

Statistical analysis - Care and treatment of patients with diabetic foot

Jovana Mitovska¹

1. University "St. Kliment Ohridski" Bitola, Republic N. Macedonia

DOI: <https://www.doi.org/10.59710/oaijoaru2421011m>

Abstract

Diabetic foot is a complication of diabetes and is a set of bone and soft tissue changes in the foot. About 15% of diabetics get diabetic gangrene. It can lead to serious complications, amputation, as a result of neuropathy and peripheral vascular diseases. Diabetic foot can be of the following types: neuroischemic foot (impaired vascularization with neuropathy) and neuropathic foot (neuropathy predominates), infection can be an additional problem.

The first degree of the diabetic foot is the loss of sensitivity, the person does not feel injuries, the existence of wounds, injuries and the development of ulcers. The second degree is the motor component, there is atrophy of the muscles of the foot, which results in deformation of the foot. The third degree changes the skin, it becomes dry and cracks easily, which is an entrance door for infections.

The best prevention of the occurrence of diabetic foot is strict glycemic control and education of the patient. Maintaining glycemic control includes dietary regimen, home monitoring of glycemia and appropriate use of prescribed medications.

Key words: diabetic foot, treatment, amputation, classification, prevention

Introduction

Diabetic foot is a disease that occurs as a result of damaged blood vessels and nerves in people with diabetes. It starts with damage to smaller and then larger blood vessels – a condition that can lead to serious problems. Diabetic foot usually occurs in people who have had diabetes for more than 10 years. It is more common in men. Any change in the skin of the foot, if neglected, can lead to serious consequences and amputation. The wound is easily infected and leads to reddening of the skin, ulcerative changes, scabies and other damage, which should be responded to immediately. Diabetic foot ulcers and infections are complicated and difficult to treat.

The pathogenesis of ulcerative changes in the diabetic foot and subsequent infections is very complex, involving three interacting processes: angiopathy, neuropathy, and immunopathy. By analyzing and understanding these three basic interactive processes, a basis is laid for the treatment and prevention of patients with this type of pathology.

The most common reason for hospitalization of patients with diabetic foot is the appearance of a leg wound that is followed by an infection of the same. Diabetic angiopathy is considered the most common cause of morbidity and mortality in patients suffering from diabetes mellitus. It is divided into two categories macroangiopathy and microangiopathy. Neuropathy occurs early in the pathogenesis of the diabetic foot, and is a significant risk factor for the development of ulcerative changes in the foot. The reduced immune response in diabetics also contributes to them being predisposed to any infections. [1]

Prevention of diabetic foot can be primary, secondary and tertiary. Lack of exercise is a very important risk factor that promotes weight gain, increased insulin resistance and the

development of diabetes. Without exercise, deformities can develop, as the reduction in muscle mass leads to changes in the structure of the feet. A tendency to damage the feet, due to changes in sensitivity or insensitivity of the nerves of the feet, creates a risk of ulceration of the feet. Patients should not heat or cool their feet with hot water heaters, heaters, etc. Cotton or woolen socks should be used. Foot injuries can also occur due to the risk of blisters, so footwear should be chosen carefully. Improper footwear, walking with bare feet and foreign bodies in the shoe contribute to foot trauma. Tertiary prevention includes clinical examination such as general examination/inspection of feet and footwear, history, neurological examination, vascular examination.[2]

Diabetic Foot Care Techniques includes: Surgical treatment of a diabetic wound (Debridment), dressings, off-loading, hyperbaric therapy. [3]

Infections in diabetic patients are a serious problem due to immunopathy. In diabetic feet, we distinguish two types of infections, they can be threatening and non-threatening for the limb. Non-threatening infections are superficial infections without systemic toxicity, minimal cellulitis, which does not spread more than 2cm from the entrance of the infection. Threatening infections include more extensive cellulitis, ulcers that penetrate deep into the subcutaneous tissue, and prominent ischemia.[4]

Material and methods

The research is a retrospective analysis of patients with diabetic feet, which was carried out in PHI UC for Plastic and Reconstructive Surgery - Skopje, where these patients are hospitalized and treated. The research includes patients suffering from diabetic foot/diabetic gangrene who were hospitalized and treated in hospital, of both genders, aged 30-85 years. The data were obtained from the medical documentation of the Clinic, and refer to hospitalized patients, in the period from 2020 to 2022. The results are presented tabularly and graphically.

