



Clinical assessment of the risk of amputation in diabetic foot: A clinical case

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Abstract. The aim of the study was to develop a clinical algorithm for assessing the risk of amputation in patients with diabetic foot syndrome and to test it on a clinical case, with an emphasis on determining the leading role of a podiatrist within a multidisciplinary team. The study was conducted as a description of a clinical case using the author's 15-point risk stratification card, gentle local podiatric interventions, individual offloading, behavioural modification and multidisciplinary routing, followed by assessment of the dynamics according to a 7- and 14-day observation protocol. During 14 days of observation, the implementation of a structured clinical algorithm ensured a progressive improvement in the local condition of the foot: on the 7th day, there was a reduction in hyperemia, pastosity, and pain, and by the 14th day, a pronounced epithelialisation ridge had formed along the edge of the defect, indicating the activation of reparative processes. The total score on the assessment card increased from 7 to 11, reflecting the patient's transition from high risk of amputation to moderate risk. The section scores for local examination increased from 1 to 3, for behavioural section – from 1 to 2, and for load correction – from 1 to 2, confirming the effectiveness of gentle sanitation, antiseptics, offloading pads and interdigital orthosis. The positive dynamics were accompanied by an increase in patient compliance and the refusal of traumatic home manipulations. At the same time, the level of glycaemia remained elevated (9-11 mmol/L), which necessitates long-term endocrinological control and prevention of relapses. The implementation of a podiatric algorithm with early stratification, gentle local interventions, individual offloading and behavioural correction allowed a clinically significant reduction in the risk of amputation to be achieved within 14 days of treatment. The results obtained can be used by podiatrists, family doctors and endocrinologists in outpatient care for early risk stratification, optimisation of the scope of interventions and timely referral of patients with diabetic foot syndrome for the purpose of preventing amputations

Keywords: podiatrist; stratification; offloading; affected area; inflammation; antiseptic treatment; sanitation

✦ INTRODUCTION

The rise in diabetes is putting a lot of pressure on health-care systems worldwide: by 2024, about 589 million adults aged 20-79 will be living with the disease (that is one in nine adults) [1]. One of the most serious complications is diabetic foot ulcer, which is diagnosed in approximately 18.6 million people each year, with these lesions accounting for up to 80% of lower limb amputations among people with diabetes [2]. The formation of ulcers is accompanied by a high risk of hospitalisation, amputation and death, and also reduces the quality of life of patients. In the context

of an ageing population, poor adherence to treatment and limited access to specialised care, there has been a steady increase in the number of patients with complications, leading to significant costs for the healthcare system. This necessitates the improvement of clinical risk stratification methods and the development of timely therapeutic and diagnostic interventions to prevent serious consequences, including amputations.

The pathogenesis of diabetic foot involves the formation of clinical factors that determine the unfavourable

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course of local lesions. A study by H. Gong *et al.* [3] emphasised that the combination of infection and peripheral arterial insufficiency significantly increases the risk of limb loss in hospitalised patients. It has been shown that such changes lead to an increase in the frequency of surgical interventions shortly after the initial visit. At the same time, clinical predictors of major and minor amputations were studied in a study by K.T. Okur *et al.* [4], which emphasised the need for stratification according to the location and depth of the lesion. The authors stressed that even with the same lesion size, the prognosis can vary significantly depending on the degree of tissue ischaemia. A systematic review by R. Forsythe *et al.* [5] analysed the prognostic value of inflammatory markers, leukocytes, C-reactive protein and albumin, which could potentially be used as laboratory indicators of the risk of amputation. However, the significant variability of these indicators between populations limits the possibility of standardising laboratory stratification. The promise of new treatment approaches in Ukrainian practice is demonstrated in the work of O. Petrenko *et al.* [6], where the use of topical plasminogen was accompanied by a decrease in the frequency of amputations. At the same time, the authors emphasised the need for standardised clinical pathways for the management of such patients.

Classification systems for foot lesions served as the basis for clinical stratification of amputation risk, but their predictive accuracy varied significantly. Within the Wagner scale, D.G. Armstrong *et al.* [2] established a relationship between stage progression and an increase in the frequency of surgical interventions, but noted that this classification did not take into account the severity of the infectious process. The integration of the Perfusion, Extent, Depth, Infection, Sensation (PEDIS) and Site, Ischemia, Neuropathy, Bacterial Infection, Area, Depth (SINBAD) systems, as shown by A.S. Kaka *et al.* [7], allowed for a more accurate prediction of the risk of complications through a combined assessment of ischaemia, infection and neuropathy. However, even these systems remained limited in their interpretation of the complex interaction of pathogenetic factors. A study conducted by A.S. Ivanova *et al.* [8] presented the experience of implementing combined classifications in specialised institutions in Ukraine, demonstrating their practical effectiveness in reducing the frequency of amputations. The authors emphasised the importance of adapting international scales to the clinical conditions of the national healthcare system.

Researchers have focused on creating models for predicting amputations using machine learning and artificial intelligence (AI) methods. In a comparative study by Z. Liu *et al.* [9], gradient boosting models showed higher accuracy in predicting major amputations among patients with diabetic foot ulcers than traditional logistic algorithms. The authors emphasised the importance of variables such as duration of diabetes, C-reactive protein level, and patient age as key predictors. The use of explainable AI in risk factor analysis was demonstrated by C.W. Oei *et al.* [10], who noted that the inclusion of the systemic immune inflammation index increased the clinical interpretability of the models. In a study by S.D. Shapoval *et al.* [11], clinical and analytical prediction algorithms were combined with multidisciplinary patient management, which

contributed to improved organ preservation outcomes. The authors noted the need for further standardisation and adaptation of AI approaches to the conditions of specialised surgical centres.

