

Preventive Foot Care in Diabetes

AMERICAN DIABETES ASSOCIATION

Foot ulcers and amputations are a major cause of morbidity, disability, as well as emotional and physical costs for people with diabetes. Early recognition and management of independent risk factors for ulcers and amputations can prevent or delay the onset of adverse outcomes. This position statement provides recommendations for people who currently have no foot ulcers, and outlines the best means to identify and manage risk factors before a foot ulcer occurs or an amputation becomes imminent. These recommendations are based on the technical review of care for the nonulcerated foot in diabetes (1). An American Diabetes Association consensus statement covers the management of diabetic foot wounds (2).

RISK IDENTIFICATION — Risk identification is fundamental for effective preventive management of the foot in people with diabetes. The risk of ulcers or amputations is increased in people who have had diabetes ≥ 10 years, are male, have poor glucose control, or have cardiovascular, retinal, or renal complications. The following foot-related risk conditions are associated with an increased risk of amputation:

- Peripheral neuropathy with loss of protective sensation
- Altered biomechanics (in the presence of neuropathy)
- Evidence of increased pressure (erythema, hemorrhage under a callus)
- Bony deformity
- Peripheral vascular disease (decreased or absent pedal pulses)
- A history of ulcers or amputation
- Severe nail pathology.

The recommendations in this paper are based on the evidence reviewed in the following publication: Preventive foot care in people with diabetes (Technical Review). *Diabetes Care* 21:2161–2177, 1998.

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Guidelines of the American Diabetes Association, the American Podiatric Medical Association, and the American Orthopaedic Foot and Ankle Society.

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FOOT EXAM — All individuals with diabetes should receive an annual foot examination to identify high-risk foot conditions. This examination should include assessment of protective sensation, foot structure and biomechanics, vascular status, and skin integrity. People with one or more high-risk foot conditions should be evaluated more frequently for the development of additional risk factors. People with neuropathy should have a visual inspection of their feet at every visit with a health care professional.

Evaluation of neurological status in the low-risk foot should include a quantitative somatosensory threshold test, using the Semmes-Weinstein 5.07 (10-g) monofilament. Initial screening for peripheral vascular disease should include a history for claudication and an assessment of the pedal pulses. The skin should be assessed for integrity, especially between the toes and under the metatarsal heads. The presence of erythema, warmth, or callus formation may indicate areas of tissue damage with impending breakdown. Bony deformities, limitation in joint mobility, and problems with gait and balance should be assessed.

PREVENTION OF HIGH-RISK CONDITIONS — Distal symmetric polyneuropathy is one of the most important predictors of ulcers and amputation. The development of neuropathy can be delayed significantly by maintaining glycemic levels to as near normal as possible. Smoking cessation should be encouraged to reduce the risk of vascular disease complications. Timely referral to a foot care specialist is critical.

MANAGEMENT OF HIGH-RISK CONDITIONS — People with neuropathy or evidence of increased plantar pressure may be adequately managed with well-fitted walking shoes or athletic shoes. Patients should be educated on the implications of sensory loss and the ways to substitute other sensory modalities (hand palpation, visual inspection) for surveillance of early problems.

People with evidence of increased plantar pressure (e.g., erythema, warmth, callus, or measured pressure) should use footwear that cushions and redistributes the pressure. Callus can be debrided with a scalpel by a foot care specialist or other health professional with experience and training in foot care. People with bony deformities (e.g., hammertoes, prominent metatarsal heads, bunions) may need extra-wide shoes or depth shoes. People with extreme bony deformities (e.g., Charcot foot) that cannot be accommodated with commercial therapeutic footwear may need custom-molded shoes.

Initial screening for peripheral arterial disease should include a history for claudication and an assessment of the pedal pulses. Consider obtaining an ankle-brachial index, as many patients with peripheral arterial disease are asymptomatic. Refer patients with significant or a positive ankle-brachial index for further vascular assessment and consider exercise, medications, and surgical options.

People with a history of ulcers should be evaluated for the underlying pathology that led to the ulceration and be managed accordingly. Minor skin conditions such as dryness and tinea pedis should be treated to prevent the development of more serious conditions.

PATIENT EDUCATION — Patients with diabetes and high-risk foot conditions should be educated regarding their risk factors and appropriate management. A non-judgmental assessment of a person's current knowledge and care practices should be obtained first. Patients at risk should understand the implications

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of the loss of protective sensation, the importance of foot monitoring on a daily basis, the proper care of the foot, including nail and skin care, and the selection of appropriate footwear. The patient's understanding of these issues and their physical ability to conduct proper foot surveillance and care should be assessed. Patients with neuropathy should be advised to break in new shoes gradually to minimize the formation of blisters and ulcers. Patients with visual difficulties, physical constraints preventing movement, or cognitive problems that impair their ability to assess the condition of the foot and to institute appropriate responses will need other people, such as family members, to assist in their care. Patients at low risk may benefit from education on foot care and footwear.

PROVIDER EDUCATION — All health care providers of people with diabetes should be able to conduct a simple screening exam of the neurological, vascular, dermatological, and musculoskeletal systems.

Providers with interest in the foot may choose to obtain additional training and provide focused management of high-risk foot conditions. Additional expertise in patient education, footwear modifications, nail and callus care, and surgical management of the foot may be needed.

Recommendations (E)

- All individuals with diabetes should receive an annual foot examination to identify high-risk foot conditions. This examination should include assessment of protective sensation, foot structure and biomechanics, vascular status, and skin integrity.
- People with one or more high-risk foot conditions should be evaluated more frequently for the development of additional risk factors.
- People with neuropathy should have a visual inspection of their feet at every visit with a health care professional.

- Evaluation of neurological status in the low-risk foot should include a quantitative somatosensory threshold test, using the Semmes-Weinstein 5.07 (10-g) monofilament.
- Patients with diabetes and high-risk foot conditions should be educated regarding their risk factors and appropriate management.
- Initial screening for peripheral vascular disease should include a history for claudication and an assessment of the pedal pulses. Consider obtaining an ABI, as many patients with PAD are asymptomatic.

References

1. Mayfield JA, Reiber GE, Sanders LJ, Janisse D, Pogach LM: Preventive foot care in people with diabetes (Technical Review). *Diabetes Care* 21:2161–2177, 1998
2. American Diabetes Association: Consensus Development Conference on Diabetic Foot Wound Care (Consensus Statement). *Diabetes Care* 22:1354–1360, 1999