Results

A total of 156 patients with diabetic foot were hospitalized at the Plastic and Reconstructive Surgery Clinic in the period from 2020 to 2022. Of them, 44 were patients in 2020, 45 in 2021, and the largest number of hospitalized patients is in 2022, as many as 67 patients.

Table 1. Total hospitalized patients by year

Year	Patients	
	Number	%
2020	44	28
2021	45	29
2022	67	43
Total	156	100

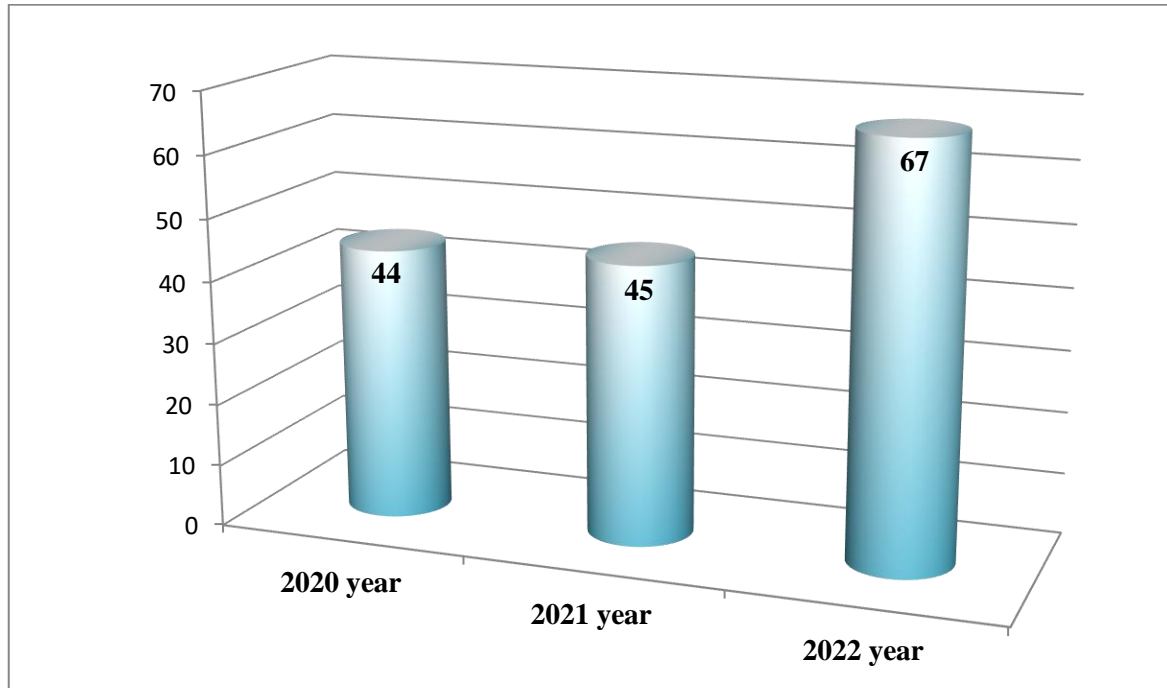


Chart 1: . Total hospitalized patients by year

Of all hospitalized patients, in the studied period, 124 or 79% were men, while 32 or 21% were women.

