ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 03,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

THE EFFECT OF ELECTRIC CURRENT ON THE HUMAN ORGANISM

Mardonova Saodat Muzaffarovna
Bukhara State University

Abstract:Based on the diversity of the effects of electric current on the human body, the effects of electric current can generally be divided into two groups: local electric current effects and shock. The author expresses his opinion on the effects of electric current on the human body.

Keywords:Electric current, thermal effect, bioelectric current, biological death, burn, clinical death, acting current.

The effects of electric current on the human body are thermal (heat), electrolytic, and biological. The thermal effects of electric current are observed in some parts of the human body as burns, heating of blood vessels, nerves, and cells.

Electrolytic effect is understood as a condition that causes changes in the physical and chemical properties of the blood as a result of the decomposition of salts in the blood or cells. This occurs when the electric current affects only certain parts of the body without crossing the central nervous system and heart.

I - as a result of a sharp contraction of the muscles, the person loses consciousness and does not lose consciousness;

II - as a result of a sharp contraction of the muscles, the person loses consciousness, but the heart and respiratory function continue to function;

III - as a result of a sharp contraction of the muscles, the person loses consciousness and the respiratory system or heartbeat stops.

IV - a state of clinical death, in which a person no longer shows any signs of life. The biological effect of electric current is a characteristic of a living organism. As a result of this effect, living cells in the human body oscillate due to sharp muscle contractions, which mainly occurs as a result of disruption of bioelectric processes in the body.

That is, the human body is mainly controlled by bioelectric currents. The impact of high-voltage electric current from the external environment disrupts the regime of these biocurrents, and as a result, an electric shock occurs in the human body. That is, in an uncontrolled organism, some of the functions of life are not performed, the respiratory system is disrupted, the circulatory system fails, etc.

Based on the variety of effects of electric current on the human body, the effects of electric current can generally be divided into two groups: local electric shock and shock. Local electric shock: burns resulting from exposure to electric current, the formation of electrical signs may indicate metallization of the skin. Burns from electric current mainly occur when a voltage arc is formed between the body and an electrical conductor.

Depending on the voltage applied to the conductor, such burns can be of different types. A mild burn can cause blisters, while a severe burn can cause the cells and skin to turn into charcoal, leading to serious complications. Electrical signs are associated with the appearance of a clear gray-light yellow mark 1-5 mm in diameter on the surface of the skin. Such signs are usually not dangerous. Metallization of the skin is also usually caused by the metal, which has melted and broken into small particles, penetrating the skin. This also occurs when an electric arc is formed.

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 03,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

After a certain time, this skin will fall off and leave no complications.

I - as a result of a sharp contraction of the muscles, the person loses consciousness and does not lose consciousness;

II - as a result of a sharp contraction of the muscles, the person loses consciousness, but the heart and respiratory function continue to function;

III - as a result of a sharp contraction of the muscles, the person loses consciousness, and the respiratory system or heartbeat stops.

IV - a state of clinical death, in which the person no longer shows any signs of life.

This is a certain interval between life and death, during which a person lives at the expense of internal resources for a certain period of time. At this time, he has no signs of life: breathing, blood circulation, he is indifferent to external influences, he does not feel pain, the pupils of the eyes are dilated and do not perceive light. However, during this period, life in him has not completely died out, certain metabolic processes continue in the cells, and this is sufficient to continue the minimal vital activity of the organism, for which there is a possibility of restoring it to life by restoring some parts of the organism that have lost their vital activity as a result of external influences.

Clinical death lasts 6-8 minutes. In the absence of any assistance, the cells in the cerebral cortex first disintegrate, and the clinical death state passes into a state of biological death. Biological death is an irreversible process, characterized by a complete cessation of biological processes in the body, as well as the disintegration of protein structures in the body. This occurs after the end of the clinical death period. The effect of current on the human body depends on several factors.

One of the main factors is the duration of the current effect on a person, that is, the longer a person is exposed to current, the more damage he will suffer. The second factor is the individual characteristics of the human body, as well as the type and frequency of the current. The known resistance of the human body to the effects of current, as well as the voltage of the current, determine the degree of a certain effect, since the resistance of the human body does not change, as a result of an increase in voltage, the amount of current flowing through the body increases.

The resistance of the human body is taken as the sum of the resistance of the skin and the resistance of the internal organs. The skin, which is mainly composed of hard layers of dry and dead cells, has a high resistance and represents the resistance of the human body as a whole. The resistance of the internal organs of the body is not so great.

Dry, undamaged human skin has a resistance of 2000 to 20000 Ohms and above, while wet, damaged skin has a resistance of 40 - 500 Ohms, and this resistance is considered equal to the resistance of human internal organs. Taking into account the above, the resistance of the human body is generally accepted for technical calculations as 1000 Ohms.

