Diabetic Foot Care Strategies for Primary Care

Part I: Complete Foot Evaluation

Presented by
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Veterans Health Administration
Objectives

1. Identify factors and findings that increase risk of diabetic foot complications
2. Accurately perform a complete diabetic foot examination
3. Implement strategies to prevent diabetic foot complications in the primary care setting
Diabetic Foot Ulcers

Lifetime risk of foot ulcer is
- 19-34%

Foot ulcers are recurring conditions:
- 40% at 1 year
- 65% at 5 years

In 2017, the estimated cost of diabetes complications in the US was over 300 billion and it has risen annually:
- Historically, 33% of direct costs have been attributed to DFU

(ADA, 2018; Armstrong, 2017; McDermott, 2023; Sorber, 2021)
Diabetic Foot Ulcer Complications

- In people with new DFU, 17% experience a minor amputation and 5% experience a major amputation in 1 year.
- Since 2014, increasing rate of lower extremity amputation are observed among younger adults.

Mortality rates increased following DFU
- 13.1% at 1 year, 49.1% at 5 years, and 76.9% at 10 years
- CVD and infection leading cause of death.

(Armstrong, 2017; McDermott, 2023; Sorber, 2021)
Foot Care: Why is it important to people with diabetes?

• A diabetic foot ulcer (DFU) may lead to lower extremity amputation and disability
  • Decrease quality of life for patients and families
  • Greater self-care needs
  • Reduce daily physical activities
  • Increase dependence on others
  • Creates financial burden

• Developing foot disease is a harbinger of severe diabetes complications affecting other organ systems

• Preventing foot disease is the best option

(Vileikyte, 2020)
Identifying people at risk for DFU

- History of previous foot ulcer and/or amputation
- Peripheral artery disease
- Peripheral neuropathy
- Visual impairment
- Dialysis
- Commercial tobacco use (non ceremonial use)
Identifying people at risk: vascular symptoms

- Peripheral Artery Disease (PAD)
  - Classic symptoms of intermittent claudication: leg muscle pain, cramping and fatigue brought on by ambulation/exercise; relieved with rest
  - Majority of patients have atypical or no symptoms.
  - Common patient complaints:
    - Pain (discomfort) and/or cramping in hips, thighs, or calves
    - Lower extremity fatigue, weakness, or pressure
    - Cold or discolored feet
    - Burning or aching pain in the feet or toes

(Boulton, 2018; International Working Group on the Diabetic Foot [IWGDF] Practical Guidelines, 2023)
Identifying people at risk: neuropathy symptoms

• Peripheral Neuropathy
  • Sensory:
    • Burning, numbness, or tingling in feet, especially at night
    • Stocking-glove distribution of complaint
  • Sensorimotor dysfunction:
    • Foot deformity, callus
    • Difficulties with ambulation-tightness, aching, tripping
    • Loss of balance-falls
    • Accompanied by signs and symptoms of generalized neuropathy such as impotence in men, resting tachycardia, or muscle weakness
  • May be asymptomatic in up to 50% of people

(Boulton, 2018; IWGDF Practical Guidelines, 2023)
Identifying people at risk: physical findings

- **Vascular findings**
  - Discolored (pallor) skin and loss of hair in toes and legs
  - Diminished or absent pedal pulses

- **Sensory findings**
  - Absent monofilament test: Loss of protective sensation (LOPS)
  - Decreased or absent vibration sense
  - Loss of temperature sensation
  - Inability to detect position sense (proprioception)
  - Decreased or absent ankle reflex

(Boulton, 2018; IWGDF Practical Guidelines, 2023)
Identifying people at risk: physical findings

(continued)

• Skin changes
  • Calluses, corns
  • Fungal infection e.g. athlete’s foot
  • Dry, cracked, fissured skin

• Nail abnormalities
  • Long or ingrown nails, onychomycosis (fungal nails)

• Foot deformity
  • Bunion, hammer toe(s), claw toe(s), Charcot

• Limited joint mobility

(Boulton, 2018; IWGDF Practical Guidelines, 2023)
Evaluate Pedal Pulses

- Assess dorsalis pedis and posterior tibial pulses in both feet
- Absent pulses indicate PAD

(Boulton, 2018; IWGDF Practical Guidelines, 2023)
Ankle Brachial Index (ABI): additional assessment for PAD

