip of the needle.



Picture 8. Injection needles with regard to diameter and length

- An injection causes discomfort in the patient. In order to reduce the discomfort, it is possible to use small size needles (if possible); distract the patient's attention; lay the patient in a position which decreases muscle tone (important in the case of intramuscular injections); use an anaesthetic 15 min. prior to an injection, or put a bag with ice (important for patients and children who are particularly sensitive to pain); insert a needle smoothly and quickly, give a drug slowly and smoothly; hold a syringe steadily, when the needle is inserted into a tissue; smoothly withdraw a needle at the same angle at which it was introduced; rotate (change) the place of injection to reduce the risk of tissue fibrosis.

- The used needles must be discarded immediately into disposable containers of hard plastic, for sharp objects. They must be treated as dangerous "infectious" medical waste. The needles after a treatment and contact with the patient must not be bent, broken, or inserted into plastic needle shields (the most common cause of pricking among medical personnel). Waste material: syringes, cotton gauze swabs, used disposable gloves should be placed in a red disposable plastic bag as medical waste that is dangerous and "infectious"; the syringe packaging and needles in a plastic bag (other than red or yellow, for example blue) as medical waste which is non-hazardous - "other." Syringes, gauze swabs and other medical equipment which had no

contact with the patient are also treated as hazardous medical waste -”infectious”, placed in a red bag.

- Depending upon the storage conditions and the collected medical waste, the containers or bags should be replaced as often as it is possible, no less **than every 72 hours.** If a nurse prepares a set for an injection on an instrument table, the bags for sorting medical waste are already available with the table. The used non-sterile disposable gloves, referred to as diagnostic - latex, nitrile or vinyl - must be discarded in a red single-use plastic bag as hazardous medical “infectious” waste, after each application.

- Following the guidelines with regard to the use of disposable equipment, it is necessary to put on a new pair of gloves prior to an injection and take them off after injecting the patient.

IMPORTANT

Post-injection complications:

- infecting the patient,
- post-injection abscess
- local allergic reaction to an administered drug,
- aseptic myonecrosis, especially due to the application of corticoids;
- fibrosis and sclerosis of the subcutaneous tissue.
- subcutaneous fat atrophy,
- impaired drug absorption,
- Hoigne syndrom,
- Nicolau syndrom.

- **Hoigné syndrome** - is formed as a consequence of the introduction of drug crystals or a suspension to a blood vessel instead of a muscle tissue. In Hoigne syndrome there is cerebral and pulmonary embolism, a neurological syndrome, lasting 10-20 min.: a panic attack accompanied by a sense of life endangering, hearing impairment (buzz-

ing sound, ringing, hypoacusia or acoustic hyperaesthesia), visual impairment (blurred vision, flashes, spots), impaired consciousness (agitation, confusion, hallucinations, delusions, and sometimes loss of consciousness), tachycardia, increased blood pressure, sometimes coughing, cyanosis. Procedure: ensuring safety, administration of sedatives, for example Relanium 10 mg intramuscularly.

- **Nicolau syndrome** - is formed as a consequence of the introduction of drug crystals or a suspension **into a blood vessel rather than a muscle tissue**. It occurs most often in children. Arterial embolism can lead to necrosis of tissues and skin defects that are difficult to heal. The symptoms are as follows: ischemia after an injection (pale or purple in colour, swelling), acute pain along the sciatic nerve, symptoms of embolism - arteries of lower limbs (paleness, cooling, no pulse on the dorsal artery of the foot, popliteal artery, femoral artery - foot necrosis, lower leg necrosis) and on the mesenteric artery (vomiting and bloody stool), leukocytosis, occasionally erythrocyturia and spinal cord transverse lesion. The syndrome prognosis is unfavourable. Treatment: shock-controlling, blockade, amputation, grafts.

3.2. Intradermal, subcutaneous or intramuscular injections

3.2.1. Intradermal administration of drugs

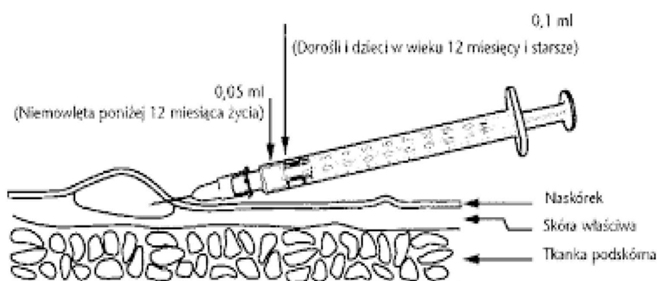
NOTE

Injections/intradermal injections (*Lat.*. Injectio intracutanea, *Eng.* Intradermal injections) – abbreviated as i.c.

NOTE

The essence of an intradermal injection - an intradermal insertion (in-between epidermis and dermis) **of 0.1** ml isotonic liquid or a vaccine, as a result of which there is a clear bubble, several millimeters in diameter.

The available literature reports that infants under 12 months should receive 0.05 ml of a liquid.



Legend:

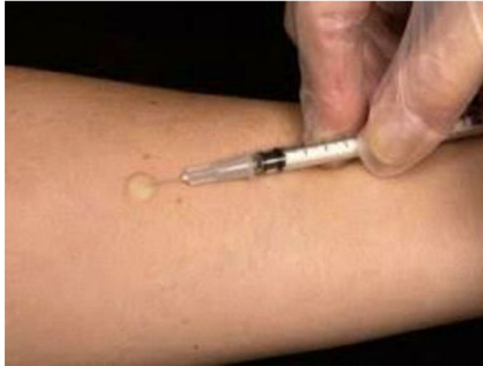
Naskórek - epidermis

Skóra właściwa - dermis

Tkanka podskórna - subcutaneous tissue

Figure 49. Intradermal injections

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. *T. 1,2. Wyd. PZWL, Warszawa 2017.*



Picture 9. Intradermal drug administration

Goal - mainly performed for diagnostic, preventive, occasionally curative purposes (administering xenogenic antibody curative serums to patients suffering from allergies).

The amount of drug delivered in an intradermal injection - 0.1 ml.

Intradermal injections are as follows: aqueous solutions, suspensions.

Indications for the administration of drugs intradermally:
- intradermal Mantoux test constitutes a widely accepted method for conducting tuberculin allergy tests (the so-called tuberculin RT23 test),
- tuberculosis vaccine - BCG (Bacillus Calmette-Guérin),
- allergy testing to penicillin, e.g. of crystalline penicillin,
- allergy testing to an administration of certain drugs, e.g. Polocainum hydrochloricum, vitamin B12,
- qualifying for wasp sting and bee sting desensitisation,
- administering serum by means of Besredka's desensitisation.

Contraindications for the administration of drugs intradermally:
- an allergic disease or an allergic reaction in patients with an allergic reaction to any substance.

Contraindications to a vaccine BCG **:**
- immunodeficiency, full-blown AIDS (carrier state is not a contraindication for vaccination),
- condition after splenectomy (removal of the spleen),

- leukemia, Hodgkin's disease, non-Hodgkin lymphoma,
- a positive tuberculosis (TB) skin test (6 mm infiltration),
- reported tuberculosis,
- 4-6 weeks after the disappearance of clinical symptoms of infectious diseases, including influenza, measles, rubella, pertussis,
- within 3 months after undergoing an immunosuppressive therapy.

Contraindications to tuberculin testing**:**
- 4-6 weeks after a regression of clinical symptoms of infectious diseases (measles, pertussis, rubella, influenza),
- a period of at least 3 months after ending an immunosuppressive therapy (steroids, cytostatic agents).

Site of making a subcutaneous injection:
- front/inner side of the forearm,
- side part of the forearm, extended line of the thumb,
- BCG vaccine - an upper outer section of the left arm.
- Mantoux tuberculin test:
  - first test: the middle part of the front surface of the left forearm (first tuberculin test,
  - middle part of the front surface of the right forearm (if there is a need to perform other tests, it is recommended as the second site),
  - 1/3 of the nearer part of the front surface of the left forearm (if there is a need to perform other tests, it is advisable as the third location),
- usually skin prick tests and intradermal tests are conducted on the forearm skin, rarely on the back, while and skin patch tests are conducted on the back.

Equipment for a subcutaneous injection:
- marker/pen to mark a drug in a syringe,
- disposable non-sterile gloves,
- an antiseptic, e.g., 70% ethanol and sterile gauze swabs soaked with 70 isopropyl alcohol (for a tuberculin test, it is not recommended to disinfect the skin; it should rather be washed with soap and water, and left to dry),
- ampoule of an ordered drug, for example. vit. B12,
- a disposable syringe of 1 ml with a scale of 1:100 (the so-called tuberculine syringe) or with a scale 1:10,
- 2 needles to take in a drug for an injection sized: 0.45x16; 0.5x25/0.33x13,

- Waste container for used infectious disposables (hardwall container for needles) and municipal waste, liquid table sanitizer),
- a shock controller kit, especially during an allergy test,
- additional equipment appropriate to the needs: ready-made kits for an allergy test, tuberculin test - OT labelled, BCG vaccines - BCG labelled,
- possibly a transparent ruler with a clear millimetre scale, easy to read by the doctor.

Technique of making a subcutaneous injection:

- pinching side surfaces of the syringe between the index finger and the thumb,
- stretching the skin,
- penetrating the skin with a needle, whose bevel is pointing upwards, at an angle of 15° and the depth of 0.5-1mm, just below the epidermis,
- not aspirating,
- having inserted a needle 1 mm beyond its bevel, it is necessary to slowly inject the drug (0.1ml) until a several millimetre bubble has been formed,
- the needle is gently removed,
- the site does not need to be covered with a gauze swab.

Algorithm of making a subcutaneous injection:

1. Becoming acquainted with the doctor’s order and paying attention to the correctness of the medical record, patient's name and data about the drug name, dosage form, method and time of administration, action, indications and possible side effects.
2. Establishing the patient's identity (by checking the ID bracelet and asking for their surname) in order to provide the patient with information on the performed injection; obtaining the patient’s consent to administer the drug/drugs.
3. Explaining the procedures to the patient.
4. Hygienic hand washing and disinfecting.
5. Checking the completeness of the kit for drug administration, verifying drug compliance with the doctor’s order, checking the drug’s expiry date, its appearance; calculating the medicament's overall volume so that it contains the prescribed drug dose.

6. An aseptic connection of the needle and syringe, aseptic drawing in a drug from the ampoule/vial, changing the needle on the syringe, venting the needle, putting the syringe with the medication on the working table and giving a signature; placing the empty drug ampoule/vial next to the syringe; tidying up the table.
7. Bringing the kit to the ward or inviting the patient to a treatment room.
8. Preparation of the environment (e.g. switching on the light).
9. Preparing the patient for drug administration intradermally: encouragement or aid in a position ensuring comfort and safety, and enabling drug administration - sitting or lying down.
10. Informing the patient about the drug type, method of its delivery, purpose of action, side effects; procedure prior to its administration, during and after the drug delivery, for example washing the forearm skin with soap and water prior to the tuberculin test; a feeling of gentle warmth and a "mosquito bite" during the test; necessity to immediately report any ill effects after the test; not touching marked spots or site, not washing or covering them with clothes; trying not to burden the arm with mechanical loads; remembering not to squeeze out the medicament from the injection site; time of reading out the test.
11. Hygienic hand washing and disinfecting.
12. Putting on non-sterile disposable gloves. Preparation of gauze pads, soaked with an antiseptic for skin disinfection at the injection site (for the tuberculin test, the skin surface must be washed with soap and water soap and left to dry).
13. Skin stretching, inserting the needle at an angle of 15°, after making an injection, a bubble is formed.

NOTE

During an intradermal injection, there is no aspiration.

14. The needle needs to be removed gently, **without applying** the gauze swab on the injection site.

15. Test description (e.g., encircling the site with e.g. a dermograph, or a pen around the test, describing the type of drug, its date and time).
16. Clearing the kit and equipment in compliance with the binding rules.
17. Hygienic hand washing and disinfecting.
18. Filing the injection in an individual medical order sheet.

Anaphylactic reaction, endangering the patient's life which may develop within several seconds/minutes after giving the allergy test is characterized by the following symptoms:

- oedema of the upper respiratory tract, which causes hoarseness and stridor, narrowing of lower airways that causes cough, wheezing, dyspnea and rhinitis,
- decreased blood pressure, pulse rate initially accelerated, then deceleration in heart rate, heart arrhythmias, chest pain, cardiac arrest,
- skin: urticaria, angioedema, itching, redness of the skin,
- nausea, vomiting, stomach ache, diarrhoea,
- buzzing sound and throbbing in the head, headache and dizziness, impaired consciousness, feeling of anxiety.

Ordering a test - doctor

Giving a test - nurse

Reading out and filing the test result - doctor

Reading out the penicillin/B12 vit. test occurs after 30 minutes of its giving, and when the result is indefinite - after 1 hour:

- negative result: no change, or the swelling and redness are not larger than in the control test,
- positive result: erythema or oedema with a diameter exceeding 1 cm.

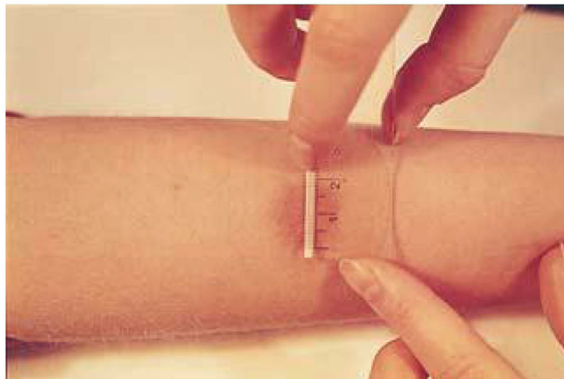
Reading out the tuberculin test occurs after 72 hours:

- negative result: infiltration of a diameter of less than 5 mm, the person is subject to BCG vaccination on the day of reading out the test,
- positive result: infiltration with a diameter of 6-15 mm, the patient is not to be BCG vaccinated.

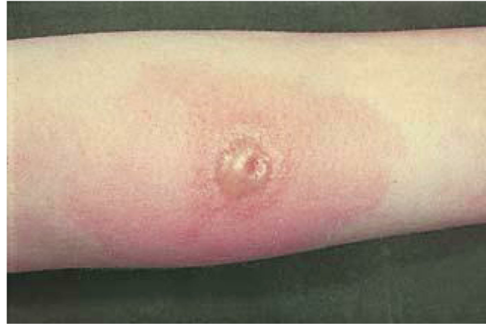
Tuberculin test is read out by measuring the diameter of the infiltration by means of a transparent ruler with a millimetre scale, transversely to the long axis of the forearm.

The assessment of the reading out does not include swelling or redness. The infiltration is assessed on the basis of feeling it gently with fingertips.

A positive tuberculin test result can only be an expression of an allergy to tuberculin, and not a tuberculosis infection.



Picture 10. Tuberculin reaction, type I with regard to Edwards & Palmer scale



Picture 11. Blistering tuberculin reaction (exudation), regarded as postinfectious.

NOTE

The result of each test, read out by the physician, must be filed in an individual medical order sheet.