The amount of current flowing through the human body determines its complications, that is, the greater the current flowing, the greater the complications. When 0.6-1.5 mA of an industrial electric current of 50 Hz flows through the human body, it is felt by it, and this amount of current is called the electric current at the threshold of perception.

If the amount of current flowing through the human body reaches 10-15 mA, then the muscles in the body contract irregularly, and the person loses the ability to control parts of his body, that is, if he holds a wire carrying electricity, he cannot open his paws, and he cannot remove the wire that is affecting him. Such a current is called a limiting current. If the amount of current reaches 25 - 50 mA, then the effect of the current affects the chest, as a result of which

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 03,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

breathing becomes difficult. If the effect of the current lasts for a long time, that is, for several minutes, then death can occur due to respiratory arrest.

If the applied current is 100 mA or more, such a current affects the heart muscle and disrupts the heart's rhythm, resulting in a complete failure of the circulatory system, which can also lead to death. The duration of the current flowing through the human body is also of particular importance, because if the current continues for a long time, the conductivity of the human body increases and the harmful effects of the current accumulate in the body, which leads to aggravation of the complications.

The type and frequency of the current also play an important role in the harmful effects. The most harmful current is considered to be electric current in the range of 20-100 Hz. The level of effect is sharply reduced for currents with a frequency of less than 20 Hz and greater than 100 Hz. Electric currents with a higher frequency do not cause electric shock, but can cause burns.

If the current is constant, then the amount of current at the detection limit is 6-7 mA, the holding limit is 50-70 mA, and the amount that can stop the heart for 0.5 seconds increases to 300 mA. II. Providing first aid to a person exposed to electric current. The assistance provided to a person exposed to electric current before the arrival of the first medical worker is divided into two parts: Rescue from electric shock; Providing first aid; Rescue from electric shock, in turn, can be of several types.

The easiest and most convenient way is to turn off the current to that part of the electrical device. If this is not possible (for example, if the circuit breaker is far away), then in electrical devices with a voltage of no more than 1000 V, you can cut the electrical wires with a hammer with a wooden handle or, if the victim is dry, pull the victim's clothes to save him from the electric shock. If the voltage of the electric current is more than 1000 V, then dielectric gloves and electrical tools with strong electrical insulation should be used.

First aid for a person who has been electrocuted is determined by his condition. If the injured person has not lost consciousness, then it is necessary to ensure his peace and wait for the arrival of a doctor or take him to a medical facility immediately. If the person has lost consciousness due to the effect of electricity, but his breathing and heart are working, then it is necessary to lay him in a dry and comfortable place, loosen his belt and collar and ensure fresh air. Good results are obtained by sniffing rubbing alcohol, spraying water on his face, and rubbing his body and arms.

If the injured person has difficulty breathing, is trembling, but has a relatively good heart rate, then it is necessary to perform artificial respiration on this person. In the event of clinical death, artificial respiration should be accompanied by a chest massage. Artificial respiration should begin as soon as the injured person is rescued from the effects of electric shock and his condition is determined.

Artificial respiration is performed by the so-called "mouth-to-mouth" method, that is, the person providing assistance fills his lungs with fresh air, and this fresh air is sent to the lungs of the injured person through his mouth. The air that comes out of the lungs of one person has been found to have enough oxygen for the lungs of the other person to function. In this method, the injured person is laid on his back, his mouth is opened and cleared. To open the airway, the head is lifted with one hand, including the forehead, and with the other hand, the mouth is pulled, bringing the mouth approximately in line with the neck.

Then, filling the chest with air, forcefully blow this air into the victim's mouth. The person providing assistance should completely cover the victim's mouth with their mouth and

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 03,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

cover their nose with their face or paws. Blows should be made approximately 10-12 times per minute. Blows can also be made through gauze, a handkerchief, or a tube. Even if the victim resumes breathing, artificial respiration is continued until the victim regains consciousness, adjusting to his breathing.

External cardiac massage is performed to artificially restore the circulatory function of the injured person.

After passing from the abdominal cavity to the chest, 2 fingers are placed on top of each other at a right angle, and the injured person's chest is pressed with a certain amount of force, depending on the body weight. The pressure should be sharp and strong once per second. In this case, the chest should fall inward by 3-4 cm, and this is continued in accordance with the rhythm of the heartbeat.

Massage should be performed in conjunction with artificial respiration. If there is only one person providing assistance, he should press the chest 15 times after each two breaths. You can check the victim's pulse to see if his heart rate has returned to normal. To do this, stop the above procedures for 2-3 seconds and count the pulse.

This Regulation must be observed when servicing and performing operation, repair, construction, installation and adjustment work on operating power plants, electrical and heat networks, heat automation and metering devices, dispatching and technological control devices, district boiler houses, electrical equipment of energy repair enterprises of the Ministry of Energy and Electrification, as well as electrical networks of housing and household service enterprises.