Table 2: Hospitalized patients in relation to gender, by years

Gender	2020 year	2021 year	2022 yer	Total
Men	35	36	53	124
Women	9	9	14	32
Total	44	45	67	156

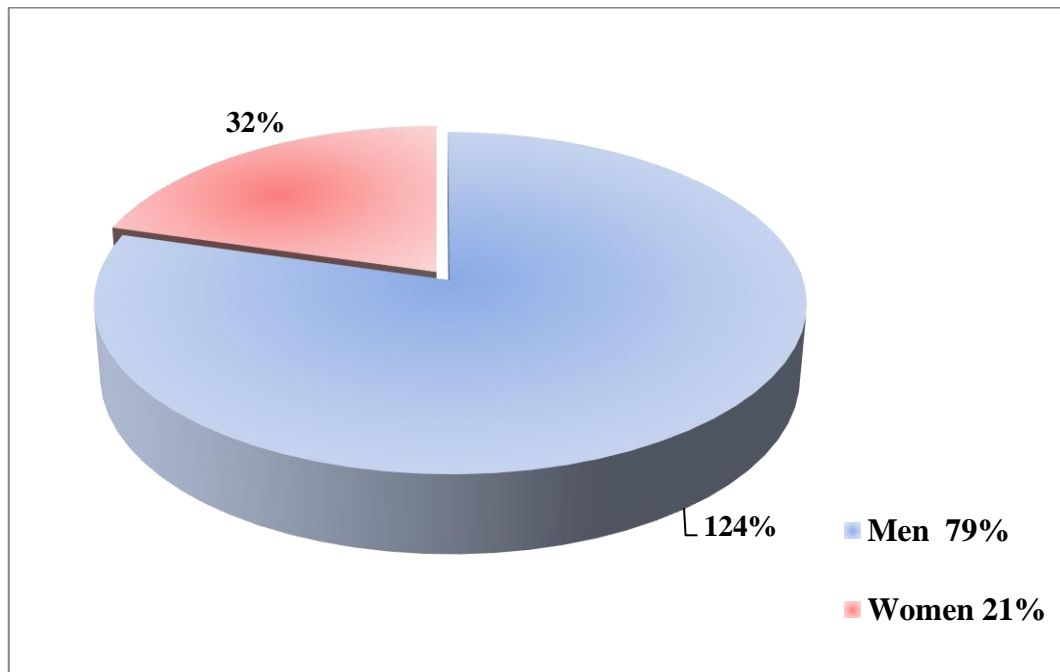


Chart 2: Hospitalized patients in relation to gender

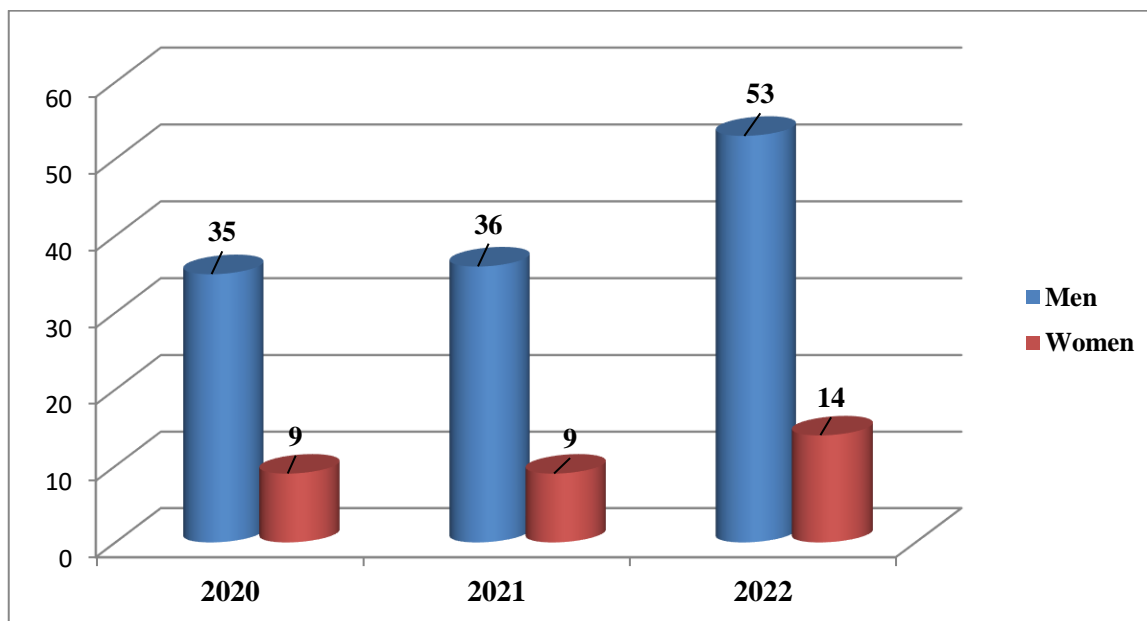


Chart 3: Patients who were hospitalized at PHI UC for Plastic and Reconstructive Surgery by gender, divided by years.

The results of the research regarding the age of the patients showed that 16 of the patients hospitalized at the clinic were