Crystalline penicillin hypersensitivity test in case of a planned treatment with crystalline pennicillin:

- **make an intradermal injection of 0.1 ml** of dissolved crystalline penicillin, **containing 10 IU** penicillin (dose determined by the physician and entered in a individual medical order sheet), in compliance with an adopted procedure,
- give a control test intradermally, using a separate syringe, **with 0.1 ml of a solvent,** e.g. 0.9% NaCl, maintaining a space of 2-5 cm between the injections.

Tuberculin test:

- injected intradermally 0.1 ml tuberculin (10 bars) in the middle part of the front surface of the left forearm which had previously been washed **with soap and water and left to dry.** On the injection site there is a whitish porous bubble, 7-9 mm in diameter, which disappears after a few minutes.

In order to carry out the intradermal tuberculin tests, tuberculin RT Tuberculins $_{23}$ is used (Renset tuberculin, batch 23), produced in 5 ml and 1.5 mm vials. Tuberculin RT23 is **administered at a standard dose of 2 units (TU 2), present in 0.1 ml tuberculin** (1 unit contains 0.00002 mg of tuberculin protein).

This means that **every 0.1 ml contains 2 units of tuberculin** to be injected during an intradermal injection.

Tuberculin RT_{23} must be stored in a refrigerator at **4-6°C.** During the use, it must be protected from light (e.g. the vial needs to be covered with a dark vessel).

NOTE

The person performing the test must write, on the label, the date of the first pricking of the tuberculin vial. Tuberculin can be used **up to 24 hours after** the first vial pricking and being stored in the refrigerator.

3.2.2. Subcutaneous administration of drugs

NOTE

Injections/subcutaneous injections (*Lat.* Injectio subcutanea, *Eng.* Subcutaneous injections) – abbreviation as s.c.

The essence of the subcutaneous injection - the introduction of the drug into the subcutaneous tissue. The injection is performed

in any place rich in loose subcutaneous tissue, devoid of major blood vessels and nerves, birthmarks, scars, infiltrations after previous injections and tattoos.

NOTE

The amount of the drug administered by subcutaneous injection - a maximum of 2 ml of the drug.

Types of drugs administered by subcutaneous injection - aqueous solution, with isotonic concentration, neutral reaction, absorbed within 15-20 minutes.

Drugs in the form of a suspension are not administered, the use of oily drugs is inadvisable, and the administration of drugs that irritate tissues is prohibited.

NOTE

Indications for subcutaneous injections:

- pain treatment,
- antithrombotic prophilaxis (administering low molecular weight heparins and its preparations e.g. Clexan),
- treatment of thromboembolism, acute myocardial infarction,
- immunizing the organism (preventive vaccination e.g. DPT vaccine against diphtheria, tetanus, Pertussis),
- administering insulin, which as a proteinaceous substance does not decompose in the digestive tract,
- administering serum e.g. anti-tetanus serum,
- administering fluids and drugs in patients with mild or moderate dehydration (hypodermoclysis)

Contraindications:
- pathological lesions on the skin: e.g. rash,
- inflammatory or purulent condition at the site of injection,
- infiltrations after previous injections,
- subcutaneous induration,
- Shock,
- predisposition to bleeding.

The site of subcutaneous injection
- abdominal wall, especially between the iliac crest and the navel (excluding the area of 2 cm radius around the navel),
- medial part of the outer thigh surface,
- medial part of the outer arm area, note that in this area the subcutaneous layer is thin and therefore it is easy to administer intramuscular injection instead of the intended subcutaneous one,
- under the scapula,
- sub-clavicle (collarbone) region or eventually in epigastric region when setting up a butterfly type needle in the palliative care),

Types of subcutaneous injections:
- typical injections (performed with the use of syringe and needle),
- specific injections to administer human insulin (performed with pens, with the insulin pump, insuflon) or e.g. morphine with the butterfly type needle.

Subcutaneous injection equipment:
- marker/pen to describe the drug in the syringe,
- non-sterile disposable gloves,
- antiseptic, e.g. 70% ethyl alcohol, sterile swabs saturated with 70% isopropyl alcohol,
- an ampoule/a vial of an ordered drug,
- a disposable syringe of at least 2 ml capacity corresponding to the drug volume,
- 2 needles: to take in the drug and for injection, the lenght of the needle depends on the age of the patient, amount of fatty tissue,

the angle of injecting, needle sizes: 0,45x16; 0,5x25; 0,6x25 (or ready preparation for example insulin in the ampoule syringe),
- a dry swab to secure the place of injection,
- a used contagious/biohazardous waste container (required a rigid hard plastic, puncture-proof container for needles) and communal waste, work surface disinfectant.

Technique of performing subcutaneous injection:
- disinfection of the injection site,
- taking a 2-3 cm pinch of skin between the fingers to pull it away from the muscles below,
- injecting the ¾ or 2/3 of the needle to the depth not smaller than 0.75-1,0 cm a tan angle of 45–60°; human insulin with the use of pen is administered at a 45–90° angle in relations to the skin surface to the full length of the needle (so that its end can reach capillary plexus), after forming the skin fold or tightening the skin in intramuscular injection,
- aspirating to make sure that we are not in the blood vessel (with some exceptions e.g. insulin, low-molecular weight heparin),
- injecting the drug,
- withdrawing the needle,
- securing the injection site with a sterile swab.

Picture 12. Technique of pinching a skin fold

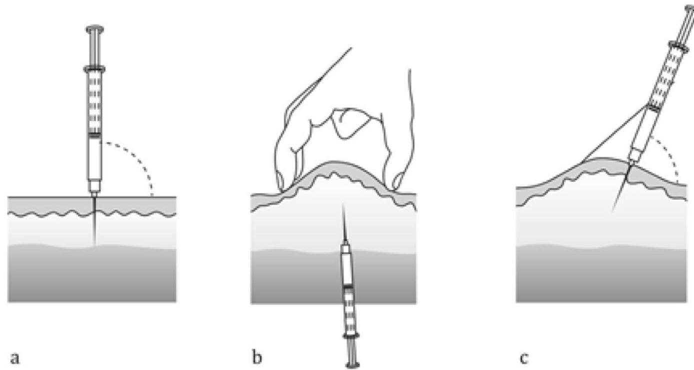


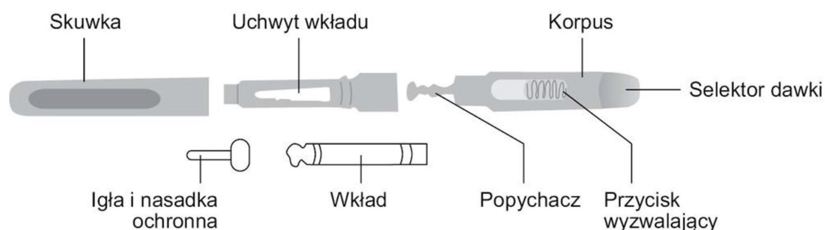
Figure 50. Subcutaneous injection: a – injection at a 90° angle; b – injection at a45–60° angle ; c – pinching the skin to form a skin fold for 45–60° angle injection

The procedure is performed to a patient in the sitting or lying position.

The subcutaneous injection is performed with the syringe of 2-5 ml capacity. To administer insulin a precisely calibrated syringe is used (1 ml contains 40 IU, 80 IU or 100 IU.), so called insulin syringe, with unit, volume and unit-volume scale and semi-automatic syringe (pen) called an injector.

Picture 13. Pen

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. *T. 1,2. Wyd. PZWL, Warszawa 2017.*



Legend:
- Skuwka - cap
- Uchwyt wkładu - cartridge holder
- Korpus - pen body
- Selektor dawki - dose indicator/selector/dial
- Wkład - cartridge
- Popychacz - plunger
- Przycisk wyzwalający - injector buton
- Igła - needle
- Nasadka ochronna - needle shield

Figure 51. Pen structure

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. *T. 1,2. Wyd. PZWL, Warszawa 2017.*

Injectors called pens. Pen is a semi-automatic device, which facilitates activities related to preparation and administering of insulin, simultaneously increasing the precision of dosage. Only a special kind of vial can be applied with the injector (called cartridges). Currently, 1,5 ml vials (containing 150 IU of insulin) and 3 ml (containing 300 IU of insulin) are used. Pens with cartridges for current use should be stored for 21-28 days (maximum 6 weeks) at room temperature (15–25°C), and the insulin intended for future use, at 2–8°C temperature.

The size of hypodermic needle depends on the angle of injection and the degree of adipose tissue development:

- when administering insulin with a pen with a special needle, the needle may have the following sizes: in slim persons with the regular structure of the subcutaneous layer– 30G (0,3 × 8 mm), in obese persons – 28G (0,36 × 12 mm). In slim persons and children a needle should be injected at a 45° angle to prevent intramascular injection whereas in adults at a 45–90° angle depending on the amount of fatty layer. When injecting the insulin

with the pen ther is no need to form a skin fold except for very slim patients of BMI < 20 – needle 31G (0,3 × 6 mm),
- when administering the insulin with a conventional syringe at a 45–60° angle, the needle has the following sizes: slim person– 23G (0,6 × 25 mm), obese person – 22G (0,7 × 30 mm).

Pen cartridges (the so called insulin reserves) should be refrigerated, while the insulin pen currently used can be kept at room temperature for 1 month, hence the need to record the patient's name, surname, date and time the pen was set, on the pen.

Subcutaneous injection algorithm:
1. Familiarizing oneself with the medical order including the correctness of the record, the patient's name and surname and data concerning the drug: name, dosage, drug form, way and time of administering the drug, its effect and possible side-effects.
2. Prior to administering heparin, it is necessary to interview the patient about other drugs taken by the patient to prevent undesired interaction (aspirin, nonsteroidal anti- inflammatory drugs, cephalosporin, antithyroid drugs, thrombolytic drugs).
3. Assessment of counterindications to administer injection.
4. Checking the patient's ID (by checking the bracelet and enquireing about the patient's surname), providing the information about the injection to the patient, obtaining the patient's consent.
5. Explaining the procedure to the patient.
6. Hygienic hand washing and disinfecting hands.
7. Checking the completeness of your supplies (set for administering the drug), checking if the drug complies with the medication/ physician's order, checking the expiry date on the drug label and the drug appearance, calculating the volume of the drug which contains the prescribed dose of the drug
8. Aseptic attaching of the needle to the syringe, aseptic drawing of the medicine from the vial with the drug, putting aside the the syringe with the drug on the work surface and desribing it, placing the emty drug vil next to the syringe, tidying up the work surface (optional joining of the pen with the insulin, bleeding the air from the needle, preparing the pre-filled syringe and acting according to the instructions provided by the manufacturer e.g. Clexan needle do not need air bleeding.

9. Bringing the set to the patients' room or inviting the patient to the treatment room.
10. Preparing the surrounding: doors, windows, good lighting.
11. Preparing the patient to the subcutaneous medicine injection, inviting him/her to assume a comfortable and safe body position, helping the patient.
12. Informing the patient about the kind of medicine, its way of administration, purpose of administering the drug, side effects, conduct before injection, when administering the drug and after e.g. not massaging the insulin or low-molecular weight heparins injection site e.g. Clexane.
13. Hygienic hand washing and disinfecting hands.
14. Putting nonsterile disposable gloves. Preparing swabs saturated with the antiseptic substance or disinfecting the skin at the site of injection (in case of insulin injections if the injection site is contaminated or the patient is in the surrounding which makes the infection more probable e.g. hospital, care home, the place needs to be disinfected. If the alcohol has been used to disinfect the skin that it is necessary to wait till the skin is completely dry.
15. Gripping the fold of skin, inserting the needle at a 45° or 90° angle (when injecting with a pen or pre-filled syringe at the abundant fatty tissue), aspirating to prevent getting into a blood vessel (neither insulin nor heparins are aspirated), giving injection (after injecting insulin, we release the skin fold and wait 10s, before removing the needle.
16. Withdrawing the needle delicately. Securing the injection site with a dry sterile swab.
17. Putting the set and equipment in order according to the applicable rules.
18. Hygienic hand washing and hand disinfecting.
19. Recording/Documenting/Annotating the injection in the physician's order sheet.

Calculation of the insulin dose:

Subcutaneous injection common - insulin contained in vials is manufactured in three different concentrations: 10 ml may include a 400 IU, 800 IU, 1000 IU hormone. To calculate the amount of insulin containing 10 400 IU ml is withdrawn into a syringe for the admin-

istration to the patient by the physician dose of 24 IU, perform the following equation:

10 ml - 400 IU
x ml - 24 IU
x = x 10 ml 24 IU / 400 = 0.6 IU ml

3.2.3. Administering drugs intramascularly

IMPORTANT

Injection/injection/intramuscular injection (pour. Injectio *intramuscular*, ang. *Intramuscula injections*) - abbreviated i.m.

The basics of intramuscular injection - administering of medicament into the muscle of a large mass at a safe distance from large blood vessels and nerve fibres.

Purpose - obtaining a therapeutic effect and protecting gastrointestinal tract against irritation.

The amount of drug administered by intramuscular injection - up to 5 ml of the drug (optionally with a change of the angle of injection to 10 ml of drug). Drugs given in this way are absorbed within 10-15 min.

The following can be can be administered by intramuscular injection:

- some aqueous solutions,
- hypertonic drugs (lipophilic),
- oily solutions,
- suspensions.

Indications for administrating drugs intramuscularly:

- Clinical condition requiring administration of a drug in the form of suspension, lipophilic drug hypo- or hypertonic.

Counterindications for intramuscular drug administration:
- pathological changes on the skin, for example. purulent lesions, rash,
- haemorrhagic diathesis and other coagulation disorders,
- anticoagulant treatment (clopidogrel, heparin-high dose)
- suspected heart attack (due to possible fibrinolysis),
- shock.

Injection site:

Do not perform the injection in a standing position. Intramuscular injection sites are the muscles:
- gluteus medius,
- gluteus maximus,
- quadriceps,
- deltoid muscle (for vaccinations).

Equipment for intramuscular injection:
- marker / pen to describe the drug in the syringe,
- non-sterile disposable gloves,
- an antiseptic, e.g.,. 70% ethanol and sterile gauze swabs soaked in 70% isopropyl alcohol,
- ampoule / vial of the ordered drug (optionally solvent, for example. 0.9% NaCl as recommended by the manufacturer for reconstitution of the powder),
- disposable syringe with a capacity adapted to the possible capacity of a medicament for intramuscular administration, for example. 5-10 ml, 2 needles: to take on the drug and for injection; size of the needles is dependent on the age of the patient, the amount of fatty tissue, angle of injection; Needle size: 21G (0.8 × 40 mm) and 20G (0.9 × 40 mm) for an adult,
- dry gauze to protect the insertion site,
- Waste container for infectious (puncture-proof, rigid, hard plastic container for needles) and communal waste, work surface disinfectant.

The technique of intramuscular injection:
- disinfecting the injection site,
- the syringe gripping between the finger and thumb (like the dart),
- extending the puncture site by stretching the skin between thumb and forefinger (gluteal muscle), or pinching the skin in the fold so

that the needle does not rest on bone (deltoid muscle, quadriceps, gluteal muscle in emaciated persons),

- inserting a needle of 21G (0.8 × 40 mm) and 20G (0.9 × 40 mm) size in adults at a 90 ° angle in relation to the body surface to a depth of ¾ of its length (approx. 3 cm),
- aspire (to make sure that we are not in the vessel),
- injecting slowly up to 5 ml of the drug - a larger volume of the drug could cause damage to muscle tissue. Infants and young children, the elderly and thin people usually tolerate only 1-2 ml of the drug in a single injection,

NOTE

- **if there is a need to administer a volume of drug in excess of 5 ml (gluteal muscle) or the need to administer two drugs simultaneously by intramuscular injection, then the second volume or the second drug should be injected in another place by performing another intramuscular injection (Kózka M., National Consultant in Nursing, letter dated 03.03.2022, response to letter NIPIP-NRPIPDM.025.28.2022.MK),**

- withdrawing the needle,
- securing the puncture site using a sterile swab.