Despite numerous studies, the issue of early prediction of amputations in diabetic foot ulcers remained understudied, especially in terms of combining clinical, laboratory, and instrumental indicators. The aim of the study was to test the developed algorithm for assessing the risk of amputation in patients with diabetic foot syndrome in a clinical case, followed by determining the role of a podiatrist in the team management of such patients.

✦ MATERIALS AND METHODS

The clinical case was assessed using the author's step-by-step algorithm for clinical assessment of the risk of amputation, developed on the basis of international recommendations from the International Working Group on the Diabetic Foot [12], the American Diabetes Association [13] and the National Institute for Health and Care Excellence [14] (Ukrainian patent No. 137472, 2025). As part of the algorithm testing, the following clinical case was analysed. An 82-year-old female patient, a resident of Brovary (Kyiv region), with type 2 diabetes mellitus for more than 12 years and low adherence to therapy, complained of swelling, redness and increased local temperature in the anterior part of the right foot, which occurred after self-application ofcelandine juice to remove a callus. Medical history: arterial hypertension, peripheral sensorimotor neuropathy, no previous ulcers or amputations. Family history includes diabetes mellitus (mother had type 2 diabetes mellitus with the development of neuro-ischaemic diabetic foot syndrome), hypertension and cardiovascular events before the age of 60 (father had a myocardial infarction). At the time of admission, the patient was taking metformin (1,000 mg/day) and amlodipine (5 mg/day) irregularly, and her glycaemia was monitored sporadically (fasting glucose level – 11 mmol/L). During the examination, pastosity and hyperemia of the I-II toes and the dorsal surface of the right foot, hyperkeratosis, scales, and isolated skin cracks were detected. The nail plates were deformed and thickened, characteristic of chronic onychomycosis (Fig. 1).



Figure 1. Initial condition of the anterior part of the right foot when the patient was admitted
Source: created by the author

There was no palpation pain, and temperature and pain sensitivity were reduced when tested with a 10-gram monofilament. The pulsation in the dorsal artery of the foot was determined to be sharply weakened, indicating a decrease in peripheral blood flow. The patient's shoes did not fit her feet, had stiff edges and created excessive pressure on the affected area, and foot hygiene and prevention rules were partially followed. Based on the podiatrist's 15-point assessment card, the patient was classified as being in the red zone of high risk of amputation (7 out of 15 points), which required urgent referral to an endocrinologist and vascular surgeon, as well as limiting podiatric interventions to non-traumatic manipulations. Repeat examinations were performed after 7 and 14 days in accordance with the standards for monitoring the treatment of diabetic foot syndrome [14]. The examination on the 7th day allowed to monitor the early clinical response to therapy, ensure that there was no deterioration, and evaluate the effectiveness of offloading. The examination on the 14th day coincided with the end of the treatment course, included a reassessment using the author's risk chart, and made it possible to determine the consistency of positive dynamics and changes in the total risk score. The study used a sterile anatomical scalpel, manual podiatric instruments (scissors, forceps, dissector), 0.05% aqueous chlorhexidine solution, soft offloading pads, interdigital fixator (I-II fingers) and sterile aseptic dressings.

The preparation and description of the clinical case were carried out in accordance with the ethical principles of the Declaration of Helsinki World Medical Association [15] and the requirements of Good Clinical Practice ICH GCP E6(R2) [16]. Before collecting data, the patient's written informed consent was obtained to include clinical information and photographs in a scientific publication, provided that personal data was completely anonymised. The patient was informed about the purpose of using the information, possible risks, benefits, confidentiality, and the right to refuse participation at any stage without prejudice to further medical care.

RESULTS AND DISCUSSION

The study resulted in the development of a step-by-step algorithm for clinical assessment of the risk of amputation, which is presented in the form of a 15-point podiatrist's card (Fig. 2). The card contained five sections: medical data (up to 3 points), foot examination (up to 4 points), hygiene and behaviour (up to 3 points), footwear and pressure factors (up to 3 points), and the podiatrist's action strategy (up to 2 points). The final score allowed the risk zone to be determined: green (low risk 13-15 points), yellow (moderate risk 10-12 points) or red (high risk <9 points). Further application of the algorithm demonstrated its effectiveness in clinical settings.

PODIATRIST'S ASSESSMENT CARD FOR PATIENTS WITH DIABETES
Author's Methodology by Dr. Maysa Durdykulyyeva, 2025©

The patient has been informed of the purpose of the podiatric assessment and the specifics of diabetic foot care. They consent to the procedure and, if necessary, referral to an appropriate specialist.
Patient: _____ Date: _____
Podiatrist's Signature: _____ Podiatrist: _____

SECTION A. MEDICAL DATA (Max. 3 points)
 Diabetes diagnosed by a physician
 Diabetes type, duration, and glucose self-monitoring known
 Patient informed and consented to data processing

SECTION B. FOOT EXAMINATION (Max. 4 points)
 Skin intact, no deep cracks/ulcers/wounds
 No signs of infection (inflammation, fungus)
 Sensation preserved (monofilament/needle test)
 Pulse palpable (dorsal / plantar artery)

SECTION C. HYGIENE AND BEHAVIOR (Max. 3 points)
 Practices hygiene, inspects feet regularly
 Does not use dangerous home remedies
 Willing to follow podiatrist's recommendations

SECTION D. FOOTWEAR AND RISKS (Max. 3 points)
 Properly fitting, pressure-free footwear
 Seamless socks with soft elastic
 Pressure areas identified and offloaded