aged 30 to 50 years, 90 were aged 50 to 70 years and 50 were aged over 70 years. There were no hospitalized patients under the age of 30 in the period from 2020 to 2022.

Table 3: Patients hospitalized at PHI UC for Plastic and Reconstructive Surgery by age, by years

Age	2020 year	2021 year	2022 year	Total
Under 30 y.	/	/	/	/
From 30 - 50 y.	/	6	10	16
To 50 - 70 y.	27	22	41	90
Over 70 y.	17	17	16	50

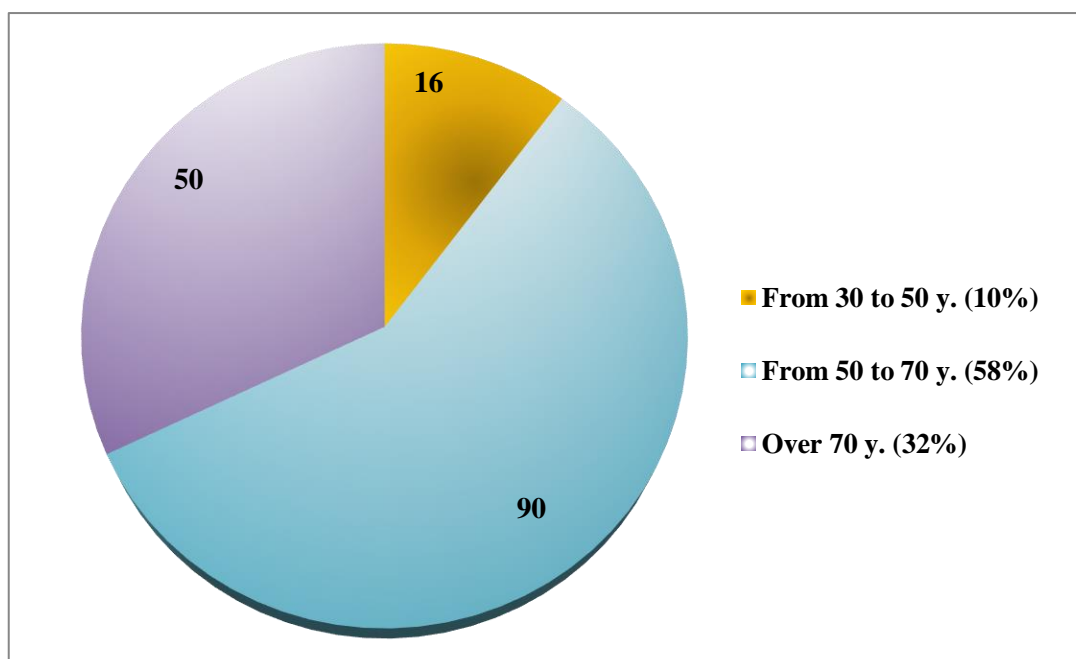


Chart 4: Patients hospitalized at PJU UC for plastic and reconstructive surgery, divided by age