Methods for determining the puncture site in the gluteal region:
In the area of gluteus medius:

1. ***Ventro- gluteal von Hochstetter method*:** The patient lies relaxed on his/her back or on their side with their knees bent slightly; At the right buttock, the fingertip of the left index finger should be placed on the right anterior superior iliac spine and the middle finger of the same hand should be moved along the iliac crest towards the rear until your fingers are fully extended. The puncture should be made in the lower third of the triangle formed by the index and middle finger.

A left middle finger tip should be put placed on the left anterior superior iliac spine and the index finger of the same hand along the iliac crest moved to the back, until your fingers are apart; a puncture made in the lower third of the triangle formed by the middle finger and pointing.

2. ***A method according to Sachtleben***: The patient is relaxed on the back or on the side of the knees slightly bent and slightly pulled up, lying on top of the hand; standing in front of a patient lying on his left side, place the index finger of the right hand on the crest of the ilium in such a way that the anterior superior iliac spine was in the "C" formed by the thumb and forefinger; injection site is located on the line between the middle joint of the pointing finger and the greater trochanter below the iliac crest at the width:
   - One finger (approx. 2.5 cm) for children up to 0.75 m height;
   - Two fingers (approx. 5 cm) in children up to 1.25 m height;
   - 3 fingers (approx. 7.5 cm) in children taller than 1.25 m in adults.

In the gluteus maximus region:

3. ***By quadrants***: The patient lies relaxed on his stomach, with his toes pointing toward each other, hands freely covering the pillow or on the side (lower limb, lying at the bottom is straight, and the one located at the top is bent); a vertical line should be drawn through the center of the buttock and the horizontal line from the top of the natal cleft to the anterior superior iliac spine, thereby defining four quadrants; an upper outer quadrant should be divided the two diagonals, the location of their intersection determines the insertion site.

In the absence of bone reference point and variable construction (buttock anatomy) there is a high probability of an incorrect designation of the injection site and, therefore, this method is not recommended.

Executing an injection in the thigh region (lateral head of the quadriceps muscle):

- injection is performed in the outer thigh. The patient lies on his back, on the side or sitting; one hand is placed on the width of the palm below the greater trochanter, and the second hand's width

above the knee; hand thumb define a line between them, the injection performed in the middle third of the line.

Executing the injection in the arm region (deltoid muscle):

- injection is performed on the outer side of relaxed arm and a width of 2-3 fingers below the acromion; the patient lies on his back, side, or sitting; avoid performing injection in the middle and lower part of the arm may cause damage to the radial nerve; here, low muscle mass is grouped and it enables the injection of small amounts of drug (2 ml) only and prevents the iterative procedure; injection in the deltoid muscle should be performed exceptionally, for example when performing the preventive vaccination.

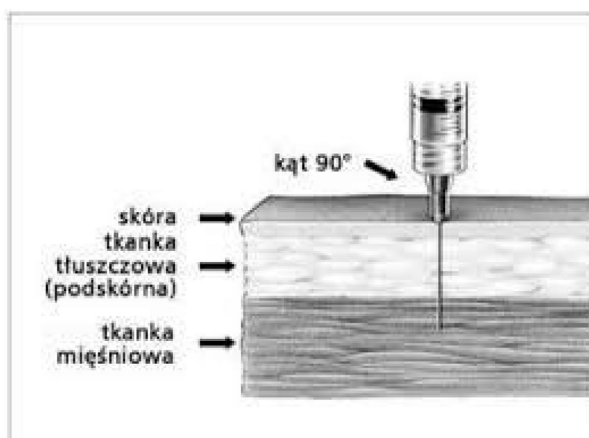


Figure 52. The angle of entry of the needle during the injection into the muscle of the buttock

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. *T. 1,2. Wyd. PZWL, Warszawa 2017.*

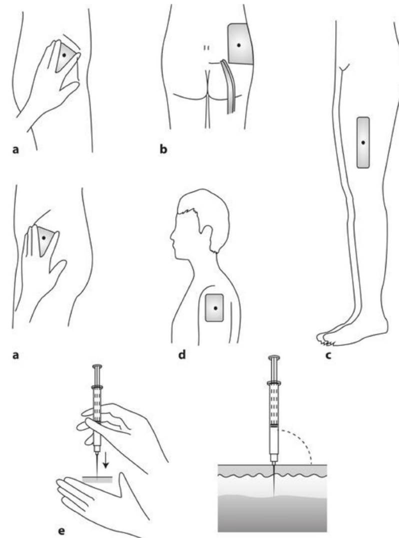


Figure 53. Places intramuscular injection:
a - medium gluteus area (ventrolateral gluteal by von Hochstetter);
b - gluteus maximus area (quadrant method);
c - the thigh area (vastus lateralis muscle of the thigh);
d - the area of the arm (deltoid muscle);
e - the angle of intramuscular administration

Source: Ślusarska B., Zarzycka D., Zahradniczek K. (red.): Podstawy pielęgniarstwa. *T. 1,2. Wyd. PZWL, Warszawa 2017.*

The algorithm intramuscular injection:

1. Familiarization with the medical order including to the correctness of the medical record, the patient's name and data on the drug name, dosage form, method and time of administration, drug operation, indications and possible side effects.
2. Assessment of contraindications for intramuscular injection, for example taking anticoagulants.
3. Assessment of the patient's ability to cooperate - cognitive processes and mental state and reactions to medications.
4. Checking the identity of the patient (by checking the ID bracelet and asking for a name) and providing the patient with the information on the performed injections; obtaining the consent of the patient to provide the drug / drugs.
5. Explaining the procedure to the patient.
6. Hygienic hands wash and disinfecting hands.

7. Checking the completeness of the set for administration, to verify the compliance with the physician's order, checking the expiry date of the drug and its appearance; calculating the volume of a medicament comprising the prescribed dose.
8. Preparation of the drug in accordance with a written doctor's order. Aseptic attachment of the needle and syringe, aseptic drawing of the medicament from the ampoule / vial, change the needle on the syringe needle vent, filing the syringe with medication and putting the filled syringe side on the worktop and describing it; positioning an empty ampoules / vials of drug next to the syringe; worktop arrangement.
9. Preparing the anti-shock set e.g. when administering drugs in suspension.
10. Bringing the set to the ward or inviting the patient to the treatment room.
11. Preparing the environment: closing the door, ensuring good lighting.
12. Preparing the patient to injection. Positioning a patient in a lying or sitting position adjusted to the desired injection site (e.g. in the abdominal, with his feet pointing towards each other when the injection is into the gluteal rear region, in the dorsal or side position when the injection is into the gluteal front region, seated when the injection is in the thigh); the unveiling of the planned injection site; visual inspection and palpation for lesions which are contraindications for the injection to be performed; accurate determination of the site of injection applying a preferred method.
13. Informing the patient about the type of drug, the method of administration, the purposes, the symptoms of side effects, complications; procedure prior to, during and after the administration of the drug; reporting distressing symptoms (agitation, visual disturbances, tinnitus, weakness, shortness of breath, itching, hives, palpitations, anxiety, nausea, etc.).
14. Hygienic handwash and hand disinfection.
15. Putting non-sterile disposable gloves on. Preparing antiseptic swabs to disinfect the skin at the injection site.
16. Disinfection of the skin at the injection site to allow the antiseptic to work and dry; place sterile dry gauze swab within easy reach.
17. Removing the sheath of the needle and positioning the needle so that the bevel of the needle is positioned on the side of the syringe scale.

18. Grabbing the syringe with the dominant hand so that the syringe barrel is held between thumb and middle finger, ring and small finger, pointing finger resting against the needle hub; and the bevel of the needle on the side of the scale; the non-dominant hand stretching the disinfected skin between the thumb and forefinger; communicating to the patient the intention to insert the needle and asking the patient to be still/remain motionless; introducing the needle firmly at a 90° angle relative to the surface of the skin to a depth corresponding to 3/4 of its length; releasing the tension of the skin and supporting the syringe barrel and needle hub with the non-dominant hand; pulling the syringe plunger with the dominant hand, aspirating to prevent inadvertent introduction of medicament into the vessel:
    - if aspiration shows no blood slow administration of the drug, i.e. 1 ml / 10 seconds,
    - if the needle cap shows blood, it must be withdrawn and the syringe and needle must be changed,
    - if blood appears in the syringe, change the medicine and syringe, insert the needle again in a new place, aspiring again.

    During the injection the middle and forefinger of the dominant hand are arranged on the wings of the cylinder, the thumb pushes the plunger of the syringe.

19. Observation of the patient during the injection.
    Intramuscular injection should be done slowly; a slow administration of the drug decreases the tissue damage and pain sensations, and the compression of the puncture site prevents bleeding and facilitates the absorption of the drug. Observation makes a quick intervention possible, e.g. in the case of anaphylactic shock. The change of injection sites for frequent injections protects against fibrosis and sclerosis. The skin mustn't be massaged when administering the drug delivery in the form of suspensions and heavy metals.
20. Applying a sterile swab to the puncture needle, removing the needle and the syringe firmly; depending on the type of drug - pressing the injection site gently with a swab; checking the presence of bleeding - if it is present, asking the patient to press the swab at the injection site.

21. Providing conditions to rest after the procedure for a patient and making sure the patient can access the alarm bell; reminding the patient of the need to report ill effects.
20. Taking off the non-sterile disposable gloves.
21. Arranging the set according to the existing rules and equipment disinfected worktop.
22. Hygienic wash and / or disinfecting hands.
22. Documenting intramuscular injection drug administration.

4. Intravenous injections

Marta Czekirda

Intravenous injection of the drug, intravenous transfusion of fluids, requires a venipuncture. Most often superficial peripheral veins on the legs of the upper (back of the hand, forearm, around the elbow) are used for this purpose in adults as they are easily accessible, rarely peripheral veins on the legs (veins feet) because of the risk of thrombosis, in infants scalp vein.

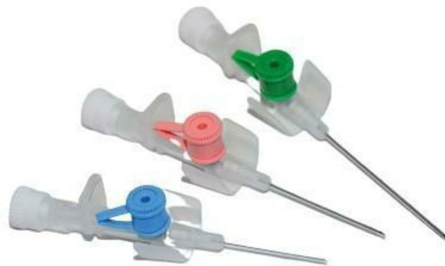
Starting intravenous treatment (drug injection, infusion fluids), should be guided by the following principles:

1. Use a vein located most peripherally (back of the hand), then successively then the lower, middle, and upper part of the forearm.
2. You must first choose a more distally located veins, because in the event of inflammation or blood clot in the part of the vein, the distal part of the vein cannot be punctured.
3. Avoid puncturing a vein within the joint, not to limit its mobility and do not cause the collapse of the catheter and thus stop the transfusion, blood clot in the light of the cannula or venous thrombosis.
4. Do not use the basilic vein for injection, due to the close proximity of the brachial artery.
5. Avoid fragile and hardened vein for cannulation, veins after previous cannulation, swollen places, areas near the wounds and scars on the skin, in the dominant limb.

Venous access can be divided due to:

- time of the residence of the cannula in the residence lumen : temporary (to single drug administration), permanent (for parenteral nutrition), a short-term (less than 24 hrs.), long-term (longer than 24 hours.),
- length, type of material used to make the cannula and its location: a short, made of metal (traditional),
- way insertion of the cannula: a transdermal (through the skin puncture) treatment (via exposed surgically vessels venesection).

4.1. Drug administration by the intravenous puncture-type peripheral venflon



Picture 14. Cannula

Objectives of performing vein punctures:

- hydration of the patient,
- correction of electrolyte imbalance, acid-base balance,
- parenteral nutrition,
- providing the blood, blood products or blood substitutes,
- administration of contrast media, eg. Omnipague,
- measurement of central venous pressure;
- induction of anesthesia,
- collection of blood for testing,
- hemodynamic monitoring, for example central venous pressure,
- a single dose of intravenous drug,
- application of a periodic intravenous medication, e.g. antibiotics every few hours,
- the use of an intravenous infusion for hours or twenty-four hours,
- parenteral nutrition.

Choosing a location for cannulation - venous access, short, peripheral:

- cannulation attempts should start with limb veins most distal and most visible and best,
- cannulate the most visible distal vessels,
- in patients with developed lateralization the opposite extremity vessels should be preferred - the left for the right-handed in, right for the left-handed.

Factors inhibiting venipuncture:

– abundant adipose tissue,
– invisible and difficult to palpate veins,
– veins shifting, moving away from the end of the needle,
– tissues fibrosis after previous numerous punctures,
– vein lumen obstructive changes,
– motor excitability of the patient,
– formation of a blood clot in the needle as a result of prolonged action,
– blocking the outlet of the needle due to the leaning the bevel of the needle against the wall of the vessel or a venous valve,
– reflex contraction of the blood vessel.

Contraindications for the administration of medicaments by venous puncture:

– tissue fibrosis, after numerous previous injection in the same place, so called obtrusive adhesions;
– change of the vein lumen due to prior administration of irritant drugs as a result of inflammation of non-bacterial origin, so. obliteration;
– formation of a blood clot in the needle.

Complications / risk that may occur in intravenous drug administration:

– adverse drug reaction (shock, allergies to medicine, heart work disorders; skin redness, pale bluish; restlessness; nausea and vomiting; blurred vision; feeling hot; dyspnoea; pain behind the breastbone; headache; dry mouth oral; somnolence),
– administration of the drug outside the vessel and pain at the injection site (e.g., during administration. Aminophylline, calcium),
– drug administration irritating subcutaneous tissue, muscle tissue, extravasation and tissue necrosis induction (e.g. during administration. Nitrogen mustard, calcium chloride).

4.2. Drug administration by the intravenous puncture port type

IMPORTANT

Vascular port system allows permanent access to veins. It consists of a chamber with a membrane and a catheter inserted into a large blood vessel.

IMPORTANT

It is implanted under the skin as a whole, under aseptic and antiseptics conditions, in the operating room conditions.

In adults the procedure is performed under local anaesthesia while in children in general anaesthesia.

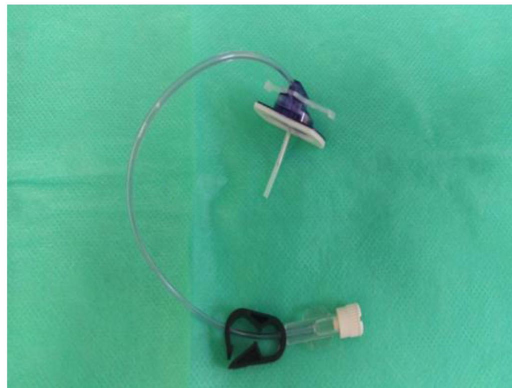
The port location is controlled by performing roentgenographic image.