SECTION E. PODIATRIST STRATEGY (Max. 2 points)
 No contraindications; coordinated with physician if needed
 Care plan and follow-up schedule established

TOTAL SCORE: ____ / 15
REASSESSMENT: Date: _____ Score: ____ / 15

RECOMMENDED REFERRALS:
 Endocrinologist
 Vascular surgeon
 Orthopedic specialist

RISK SCALE:
13–15 points — Safe for podiatric treatment (GREEN zone)
10–12 points — Proceed with caution (YELLOW zone)
< 9 points — Treat only in coordination with a physician (RED zone)

Podiatrist's Signature: _____ Date: _____

INFORMED CONSENT AND WAIVER OF CLAIMS
I, the undersigned, confirm that:

- I have received complete information regarding the nature and purpose of the podiatric procedure, as well as any limitations or risks due to diabetes.
- I understand that podiatric care does not replace medical treatment and is not a form of medical therapy.
- I am aware that in the presence of high risk or contraindications, the podiatrist may refuse the procedure or refer me to another specialist.
- I agree to follow the podiatrist's recommendations (both verbal and written).
- I acknowledge that failure to comply with the recommendations may lead to complications, which do not constitute grounds for legal claims.
- I voluntarily consent to the procedure and release the podiatrist from legal liability.

Patient's Signature: _____
Date: _____

Figure 2. Podiatrist's assessment card for working with patients with diabetes

Note: patented (No. 137472, 2025)

Source: created by the author

During initial visit, the patient showed signs of inflammatory damage to the front part of right foot, which led to the start of intensive medical intervention according to the author's algorithm. Accordingly, a comprehensive podiatric approach was applied, including local gentle intervention, antiseptic therapy, offloading of the affected area, medical and health education of the patient, systemic antibacterial support, and referral to specialised specialists. At the first stage, gentle mechanical treatment of the wound surface

was performed with a sterile anatomical scalpel and a manual podiatric instrument, removing superficial necrotic layers and hyperkeratosis in order to reduce peripheral inflammation and improve tissue oxygenation. Immediately after that, the affected area was treated with a 0.05% chlorhexidine solution, offloaded with soft pads, which allowed to eliminate local pressure on the front of the foot and fix the I-II toes, and a sterile aseptic bandage was applied (Fig. 3). The patient and her relatives were trained in the

technique of bandaging, after which they independently changed the dressings daily at home for the next 6 days, observing a gradual decrease in hyperemia and pastosity.



Figure 3. Offloading and initial bandaging of the affected area of the foot

Note: a – soft foam pads installed to offload the forefoot; b – aseptically banded after mechanical and antiseptic treatment
Source: created by the author

After the swelling went down and the soft tissues stabilised (on day 7), a customised interdigital orthosis made of medical-grade silicone was made and fitted, which kept the contracted areas separated and reduced surface friction when walking (Fig. 4). An aseptic bandage continued to be applied daily for 3 days after the orthosis was installed, which prevented re-traumatisation of the damaged area and created conditions for the formation of a granulation ridge, confirming the activation of recovery processes.



Figure 4. Fitting an individual silicone interdigital orthosis

Source: created by the author

The next step was to teach the patient and her relatives how to care for her feet: daily inspection of the soles and between the toes using a mirror, washing with warm water and neutral pH soap without soaking, thorough drying of the interdigital spaces, application of emollients to dry areas of skin, but not between the toes; wearing socks made of natural fabrics, changing them twice a day, wearing comfortable shoes that fit well and have soft insoles. Emphasis was placed on the mandatory control of glycaemia, refusal of aggressive home methods of self-treatment of calluses (salt, celandine, peroxide, salicylic acid) and the need for immediate medical attention in case of cracks, blisters or skin discolouration. Educational work was aimed at increasing adherence to prevention and recurrence prevention.

Due to the high systemic risk, urgent referral was made on the day of the initial visit to an endocrinologist for correction of hypoglycaemic therapy and to a vascular surgeon to rule out critical ischaemia of the lower extremities and assess the need for further examination (Doppler ultrasound of the vessels, determination of the ankle-brachial index). This confirmed the absence of acute arterial obstruction and allowed the conservative strategy of local podiatric treatment to be continued. To prevent the spread of the infection, Augmentin 875/125 mg (1 tablet twice daily for 5 days) was prescribed. To prevent antibiotic-associated intestinal dysbiosis, the probiotic Neoflorum (1×10^9 colony-forming units/tablet) was recommended at a dose of 1 tablet once a day for 14 days. The patient tolerated the treatment well, with no side effects noted, which allowed for high adherence to the treatment strategy. During the first 7 days of therapy, the clinical condition was characterised by a progressive reduction in oedema and stabilisation of skin colour, with the colour tone changing from hyperemic pink to a pale pink more characteristic of epithelialisation, without perifocal areas of inflammation.

During the second week of observation, against the background of continued systemic antibacterial and probiotic therapy, local podiatric care and the use of an individual orthosis, a gradual increase in signs of regeneration was observed. The appearance of the affected area was characterised by the absence of hyperemia and oedema, clear delineation of the contours of the toes, a decrease in the density of hyperkeratotic layers, and the appearance of a

pale pink area of epithelialisation in the centre of the primary lesion (Fig. 5). The patient did not report pain when walking, and complaints of a feeling of fullness and local heat disappeared.