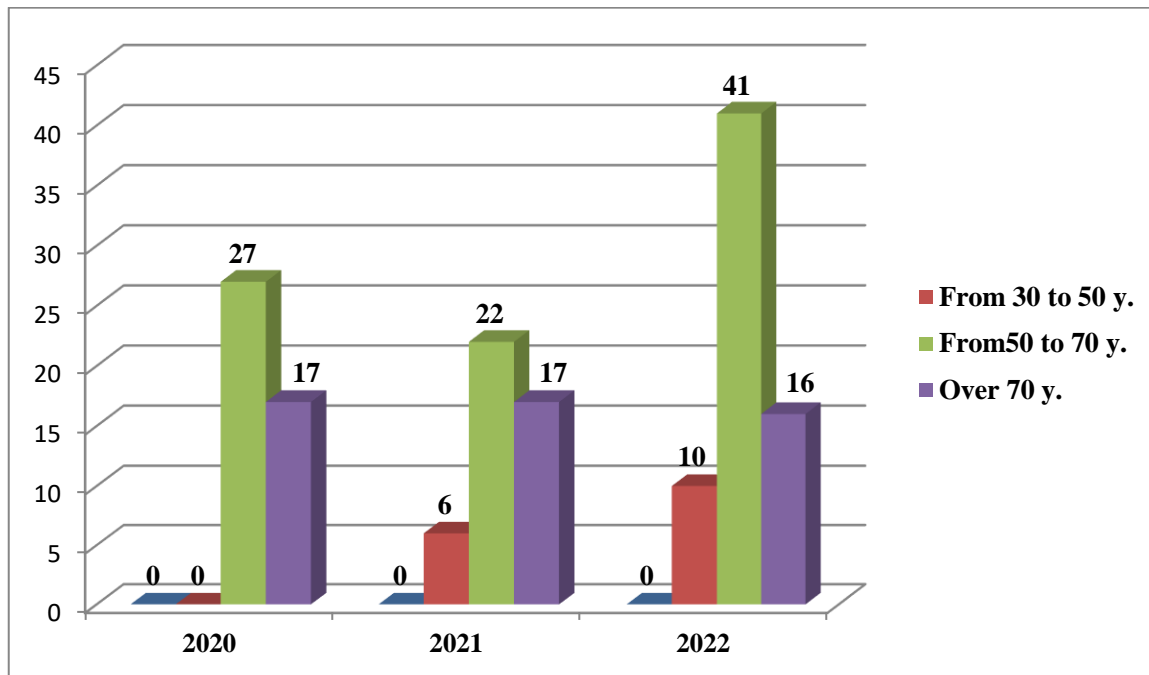


Chart 5: Patients hospitalized at PJU UC for Plastic and Reconstructive Surgery by age, by years.

According to the treatment they were treated with and the outcome of the treatment after discharge, the results showed that,

- 72 of the patients ended up with amputation of the foot or part of it,
- 42 were surgeries treated with debridement of the wounds after remediation of the infection, the defects caused by the diabetic ulcers were successfully reconstructed,
- 33 patients were treated conservatively with the application of antibiotic therapy and bandages, after which the ulcerous changes were successfully repaired.
- 9 patients ended fatally, that is, the outcome of the treatment resulted in death.