Such indications as: administration of infusion, intravenous drug, contrast, blood sampling requires port puncturing by Huber needle - with special cut that does not damage the membrane. Properly nurtured can serve the patient for many years.

Port care

After implantation, the port acts as the operational wound.
After each drug administration, infusions - rinse the port 10 ml of 0.9% NaCl - for protection when not in use it should be secured

with the heparinized solution of 0.9% NaCl 3-4 ml (typically 100 m. Heparin / ml) - for the treatment interval longer than 4-6 weeks, purge port with 0.9% NaCl and secure with the heparinized solution of 0.9% NaCl – building up a positive pressure during the removal of the needle from the port in the case of the treatment interval longer than 4-6 weeks, purge port 0.9% NaCl and securing heparinized solution of 0.9% NaCl – building up a positive pressure during the removal of the needle from the port - the use of syringes of not less than 10ml - Huber needle in a hospital environment can be maintained for no more than 5-7 days, protected by a semi-permeable dressing - the needle position and the state of skin controlled and documented at least twice a day - at every stage of the aseptic and antiseptic conditions must be maintained.



Picture 15. Huber Needle

Vascular port implantation, after receiving the patient's written consent, is performed most frequently by the surgeon or anaesthesiologist in the operating room conditions.

The treatment is carried out on an empty stomach (at least 6 hours after the last meal).

Prior to installing the port, it is necessary to perform a CBC and determine coagulation parameters. Implantation procedure lasts about 30 minutes and it is performed under local anaesthesia and it is possible to use it the next day after the implantation of the port.

After the wound has healed, about 5-7 days normal functioning is possible, and the sutures are removed after 7-10 days.

4.3. Intravenous drip infusion

IMPORTANT

It is a procedure which belongs to a group of aseptic treatment, therapy, based on the introduction of the medicament into the body via venipuncture and administration of it in the form of drip infusion.

The procedure is performed on the order of the physician.

The aim of infusion is a parenteral delivery of fluids and drugs.
Indications for transfusion of fluids:

- correction of water and electrolyte disorders,
- regulating the acid-base balance,
- volume expansion of circulating fluids,
- complementing quantitative and qualitative losses- vitamins, energy nutrients, protein,
- partial or total parenteral nutrition,
- administration of drugs that require high dilution and application in an open and continuous infusion.

Infusion solutions according to their osmolarity are divided into:

- **isotonic** (270-310 mOsmol/kg) - a solution of osmotic RR equal to RR of comparative solution example. NaCl- 0.9% osmium the RR = RR blood,
- **hypotonic** (Less than 270 mOsmol/kg) - a solution of osmotic RR less than a comparative solution, overhydration blood cells causes their haemolysis,
- **hypertonic** (More than 310 mOsmol/kg) - a solution of osmium RR greater than comparative solution, e.g. red blood cells shrink in it (escape of water).

Table 4. Intravenous solutions

ELECTROLYTE SOLUTIONS	➢ 0.9% NaCl ➢ Ringer solution ➢ Jonosteril ➢ Normofundin ➢ Sterofundin ➢ Isotonic electrolyte solution ➢ Intestinal fluid preventive isotonic ➢ Gastric fluid preventive isotonic
PLASMA SUBSTITUTES	➢ Dekstran 40, 70 ➢ Plasmasteril ➢ Albumins 20% ➢ Voluven ➢ HES ➢ Gelafundin
CARBOHYDRATE SOLUTIONS	➢ Glucose 5% ➢ Glucose 10% ➢ Glucose 20%
SPECIAL FLUIDS	➢ Mannitol 10% 20% ➢ THAM 3%, 6% ➢ Sodium bicarbonate 8,4%

One can distinguish the short-term intravenous drip infusion (the duration of 3 hrs) long duration (the duration of more than a day) high-pass - bolus (pass the entire volume in a short time). Infusion solutions are in a volume of 50, 100, 250, 500, 1000 ml in glass bottles and plastic bags and plastic. Infusion solutions include: *crystalloid* (Natrium chloratum 0.9% Glucosum 5% Glucosum 10% Solutio Ringeri), isotonic fluid multi - electrolyte - PWE) *colloids* (Mannitol 20%, 10% Dextran 40 000, 6% dextran 70, 000).

Calculating the flow rate of intravenous drip infusion

If you know the volume of the infusion and intended infusion time, you calculate the number of drops according to the formula:

NOTE

$$\frac{\text{the infusion volume in ml x 20}}{\text{min infusion time}} = \text{Number of drops / min}$$

NOTE

When given the number of drops you can calculate the volume of a transfused fluid according to the formula:

the number of drops / min x infusion time in min = volume infusion

IMPORTANT

- **1 ml of liquid to 20 drops**
- **the infusion volume in ml x 20 drops**
- **the number of drops / min = the duration of infusion in min**
- or calculating the volume of transfused fluid
  the number of drops / min x infusion time in min
  the infusion volume = 20

IMPORTANT

FORMULA FOR THE CALCULATION OF FLOW RATE INTRAVENOUS DRIP INFUSION

$$\frac{\text{dose commissioned}}{\text{concentration of solution}} = \text{volume / hour}$$

$$\frac{\mathbf{50\ mg\ /\ hr}}{\mathbf{2\ mg/ml}} = \mathbf{25\ ml\ /\ h.}$$

$$Szybkosc\ przepływu = mL/h\ \frac{Objętość \times Ustawienia\ Zestawu}{Czas\ (60\ min\ lub\ mniej)}$$

$$\text{Rate of flow } \textit{(szybkość przepływu)} = \frac{\text{volume } \textit{(objętość)} \times \text{setting time } \textit{(ustawienie zestawu)}}{\text{set } \textit{(czas)}}$$

Example 2

When calculating the flow rate of intravenous drip infusion hours can be converted to minutes, or 1 hour 60 min =

$$\frac{125\ (mL) \times 10\ (\frac{krople}{mL})}{\mathbf{60\ (min)}}$$

You have to administer the drug solution 125 ml / h to the patient, determining that 1 ml of solution given is 10 drops. Calculate the rate at which drops per minute the IV set.

$$\frac{125\ \times 10}{60} = 20{,}8 = \mathbf{21}\ \boldsymbol{kropli/min}$$

Or 125 (ml / h): 6 = 20.8 = 21 drops/min.

Example 3

Calculate 2500ml / 24 hr

$$2500\ \div 24\ hr = 104{,}1 = 104\ mL/hr$$

Calculate 104 mL / hr to mL / min.

$$104\ mL\ \div 60\ min = 1{,}73 = 1{,}7\ mL/min$$

Count the flow rate (gtt / min) to 1.7 mL / min

$\frac{20\ gtt}{1\ mL} = \frac{x\ gtt}{1{,}7\ mL} = 34\ gtt$ **or** $20\ gtt : 1\ mL = X\ gtt : 1{,}7\ mL$

$$20\ gtt : 1\ mL = X\ gtt : 1{,}7\ mL$$

X = 34 gtt

Example 4

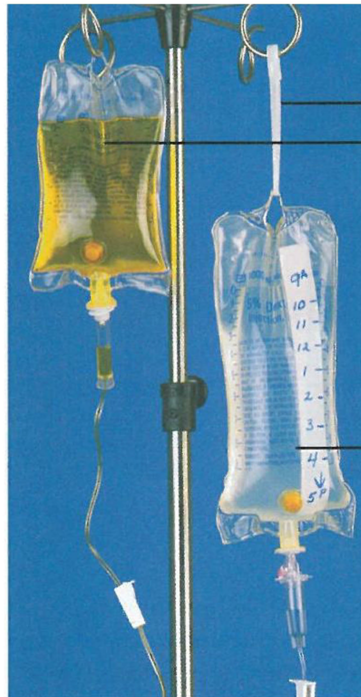
The order includes an application 1000 ml 0.9% NaCl at a flow rate of 90 ml / h. Calculate the flow of intravenous drip infusion.

$$100mL \div 90mL/h - 11.11h$$

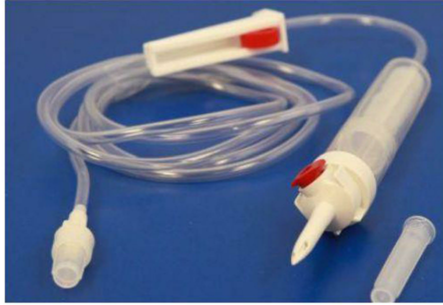
Keep in mind that .11 is a part of the next hour. It should be converted to min 60 min by multiplying by .11

$$60\ min/h \times .11\ h = 6.6 = 7\ min$$

Intravenous drip infusion time is 11 h 7 min.



Picture 16. Set for iv injection administered in an intravenous drip infusion.



Picture 17. Apparatus for the drip infusion.

Most infusion fluids are administered intravenously by drip infusion. The feeding rate of the fluid must be adapted to the body compensation capacities.

If the fluid is iso-osmotic 120 drops per minute can be administered. Typically, in the used drip chamber, isolated droplets have a volume of 0.05 ml, which is the condition that, the volume of 1 ml contains 20 drops.

Hyperosmotic solutions (having an osmotic pressure higher than normal) are administered slowly, at a rate inversely proportional to the osmotic pressure. Emulsions containing oil phase are administered carefully and slowly, at a rate of 3-5 drops / min.

Calculation the start and end time of intravenous drip infusion

The duration of intravenous drip infusion of 13 h 20 min. What will be the end time, if the start time of the drip infusion started about 10:45?
Add 13 h 20 min (duration of infusion) to 10:45 that is the drip start time.
Convert 65 min to 1 hr 5 min = 24:05. Subtract 12 h.
The end time is 24:05

Example 6

The duration of intravenous drip infusion, which started at 9:42 is 10 h 7 min. What time does it end?
Add 7 h 10 min (duration of infusion) to the 9:42- start time of infusion.
Subtract 12 h, then the end time is 7:49.
The end time is 7:49.

Note: 1 ml contains 20 drops of the fluid**.** To calculate the amount of drops per minute use two formulas.

Formula:
the amount of fluid in ml x 20 drops
The number of drops per minute = the time specified in hours x 60 minutes

$$\frac{mL \ x \ \frac{krople}{mL}}{60 \ min} = \frac{krople}{min}$$

Example 7

You have to administer a 125 ml / h of a medicament to the patient with flow rate of 15 drops per ml. Calculate how many drops per minute will you set the drip?

125 x 15 : = 60 = 31.2 = **31 drops / min**
60:15 = 4
125 : 4 = 31.2 = 31 drops/min.

5. Vaccinations against influenza, hepatitis B, hepatitis A, tetanus

Joanna Girzelska

The essence of vaccination - introduction into an organism weakened pathogens, or antigens thereof - resistance may be long-term or persist for life.

Goal - protection against severe course of the disease and its complications.

Routes of administration of vaccines - according to the manufacturer's indications, are given:

- intradermally (only BCG),
- intramuscularly,
- subcutaneously,
- orally,
- intranasally (not available in Poland).

Attention: most vaccines administered according to vaccination schedule is administered intramuscularly.

Complications:

- infection caused by non-sterile injection (consequences: abscess, sepsis, toxic shock syndrome, hepatitis B, HIV),
- the vaccine in the wrong place (consequences: abscess, local reaction, injury to the sciatic nerve),
- the negative effect of an administered drug by mistake instead of the vaccine,
- application of a defective vaccine or solvent (consequences: ineffectiveness vaccination, vaccine injury topical and systemic),
- complications included in the group of vaccination side effects (impairment of health, which occurred during the 4 weeks after administration of the vaccine).

Attention: after vaccination the patient must remain in the GP doctor / paediatrician clinic for about 20-30 minutes. Persons with allergic disease require longer follow-up.

Necessary equipment:

- vaccines,
- disposable needles and syringes of various sizes,
- disinfecting fliuds: skin, hands, surfaces (aerosol and ready-made sachet),
- sterile swabs to disinfect the skin of the patient and ampoules, vials (individually wrapped),
- non sterile latex gloves Powder / powder-free disposable in a selected size; It is indicated as useful synthetic gloves for personnel or patient sensitization to latex,
- waste containers (sharps - needles and infectious medical waste).

NOTE

The essential duties of the nurses in the vaccination room must provide a set for resuscitation, completed in full and containing an injectable medication and equipment with the current expiry date. Ambu bag should be checked and ready for use. Emergency equipment should be stored in an easily accessible and marked place.

The effectiveness of vaccination – the efficacy and safety of vaccinations is foremostly affected by the choice of the injection site (as specified by the manufacturer) and the needle length (to a lesser extent its diameter) Selected according to the specified criteria, dependent on the age and weight of the child.

The decision to choose the length of the needle and the anatomic site of injection should be made individually for each vaccinated child, depending on their age and:

- muscle size,
- the thickness of the subcutaneous tissue at the injection site,

- the volume of vaccine administered,
- injection technique,
- depth to which the vaccine should be given.

The selection of needles for the vaccination by the intramuscular route: It depends on the age and place of injection.

The selection of needles for subcutaneous vaccination: A needle of a diameter of **0.5-0.6 mm** (25G and 23G) and a length of 16 mm.

Attention: some vaccines are prepared in the form of pre-filled syringes with a needle embedded, some other manufacturers attach separate the needle, and then their parameters are not always in line with the recommendations discussed.

1. **Route of administration of influenza vaccine -** given deep intramuscularly or subcutaneously (according to the manufacturer's instructions).

Vaccination schemes: Varied depending on the age of the person vaccinated.

Time post-vaccination observation: 15 minutes,

2. **Route of administration of the vaccine against hepatitis B**: Administered intramuscularly. In exceptional cases, mainly with concomitant coagulation disorders, the subcutaneous route allowed.

Vaccination schemes against B: Most commonly **0–1–6 months** in which the first dose is given within 24 hours after birth. Vaccinations for children with a birth weight of less than 2.000 g should follow the four-dose schedule: 0–1–2–12 months.

In post-exposure prophylaxis, the vaccination schedule (0–1–2–12 months) should be started no later than on the **7th day after exposure to HBV**, and the immunoglobulin preparation not later than **72 hours after exposure**.

3. **Route of administration of the vaccine against hepatitis A**: Administered intramuscularly.

Passive Immunoprophylaxis of hepatitis A comprises administration of a formulation of immunoglobulin (IG) intramuscularly.

4. **Route of administration a vaccination against tetanus (tetanus):** intramuscularly or subcutaneously (as indicated by the manufacturer).

The only form of tetanus vaccine is toxoid (toxoid). Vaccination is performed deeply sc. into the deltoid or anterolateral thigh, and the antitoxin is administered intramuscularly.

Vaccination schemes: Vaccination against tetanus is compulsory and begins after the age of six weeks. The basic scheme includes three doses (0–1–6), but for vaccines in the vaccination program, which also contain pertussis antigens, children receive four doses of the vaccine as part of the primary vaccination. Booster doses are given at 6, 14 and 19 years of age. Then booster doses are recommended every 10 years.

Attention: in the case of a patient who received the last dose of primary immunization or booster dose in **a period of less than 5 years,** there is no need to take post-exposure immunoprophylaxis (in exceptional high-risk cases the administration of one dose of vaccine may be considered).

The document confirming carrying out vaccination in children, stored in the vaccination room is Vaccination and Child Health booklet.