Figure 5. Condition of the right foot on the 14th day of treatment

Source: created by the author

On the 14th day of treatment, the foot condition was reassessed using the author's 15-point podiatrist scorecard. The total score increased from 7 to 11, which corresponded to a transition from the red (high risk of amputation) to the yellow (moderate risk) zone. This was the result of improved scores in section B "Foot examination", where the score increased from 1 to 3 due to reduced inflammation and signs of epithelialisation, as well as in sections C ("Hygiene and behaviour") and D ("Footwear and pressure factors"), where, thanks to training and the selection of orthoses, the score rose to 2 instead of the initial 1. The maximum score of 2 remained stable in section E ("Podiatrist's treatment strategy") as the plan of therapeutic and diagnostic interventions was adhered to. Clinically, this was reflected in the stabilisation of foot tissue homeostasis, the absence of indications for amputation, and the formation of an epithelialisation ridge. At the same time, blood glucose levels remained elevated (9-11 mmol/L), necessitating increased endocrinological monitoring. The objective dynamics are summarised in Table 1, which showed a clear improvement in four of the five sections of the card and confirms the effectiveness of the comprehensive algorithm for clinical assessment of the risk of amputation.

Table 1. Dynamics of clinical assessment according to the author's 15-point podiatrist card against the background of treatment

Card section	Maximum points	Before treatment	After treatment	Comments on dynamics
A. Medical data	3	2	2	Therapy control has been partially improved.
B. Foot examination	4	1	3	Reduction of hyperemia, edema, epithelialisation.
C. Hygiene and behaviour	3	1	2	Refusal of self-help, compliance with recommendations.
D. Footwear and pressure factors	3	1	2	Offloading, use of orthosis.
E. Podiatrist's treatment strategy	2	2	2	The action plan has been followed.
Total score	15	7	11	Transition from the red to the yellow zone.

Source: created by the author

The results confirmed that the use of a structured algorithm for clinical assessment of the risk of amputation using the author's 15-point podiatrist card, gentle local interventions, offloading, educational work and multidisciplinary routing allows to quickly stabilise the condition of the diabetic foot and reduce the risk of amputation, emphasising the key role of the podiatrist as a primary care specialist capable of timely identifying critical changes and initiating preventive measures. The application of the author's algorithm with a step-by-step assessment of the clinical risk of amputation showed high efficiency during a two-week observation period. The patient's transition from the critically dangerous red zone to the moderate yellow zone was accompanied by a reduction in local inflammation, improvement in perfusion parameters, and the creation of conditions for wound healing. The greatest contribution to the positive dynamics was demonstrated by gentle local interventions and offloading technologies, while glycaemic control and behavioural modification remained the most difficult components for the patient, limiting the possibility of achieving low risk in the short term.

The reduction in the risk score from 7 to 11 within 14 days reflected not only an improvement in the local

condition of the foot, but also a clear impact of behavioural modification and the implementation of a structured podiatric stratification algorithm. The patient experienced a reduction in inflammation, restoration of microcirculation, stabilisation of tissue homeostasis and formation of an epithelialisation ridge, which, combined with the abandonment of aggressive home treatment methods, allowed to move from the red to the yellow risk zone. Compared to the data of T. Korkmaz *et al.* [17], where even minimal behavioural modification reduced the risk of amputation from 35.4% to 21.7%, the results obtained confirmed the importance of the educational component of podiatric care. A study by C. Gazzaruso *et al.* [18] showed that comprehensive multidisciplinary interaction with a podiatrist, vascular surgeon, and endocrinologist forms the basis for successful conservative management, which is fully consistent with the routing applied in this case. At the same time, M.S. Aydın *et al.* [19] emphasised that a normalised systemic inflammatory background is necessary for a long-term reduced risk of amputation, which was not achieved in the patient under study, determining the need for further endocrinological correction. This observation is fully consistent with the conclusions of M. Klymenko [20], who

highlighted that persistent low-grade inflammation underlies multiple chronic metabolic and microvascular complications, including impaired tissue repair and recurrent lesions, thus complicating the conservative management of diabetic foot syndrome. Comparable conclusions are presented by F. Afshar *et al.* [21], where it was emphasised that optimisation of the ratio of neutrophils to lymphocytes in peripheral blood <3.8 after two weeks of treatment served as a predictor of stability of the result, which requires additional laboratory monitoring in further management.

The reduction in hyperemia, pastosity, and local signs of inflammation during the first two weeks of treatment demonstrated the important role of regular antiseptic treatment and gentle mechanical sanitation in stabilising early diabetic lesions. It was the removal of necrotic layers and hyperkeratosis that minimised the risk of bacterial colonisation and provided the tissues with access to oxygen, creating optimal conditions for epithelialisation. Scientists É. Senneville *et al.* [22] proved that systematic surface sanitation in combination with antiseptics reduced the risk of osteomyelitis formation within the diabetic foot by two times, confirming the feasibility of early local intervention. The work of J. Hüsers *et al.* [23] showed that the inclusion of the indicator of the frequency of mechanical treatments in prediction systems significantly improved the accuracy of amputation risk assessment tools, which emphasised the importance of podiatric sanitation as an important variable in mathematical models. A study by D. Demirkol *et al.* [24] demonstrated that the frequency and quality of local wound treatment determined the difference between conservative healing and progression to surgical intervention in more than 30% of cases, proving the critical role of biofilm removal. Similarly, R.G. Frykberg *et al.* [25] noted that the absence of mechanical sanitation and antiseptic prophylaxis significantly reduces the effectiveness of even surgical reconstructive care, emphasising the leading role of the podiatrist as the first specialist capable of preventing the penetration of infection into deep tissues and thereby reducing the need for amputation.