When granting work permits to employees of specialized and other construction and installation organizations to perform work on electrical equipment operated in accordance with these Rules, the requirements of these Rules must be met.

Amendments and additions to these Rules may be made only by the organization that approved them.

Protective equipment used in the process of work in accordance with these Rules must meet the requirements of the State Unified State Standard and the "Rules for the Use and Testing of Protective Equipment Used in Electrical Equipment".

Mechanisms and lifting machines, compressors and air-collecting devices, tools and equipment used in the performance of work must be tested and used in accordance with the requirements of the Unified State Register of Labor Safety, the Rules for Agricultural and Water Resources Facilities of the Republic of Uzbekistan and the "Safety Rules for Performing Work with the Help of Tools and Equipment", as well as the requirements of the factory instructions that produced them.

When performing construction and installation work on operating electrical equipment, it is mandatory to comply with the requirements of construction standards and rules, namely the rule "Technical Safety in Construction". The rule is mandatory for everyone. The instructions for the protection of workers and employees must be brought into line with this rule. Each employee must immediately notify the higher management of any deviation or non-fulfillment of the rule that contradicts the requirements of the rule and any malfunction in electrical equipment that poses a threat to human life, or a breakdown in machines, mechanisms, tools, devices and protective equipment used in the process of work, if he cannot take measures to eliminate it. It is prohibited to carry out orders and assignments that contradict this rule.

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 03,2025
Journal: https://www.academicpublishers.org/journals/index.php/ijai

References:

1. S.M. Mardonova, G.S. Muratova. Principles of increasing the spiritual and spiritual integrity of the population in possible emergency situations. E3S Web of Conferences 389 (9), 1-11.
2. С Мардонова. Хаёт хавфсизлиги коидаларини укитишнинг самарадорлиги. Центр научных публикаций (buxdu. uz) 32 (32.
3. С Мардонова. Shikastlanganda tibbiy yordam ko'rsatish. Центр научных публикаций (buxdu. uz) 32 (32).
4. С Мардонова. Mehnat muhofazasining nazariy asoslari. Центр научных публикаций (buxdu. uz) 32 (32).
5. С.М Мардонова. Йўл-транспорт ҳодисаларида биринчи тиббий ёрдам кўрсатиш хусусиятлари.Science and Education 3 (5), 191-196.
6. С.М Мардонова. Ҳаёт хавфсизлиги қоидаларини ўқитишнинг самарадорлиги. Science and Education 3 (9), 492-497.
7. S.M Mardonova. Shikastlanganda tibbiy yordam ko'rsatish. Science and Education 3 (6), 152-159.
8. M.S Muzaffarovna. The influence of bad habits on the human body. Thematics Journal of Education.
9. S Mardonova. Efficiency of creation and use of multimedia training courses in the education system. Центр научных публикаций (buxdu. uz) 8 (8)
10. S Mardonova. Abu ali ibn sino asarlarida tibbiy-ekologik madaniyatni oshirish masalasi. Центр научных публикаций (buxdu. uz) 8 (8).
11. S Mardonova. Абу Али Ибн Сино асарларида маънавий-ахлоқий тарбия масалалари ва инсон камолоти. Центр научных публикаций (buxdu. uz) 8 (8).
12. С.М Мардонова. Электр токидан жароҳатланиш ва унинг инсон организмига таъсири. Problems of biology and medicine биология ва тиббиёт муаммолари.
13. S Mardonova. Emergency Medical Care in Emergency Situations. Центр научных публикаций (buxdu. uz) 8 (8).
14. M.S Muzaffarovna. Efficiency Of Creation And Use Of Multimedia Training Courses In The Education System. Bridge to science: research works, 57-59.
15. С.М Мардонова. Соғлом авлодни тарбиялашда оилада соғлом муҳитни яратиш. Профессионал таълим муассасаларида дуал таълимни ташкил этишнинг замонавий.
16. S Mardonova. Соғлом авлодни тарбиялашда оилада соғлом муҳитни яратиш. Центр научных публикаций (buxdu. uz) 8 (8).
17. S Mardonova. The influence of bad habits on the human body. Центр научных публикаций (buxdu. uz) 8 (8).
18. R.I Sharafutdinova, G. Muratova. S., Tursunbayeva MT Concepts of ecological thinking and education and their formation in the minds of students. Electronic science journal" Biology and integrative medicine.
19. G.S Muratova, R.I Sharofutdinova, A.N Asadullaev. Health Lifestyle And safety Activity.The American Journal of Applied Sciences. The American Journal of Applied.
20. Р.И Шарафутдинова, Г.С Муратова, М.Т Турсунбаева. Талабаларда экологик тафаккур ва тарбия тушунчаларини шакллантириш. Новый день в медицине 1 (29), 105-107.