Table 5. The selection of needles for intramuscular immunization

AGE	THE LENGTH OF THE NEEDLE	INJECTION SITE
0-6 weeks old	16 mm	Anterolateral aspect of the thigh
Baby (1.-12. Months of age).	25 mm	Anterolateral aspect of the thigh
Toddler (> 12 mż.-2. N.)	25 x -32 mm	Anterolateral aspect of the thigh
	16 x -25 mm	Deltoid
Children and adolescents (< 18 years)	16 x -25 mm	Deltoid
	32 / 38 mm	Anterolateral aspect of the thigh

Source: Bednarek A., Bartkowiak-Emeryk M., Wysocki J.: Szczepienia ochronne w profilaktyce chorób zakaźnych u dzieci. PZWL, Warszawa

Bożek L.: Wstrzyknięcia i wlewy dożylne. Wydawnictwo lekarskie PZWL, Warszawa 2018.

Description of the procedure - intramuscular vaccines in infants and children under 3 years of age:

1. hygienic washing and disinfection of hands, putting on non-sterile disposable gloves.
2. Selecting the recommended injection site according to the age, body weight and muscle mass of the patient.
3. Disinfecting the vaccination site with gauze pads soaked in alcohol or other disinfectant, guiding them in an oval spiral motion from the selected vaccine site over an area about 5 cm in diameter. Waiting until the alcohol has completely evaporated from the skin surface.
4. Inserting the needle into the muscle, using one of two methods:
   – stretching the skin at the site of administration of the vaccine using the thumb and index finger of the free hand and insert-

ing the needle of the syringe with the vaccine into the selected site at an angle of 90o (perpendicular to the skin surface) - the preferred technique;
   - grasp the muscle with the fingers of the left hand and with the right hand, insert the needle of the syringe with the vaccine into the selected site at an angle of 90o (perpendicular to the skin surface).
5. Inject the vaccine without prior aspiration. It is recommended to inject quickly (but smoothly, without using excessive force), as the intensity of pain and stress during the shorter procedure is less than during a standard slow injection.
6. Remove the needle in a uniform rapid motion.
7. Apply pressure to the vaccine site with a sterile gauze pad and have the parent apply pressure for 30-60 seconds (this may reduce the sensation of pain).
8. If there is bleeding from the vaccine site, apply a sterile dressing.
9. After administration of the vaccine, observe the patient in a sitting or lying position in the medical facility for 20-30 minutes for fainting or anaphylaxis.

6. Calculation of doses

Joanna Girzelska

Gases: gas flow is measured in litres / min (e.g. oxygen flow of 5 l / min). Water capacity bottle (volume of water which can be poured into the bottle after removing it from the valve) is measured in litres. Gas pressure in the cylinder is measured in atmospheres, bars, megapascals

1 MPa = ~ = ~ 10 bar at 10

Gas supply tank : cylinder water capacity x cylinder pressure= cylinder gas supply
if:
cylinder water capacity = 2.7 litre
cylinder pressure= 150 bar
Then: 2.7 X 150= 405 litres
If the gas flow is set to 5 l / min
Then: 405/5= 81 min
Which means that there is enough gas for 81 minutes.

DRUGS
Drug units:

- Doses can be expressed as:
  - Grams - g

1g = 1000000 = 1000000 µg
Milligrams - mg
1 mg = 1000 µg = 0.001 g

  - Micrograms - mcg or µg

1 mg = 0.001 mg = 0.000001 g

- Also in:
  - international units
  - milliequivalents
  - moles
  - etc.

NOTE

Table 5. Drug units

1 g = 1000 mg	G 1 = 1000000 μg
0.1 g = 100 mg	0.1 g -100,000 μg
0.01g = 10 mg	0.01 g = 10 000 μg
0.001g = 1 mg	0.001 g = 1,000 μg
1 mg = 1000 μg	0.0001 g = 100 μg
0.1 mg =100 μg	0.00001 g = 10 μg
0.01 mg = 10 μg	0.000001 g = 1 μg
0.001 mg -1 μg	

The amount of drug in an ampoule

The drug content in the ampoule may be different in different volumes

The capacity of an ampoule is measured in ml

In 1 ml, 1 mg, 10 mg, 100 mg of drug may be dissolved - concentration will vary, eg. MORPHINE 1ml vial can contain 10 mg of drug and 20 mg of the drug

Picture 18. Drugs

Percent concentration:
The number of grams in 100 g of a solution of
We assume that 100 g of the solution is 100 ml which gives 100%

The concentration of 1% means that in 100 ml of solution there is 1 g of substance

A concentration of 10% means that in 100 ml of solution of there is 10g substance

The concentration of 100% means that in 100 ml of solution of 100 g of substance

An ampoule's description
E.g. CORDARONE,
Ampoule of 3 ml contains 150 mg Amiodarone
It can be described in two ways:

- 150mg / 3ml, 3ml (total dose / total volume, the number of milliliters)
- 50 mg / ml, 3 ml (a dose in the milliliter and the number of milliliters)

Percentage description:
X% volume. amp. x 10 = mg
e.g. Adrenaline 0.1%, 1 ml
0.1% x 1 mL x 10 = 1mg

Calculating:
In one ampoule there is 1 mg / 1 ml (because 0.1%, 1 ml)
We take the 1ml of drug
Dilute to 10 cm^3 (1 cm^3 => = 0.1 mg> 100 μg)
Give 1.5 cm^3 (0,15 mg = 150 μg)
Give the patient 7 mg MF

Calculation - give 7 mg morphine
Give the patient 3 mg MF

Calculation - give 3 mg of morphine
In one ampoule there is 20 mg medicine because we see that: 20 mg/ 1ml

We draw 1 ml of a medicament to the syringe, for example. 20 ml Dilute to 20 cm^3 (1 cm^3 => 1 mg of drug; 10 cm^3 => 10 mg of drug and 20 cm^3 => 20 mg drug)

We give 3 cm^3 (Because 3 cm^3 => 3 mg of drug

or 20 mg - 20 ml or cm^3
3 mg - x ml
X = 20 cm^3 x 3 mg / cm^3 = 20 mg^3

or

We draw 1ml of a medicament to the syringe, for example: 10 ml Dilute to 10cm^3 which means that in 10 ml we have 20 mg of drug (1 cm^3 => 2 mg of drug; 10 cm^3 => 20 mg of drug)
We give 1.5 cm^3
because 1 cm^3 of drug is 2 mg, 0.5 cm^3 drug is 1 mg

or

20 mg - 10 cm^3
3 mg - X cm^3
X = 10 cm^3 x 3 mg / 20 mg = 1.5 ml
The syringe described “MF 10 mg / 20 ml” Give 6 mg

Calculation
Vial contains 750 mg Give 125 mg IV to a child

7. Collecting (sampling) material for laboratory tests

Ewa Guz

7.1. Performing diagnostic tests

Diagnostic test strips

Capillary blood collection goal: Execution of strip diagnostic tests using different types of devices / diagnostic systems, such as the glucometer, a system for the determining of cholesterol, triglycerides, glucose, lactate in the blood, prothrombin time monitoring system.

Standard puncture site to draw capillary blood?

- the lateral surface of the fingertip of the middle, cordial and small finger of the non-dominant hand,
- lateral and medial plantar surface of the heel in neonates and infants,
- earlobe - the lower part.

AST - alternative site testing:

- preferred AST: a thumb thenar and the fifth finger hypothenar within the hand,
- inner and outer side of the forearm, upper arm, calf or thigh.

Set for capillary blood collection:

- treatment trolley, disposable gloves, kidney bowl, the hard plastic, puncture-proof container, sterile swabs, lancets, the fluid for disinfecting the skin (not for blood glucose testing) bags for medical waste and municipal waste,
- depending on the purpose of the study: for blood glucose testing- glucose meter, test strips for biochemical or morphological testing – microtube, preheparinized capillary tube, caps, mixer magnet.

7.2. Venous blood sampling for laboratory tests

The best place on the body for blood drawing is a vein around the elbow flexion, less commonly the back of the hand or the forearm.

In case of difficulty in taking blood from peripheral veins in patients with severe general condition, we can get blood from a central venous catheter observing the principles (first drawn 10 ml of blood is not suitable for testing, at least two hours earlier the administration of fluids and drugs has been stopped, the catheter after blood taking must be thoroughly flushed with physiological saline).

Preanalytical errors affecting the test results:

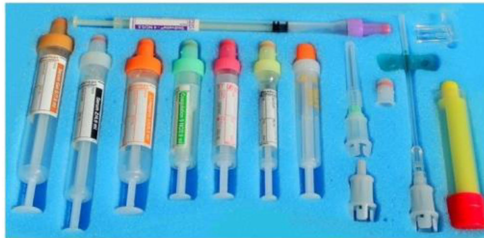
- Too long or too strong vein pressing
- Too thin needle
- Too fast aspiration of blood
- Lack of proportion between the volume of blood and an anticoagulant
- inadequate reagent
- Improper storage of blood samples and their transport to the laboratory

Methods of blood sampling:

- The traditional method - an open system, a syringe needle
- Vacuum method - closed system - Vacuette
- Vacuum aspiration method - a closed system - Monovette
  For blood-collecting a needle of the possibly large diameter should be used. Adults: min. G 21, children - 23G.

Picture 19. Safe Needle (safety)

Picture 20. Needles for vacuum method blood collection



Picture 21. The vacuum-aspiration Monovette

Contraindications to the collection of venous blood

- Relative: bleeding disorders, hemorrhagic diathesis
- Local: burns, scars, frostbite, edema, abscess, pigmented lesions
- arteriovenous fistula venous limb
- mastectomy side limb

Complications:

- Superficial thrombophlebitis
- rupture of the veins
- Subsequent bleeding
- circulatory collapse
- haematoma
- Infection puncture of adjacent tissues: artery, nerves.

Difficulties during venous blood collection:

- Easily bursting veins (the elderly), apply slight pressure of the stasis.
- The small diameter of the vein, we puncture with a needle with a notch directed downwards almost parallel to the skin
- Invisible vein, we can heat the limb in hot water
- Hemorrhagic diathesis, tourniquet cannot be applied and after the blood is collected n insertion site must be pressed for about 5 min

- The tendency to faint, blood should be collected in a lying position
- Hyperactivity of the patient – we talk and calm the patient
- Rupture or puncture of the vein during the collection, stopping the bleeding bt compressing the site, change of blood collection site
- Abundant adipose tissue, use the knowledge the anatomy concerning the course of the veins.

It is recommended that blood collection in the following order in the Monovitte system:

- for culture (traditional method- open system syringe, needle)
- to clot (white cap - serum, biochemistry),
- the clot (brown cork - serum with gel),
- citrate (green stopper - clotting system),
- citrate (purple cap - ESR),
- heparin (orange plug - plasma),
- EDTA (red cap - morphology),
- fluoride (yellow plug - glucose).

7.3. Collecting urine for general testing and testing for culture

Micturition (lat. Mictio) - medical term for an act of urination, consisting in conscious (control of cerebral cortex) expulsion of the urine collected in the bladder through the urethra to the outside.

Diuresis - urine passing
Norm: 600-2500

NOTE

Disorder urination:

1) **Anuria**
   - **Below 5-10 ml per h.,**
   - **Less than 100 ml per day.**
2) **Oliguria**
   - **Less than 60 ml per h.,**
   - **Less than 400 ml per day.**
3) **Polyuria**
   - **Greater than 2.5 liters per day.**

Polyuria - polyuria - passing more than 3000ml / day, often associated with polydypsia (Excessive thirst).
Haematuria - blood in the urine.
Dysuria - painful urination.
Bacteriuria - the presence of bacteria in urine inoculation, 100 000 bacterial colonies per 1 ml of urine (in 105 ml).
Pyuria - the presence of leukocytes (leucocytosis) and micro-organisms (viruses, bacteria, fungi or parasites), in urine.
Nycturia - night urination.

Most frequently urine is collected for routine test (urinalysis) or bacteriological examination. Other tests include creatinine clearance levels of enzymes and hormones, toxicological examination, cytological examination. Depending on the type of test, from 10 to 100ml is collected.

What are the procedures for collecting urine samples?

- Urine is collected from the first morning micturition of the so-called the central stream so that the urine will contain the least impurities from mucus, bacteria of the urethra.
- Urine can also be collected from the urinary catheter when setting the catheter or by puncturing an indwelling catheter. To this end, the surface of the catheter is thoroughly disinfected and the catheter is punctured in the sanitized site and then draw an appropriate amount of the urine into the syringe. Prior to this, we

have to tighten the catheter about 4-5 hours to collect the urine in the bladder. Sometimes catheters are provided with a special port, then the urine is collected by puncturing the port after prior disinfection.

- In new-borns and infants urine is collected into special urine bags glued to the crotch of the child.

7.4. Sputum sampling

In medical diagnostics two terms of sputum are used: spontaneous sputum expectoration and induced sputum expectoration that is expectoration after inhalation of a solution of NaCl-administered in increasing concentrations.

Rules for sputum sampling:

- 1-3ml of sputum should be collected at one time in the morning on an empty stomach, immediately after waking up or 3 hours for 3 consecutive days. The sputum for cytology is collected throughout the day. To test for tuberculosis, of 3-10 ml of sputum is collected.
- Sputum is collected before giving an antibiotic or two days after its withdrawal.
- Sputum is collected away from other people.
- If the patient coughs a small amount of secretion, an amount of fluids can be increased (hydration), we can tap the patient, perform postural drainage or inhalation of 0.9% NaCl or 10% NaCl spray heated to 50 ° C, or the inhalation of drugs thinning secretions.
- If you collect secretions from the whole day, we do it in 3 hours after a meal.
- The procedure is always performed under aseptic conditions and precautions for use in the prevention of HIV, HBV, HCV.

Objective:

- Examination (dose quantity, colour, density, additives, parasites, method of laying in the vessel);
- Bacteriological examination (defining present microorganisms and performing antibiotic susceptibility tests);
- Cytology test;
- Mycobacerium tuberculosis test. (Testing for tuberculosis).

Contraindications to collecting spontaneous sputum expectoration itself:

- Patients weak, emaciated;
- Uncooperative patient (patient unconscious with dementia);
- Purulent mucous membranes of the mouth.

Set: Sterile closable container with a wide mouth (or petri dishes), boiled water in a cup, bowl Kidney, tissues, plastic helmet or protective mask on the face + goggles, disposable gloves non-sterile, disposal bags (optional stage treatment), a nebulizer, and a drug loosening sputum, if the patient has difficulty in secretions expectoration.

7.5. Swabbing

For the purpose of testing, glandular mucous membrane of the throat, tonsils, nasal, vaginal or anal swabs are collected. Swabs are also often collected from wounds to perform culture and susceptibility testing.

Swabbing is rubbing a sterile swab or bacteriological loopful of surface, from which we get the material for the study. The swabbing process itself must be carried out aseptically.

Objective:

- Parasitological examination (parasites);
- Virological examination (of the virus);
- Cytology (evaluation of qualitative and quantitative composition of the cell);
- Bacteriological examination (a type of microorganism and antibiogram).

Pharyngeal swab

Dangers associated with the collection of throat swab:

- Provoking vomiting;
- Mechanical damage to the throat mucosa;
- False positive results due to transfer of germs from sites other than the back wall of the throat, tonsils and their crypts;
- False negative result because of too superficial rubbing or contact with saliva sample.