In this case, the improvement in the local condition of the foot was largely due to the correct selection of the method of offloading the affected area, which ensured a reduction in microtrauma to the tissues, stabilisation of microcirculation and the creation of conditions for physiological recovery. The use of soft silicone pads and an interdigital orthosis contributed to the reduction of pressure in the critical area of the I-II toes, which was accompanied by the formation of an epithelialisation ridge and a transition from the red to the yellow risk zone. A similar effect of biomechanical correction was described by Z. Huang *et al.* [26], who showed that the use of individual offloading devices was associated with a 38% reduction in the frequency of lesion progression, but noted that the maximum effect is achieved only with simultaneous modification of footwear. In the work of F.S. Yen *et al.* [27], it was proven that the use of orthopaedic offloading devices can prevent the formation of ulcers in 64% of patients with monoregional lesions, which is comparable to the dynamics obtained in this study, although the authors emphasised the limited result in the absence of daily compliance monitoring. A study by A. Azhar *et al.* [28] demonstrated that the combined use of antibacterial therapy and orthotics prevented

amputation in 79.4% of cases, confirming the feasibility of combining orthopaedic and pharmacological approaches used in this case. On the other hand, S. Stefanopoulos *et al.* [29] emphasised that the long-term effectiveness of offloading depends on the individualisation of the approach and the ability to adapt to changes in the shape of the foot, which determined the prospect of further improvement of stratification algorithms for the needs of a specific patient.

The patient's adherence to hygiene recommendations, refusal of aggressive home procedures, and regular monitoring of the condition of the foot proved to be an important behavioural component that supported the positive local dynamics achieved by podiatric interventions. Daily visual inspection, thorough drying of the interdigital spaces, application of emollients, and wearing of adapted footwear minimised the risks of re-traumatisation and secondary infection and contributed to the formation of an epithelial ridge. In the work of B. Peng *et al.* [30], it was shown that systematic implementation of preventive measures led to a reduction in the frequency of amputations from 27.1% to 8.6%, which emphasised the critical role of adherence to recommendations even in patients with high baseline risk. W.W. Han *et al.* [31] emphasised that strict adherence to hygiene and routing recommendations reduces the risk of sepsis by almost half, which is consistent with the positive evolution of the process in the patient under study. According to A.D. Popa *et al.* [32], a combination of daily care and wearing appropriate footwear can prolong the period of remission in almost 70% of cases, confirming the importance of the behavioural component in the prevention of recurrent lesions. At the same time, S. Smith *et al.* [33] noted that without preventive measures, the risk of recurrence and increasing neurological complications may exceed 50%, which justifies long-term podiatric support even after clinical stabilisation.

This clinical case clearly demonstrated the leading role of podiatrists in the system of primary prevention of amputations in patients with diabetic foot syndrome, where rapid risk stratification and early intervention are crucial for the formation of organ-preserving tactics. The use of the author's 15-point card allowed not only to assess the degree of threat, but also to determine the limit of the permissible scope of podiatric manipulations, avoiding excessive actions that could provoke the progression of the lesion. The importance of rapid stratification is confirmed by the Australian recommendations of P.A. Lazzarini *et al.* [34], which state that a delay in risk assessment of more than 48 hours almost doubles the likelihood of amputation. In turn, the authors W. Jeffcoate *et al.* [35] emphasised that it is the podiatrist who should be the first point of contact, capable of early identification of prognostically unfavourable changes and initiating patient education. At the same time, F. Farine *et al.* [36] noted that adequate stratification allows both underestimation and oversaturation of interventions to be avoided, since it is errors in the choice of the scope of procedures that are associated with a 2-3-fold increase in the frequency of amputations. The study by C.K. Perng *et al.* [37] showed that patients who were referred to a vascular surgeon within the first ten days of the onset of the lesion had a lower rate of progression to critical ischaemia (15.8% vs 34.1%), reflecting the need for rapid referral. The study by P.O. Gerasymchuk *et al.* [38] proved

that the results of modern technologies (e.g., vacuum therapy) are most effective in early intervention, when the local process remains under the control of the podiatrist, which emphasised the importance of the author's algorithm as a tool for timely routing.

The use of a structured algorithm with the author's risk map ensured the timely detection of a high risk of amputation, the determination of the acceptable scope of local intervention, and the rapid referral of the patient to specialists, which is critically important in preventing the progression of the lesion. Thanks to a combination of gentle mechanical sanitation, offloading of the affected area, antiseptic therapy, and behavioural modification, it was possible to stabilise the condition of the foot tissues and reduce the clinical risk of amputation in less than two weeks. The results obtained are consistent with current international approaches, in which the podiatrist is considered the first point of contact, which is crucial in the primary prevention of diabetic foot complications through rapid stratification, tactical flexibility, and integration of the patient into a multidisciplinary care system. The use of such algorithms is particularly appropriate in high-risk groups – elderly patients with low treatment adherence and severe neuropathy, where even minimal local lesions are highly likely to progress rapidly to amputation.

◆ CONCLUSIONS

The use of a structured algorithm with the author's 15-point podiatrist card in the management of a patient with diabetic foot syndrome allowed for timely stratification according to the risk of amputation and the formation of a personalised trajectory of therapeutic and preventive interventions. The initial risk score was 7 out of a possible 15, which corresponded to the red zone (high risk of amputation) and led to restrictions on invasive procedures and urgent referral to an endocrinologist and vascular surgeon. The introduction of a complex of local interventions (gentle sanitation, antiseptic treatment, aseptic dressing), individual offloading and behavioural modification, combined with educational work, contributed to the formation of conditions for the restoration of microcirculation on the 5th day and the appearance of an epithelialisation ridge by the 14th day of treatment.

