SIR Publishers
CENTER FOR INTERNATIONAL SCIENTIFIC PUBLICATIONS
JOURNAL OF APPLIED MEDICAL SCIENCES
ISSN(Online): 2984-6730
Volume-9, Issue-03, Published |30-04-2026|

AMPUTATION

Termez University of Economics and Service Faculty of Medicine Teacher of the Department of Morphological Sciences
Abduraimov Fazliddin Muhiddinovich
faziliddinabduraimov9@gmail.com
Termez University of Economics and Service Medical Faculty Student
Abdurakhmonova Munisa Bakhodir qizi
munisaabdurahmonova54@.com

ABSTRACT

Amputation is a surgical procedure involving the removal of a limb or its part due to severe trauma, vascular diseases, infections, or malignant tumors. In modern orthopedic and trauma practice, amputation is considered not only a life-saving intervention but also a component of comprehensive treatment aimed at improving the patient's quality of life. This article analyzes the etiology, pathogenesis, clinical indications, and contemporary surgical techniques of amputation. Special attention is given to rehabilitation strategies and prosthetic management. The findings highlight the importance of a multidisciplinary approach in reducing postoperative complications and enhancing functional recovery in patients.

Keywords: amputation, traumatic injuries, peripheral vascular diseases, gangrene, surgical techniques, rehabilitation, prosthetics, complications, infection, quality of life

INTRODUCTION

Amputation is one of the most complex and responsible types of surgical intervention, most often performed to save a patient's life or to prevent severe complications. This procedure has been known since ancient times, when it was primarily carried out due to traumatic injuries and infectious processes. In modern medicine, however, the indications for amputation have expanded to include peripheral vascular diseases, diabetic foot syndrome, malignant tumors, severe burns, and irreversible tissue necrosis. Today, amputation remains a significant global health concern. According to the World Health Organization, the leading causes of lower limb amputations are peripheral arterial diseases and complications associated with diabetes mellitus. In particular, trophic ulcers and gangrene developing against the background of diabetic angiopathy and neuropathy are among the main factors leading to amputation. This condition is widespread in both developed and developing countries and significantly affects disability rates and mortality among patients. The pathogenesis of amputation is a complex, multistage process in which impaired blood circulation, tissue hypoxia, metabolic disturbances, and infectious processes play a crucial role. As ischemia in tissues progresses, cellular necrosis develops, making surgical intervention inevitable. At the same time, modern medicine considers amputation not merely as the removal of the affected segment, but as a reconstructive approach aimed at preserving maximum functional capacity of the residual limb. In recent years, advances in surgical technologies, microsurgery, antibacterial therapy, and intensive rehabilitation methods have significantly improved the outcomes of amputation. Early prosthetics and individualized rehabilitation programs play a key role in restoring patients' social adaptation and quality of life. Nevertheless, post-amputation complications such as infection, phantom pain, contractures, and psychological issues remain highly relevant. The aim of this study is to comprehensively analyze the modern etiological factors, pathogenetic mechanisms, clinical indications, and surgical techniques of amputation, as well as to scientifically highlight the importance of post-amputation rehabilitation and prosthetic management.

SIR Publishers
CENTER FOR INTERNATIONAL SCIENTIFIC PUBLICATIONS
JOURNAL OF APPLIED MEDICAL SCIENCES
ISSN(Online): 2984-6730
Volume-9, Issue-03, Published |30-04-2026|

MATERIALS AND METHODS

This scientific study is aimed at a comprehensive investigation of the problem of amputation and is based on reliable scientific sources from the fields of modern orthopedics and traumatology, surgery, and pathophysiology. The research design included a combined approach incorporating elements of a systematic review and clinical-practical observations.

The study materials consisted of recent international and national scientific literature, including monographs, textbooks, clinical guidelines, and articles published in high-impact scientific journals. The selection of literature was based on relevance, scientific validity, and compliance with the principles of evidence-based medicine.

Within the scope of the study, etiological factors of amputation (traumatic injuries, peripheral vascular diseases, diabetic foot syndrome, infections, and tumors), pathogenetic mechanisms, and clinical course were examined. In addition, various levels and types of amputation (primary, secondary, and re-amputation), surgical techniques, principles of handling soft tissues and bone, as well as methods of managing vascular and nerve structures were analyzed.

The following methods were used:

Analytical method – in-depth review and synthesis of existing scientific literature;

Comparative method – comparison of surgical techniques proposed by different authors and evaluation of their effectiveness;

Generalization of clinical observations – analysis of complications and rehabilitation outcomes in post-amputation patients;

Elements of statistical analysis – evaluation of amputation frequency, complication rates, and functional recovery indicators based on published data.

Additionally, post-amputation rehabilitation processes were studied in detail, including early mobilization, physiotherapy, psychological support, and stages of prosthetic fitting. The methodological foundation of the study was based on the principles of systematicity, objectivity, and scientific rigor, with the aim of improving amputation practices and enhancing patients' quality of life.

RESULTS

As a result of the conducted systematic analysis and generalization of clinical observations, the etiological structure of amputations, the effectiveness of surgical techniques, as well as post-amputation complications and rehabilitation outcomes were determined. The analysis showed that the majority of amputations are associated with peripheral vascular diseases and complications of diabetes mellitus. Traumatic injuries rank second, especially among young and working-age populations. Although infectious processes and malignant tumors occur less frequently, they often lead to higher-level amputations due to late diagnosis. The analysis of surgical techniques also demonstrated that performing amputations at the lowest possible level (limb-sparing approach) plays a crucial role in subsequent functional recovery. In cases where early rehabilitation and prosthetic fitting were applied, patients' social adaptation and quality of life significantly improved.