Set:

- The sterile swab transport set with the substrate or without a substrate;
- A sterile solution of 0.9% NaCl;
- Spatulas;
- Protective mask;
- Gloves;
- Bags for medical waste and municipal (optional treatment trolley).

Swabbing the anus:

Hazards

- Mechanical damage to the mucosa;
- False negative or positive results due to failure to comply with a swab and sampling; techniques and the principles of the sample storage and transport.

Set:

- A sterile swab in the transport set with or without the substrate;
- Set Graham Hall or the NIH to study the parasitological;
- A sterile solution of 0.9% NaCl;
- Disposable protective mask;
- Gloves;
- Infectious waste bags and other.

NOTE

The patient lies in the lateral position with the legs bent towards the body. We part the anus folds, put the swab to a depth of 2-3cm and with rotational movement collect swab. For parasitological testing by Graham – a transparent adhesive tape should be used, adhesive side that sticks to the anal region, and then it is stuck on a glass slide. The treatment is performed in the morning before passing the stool.

Stool sampling:

For the study, newly passed stool sample comprising pathological material, blood, mucus, pus, strands of epithelial cells, food debris, and not the formed portion which contains the food residues and the intestinal flora. Typically, the sample of hazelnut-size is collected to a container, comprising a transport medium. Samples of faeces are collected from the stool that has been passed without the help of laxatives.

Samples for bacteriological testing should be collected three times on three consecutive days, so that detection of the etiological agent is increased.

Purpose of faeces sampling:

- general examination,
- bacteriological,
- virological,
- parasitological,
- faecal occult blood.

8. Feeding the patient with a gavage

Ewa Guz

Food can be supplied into the human via two different routes:
- enteral by (physiologically, enteral);
- parenteral (non-physiological, parenteral).

Oral nutrition is the simplest way to ensure that patients have the necessary nutrients during illness and convalescence.

Tube feeding is giving a prepared liquid or semi-liquid food through a gavage (probe) introduced into the stomach or small intestine. There are three methods of tube feeding:
- portions method - is the administration of food with a volume of 200-300 mL using a syringe,
- intermittent method - comprises administering food portions, for example. A 500 ml (bottle) within 1 hour,
- by continuous infusion (using gravity or pumps - consists of a drip feed through a whole day - continuous infusion or intermittent, depending on clinical indications.

Indications for feeding via gastric tube:
- lack of oral nutrition,
- dysphagia,
- psychiatric disorders (anorexia nervosa),
- craniocerebral injuries,
- diseases of the oral cavity, pharynx, oesophagus, to prevent ingestion,
- burn injury,
- acquired short bowel syndrome,
- states of consciousness disorders,
- disorders caused by chemotherapy and radiotherapy (lack of appetite, vomiting),
- neurological changes resulting from injury or illness,
- preparing for surgery.

Contraindications for feeding through a nasogastric tube:

- lack of bowel function due to its failure, severe inflammatory post-operative paralytic ileus,
- total mechanical obstruction,
- intestinal fistula secreting a lot of content,
- lack of access to the gastrointestinal tract, e.g. severe burns of the oesophagus, multiple trauma,
- the lack of hard palate,
- recent surgery of the oesophagus or stomach.

Principles of tube feeding:

– before feeding make sure that we are in the stomach, and that there is no backlog.

Suctioning more than 150 ml of retained contents indicates a backlog.

– feeding 5-7 times a day,
– feeding 200 - 300 ml of food at a time,
– feeding speed:
  1) funnel/syringe: 100ml/5-10min,
  2) bag/bottle on a stand: -100ml/10-15min,
  3) nutrient pump: 100 ml/hour,
– temperature of food and liquids about 30°C,
– restricting the entry of air to a minimum,
– flushing the probe after each feeding.

The gastric probe is placed for the duration of the feeding or for a certain period of time.

Replacement of the gastric probe:

– polyvinyl (PVC) every 7-10 days,
– polyurethane (PUR), silicone every 6 weeks.

9. Patient care with a lower gastro-intestinal part problem

Mariusz Sutryk

9.1. Treatments in the rectal area

Contraindications to performing procedures in the rectal area are:
1. Bleeding from the gastrointestinal tract;
2. Mechanical obstruction;
3. Risk of miscarriage or premature birth;
4. Unexplained abdominal pain;
5. Intestinal fistula;
6. Acute abdominal disease (e.g. peritonitis);
7. States after large intestine surgeries.

Execution of rectal ingots - drug administration in liquid form into the rectum. The main objectives of drug ingot is to provide a drug acting local or general, i.e.:
– locally acting on the mucous membrane of the colon and used for shielding and anti-inflammatory purposes,
– are also used in the case of seizures, fever, pain, and in case of nervous excitement.

The substances most commonly used for therapeutic infusion are among others: ingots having general therapeutic effect (Luminal, chloral hydrate) and acting locally on the mucosa of the colon (activated carbon, 0.5% tannic acid, water of linseed).

Execution of purging rectal ingots

The aim of treatment is to stimulate the motility of the bowel and facilitating the removal of accumulated gas and stool. It involves pouring into the rectum of glycerine, paraffin or olive oil. Indication for

purging ingots is to facilitate bowel movement in the case of constipation and stimulate peristalsis.

Most purging ingots are performed with a use of glycerine, mineral oil and a volume of about 30 to 100 ml at a temperature of 36-38/40 degrees C.

Accelerated and delayed rectal ingots

This is the introduction of fluid into the rectum by drops. The main objective of the performing of drip enema is to facilitate the expulsion of gases and stool and stimulate peristalsis. This leads to irritation of sensory nerve endings (stimulation of gastrointestinal motility), and thereby softening the stool.

Accelerated rectal ingot

Most frequently used fluids such as 0.9% NaCl and 5-10% NaCl. Liquid volume of 300 to 500 ml at a temperature of 36- 38/40 degrees C.

The flow rate of infusion should be between 80-120 drops per minute (note that the 20 drops = 1 ml).

Delayed rectal ingot

The main objective is to give medication and hydration. It is commonly used for implementation of the infusion liquids such as a released: 0.9% NaCl, 5% glucose, PWE, Intestinal Fluid.

Up to 300 ml should poured. The rate of infusion within one minute should be about 30-60 drops/min.

Keep in mind that the patient should lie still so as not to trigger pressure.

Enema

Cleansing enema is performed in case of:

- preparing a patient for diagnostic tests,
- preparation for childbirth,
- preparation of the surgery (in particular in terms of preparation and purification of the lower gastrointestinal tract),
- facilitating the excrement for faecal impaction,

Picture 22. Enema- preparation for rectal ingots (own work).

Effects:

- causing peristalsis stimulation by irritation of sensory nerves found in the large intestine wall by thermal, chemical and mechanical resistance,
- causes the softening of faecal mass.

To perform the enema, commonly used fluids, such as boiled water, soapy water, water with 20 g of baking soda and 10% glycerine solution are used. The water temperature should be about 36-38-40 degrees C.

9.2. Care of intestinal fistula (stoma)

The basic principles of stoma care include:

1. Be sure to rinse thoroughly with warm water. It is advisable to wash stoma with lukewarm water. Touching the stoma is not painful.
2. The skin around the stoma must necessarily be perfectly dry. Drying of the skin, we can performed with a soft towel or gauze. It is important to dry it thoroughly so that, the adhesive adheres well to the skin.
3. Carefully cut a hole in the adhesive, which should be matched to the diameter of the stoma. Then stick the adhesive to the skin.
4. When there are the recesses or grooves of the stoma, it is desirable to use a paste. Sealing paste fills the irregularities of the skin and prevents leakage of intestinal contents into the adhesive.
5. Special skin conditioners and anti-chafing creams should be used.

10. Catheterization of the bladder

Ewa Guz

Bladder catheterization involves inserting a catheter into the bladder through the urethra. Catheters are made of different materials which have the appropriate flexibility, for example. from polyurethane, silicone or latex.

NOTE

How long the catheter stays in the bladder depends on the type of material it is made of:
- latex - maximum 14 days,
- silicone - up to 90 days.

Silicone catheters are used for long-term urinary drainage. Each catheter has a certain size, which is described in the paper of the package. The size is given by the scale French (Fr) or Charrier (Ch), which refers to the periphery of the catheter given in millimeters (1 degree corresponds to 0,33 mm of the outer diameter while the inner duct is reduced accordingly.

Types of catheters:
Foley catheter

Picture 23. The size of catheters

Picture 24. Filled balloon catheter with a catheter in the bladder retention

Catheter manufacturer gives the amount of fluid required to fill the balloon. This type of catheter may have three channels, then one of the channels used to rinse the bladder in a closed system, can also have a port to collect urine for testing. The balloon may not be washed with saline, as crystallization may occur and consequently a problem with the removal of the catheter. Fill the balloon with water for injection.

Picture 25. Catheters Nelaton

The Nelaton catheter comes in various sizes, it is used for a single urine flow. If you leave the catheter for a long time, it is necessary to put sutures to fix it to the penis or vulva.

Picture 26. Couvelaire's catheter

Couvelaire's catheter used mainly in patients with hematuria. Construction of the catheter provides a free flow of urine along with blood clots. This type of catheter is also a good option if you need to rinse the bladder.

Picture 27. Tieman's catheter

Tieman's catheter characterized by folded pointed, conical harder tip

and at the top end of the catheter. That kind of a catheteris used to catheter men with prostatic hypertrophy or in patients with narrowed urethra.

Malecot and Pezzera's catheters have a characteristic "head", and are used to drain the urinary tract after surgery in order to facilitate healing.

Catheterization of the bladder in a woman and a man

IMPORTANT

Therapeutic and diagnostic indications of the bladder catheterization:

- Diagnostics:
  - urine collection,
  - administration of a contrast agent - diagnostic radiology (voiding cystourethrography),
  - monitoring diuresis in patients severely ill,
  - rating urinary retention,
  - patency of the urethra,
  - urodynamic study.
- Medical:
  - rinsing the bladder with therapeutic agents of urinary bladder after the surgery in the bladder area, after resection of the prostate,
  - running water balance,
  - administration of drugs into the bladder, for example. cytostatics or antibiotics
  - maintaining the patency of the urethra after surgery and urology.

Indications:

- One-time catheterization:
  - Collect urine for bacteriological examination in the unconscious patient
  - Collect urine for general testing in women during menstruation
  - No spontaneous urination for 12 hours after surgery or from 6 to 8 hours after giving birth
- Permanent Catheterization
  - need for fluid balance or hourly diuresis in unconscious patients,
  - maintaining the patency of the urethra after surgery and urological procedure,
  - urinary incontinence of central nervous system origin, eg. after spinal cord injury,
  - rinsing the bladder after bladder surgery in men after prostate removal.

Contraindications for bladder catheterization:

1) Female:
   - inflammation of urethra,
   - paraurethral abscesses,
   - injury to the pelvic urethra. (traumatic urethral),
   - stenoses, urethral,
   - inflammation of the vagina and vulva.
2) Male:
   - acute prostatitis,
   - suspected urethral rupture associated with blunt or irritant trauma,
   - the presence of blood in the mouth of the urethra,
   - scrotal hematoma,
   - ecchymosis at the crotch area,
   - prostate imperceptible in physical examination,
   - significant narrowing of the urethra.

11. Nurse assistance during puncture

Marta Czekirda

Sternum puncture

The bone marrow aspiration is performed by puncturing the sternum, crest iliac crest, and in children - the spinous processes of the lumbar vertebrae and ribs or tibia. The most typical place of aspirating the sternum is manubrium sternum bridge (about 3-4 cm below the jugular notch in the median line at the level of 1st rib), rarely body of sternum at the height of the 2nd or 3rd the intercostal space; the patient is laid flat on his back.

The iliac crest site is punctured at the anterior superior iliac spine (the patient lies flat on his back), or the posterior superior iliac spine (patient positioned in the lateral decubitus position with knees bent towards the chest). When there are difficulties in obtaining bone marrow through puncture and in some forms of leukaemia and lymphoma, trepan biopsy is recommended.

Its purpose is to aspirate a bone and marrow material by various types of needles and trepans, e.g. Jamashidi needle, Burkhard piercing apparatus, drilling cutter of ilium crest in area of the the posterior superior iliac spine.

Objective

a. Diagnostic:
   - execution of marrow smear, so called myelogram;
   - execution of the cytochemical and cytoenzymatic test;
b. Medicinal:
   - application of drugs, such as Cytostatic;
   - bone marrow transplantation (the donor).

Indications:
- acute and chronic myelogenous leukemia;
- acute lymphoblastic leukemia;

Pernicious anemia
Hodgkin's Disease
Multiple myeloma

Contraindications:

a. Absolute:
   - haemophilia.
b. Relative:
   - other blemish plasma;
   - acute blemish purpura;
   - low blood platelet levels;
   - disturbances of bleeding time and clotting;
   - inflammation of the puncture site.

Complications:
- puncturing the chest bone associated with damage to large blood vessels and the right atrium in patients with abnormalities of the chest and disease processes leading to thinning and softening of the bones (e.g. Osteoporosis, multiple myeloma, tumour metastasis to bone) and the aneurysm aorta, which as a result of compression can lead to sternum bone loss - in these cases crest iliac puncture is safer;
- bleeding from the puncture site;
- the introduction of infection (osteomyelitis marrow).

Puncture of iliac crest bone is safer (no danger puncture blood, organs) puncture of the bridge, but usually it is harder to get the marrow.

The patient before the bone marrow aspiration is carried out following standard blood test:
- CBC with smear,
- bleeding and clotting time.

Lumbar puncture

Cerebrospinal fluid is collected generally from lumbar puncture, usually in the supine patient position, rarely in a seated position and occasionally from suboccipital puncture. **Lumbar puncture per-**

formed in the subarachnoid space L3-L4, L4-L5 or L5-S1 (area including no core, as it ends at L2 and the meningeal bag contain only the nerve roots. Iliac crest connects to a horizontal line passing through the spinous process of the lumbar vertebra 4, the intervertebral space above or below the puncture place.

The patient is laid flat on the back side with a maximum flexion of the spine rarely in a sitting position, but then the measurement of pressure and Queckenstedt test are not performed.

Objective:

a. Diagnostic:
   - measuring the pressure of cerebrospinal fluid;
   - test of physico-chemical properties: colour, pleocytosis, protein, glucose, chlorides, globulin reactions and tests for the presence of iron.

b. Medicinal:
   - dropping the fluid to reduce pressure;
   - injection of drugs, e.g. Antibiotics, cytostatics;
   - obtaining spinal anaesthesia.

Indications:

- meningism (irritation or meningitis, subarachnoid haemorrhage);
- rapidly progressive paresis of the core origin (primary tumours and metastases, inflammatory processes and vascular);
- sharply or subsharply increasing symptoms of damage to the roots and peripheral nerves (e.g., Guillain-Barre syndrome);
- the presence of other neurological (and therefore the test is routinely performed in people hospitalized in illnesses: neurological, infectious, internal).

Contraindications:

- the presence of the papilloedema at the bottom of the eye, indicating an increased intracranial pressure, cerebral edema, swelling of the optic nerve;
- patients with purpura and treated with anticoagulants due to the possibility of spinal hematoma epidural and subdural hematoma.