The positive dynamics of the local condition was reflected in the increase in assessment scores in the sections

◆ REFERENCES

- [1] International Diabetes Federation. Diabetes facts & figures [Internet]. [cited 2025 February 25]. Available from: <https://idf.org/about-diabetes/diabetes-facts-figures/>
- [2] Armstrong DG, Tan TW, Boulton AJ, Bus SA. Diabetic foot ulcers: A review. *Jama*. 2023;330(1):62–75. DOI: [10.1001/jama.2023.10578](https://doi.org/10.1001/jama.2023.10578)
- [3] Gong H, Ren Y, Li Z, Zha P, Bista R, Li Y, et al. Clinical characteristics and risk factors of lower extremity amputation in the diabetic inpatients with foot ulcers. *Front Endocrinol*. 2023;14:1144806. DOI: [10.3389/fendo.2023.1144806](https://doi.org/10.3389/fendo.2023.1144806)
- [4] Okur KT, Ozan F, Kahraman M, Melez M, Ünlü ÖC, Altun İ. Assessment of the risk factors determining the prognosis of major and minor limb amputations in patients with diabetic foot ulcers. *Adv Clin Exp Med*. 2024;33(12):21–30. DOI: [10.17219/acem/163240](https://doi.org/10.17219/acem/163240)
- [5] Forsythe RO, Apelqvist J, Boyko EJ, Fitridge R, Hong JP, Katsanos K, et al. Performance of prognostic markers in the prediction of wound healing or amputation among patients with foot ulcers in diabetes: A systematic review. *Diabetes Metab Res Rev*. 2020;36(1):e3278. DOI: [10.1002/dmrr.3278](https://doi.org/10.1002/dmrr.3278)
- [6] Petrenko O, Badziukh S, Korska V, Kolosovych I, Tykhomirov A. Topical application of autologous plasma-derived plasminogen accelerates healing of chronic foot ulcers in type 2 diabetes patients. *Int J Low Extrem Wounds*. 2024;15347346241256025. DOI: [10.1177/15347346241256025](https://doi.org/10.1177/15347346241256025)

of the “Foot Examination” card, “Hygiene and Behaviour” and “Footwear and Offloading” sections of the card from 1-1-1 to 3-2-2, respectively, which indicated the effectiveness of the sanitation and offloading approach and the patient's increasing adherence to the recommendations received. The total score increased from 7 to 11, i.e. by 57.1%, which corresponds to a transition from the red to the yellow risk zone. At the same time, the preservation of suboptimal control of systemic parameters (fasting glucose level 9-11 mmol/L) and incomplete adherence to the preventive regimen indicated the need for continued endocrinological and behavioural supervision to prevent recurrence or progression of the lesion.

The presented clinical case confirmed the leading role of the podiatrist not only in the local prevention of diabetic complications, but also in the formation of a multidisciplinary referral network that allows for the implementation of organ-preserving tactics in outpatient settings. The implementation of this algorithm contributed to a reduction in the time from referral to clinical improvement (on average to 14 days), individualisation of the therapeutic strategy and increased objectivity of risk assessment, which makes it a promising tool for early intervention in podiatric care, especially among elderly patients with low treatment adherence and severe neuropathy. Further research should include multicentre prospective studies involving a larger sample of patients to verify the algorithm and refine the prognostic value of the author's card.

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◆ CONFLICT OF INTEREST

The author is the developer and owner of the patent of Ukraine No. 137472 (2025) for the podiatrist's assessment card for diabetes mellitus, which could potentially be perceived as a factor that could affect the objectivity of the presentation of the results. There are no other commercial or financial conflicts of interest.