Table 4: Hospitalized patients divided by treatment and treatment outcome, by years

Treatment and outcome of treatment	2020 year	2021 year	2022 year	Total
Amputation of the foot or part of it	19	18	35	72 46%
Surgically treated	13	10	19	42 27%
Conservative treatment	9	14	10	33 21%
Exitus letalis	3	3	3	9 6%

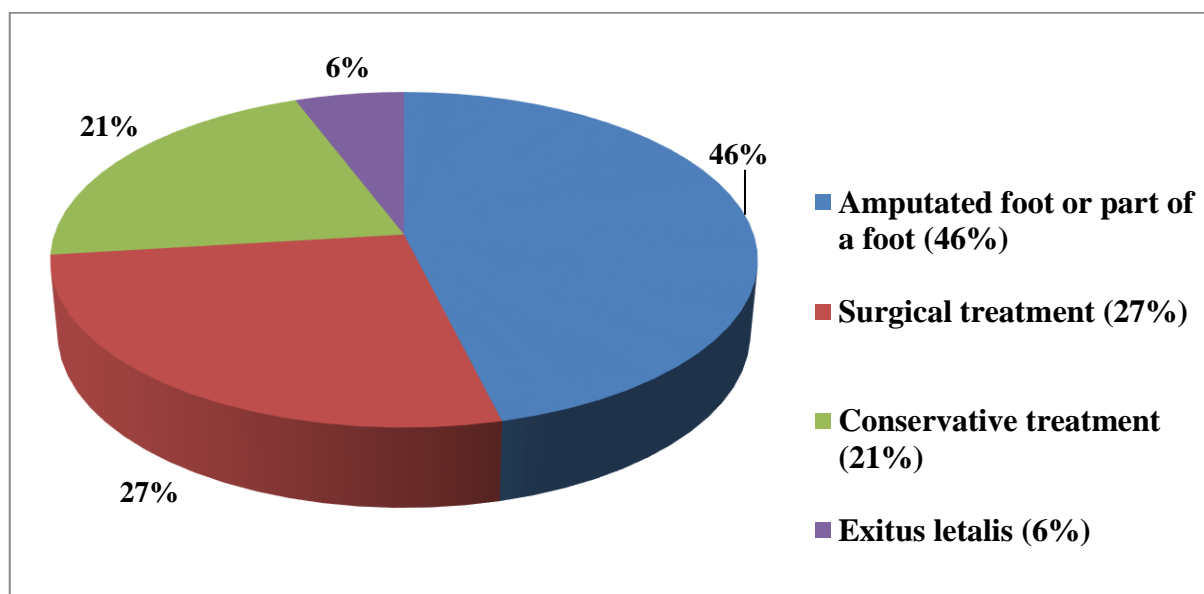


Chart 6: Patients hospitalized at PHI UC for plastic and reconstructive surgery according to treatment and treatment outcome