Complications:

a. Threatening to the patient during the puncture:
   - erroneous puncture (with spinal cord injury, cauda equina, vasculitis);
   - herniation of the brain stem in case of elevated intracranial pressure (respiratory arrest, cardiac arrest, disturbances of consciousness, mydriasis).

b. Occurring after the puncture:
   - **post-dural-puncture headache -** Which involves the appearance of headache and dizziness worsening in the vertical position, which is often accompanied by nausea and vomiting, and sometimes Meningism.

Puncture/drainage of the pleural cavity

Puncture of the pleural cavity (thoracocentesis). Is usually made after finding the fluid or air in the pleural. If there are no special reasons to select a different puncture site, the best place for the aspiration of fluid it is VII-VIII intercostal space in the posterior axillary line or the center, the upper edge of a rib. The most convenient way to perform puncture in the mid scapular line, about 2 cm below the angle of the blade. Sometimes it is carried out in the ninth intercostal space between the mid scapular line and the posterior axillary line. In the case of the encysted pleural fluid, puncture is carried out under the direct control of the ultrasound in the anterior axillary line in the middle of the third intercostal space, because in this area intercostal artery splits into upper branch - extending below the lower edge of the rib and the lower branch - extending above the upper edge of the ribs.

In order to remove air from the pleural most preferred puncture site is in the second intercostal space in the mid-clavicular line, the upper edge of the third rib). Content aspirated by venipuncture should differentiate between the pleural exudation (protein rich) and transudate (poor in protein). In the case of transudate proceeding consist in pleural cavity emptying, in the case of pleural effusion - pleural biopsy. To puncture a patient is placed in a sitting position, with a slight tilt forward, forearms and head resting on a cushion located on the back of the chair (lifting arms leads to the extension of the intercostal space), rarely in a position lying on his side with his hand toward abducted top.

12. Multistage activities of scrub nurses

Ewa Guz

Tools administration:

- All tools administered in such a way that they can be used immediately: the scrub nurse holds the tool in the middle or at the end and hands in such a way that the functional part is facing downwards;
- During instrumentation of the left-handed people we hand the instruments reversely;
- Hand sharp tools carefully;
- Take care that during handing of the thread ends do not fall into the operative field;
- Do not hand the tools behind the operator;
- Implants must be protected against scratching: screws and wires served with tweezers or clean glove.

Tools depositions:

- Make sure that the used needle and thread remains were returned by the operator and were not lost in the operating field;
- always put tools after use in a designated place;
- Take care of the cleanliness of tools, wipe with a damp cloth so they do not stick together;
- Before the end of the operation a "dirty" scrub nurse counts worn scarves, compresses, swabs. A "clean" scrub nurse counts those on the table with the tools and the operating field;
- When closing the surgical field , check whether the number and completeness of the material used (before the closure of the peritoneum) match. Check whether the documentation is correct;
- Check whether the damaged materials have been put away.

Preparation of the surgical field

Shaving of the surgical field:

Depending on the hospital, shaving is performed on the wards or in the operating room. Shaving is often controversial. In the operating room more microorganisms can be released this way.

- Shaving is carried out by a “dirty” scrub nurse in the disposable glove.
- The operating field is shaved with a disposable razor.
- The entire surface to be disinfected must be free of hair.
- Shaved hair must be removed with the gauze, stick the plaster to the shaved place so that the remnants of hair adhere to it.

The skin must be pre-washed and shaved in the ward.

Before disinfection environment of the operative field should be wrapped with absorptive towels to prevent the accumulation of fluid under the patient

13. The structure and activities of changing the dressing on the clean and dirty wound

Ewa Guz

Obiektive: to prevent wound infection, early detection of clinical signs of infection, improve patient well-being. Indication to change the dressing can be a visible soil dressing, soaking of serous or bloody content or loosening of the dressing.

Wound dressing protects against harmful external factors.

NOTE

Before the change of dressing assess the patient's ability to move or change position. This will allow to plan on the place of application and prepare the conditions to change the dressing in the aseptic way.

The course of treatment:

- Prepare the patient for a dressing change, inform them of the purpose and the course of treatment if the patient is efficient in self-service, ask them to go to the dressing room, if not ready prepare the patient's environment. A room for the dressing trolley should be made, the patient positioned comfortably, so that access to the wound was free.
- If you change of the dressing will be held at the dressing room, the couch should be disinfected before the treatment and cover it with a disposable sheet.

- The full set of tools and dressings and skin disinfectants, lavaseptics should be prepared on the dressing trolley:
  - sterile swabs of different sizes,
  - the sterile adhesive dressings of different sizes,
  - fastening bands,
  - sterile compresses, sterile gauze,
  - sterile drapes,
  - kidney-shaped bowl, sterile and non-sterile,
  - puncture-proof container,
  - sterile tools,
  - sterile gloves,
  - non-sterile disposable gloves,
  - lavaseptics example; Octenilin, Prontosan, antibacterial agents for the treatment of infected wounds,
  - 0.9% NaCl,
  - scissors,
  - disposal bag,
  - hand disinfectants,
  - scalpels,
  - threads,
  - swabs.
- Before the surgery, wash hands hygienically and disinfect them, wear non-sterile gloves;
- Reveal the wound area;
- Remove the dressing and discard it to the medical waste bag;
- Remove the gloves, disinfect hands, spread sterile drape around the wound;
- On the sterile drape lay off kidney-shaped bowl, sterile swabs, sterile tweezers, sterile adhesive bandage;
- Pour swabs with lavaseptics;
- Set sterile swabs;
- With the help of tweezers and soaked swabs, cleanse the wound while assessing its appearance and possible signs of infection.

  Keep the following rules for cleaning wounds:
  - one swab - one wiping,
  - if the wound is not infected always clean the wound from the inside out,

  - for infected wounds purify the wound from outside to inside and then use antiseptic broad-spectrum and antibacterial dressing for example silver ion;
- After cleaning the wound attach sterile dressing trying not to touch the side which is to adhere to the wound;
- Arrange the set in accordance with rules: medical waste into a red bag, tools for the tub with disinfectant, paper packaging to the communal waste bag;
- Remove the gloves, disinfect hands, help the patient return to the patient room, or if the dressing was changed in the patient's room, help him position comfortably;
- If the dressing was changed in the dressing room, disinfect the couch, trolley rails, table tops;
- Give the patient the information on the state of the wound and how to proceed with the dressing;
- Annotate the dressing change in the medical records.

In the case of the wound with the drain the mouth of the drain area must be further purified using the principle of one swab one wipe from the inside to the outside. We observe the quantity and nature of secretions, change exudate container and after the procedure we record observations in the patient's documentation.

Training of knowledge – part II

1. **The nurse does not take further action if oxygen saturation of arterial blood hemoglobin in the patient is:**

A. 100 – 101%
B. 95 – 98%
C. 90 – 92%
D. 89 – 90%

2. **A decrease in oxygen saturation is affected by:**

A. effort
B. fever
C. infections
D. taking measurement in a cold place

3. **A contraindication for the measurement of saturation is:**

A. fever
B. oxygen therapy
C. patient's serious condition
D. poisoning with carbon monoxide

4. **When measuring the oxygen saturation in blood, the nurse obtains information about oxygen saturation of hemoglobin**

A. arterial blood
B. venous blood
C. mixed venous blood
D. mixed arterial blood

5. **By injection intradermal you give the patient a maximum of:**

A. 0.5 ml of the drug
B. 0.1 ml drug
C. 1 ml
D. 2 ml

6. Intradermal injection will be executed in the area:

A. gluteus maximus
B. the stomach around the navel
C. on the forearm or the arm
D. quadriceps

7. By subcutaneous injection you give the patient a maximum of:

A. 2 ml drug
B. 10 ml medicament
C. 0.1 ml of the drug
D. 5 ml drug

8. You give the patient insulin selecting the area:

A. deltoid
B. half of the outer surface of the thigh above the knee
C. gluteus maximus
D. quadriceps

9. The pen needle insertion site must first be:

A. disinfected, when the skin is dirty, when the patient is in place where it is easy to infect the site
B. wash it earlier earlier with soap and water
C. absolutely disinfect
D. only wipe with a dry gauze

10. The optimum amount of drug IU administered to patients by injection is:

A. 15ml adults to children and 5 ml infants to 2 ml
B. 15ml adults to children up to 1 ml to 3 ml infants
C. to 10ml adults, children up to 2 ml, 5 ml infants
D. 10ml adults to children up to 3 ml, infants up to 1 ml

11. The angle of entry of the needle into the tissue at the i.m. injection site is:

A. 90˚
B. 45˚
C. 20-30˚
D. 10-15˚

12. Drug administration with injection according to the of von Hochstetter method relates to muscle:

A. deltoid
B. quadriceps
C. gluteus maximus
D. middle gluteal

13. The temperature in the refrigerator for storage of a pharmaceutical vaccine should be either:

A. continuously monitored with an electronic thermometer display on the outside of the refrigerator
B. monitored periodically during the day and at night
C. recorded at 2 hours
D. monitored only at night

14. Area of administering vaccination to a child should be based on:

A. the age and health of the child
B. age, state of health of the child and the manufacturer's recommendations
C. the size of the muscle of the child and the manufacturer's recommendations
D. age, health, child and evaluation of the skin at the injection site, muscle size, the manufacturer's recommendations

15. When giving an intramuscular vaccine in infants in the recommended areas of the body (anterolateral thigh or the deltoid muscle) aspiration prior to injection of the vaccine:

A. it is always recommended
B. it is recommended prior to administration of inactivated vaccines
C. is not recommended
D. it is recommended prior to administration of highly associated vaccines

16. The most common errors and complications resulting from this vaccination technique:

A. infection caused by non-sterile injection
B. providing a defective vaccine or solvent
C. Failure to wear gloves prior to vaccination
D. the correct answers are a and b

17. After vaccination, the child's parents should remain in the GP's/paediatrician's office in for post-vaccination observation:

A. around 4-5 minutes
B. 20-30 minutes
C. post-vaccination observation is not required in children of school age
D. only the parents of a child with allergies for about 1 hour

18. Urine is collected

A. In the afternoon
B. In the morning of the first micturition
C. It does not matter when

19. Urine is collected as follows:

A. First, wash the groin, then we collect a sample of urine
B. First wash crotch, then we collect a sample from the midstream urine
C. Urine is always collected from the midstream

20. Capillary blood is sampled:

A. vein in the arm
B. veins within the hand area
C. side surface of the middle finger pad

21. Blood mustn't be collected from (tick as appropriate):

A. if the patient did not give their consent
B. on a limb with fistula
C. on the mastectomy side
D. all are correct

22. Can you take a sample of stool if defecation was caused by laxative

A. Yes
B. No

23. Giving the patient food volume of 200 - 300 ml by gavage using a syringe by the nurse is determined as:

A. continuous infusion
B. intermittent method
C. portions method
D. gravitation method

24. The nurse should check the patient at least once daily for leaks of gastric contents. Observing the presence of redness of the skin around the stoma shows:

A. compression of the outer silicone plate on the skin
B. gastric contents irritation
C. infection in place of the fistula
D. interigo as a result of improper care

25. The nurse administered, in accordance with the doctor's order, nutrients to the patient directly into the circulatory system. This means that she's performing:

A. industrial nutrition
B. enteral nutrition
C. parenteral nutrition
D. physiological nutrition

26. Urinary retention is

A. Involuntary urination
B. Urinary retention
C. Normal urinary incontinence

27. The causes of urinary retention are:

A. diseases of the nervous system, inflammation of the prostate, or epidural anesthesia
B. prostatitis, diabetes, the condition after the removal of the bladder
C. gynecological diseases, hypothyroidism, prostatitis

28. Choosing catheter pay attention to (select all correct):

A. the patient's age, the size of the catheter, the state of the urethra, sex
B. the patient's age, sex, purpose catheterization
C. what is important is the patient's age
D. men are always catheterised with size 14 and women with size 16

29. Enumerate contraindication to catheterization:

....
....
....

30. Disinfection of the urethra in women is always carried out:

A. From bottom to top and from the urethra outside
B. From urethra to the outside and from top to bottom
C. It does not matter in which direction, if only performed from the urethra outside

31. When catheterising a man, his penis should be set as follows:

A. first, horizontally in relation to the body, then vertically
B. first vertically relative to the body, then horizontally
C. no matter what position we maintain penis during catheterization

32. Do microorganisms colonizing the nasal pharyngeal cavity penetrate a face mask when speaking and coughing?

A. No
B. Yes

33. During the surgical hand-washing, the following areas are washed:

A. hands
B. hands up to the elbows
C. the whole hand, the spaces between the fingers, nails, and with forearms to the elbows

34. Surgical hand washing is done by:

A. 5 min
B. 3 min
C. 1 min read

35. Disinfect hands for:

A. 1 min
B. 3 min
C. 5 min

36. Containers with clothes, packaging gloves are always opened by a "dirty" scrub nurse.

A. Yes
B. No

37. Operator is dressed by a "dirty" scrub nurse.

A. Yes
B. No

38. Prior to administration of sterile materials particular attention should be paid to:

A. damage to the packaging
B. Validity of sterilization (Expiry date)
C. Whether the package is dry
D. All Valid

39. We always prepare spare packets of sterile tools and materials

A. Yes
B. No

40. During instrumentation, it is important (check all correct):

A. Careful observation of the course of operation
B. Proper tools administration
C. Proper tools deposition
D. The exact count of the tools and materials used before closing the peritoneum

41. In preparing the operative field one must:

....
....
....