- [7] Kaka AS, Landsteiner A, Ensrud KE, Logan B, Sowerby C, Ullman K, et al. Risk prediction models for diabetic foot ulcer development or amputation: A review of reviews. *J Foot Ankle Res.* 2023;16(1):13. DOI: [10.1186/s13047-023-00610-6](https://doi.org/10.1186/s13047-023-00610-6)
- [8] Ivanova AS, Melekhovets OK, Melekhovets IV. A comprehensive approach to diabetic foot ulcers treatment in patients with anisomelia. *Int J Endocrinol.* 2025;21(2):140–6. DOI: [10.22141/2224-0721.21.2.2025.1511](https://doi.org/10.22141/2224-0721.21.2.2025.1511)
- [9] Liu Z, Wei D, Wang J, Gao L. Predicting major amputation risk in diabetic foot ulcers using comparative machine learning models for enhanced clinical decision-making. *Sci Rep.* 2025;15:28103. DOI: [10.1038/s41598-025-13534-x](https://doi.org/10.1038/s41598-025-13534-x)
- [10] Oei CW, Chan YM, Zhang X, Leo KH, Yong E, Chong RC, et al. Risk prediction of diabetic foot amputation using machine learning and explainable artificial intelligence. *J Diabetes Sci Technol.* 2024;19(4):1008–22. DOI: [10.1177/19322968241228606](https://doi.org/10.1177/19322968241228606)
- [11] Shapoval SD, Tribushniy OV, Savon IL, Sophyskanych MM, Shidlovskiy VO, Vasilevska LA, et al. Complex treatment of patients with complicated syndrome of diabetic foot and sepsis. *Rom J Diabetes Nutr Metab Dis.* 2021;28(2):131–6. DOI: [10.46389/rjd-2021-1021](https://doi.org/10.46389/rjd-2021-1021)
- [12] International Working Group on the Diabetic Foot. Practical guidelines on the prevention and management of diabetes-related foot disease [Internet]. 2023 [cited 2025 February 25]. Available from: <https://iwgdfguidelines.org/wp-content/uploads/2023/07/IWGDF-Guidelines-2023.pdf>
- [13] American Diabetes Association Professional Practice Committee. Retinopathy, neuropathy, and foot care: Standards of care in diabetes – 2025. *Diabetes Care.* 2025;48(1):252–65. DOI: [10.2337/dc25-S012](https://doi.org/10.2337/dc25-S012)
- [14] National Institute for Health and Care Excellence. Diabetic foot problems: Prevention and management [Internet]. 2015 August 26 [cited 2025 February 25]. Available from: <https://www.nice.org.uk/guidance/ng19>
- [15] World Medical Association. Declaration of Helsinki: Ethical principles for medical research involving human subjects [Internet]. [cited 2025 February 25]. Available from: <https://www.wma.net/policies-post/wma-declaration-of-helsinki/>
- [16] European Medicines Agency. Guideline for good clinical practice E6(R2) (EMA/CHMP/ICH/135/1995) [Internet]. [cited 2025 February 25]. Available from: <https://www.ema.europa.eu/en/ich-e6-good-clinical-practice-scientific-guideline>
- [17] Korkmaz T, Afacan MY, Davulcu CD, Elibollar C, Değer GU, Şeker A. Depression as a prognostic factor in lower extremity amputation for diabetic foot: Insights from a prospective study on wound healing, infections, and early mortality. *J Foot Ankle Surg.* 2024;63(6):705–12. DOI: [10.1053/j.jfas.2024.07.005](https://doi.org/10.1053/j.jfas.2024.07.005)
- [18] Gazzaruso C, Gallotti P, Pujia A, Montalcini T, Giustina A, Coppola A. Predictors of healing, ulcer recurrence and persistence, amputation and mortality in type 2 diabetic patients with diabetic foot: A 10-year retrospective cohort study. *Endocrine.* 2021;71:59–68. DOI: [10.1007/s12020-020-02431-0](https://doi.org/10.1007/s12020-020-02431-0)
- [19] Aydın MS, Eren MA, Uyar N, Kankılıç N, Karaaslan H, Sabuncu T, et al. Relationship between systemic immune inflammation index and amputation in patients with diabetic foot ulcer. *J Orthop Sci.* 2024;29(4):1060–3. DOI: [10.1016/j.jos.2023.07.015](https://doi.org/10.1016/j.jos.2023.07.015)
- [20] Klymenko M. Progress and prospects in research on low-grade diffuse chronic inflammation: A literature review. *Ukr J Med Biol Sport.* 2025;10(1):16–29. DOI: [10.63341/ujmbs/1.2025.16](https://doi.org/10.63341/ujmbs/1.2025.16)
- [21] Afshar F, Daraie M, Mohammadi F, Seifouri K, Amin Afshari S, Heidari Some'eh S, et al. Neutrophil-lymphocyte ratio (NLR); an accurate inflammatory marker to predict diabetic foot ulcer amputation: A matched case-control study. *BMC Endocr Disord.* 2025;25:120. DOI: [10.1186/s12902-025-01941-0](https://doi.org/10.1186/s12902-025-01941-0)
- [22] Senneville É, Albalawi Z, Van Asten SA, Abbas ZG, Allison G, Aragón-Sánchez J, et al. IWGDF/IDSA guidelines on the diagnosis and treatment of diabetes-related foot infections (IWGDF/IDSA 2023). *Diabetes Metab Res Rev.* 2024;40(3):e3687. DOI: [10.1002/dmrr.3687](https://doi.org/10.1002/dmrr.3687)
- [23] Hüsters J, Hafer G, Heggemann J, Wiemeyer S, John SM, Hübner U. Predicting the amputation risk for patients with diabetic foot ulceration – a Bayesian decision support tool. *BMC Med Inform Decis Mak.* 2020;20:200. DOI: [10.1186/s12911-020-01195-x](https://doi.org/10.1186/s12911-020-01195-x)
- [24] Demirkol D, Erol ÇS, Tannier X, Özcan T, Aktaş Ş. Prediction of amputation risk of patients with diabetic foot using classification algorithms: A clinical study from a tertiary center. *Int Wound J.* 2024;21(1):e14556. DOI: [10.1111/iwj.14556](https://doi.org/10.1111/iwj.14556)
- [25] Frykberg RG, Attinger C, Smeets L, Koller A, Bal A, Kavarthapu V. Surgical strategies for prevention of amputation of the diabetic foot. *J Clin Orthop Trauma.* 2021;17:99–105. DOI: [10.1016/j.jcot.2021.02.019](https://doi.org/10.1016/j.jcot.2021.02.019)
- [26] Huang Z, Zheng X, Liang H, Zhong SY, Meng J, Yao J. Association of systemic immune-inflammatory index with risk of foot ulcer amputation in patients with type 2 diabetes mellitus: Insights from a cross-sectional study. *J Inflamm Res.* 2025;18:8295–304. DOI: [10.2147/JIR.S517693](https://doi.org/10.2147/JIR.S517693)
- [27] Yen FS, Yen YH, Hung YM, Wei JCC, Tsai FJ, Hung YT, et al. Diabetic microvascular disease and risk of peripheral artery disease, foot ulcer, leg infection, and amputation. *Thromb Haemost.* DOI: [10.1055/a-2661-2537](https://doi.org/10.1055/a-2661-2537)
- [28] Azhar A, Basheer M, Abdelgawad MS, Roshdi H, Kamel MF. Prevalence of peripheral arterial disease in diabetic foot ulcer patients and its impact in limb salvage. *Int J Low Extrem Wounds.* 2023;22(3):518–23. DOI: [10.1177/15347346211027063](https://doi.org/10.1177/15347346211027063)
- [29] Stefanopoulos S, Qiu Q, Ren G, Ahmed A, Osman M, Brunicardi FC, et al. A machine learning model for prediction of amputation in diabetics. *J Diabetes Sci Technol.* 2024;18(4):874–81. DOI: [10.1177/19322968221142899](https://doi.org/10.1177/19322968221142899)
- [30] Peng B, Min R, Liao Y, Yu A. Development of predictive nomograms for clinical use to quantify the risk of amputation in patients with diabetic foot ulcer. *J Diabetes Res.* 2021;2021(1):6621035. DOI: [10.1155/2021/6621035](https://doi.org/10.1155/2021/6621035)
- [31] Han WW, Fang JJ. Analysis of risk factors and predictive value of a nomogram model for sepsis in patients with diabetic foot. *World J Diabetes.* 2025;16(4):104088. DOI: [10.4239/wjd.v16.i4.104088](https://doi.org/10.4239/wjd.v16.i4.104088)