- Use Doppler and blood pressure cuff to:
  - Measure systolic BP in brachial artery in each arm
  - Measure systolic BP in the posterior tibial and dorsalis pedis arteries
- Calculate ABI:
  \[
  \text{ABI} = \frac{\text{highest Ankle Systolic BP}}{\text{highest Brachial Systolic BP}}
  \]
- Results:
  - <0.90 indicates PAD
  - >1.3 suggests arterial stiffness from calcified vessels

(Boulton, 2018; Gerhard-Herman, 2017; IWGDF PAD Guidelines, 2023; Resnick, 2004)
Use 10g (5.07) Semmes-Weinstein monofilament to assess for loss of protective sensation (LOPS):

- Press perpendicular to point of bending, hold 1 second and release. (Demonstrate on hand.)
- Instruct patient to close their eyes, and acknowledge sensation of pressure with a “yes”.
- Test both feet, at least 5 sites each:
  - Great toe, 1st, 3rd & 5th metatarsal heads
  - Dorsum of metatarsals between 1st and 2nd toes

Monofilament test is abnormal if sensation is absent in one or more areas.
Ipswich (Light) Touch Test

- Ask the patient to close their eyes.
- Use index finger to lightly touch the tips of the first, third and fifth toes for 1-2 seconds. Ask the patient to identify when the toe is touched.
- Reduced foot sensation is defined as \( \geq 2 \) insensate areas.
- Abnormal test indicates loss of protective sensation (LOPS).
Vibration Test – 128 Hz tuning fork

• Strike the tuning fork on the palm of your hand.
• Place the vibrating tuning fork on the bony prominence of the great toe, proximal to the nail, bilaterally.
• An abnormal response is noted when the patient can no longer feel vibratory sensation and the examiner still perceives it.

(IWGDF Practical Guidelines, 2023; Kanji, 2010)
Foot Deformities

• Result of diabetic neuropathy and sensorimotor dysfunction
• Associated with increased risk of DFU and amputation
• Common deformities are:
  • Claw or hammer toe(s)
  • Hallux valgus
  • Charcot Foot
Foot Deformities

Hallux Abducto Valgus (Bunion)
Foot Deformities: Flexor-Extensor Imbalance

![Foot Deformities Diagram]

- **Hammer Toe**
- **Claw Toe**
- **Mallett Toe**

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Foot Deformities:
Charcot Neuroarthropathy

Charcot Foot

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A COMPLETE DIABETIC FOOT EXAMINATION
DEMONSTRATION VIDEO

A complete diabetic foot examination should be performed at diabetes diagnosis and at least annually thereafter to identify people at risk for foot ulcers and amputation.
Protecting the Patient from Foot Complications: Strategies for Primary Care Clinicians

- Screening for High-Risk Patients
- Practical Interventions
- Implementation into Practice
  - Education
  - Resources

(IWGDF Practical Guidelines, 2023)
## Risk Assessment and Follow up Care

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Complete foot exam</th>
<th>Primary Care visit &amp; foot check</th>
<th>Podiatry/Foot Clinic</th>
<th>Footwear</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very Low</strong> (No abnormal findings)</td>
<td>Annual</td>
<td>6-12 months</td>
<td>within 1-3 months, and at least annually</td>
<td>Preventive</td>
</tr>
<tr>
<td><strong>Low</strong> (LOPS +/- deformities and skin changes)</td>
<td>Annual</td>
<td>3-4 months</td>
<td>within 1 month, and every 4-6 months</td>
<td>Preventive or protective</td>
</tr>
<tr>
<td><strong>Moderate</strong> (Prior and risk history and/or PAD +/- LOPS)</td>
<td>Annual</td>
<td>2-3 months or more often as needed</td>
<td>within 1-3 weeks, and every 2-3 months</td>
<td>Protective and/or custom footwear</td>
</tr>
<tr>
<td><strong>High and/or Active Ulcer</strong></td>
<td>Annual</td>
<td>1-2 months or more often as needed</td>
<td>next available/Immediate</td>
<td>Protective and/or custom footwear</td>
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(Boulton, 2018)
ADA foot care recommendations:

- Refer patients with the following risk factors to podiatry and/or foot clinic
  - Diabetic Foot Ulcer
  - Absent Monofilament sensation: Loss of Protective Sensation (LOPS)
  - Absent DP or PT pulses: Significant peripheral arterial disease (PAD), may require vascular surgeon consultation
  - Structural foot abnormalities
  - Current cigarette smoking
  - History of prior amputation or ulcer

Note: Referral to the specialist should be individualized in a patient-centered approach after evaluating the above risk factors and considering access to resources.
Practical Interventions

- Optimize glycemic control
- Optimize blood pressure control
- Provide foot injury education to all patients with diabetes
# Practical Interventions: Patients with Neuropathy

Boulton, 2018; IWGDF Practical Guidelines, 2023

## Neuropathic Findings Strategies

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<th>Strategies</th>
</tr>
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<tr>
<td><strong>Sensory:</strong> loss of protective sensation</td>
<td>Clear walking space, use nightlights, obtain protective footwear</td>
</tr>
<tr>
<td><strong>Motor:</strong> muscle wasting, foot deformity, callus</td>
<td>Accommodative footwear, regular removal of callus</td>
</tr>
<tr>
<td><strong>Autonomic:</strong> decreased sweating - dry skin, edema</td>
<td>Moisturize skin, diabetic socks</td>
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<tr>
<td><strong>Autonomic:</strong> abnormal blood flow - edema</td>
<td>Reduce edema with medication and/or positioning</td>
</tr>
</tbody>
</table>
Practical Interventions: Patients with Vascular Disease

**Strategies for Peripheral Artery Disease**

- Treat hypertension and hyperlipidemia
- Encourage smoking cessation
- Refer to specialist for additional vascular assessment
- Consult for revascularization or continue medical management of limb ischemia
Foot Care Education for All Patients with Diabetes

• Check your feet daily or have a family member/caregiver help you.
• Get help early if a foot problem is identified.
• Quit using commercial tobacco or never start.
• Wear shoes indoors and outdoors.
• Protect feet from hot and cold.
• Don’t soak feet, dry thoroughly after bathing.
• Learn about proper shoe selection and fit, proper care, and maintenance.
• Work to keep your blood sugar in target range.

(ADA Standards of Care, 2023; Bonner, 2016; IWGDF Prevention Guidelines, 2023)
Foot Care Education Resource from IHS
Division of Diabetes Treatment and Prevention

Diabetes Information for You and Your Family
Keeping Your Feet Healthy

Healthy feet help us to take care of ourselves and our families. We depend on them daily. Many people also rely on them to walk familiar trails and to take part in traditions, such as dances and ceremonies. For people with diabetes, controlling blood sugars is important to keep feet healthy. There are three things you can do to take care of your feet.

1. Check your feet every day:
   - Look at your feet for cuts, sores, and/or swollen areas and blisters.
   - Check for any signs of infections.
   - If you notice any changes in your feet, ask a nurse or tribal health center to help you.

2. Get help if you find a foot problem:
   - If you find any problems during your daily foot check, contact your health care team right away.
   - Getting help early can keep small problems from becoming bigger problems.

3. Quit using commercial tobacco or never start:
   - Tobacco use increases blood flow to your feet.
   - Ask your health care team about the resources available for quitting tobacco.
   - Call 1-800-QUIT-NOW (1-800-784-8663) for free help.
   - Avoid being around others who are smoking, including in the car.

At each clinic visit, talk off your shoes and socks:
Ask a member of your health care team to:
- Check your feet
- Show you how to treat your feet
- Tell you about your risks for infection
- Discuss how to treat or prevent foot problems
- Teach you about ways to keep your feet healthy

What are other ways you can keep your feet healthy?
- Wear shoes and socks:
- Use comfortable shoes that fit well and protect your feet.
- Shoes should have room for toes and low heels.
- Avoid shoes that are open at either the toe or the heel.

Report foot problems early. It is important to get problems checked and treated right away. Ask your health care provider about treatment options. You may refer to a foot wound care specialist, if needed.

At the end of the day, take off your shoes and socks:
- Wash your feet often.
- Inspect your feet for signs of infection.
- Do your feet well, including between your toes.

Put feet on your feet daily:
- Apply lotion on the tops and bottoms of your feet, but not between your toes.
- If there are cuts and bruises on your feet, wash your feet and dry them.

Tell your provider if you:
- See any changes in your feet, like swelling or deformities.
- Have trouble walking or have pain that is not normal.