42. Disinfecting the operative field one must remember (select all correct):

A. disinfect the place of the cut by a wide margin
B. disinfect from outside to inside when the open wound is
C. always use a dyed disinfectant
D. never repeat the disinfection with the same tupfer
E. watch that liquid disinfectant does not get into the patient
F. disinfect the operative field from 2 to 3 times

43. The angle of insertion of the needle into the tissues during the i.m. injection is:

A. 90˚
B. 45˚
C. 20-30˚
D. 10-15˚

44. Due to the risk of venous thrombosis, venipuncture in the area of:

A. head veins
B. foot veins
C. forearms
D. hand veins

45. CVP is:

A. blood pressure
B. venous pressure
C. central venous pressure
D. arterial pressure

46. During urinary retention, during a catheterization of an adult, no more urine should be drained than:

A. 100 ml
B. 1000 ml
C. 600-800 ml
D. 1500-2000 ml

47. The temperature of the liquid administered during the laxative rectal enema:

A. it should be 36 or 38˚C
B. it should be 37˚C
C. it does not matter
D. it should be 41˚C

48. Washing the male / female urethra during preparation for catheterization requires the use of:

A. sterile gloves
B. sterile gauze pads
C. sterile antiseptic fluid for disinfecting mucous membranes
D. all answers are correct

49. A patient who is immobilized for a long time, lying in bed in a flat position on his back, is at risk of developing pressure ulcers in the area of:

A. occipital, scapula, sacrum, sternum
B. the occiput, sacrum, heels, knees
C. shoulder blades, spine, sacrum, heels
D. occipital, shoulder blades, elbows, sacrum, heels

50. A full body toilet and a change of bed linen in a patient who is immobilized for a long time should do:

A. only once a day
B. at least once a day
C. once a week
D. 3 times a day

51. Activities of a nurse related to the prevention of nosocomial infections in time making a bed with a patient lying down concerns:

A. avoiding contact of bedding with: the floor, nurse's uniform
B. avoiding contact with bedding from other patients' beds
C. washing and disinfecting hands before and after the treatment, or changing gloves when making new beds
D. all the activities mentioned

52. When there is a discharge in the middle lobe of the right lung, the positional drainage will consist in positioning the patient:

A. In Trendelenburg position, on the left side, slightly / with a backward rotation
B. In the anti-Trendelenburg position, on the left side, slightly / with a backward rotation
C. In the Trendelenburg position on the right side, slightly / forward rotation
D. In the anti-Trendelenburg position, on the right side, slightly / forward rotation

53. Asepsis is:

A. prevention of infection or contamination with microorganisms of the wound, place, equipment, material and tools
B. bringing to a state of relative sterility in a specific part of the body or infected wound
C. the process of inactivating microorganisms on inanimate surfaces in order to prevent infections
D. all answers are false

54. Antiseptics aims to:

A. bringing to a state of relative sterility in a specific body part or infected wound
B. preventing contamination or contamination with microorganisms of the wound, place, equipment, material and tools
C. the process of inactivating microorganisms on inanimate surfaces in order to prevent infections
D. all answers are false

55. Disinfection is called:

A. bringing to a state of relative sterility in a specific body part or infected wound
B. preventing contamination or contamination with microorganisms of the wound, place, equipment, material and tools
C. the process of inactivating microorganisms on inanimate surfaces in order to prevent infections
D. all answers are false

56. Immediately before preparing the patient for the RR and pulse rate examination, it should be checked that:

A. Did he not smoke cigarettes a moment ago,
B. Is he or she is not under the influence of strong emotions
C. Whether he was engaged in intense physical exertion
D. All answers were correct

57. A 1 degree increase in body temperature will increase your heart rate by:

A. 5-10
B. 10-20
C. 10-30
D. 30-40

58. A paradoxical breath is characterized by:

A. thorax rises on exhalation
B. there are periods of apnea during normal breathing
C. the chest rises very quickly while inhaling
D. all answers are false

59. BMI = 26 indicates:

A. overweight
B. 1st degree obesity
C. 2nd degree obesity
D. optimal body weight

60. Heart rate in patients with arrhythmias is measured by:

A. for 1 minute
B. for 15 seconds and the result is multiplied by 4
C. for 30 seconds and the result is multiplied by 2
D. for 30 seconds

61. The systolic-diastolic amplitude during blood pressure testing is:

A. 10 mmhg
B. 130 mmHg
C. 30-50mmhg
D. 90 mmHg

62. Kussmaul's breath is characterized by:

A. very deep, regular breaths with short periods of apnea
B. rising of the chest during exhalation
C. short-term respiratory arrest
D. very deep breathing and increased respiratory rate

63. The number of breaths is measured:

A. for 1 minute
B. for 15 seconds and the result is multiplied by 4
C. for 30 seconds and the result is multiplied by 2
D. for 30 seconds

64. The number of pulse beats increases as the temperature increases:

A. for each degree Celsius from 10-20 beats / min
B. for every 0.3 degree Celsius by 10 strokes / min
C. for every 0.5 degrees Celsius by 10 beats / min
D. for every 0.1 degree Celsius by 10 beats / min

65. Oliguria is:

A. urine excretion
B. anuria, less than 50 ml of urine per day
C. pain when urinating
D. oliguria 100 - 500 ml of urine for 24 hours

66. Single-diversion urine catheters are:

A. Nelaton's catheter
B. Foley catheter
C. Tiemann catheter
D. Couvelaire catheter

67. The indication for urinary bladder catheterization is not:

A. restoration of the urethra
B. urine must be collected for bacteriological examination
C. the patient's inability to urinate
D. facilitating the care of the patient

68. Anuria is:

A. urine excretion
B. anuria less than 50 ml of urine in 24 hours
C. pain when urinating
D. oliguria 100 - 500 ml of urine for 24 hours

69. Complications arising from gastric feeding:

A. drying and cracking of the oral, pharyngeal and nasal mucosa
B. damage to the wall of blood vessels (esophageal varices)
C. erosion, bedsores
D. all answers are correct

70. Suction of more than 150 ml of residual contents in the stomach:

A. indicates backlog and requires a drain bag connection
B. it is indicative of gastric retention and does not require additional interventions
C. is always correct
D. indicates the necessity to administer food to the stomach

71. Indications for gastric tube feeding are not:

A. disturbance of consciousness
B. swallowing disorders
C. neurological changes as a result of injuries and diseases
D. decreased appetite

72. The holding time of the gastric probe is:

A. we place the probe only for the time of feeding the sick person
B. 24 to 48 hours - plastic probe
C. 10 - 14 days regardless of the type of probe
D. depending on the medical order

73. There is no contraindication to the insertion of a gastric tube

A. nasal septum deviation
B. swallowing disorders occurring, for example, as a result of surgery
C. no hard palate
D. recent surgery on the esophagus or stomach

74. The maximum amount of drug that you can inject by intra-dermal injection is:

A. 0.5 ml
B. 0.1 ml
C. 0.01 ml
D. 1.0 ml

75. The abbreviation for intradermal injection is:

A. i.D.
B. i.m.
C. s.C.
D. i.v.

76. The abbreviation for subcutaneous injection is:

A. i.D.
B. i.m.
C. s.C.
D. i.v.

77. The abbreviation for intramuscular injection is:

A. i.C.
B. i.m
C. s.C.
D. i.v.

78. The abbreviation for intravenous injection is:

A. i.C.
B. i.m.
C. s.C.
D. i.v.

79. For intradermal administration, the area used is:

A. abdomen (between the iliac crest and the navel about 2 cm around the navel)
B. the inner surface of the forearm in line with the thumb
C. outer arm area
D. the inner surface of the arm

80. The correct puncture angle for individual injections is:

A. Intracutaneous - 45 degrees, intramuscular - 90 degrees, subcutaneous - 15 degrees
B. Intradermal - 15 degrees, intramuscular - 45-90 degrees, - subcutaneously 45 degrees
C. Intradermal - 10-15 degrees, intramuscular - 90 degrees, subcutaneous - 45-60 degrees
D. Intradermal - 45 degrees, intramuscular - 15 degrees, subcutaneous - 45 degrees

81. For subcutaneous injection we use a needle:

A. 1.20
B. 0.8
C. 0.9
D. 0.6

82. For intramuscular injection we use a needle:

A. 1,2
B. 1.1
C. 0.8
D. 0.6

83. When injecting, we aspire to:

A. always
B. depending on the position of the patient
C. always, except for i.d. injections and some subcutaneous
D. always, except for i.m. injection

84. We can perform intramuscular injections in the area of:

A. the middle gluteus muscle
B. the gluteus great muscle
C. thigh area
D. the deltoid muscle and all of the above

85. The complications of intramuscular injection include:

A. damage to the sciatic nerve
B. core damage
C. heavy haemorrhage
D. hot flush

86. In the intramuscular injection we give the solution:

A. aqueous solution
B. oily solution
C. a suspension of
D. all three

87. The basic patient document on which you rely when administering medication by the tissue test is:

A. hectic card
B. order book
C. medical history of the patient
D. individual card of medical orders

88. The number of needles needed to administer the drug by injection is:

A. 1 is enough
B. 2 is enough
C. 3 is enough
D. 4 is enough

89. Nycturia is:

A. pain while urinating
B. pematuria
C. urination at night
D. pyuria

90. Pyuria is:

A. pain while urinating
B. hematuria
C. urination at night
D. the condition of urine containing white blood cells or pus

Answers

Question	Answer	Question	Answer	Question	Answer
1	**B**	31	**B**	61	**C**
2	**D**	32	**B**	62	**D**
3	**D**	33	**C**	63	**A**
4	**A**	34	**A**	64	**A**
5	**B**	35	**A**	65	**D**
6	**C**	36	**B**	66	**A**
7	**A**	37	**B**	67	**D**
8	**B**	38	**D**	68	**D**
9	**A**	39	**A**	69	**D**
10	**D**	40	**B**	70	**A**
11	**A**	41	**	71	**D**
12	**D**	42	**ACD**	72	**B**
13	**A**	43	**A**	73	**B**
14	**D**	44	**B**	74	**B**
15	**C**	45	**C**	75	**A**
16	**D**	46	**C**	76	**C**
17	**B**	47	**A**	77	**B**
18	**B**	48	**D**	78	**D**
19	**B**	49	**D**	79	**B**
20	**C**	50	**B**	80	**C**
21	**D**	51	**D**	81	**D**
22	**B**	52	**A**	82	**C**
23	**C**	53	**A**	83	**C**
24	**B**	54	**A**	84	**D**
25	**C**	55	**C**	85	**A**
26	**B**	56	**D**	86	**D**
27	**A**	57	**B**	87	**D**
28	**Ab**	58	**A**	88	**B**
29	*	59	**A**	89	**C**
30	**B**	60	**A**	90	**D**

*urethritis, paraurethral abscesses, damage to the urethra, urethral stricture, inflammation of the vagina and vulva, acute prostatitis, blood in the mouth of the urethra

** shave and disinfect the operation site

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Dictionary

Antiseptics - disinfection of skin, mucous membranes, damaged tissues using preparations which do not harm human tissues

Aseptics – a procedure designed to prevent tissue contamination of sterile surfaces.

Bacteriuria - the presence of bacteria in urine inoculation, 100 000 bacterial colonies per 1 ml of urine (in 105 ml)

Bradypnoë - slower breath, e.g. at rest, in a dream

Breathing - a gaseous exchange process in the body to take up oxygen and eliminate carbon dioxide

Breathing exercises - breathing gymnastics (controlled inhalation and exhalation as well as maximum exhalations)

Care function - a specific range of tasks expressing the essence of professional nursing

Chain of Survival - is a sequence of consecutive **rescue** steps to enable the patient who has suffered cardiac and circulatory arrest to survive

Competence - a scope of powers and powers of attorney given to take action

Competence - is a scope of powers and powers of attorney given to take action.

Constipation - too little bowel movements (less than 3 per week)

Cough - this is the body's defensive reflex, which consists of a sudden exhalation with a contraction of the respiratory muscles and diaphragm with violent ejection from the lungs

CPR - cardiopulmonary resuscitation - a syndrome of activities used in a victim who is suspected of sudden cardiac arrest, i.e. cessation of heart activity with loss of consciousness and apnoea

Desmurgy - bandaging

Diagnosis - is the collection of data about the patient and environment

Diarrhoea - a condition in which the patient gives stools that are too loose (liquid or semi-liquid), at a higher frequency (more than 3 per day) and/or in an increased amount (more than 200 g per day)

Disinfection – the process by which the vegetative forms of the organism are destroyed (bacterial spores and so-called “slow” viruses remain). In addition to the vegetative forms, high-level disinfection also destroys tuberculosis mycobacteria, enteroviruses and certain spores

Electrocardiogram (ECG) - ECG recording, imaging the electrical activity of the heart

Empathy - a form of facilitating the communication process with the patient. It also helps nursing. It is perceiving and understanding another person’s condition and compassion.

Health - a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity

Hoigné syndrome - is formed as a consequence of the introduction of drug crystals or a suspension to a blood vessel instead of a muscle tissue

Hyperthermia - is an uncontrolled increase in body temperature that exceeds the body’s compensation capacity

Hyperthermia - nan uncontrolled increase in body temperature that exceeds the body’s compensation capacity

Hyperventilation - excessive ventilation of the lungs, for example in mental disorders, during a hypovolemic shock

Hypoventilation - reduced lung ventilation, e.g. in a depression, pneumothorax,

Infection - the incursion of pathogenic microorganisms into the body

Inflammation - a body reaction to a stimulus causing an inflammation

Injection - an introduction of a solution, a diagnostic agent, an administration of a medicament with a needle (cannula) into tissues, body cavities and blood vessels

Micturition - medical term for an act of urination, consisting in conscious (control of cerebral cortex) expulsion of the urine collected in the bladder through the urethra to the outside

Nicolau syndrome - is formed as a consequence of the introduction of drug crystals or a suspension into a blood vessel rather than a muscle tissue.

Nurse - a professional title of a person who belongs to a group of health professionals, and whose independent occupation is called nursing

Nursing - encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings

Nursing diagnosis - these are the conclusions from the data on the patient, the formulation of the diagnosis is of fundamental value for individual and purposeful nursing, because it clearly shows the condition of the patient the nurse is dealing with

Nursing process - a proposal for such nursing care that uses the conscious application of the recognition of the biological, mental and social state of an individual and the environment, as well as taking deliberate and planned actions to contribute to maintaining or changing the existing state and evaluating the results obtained

Nycturia - night urination

Oedemais - the accumulation of fluid in the extracellular and extravascular space of tissues and organs

Orthopnoë - a disease symptom observed in e.g. chronic left-sided heart failure - due to severe dyspnoea the patient remains in a standing position and rests his/her hands against an object (e.g. window sill, bed), making it easier to breathe

Paradigm - arrangement in a specific, logical way of knowledge, philosophy and theory, which are components of every scientific discipline

Patient's zone - it refers to the patient himself/herself and the surfaces they are in direct contact with

Per os - it may be absorbed through almost all sections: the oral mucosa, stomach, intestine; therefore the drug can be delivered per os, sub linguam, per buccalis or per rectum

Percussion - is a series of vigorous strokes performed with the masseur's hands, following one after the other, very quickly into a massaged tissue

Presence - means being with another person, reacting to their needs and expectations, watching over someone

Procedure of hygienic handwashing - it mainly consists in washing off organic pollutants and dirt from the skin surface of the hands as well as partial elimination of transient and permanent flora

Professional function- defined by a set of complex and detailed professional tasks which are undertaken for a clearly defined common purpose

Professional qualifications - a dynamic set of knowledge, skills and attitudes that determine the performance of professional tasks

Professional qualifications - are a dynamic set of knowledge, skills and attitudes that determine the performance of professional tasks

Professional role - is a relatively stable, internally consistent system of behaviours, which is a reaction to the behaviour of other people, following an established pattern

Prophylaxis - a preventive measure, mainly medical, aimed against diseases

Pyuria - the presence of leukocytes (leucocytosis) and microorganisms (viruses, bacteria, fungi or parasites), in urine

Respiration - activities that contribute to the control of respiration, or elimination/reduction of factors which impair breathing

Sputum - an exudative substance, exceptionally transudative, expectorated from the respiratory system

Sterilisation – the process leading to the destruction of all living forms of micro-organisms.

Tachypnoë - accelerated breathing, e.g. in states of excitement, diseases of the lungs (pulmonary edema, pneumonia)

The Body Mass Index (BMI) - is defined as the body mass divided by the square of the body height

The waist-height ratio (WHtR) - is calculated as waist measurement (cm) divided by height measurement (cm)

The waist-hip ratio (WHR) - is the circumference of the waist to that of the hips calculated as waist measurement divided by hip measurement

Theory - a phenomenon and specific knowledge of a discipline, in an orderly form reflecting the regularities of reality, providing information on how it can be used in practice Dictionary

Touch - a form of non verbal communication. It also gives a sense of security

Undesirable post-vaccination reaction - any medical symptom that is temporarily associated with vaccination

Vaccine - a preparation containing antigens that are capable of inducing the development of specific active resistance against an infectious agent or the toxins or antigens it produces.

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