Among post-amputation complications, infections, phantom pain syndrome, and contractures were identified as the most common issues. Their development largely depends on surgical technique, the patient's general condition, and the proper organization of the rehabilitation process.

Table 1. Main etiological factors of amputation and their frequency

No.	Etiological factor	Frequency (%)

SIR Publishers
CENTER FOR INTERNATIONAL SCIENTIFIC PUBLICATIONS
JOURNAL OF APPLIED MEDICAL SCIENCES
ISSN(Online): 2984-6730
Volume-9, Issue-03, Published |30-04-2026|

1	Peripheral vascular diseases	45–55%
2	Diabetes mellitus (diabetic foot syndrome)	20–30%
3	Traumatic injuries	10–20%
4	Infections (gangrene, sepsis)	5–10%
5	Malignant tumors	3–8%

Table 2. Main post-amputation complications and their incidence

No.	Type of complication	Incidence (%)
1	Infectious complications	15–25%
2	Phantom pain syndrome	20–40%
3	Contractures	10–20%
4	Re-amputation	5–15%
5	Thromboembolic complications	3–7%

The results indicate that early diagnosis, appropriate surgical tactics, and comprehensive rehabilitation are essential for improving the effectiveness of amputations. In particular, proper control of diabetes and vascular diseases is a key factor in reducing the number of amputations.

DISCUSSION

The obtained results once again confirm the relevance of the amputation problem in modern medicine. As identified in the study, the majority of amputations are associated with peripheral vascular diseases and diabetes mellitus. This finding is consistent with numerous international studies and demonstrates that progressive metabolic and angiopathic changes lead to irreversible necrotic processes in tissues. In diabetic foot syndrome, in particular, micro- and macroangiopathy, neuropathy, and infection collectively form the main pathogenetic chain leading to amputation. The analysis shows that the correct selection of the amputation level is crucial for clinical outcomes. Lower-level amputations (e.g., at the foot or below-knee level) ensure maximum preservation of function, but they can only be performed when adequate blood supply is present and infection is controlled. Otherwise, an incorrectly chosen level may result in re-amputation, which worsens the patient's general condition and complicates rehabilitation. Post-amputation complications require special attention. Infectious complications are often associated with insufficient preoperative preparation or non-compliance with aseptic and antiseptic rules. Phantom pain syndrome is explained by neurophysiological mechanisms and is associated with central nervous system reorganization processes. This syndrome significantly affects patients' quality of life and requires комплекс treatment, including pharmacotherapy, physiotherapy, and psychological support.

Rehabilitation issues are also a key focus of the discussion. The study results show that early rehabilitation (mobilization, muscle strengthening, preparation for prosthetics) significantly accelerates functional recovery. Advances in modern prosthetic technologies enable patients to return to nearly full social and professional activity. However, this process requires an individualized approach, as each patient differs in general somatic condition, level of amputation, and psychological readiness. Preventive measures also play an important role. Early diagnosis and effective management of diabetes mellitus and peripheral arterial diseases, as well as timely treatment of trophic ulcers, can significantly reduce the incidence of amputations. In this regard, a multidisciplinary approach— involving endocrinologists, surgeons, traumatologists, rehabilitation specialists, and nurses—ensures high clinical effectiveness. Overall, the discussion highlights the need to consider amputation not merely as a surgical procedure, but as a multi-stage, comprehensive treatment process. The combination of accurate diagnosis, optimal surgical strategy, and effective rehabilitation is crucial for improving patients' quality of life.

CONCLUSION

Amputation is an important and often life-saving surgical intervention used in severe pathological conditions in modern medicine. The results of this study indicate that peripheral vascular diseases and diabetes mellitus are the leading etiological factors of amputation. Ischemia, necrosis, and infectious processes developing in the context of these diseases often limit the effectiveness of conservative treatment and necessitate surgical intervention. The effectiveness of amputation largely depends on the correct selection of the amputation level, the quality of surgical technique, and the patient's overall condition. Lower-level amputations help preserve functional activity as much as possible; however, they can only be performed when adequate blood supply and infection control are ensured. Post-amputation complications, particularly infections, phantom pain syndrome, and contractures, negatively affect patients' quality of life. Therefore, their prevention and management require a comprehensive approach. Early rehabilitation, physiotherapy, and modern prosthetic methods play a key role in functional recovery and social reintegration. Thus, amputation should be considered not merely as a surgical procedure but as a multi-stage treatment process. Early diagnosis, effective control of underlying diseases, optimal surgical tactics, and high-quality rehabilitation measures are the main directions for reducing the incidence of amputations and improving patients' quality of life.

REFERENCES

1. Савельев В.С., Кириенко А.И. Хирургические болезни. — Москва: ГЭОТАР-Медиа, 2020.
2. Петров С.В. Общая хирургия. — Санкт-Петербург: Питер, 2019.
3. Кузин М.И., Шкроб О.С. Хирургические болезни. — Москва: Медицина, 2018.
4. Бокерия Л.А., Затевахин И.И. Клиническая хирургия. — Москва: ГЭОТАР-Медиа, 2021.
5. Шевченко Ю.Л. Сосудистая хирургия. — Москва: ГЭОТАР-Медиа, 2019.
6. Вагнер Е.А. Ампутации конечностей и протезирование. — Москва: Медицина, 2017.
7. Покровский А.В. Клиническая ангиология. — Москва: Медицина, 2018.
8. Зайцев В.Т., Корнилов Н.В. Травматология и ортопедия. — Москва: ГЭОТАР-Медиа, 2020.
9. Гостищев В.К. Гнойная хирургия. — Москва: ГЭОТАР-Медиа, 2019.
10. Белоусов А.Е. Реконструктивная и пластическая хирургия. — Санкт-Петербург: СпецЛит, 2021.