- [32] Popa AD, Gavril RS, Popa IV, Mihalache L, Gherasim A, Niță G, et al. Survival prediction in diabetic foot ulcers: A machine learning approach. *J Clin Med*. 2023;12(18):5816. DOI: [10.3390/jcm12185816](https://doi.org/10.3390/jcm12185816)
- [33] Smith S, Normahani P, Lane T, Hohenschurz-Schmidt D, Oliver N, Davies AH. Prevention and management strategies for diabetic neuropathy. *Life*. 2022;12(8):1185. DOI: [10.3390/life12081185](https://doi.org/10.3390/life12081185)
- [34] Lazzarini PA, Rasovic A, Prentice J, Commons RJ, Fitridge RA, Charles J. Australian evidence-based guidelines for the prevention and management of diabetes-related foot disease: A guideline summary. *Med J Aust*. 2023;219(10):485–95. DOI: [10.5694/mja2.52136](https://doi.org/10.5694/mja2.52136)
- [35] Jeffcoate W, Boyko EJ, Game F, Cowled P, Senneville E, Fitridge R. Causes, prevention, and management of diabetes-related foot ulcers. *Lancet Diabetes Endocrinol*. 2024;12(7):472–82. DOI: [10.1016/S2213-8587\(24\)00110-4](https://doi.org/10.1016/S2213-8587(24)00110-4)
- [36] Farine F, Rapisarda AM, Roani C, Giuli C, Comisi C, Mascio A, et al. Predictive factors of amputation in diabetic foot. *Biomedicine*. 2024;12(12):2775. DOI: [10.3390/biomedicine12122775](https://doi.org/10.3390/biomedicine12122775)
- [37] Perng CK, Chou HY, Chiu YJ. Identifying major predictors of lower-extremity amputation in patients with diabetic foot ulcers. *J Chin Med Assoc*. 2021;84(3):285–9. DOI: [10.1097/JCMA.0000000000000473](https://doi.org/10.1097/JCMA.0000000000000473)
- [38] Gerasymchuk PO, Pavlyshyn AV, Fira DB, Volotovska NV. Study of the vacuum therapy influence on the wound process in patients with diabetic foot syndrome. *Rom J Diabetes Nutr Metab Dis*. 2024;31(4):428–32. DOI: [10.46389/rjd-2024-1741](https://doi.org/10.46389/rjd-2024-1741)

Клінічна оцінка ризику ампутації при діабетичній стопі: клінічний випадок

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Анотація. Метою роботи було створення клінічного алгоритму оцінки ризику ампутації для пацієнтів із синдромом діабетичної стопи та його апробація на прикладі клінічного випадку, з акцентом на визначенні провідної ролі подолога в межах мультидисциплінарної команди. Дослідження виконано як опис клінічного випадку із застосуванням авторської 15-бальної карти стратифікації ризику, щадних локальних подологічних втручань, індивідуального розвантаження, поведінкової модифікації та мультидисциплінарної маршрутизації з подальшим оцінюванням динаміки за 7- та 14-денним протоколом спостереження. Упродовж 14 днів спостереження впровадження структурованого клінічного алгоритму забезпечило прогресивне покращення локального стану стопи: вже на 7-й день спостерігалось зменшення гіперемії, пастозності та болю, а до 14-го сформувався виражений епітелізаційний валик по краю дефекту, що свідчило про активацію репаративних процесів. Загальний бал за оцінковою картою підвищився з 7 до 11, відображаючи перехід пацієнтки з високого ризику ампутації до помірного. Секційні бали локального огляду зросли з 1 до 3, поведінкової секції – з 1 до 2, а корекції навантаження – з 1 до 2, що підтвердило ефективність щадної санації, антисептики, розвантажувальних прокладок та міжпальцевого ортеза. Позитивна динаміка супроводжувалась підвищенням комплаєнсу пацієнтки й відмовою від травмувальних домашніх маніпуляцій. Водночас рівень глікемії залишався підвищеним (9-11 ммоль/л), що зумовлює необхідність тривалого ендокринологічного контролю та профілактики рецидивів. Впровадження подологічного алгоритму з ранньою стратифікацією, щадними локальними втручаннями, індивідуальним розвантаженням та поведінковою корекцією дозволило досягти клінічно значущого зниження ризику ампутації вже протягом 14 днів лікування. Отримані результати можуть бути використані подологами, сімейними лікарями та ендокринологами у практиці амбулаторної допомоги для ранньої стратифікації ризику, оптимізації обсягу втручань і своєчасного направлення пацієнтів із синдромом діабетичної стопи з метою профілактики ампутацій

Ключові слова: подолог; стратифікація; розвантаження; уражена ділянка; запалення; антисептична обробка; санація