If you have any of these symptoms, see your health care provider right away.

Indian Health Service Division of Diabetes Treatment and Prevention

Look at Your Feet EVERY DAY
Use a mirror if needed to see bottom of foot

Check

• Skin
• Nails
• Area between toes
• Heels
• Area under metatarsal heads (ball of foot)
• Dorsal surfaces of toes, especially if clawed or hammered
Footwear Resources: Preventive and Protective Footwear

• Normal feet: standard, well fitting, shoes
• Insensate feet: quality walking shoe or added depth shoe
  • Adjustable upper
  • Firm heel counter
  • Padded insert and collar
  • Broad sole
• Insensate feet and minor deformity: added depth shoes with custom insert
• Major deformities: custom molded shoes

(Jorgetto, 2019)
Footwear Structure

Collar
Upper
Toe Box
Heel counter
Insert
Shank
Sole
Added depth
Rocker sole
Referrals for Therapeutic Footwear
Custom-Molded Inserts and Extra Depth Shoes
Footwear and Prevention of Foot Complications

- Reduced Peak Plantar Pressures > 50%
- Reduced callus formation > 30%
- Ulcer recurrence rates reduced > 50%
- Lower extremity amputation rate reduced > 70%
- Effectiveness is associated with adherence to footwear use.

(Bus, 2013; Jorgetto, 2019; Luo, 2022)
Medicare Therapeutic Footwear Benefit

- Physician Certification for Therapeutic Footwear (MD, DO)
  - Certification that patient has diabetes and one or more of the following:
    - History of partial or complete amputation of the foot
    - History of previous foot ulceration
    - History of pre-ulcerative callus
    - Peripheral neuropathy with evidence of callus formation
    - Foot deformity
    - Poor circulation
  - Attestation that patient is receiving care for diabetes, and that they need special shoes because of their diabetes
- Footwear Prescription (usually a Podiatrist)
- Fitting and Dispensing (usually a Pedorthist)
Revised Medicare Policy: Therapeutic Shoes for Persons with Diabetes

• Medicare Policy article A52501 (11/2020): Nurse Practitioner (NP) and Physician Assistant (PA) providing ancillary services as auxiliary personnel could meet the “incident to” requirement in their provision of therapeutic shoes to beneficiaries with diabetes if all of the following criteria are met:

  • Supervising physician has documented in the medical record that patient has diabetes and continues to provide comprehensive care; and
  • NP or PA certifies that the provision of the shoes are part of comprehensive treatment plan for the patients; and
  • Supervising physician must review and verify (sign and date) all of the NP or PA notes pertaining to the provision of the therapeutic shoes acknowledging agreement with NP or PA.

(CMS.gov Therapeutic Shoes for Persons with Diabetes)
# Chronic Care Model for Diabetes Foot Care

## Delivery System Design
- Proactive visits for foot screening and clinical care
- Regular visits and interactions with Foot Care Team

## Self-Management Support
- Self-help education and materials for patients and families
- Patient-identified priorities for care

## Decision Support
- Evidence-based care and referral guidelines
- Training and education
- Foot care evaluation and provider feedback

## Information Systems
- Risk-stratified diabetes registries
- Audits for tracking appointments and reminders
- Summarize data from encounters

## Community Resources
- Resources for clinical care
- Coordinate participation
- Address SDOH needs

## Health System Organization
- Foot care quality
- Leadership support
- Attainable targets and evidence-based guidelines

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**Fewer Foot Ulcers and Amputations**

(ADA Standards of Care, 2023; Reiber, 2005; Rith-Najarian, 1998; Rith-Najarian, 2000)
In Summary:

We have:
1. Identified factors and findings that increase risk of diabetic foot complications.
2. Demonstrated how to perform a complete diabetic foot examination.
3. Introduced strategies to prevent diabetic foot complications in the primary care setting.

We can:
1. Improve our rate of performing diabetic foot exams.
2. Improve performance in form of GPRA (government performance results act).
3. Improve Medicare MIPS (merit-based incentive payment system).
4. SAVE a Limb and SAVE a Life.
Part 1-References


• Indian Health Service Division of Diabetes Treatment and Prevention. https://www.ihs.gov/diabetes/education-materials-and-resources/diabetes-topics/keeping-your-feet-healthy/


Part 1-References