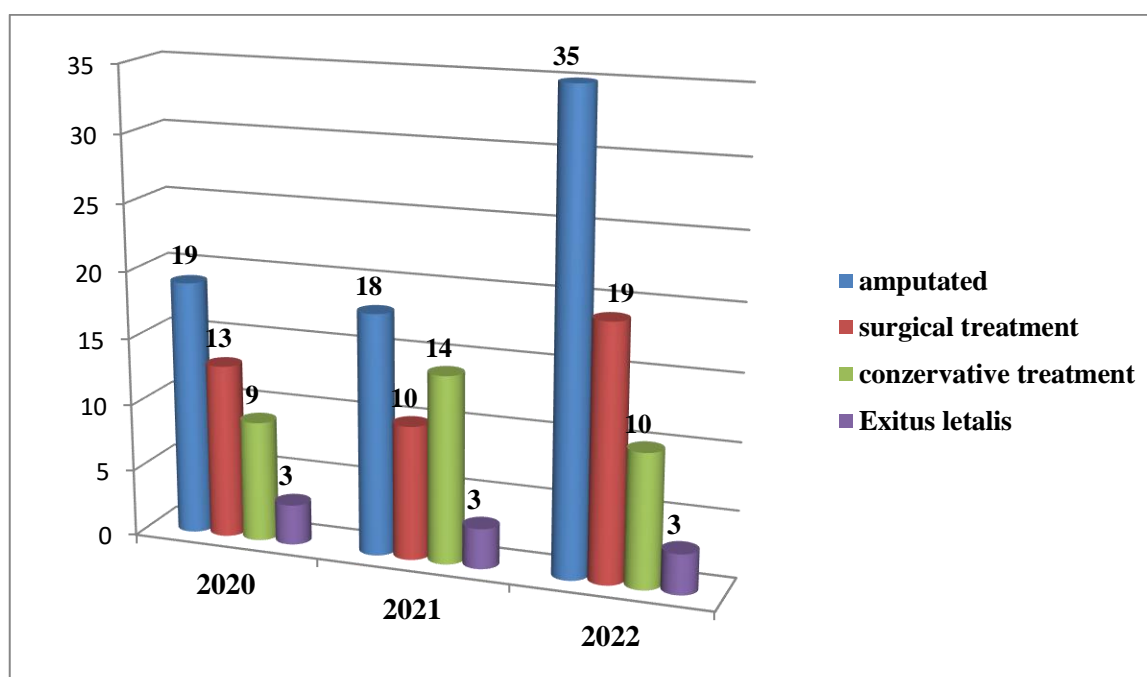


Chart 7: Patients hospitalized at PHI UC for plastic and reconstructive surgery according to treatment and treatment outcome, by years.

Discussion

After the conducted research, a quick database was created of the data obtained from the registers and the electronic system for managing hospitalized patients in PHI UC for Plastic and Reconstructive Surgery for the period from 2020 to 2022. We can see that the clinic had the most hospitalized patients in 2022, while the least in 2020. A greater number of those hospitalized were men, 79%, in contrast to women, who were only 21%. With that, we can notice that men have a greater tendency to suffer from diabetic foot in contrast to women. When it comes to the age limit, patients aged 50-70 get sick the most, while patients aged 30 to 50 get the least, and patients under 30 are not hospitalized at all. When it comes to the treatment with which they were treated and the outcome of the hospitalization, we can conclude that: 72 of the patients or 46% ended with amputation of the foot or part of it, 42 patients or 27% were surgically treated with debridement of the wounds after healing the infection, the defects caused by diabetic ulcers were successfully reconstructed, 33 patients 21% were treated conservatively with the application of antibiotic therapy and bandages, after which the ulcer changes were successfully repaired, and 9 patients or 6% ended fatally, that is, the outcome of the treatment resulted in death.

With that, we can conclude that the most patients who were hospitalized in the period from 2020 to 2022 lost their feet or part of them, while there were the least number of patients who lost their lives as a result of the diabetic foot.

Conclusion

Diabetes, one of the main causes of creating chronic wounds, is spreading more and more. Diabetics have 15% more chances of amputation due to chronic ulcers than the rest of the population. Diabetes causes neuropathy that interferes with pain receptors and perception. Because of this, patients initially do not notice small wounds on the legs and feet, and therefore cannot prevent infection or re-injury. There are many methods by which these problems can be alleviated. These include antibiotics and antibacterial drugs, debridement, lavage, negative pressure therapy, rewarming, oxygenation, the wet dressing method of wound healing, removal of mechanical stress, and the addition of cells or other materials to secrete or improve levels of growth factors of healing.

References

- [1] Gjorge Dzokich. Osnovi vo plasticna I rekonstruktivna hirurgija – uchebno pomagalo za student po medicina I mladi lekari (2012).
- [2]Zelko M., Neva B. C. Prevencija dijabetickog stopala -2013 god; Sveučilišna klinika za dijabetes, endokrinologiju i bolesti metabolizma Vuk Vrhovac, Klinička bolnica Merkur i Medicinski fakultet Sveučilišta u Zagrebu, Zagreb, Hrvatska
- [3]Sofija Pejkova, Bisera Nikolovska, Gordana Georgieva- Vox medici broj 119 –juni 2023 god. Wound Healing Treatment. Oxford Text Book of Surgery.Oxford press 2005.
- [4] Kevin J S., Philip S B. The Chronic Infected Wounds and Surgical Site Infections. Practical Plastic Surgery. Austin. Landes Bioscience. 2007; 15: 71-79