

ECHO Diabetes

Series on Diabetes Foot Care

Footwear Assessment & Foot Care Education

April 13, 2023

Carol Greenlee MD

Pre-question – which options are correct

1) Assessment of Footwear (shoes & socks) in our patients with diabetes:

- A. Can identify sources of rubbing or pressure that might cause injury
- B. Can help ensure that our patients are fashionable
- C. Should be done as part of the diabetic foot exam
- D. Can be taught to patients as part of their foot care plan

- A & B
- B & C
- B & D
- A, B & C
- A, C & D
- All the above

Pre-Question – which options are correct

2) When a patient has loss of protective sensation in their feet

- A. It is important that they look at their feet daily (for blood, blisters, black, red or raw areas)
- B. It is good idea to use hot water to disinfect their feet
- C. It is important that they not go barefoot
- D. It is important to keep skin from cracking if dry

- A & B
- B & C
- B & D
- A, B & C
- A, C & D
- All the above

Why assess footwear and teach foot care?

***Goal = to help our patients with diabetes stay healthy –
Reduce complications & improve outcomes***

**Hoping to help prevent foot ulcers and amputations in our
patients**

80% of amputations result from injury or ulcers

People with loss of protective sensation are more prone to injury and ulcers

Appropriate footwear & foot care can help prevent

Background – Diabetic Peripheral Neuropathy

- The presence of **peripheral sensory neuropathy** is the ***single most common component cause for foot ulceration*** - found in 78% of people with diabetes with ulcerations
 - the triad of peripheral sensory neuropathy, minor trauma, and foot deformity was present in >63% of participants.
- ~50% of people with diabetic peripheral neuropathy do not have pain symptoms – **requires exam to detect that they have neuropathy**

Just because they don't have *neuropathy pain* doesn't mean they don't have *neuropathy*

- They can have ***loss of feeling (insensate feet- loss of the “gift of pain”)*** – Loss of Protective Sensation (LOPS) → vulnerable to trauma & damage
 - E.g., Walk on hot or sharp surfaces; Do not feel footwear rubbing

See didactic on Diabetic Peripheral Neuropathy <https://youtu.be/2RQyNLot8Ss>



Foot Care

ADA 2023 Standards of Care - Recommendations

- **12.21** Perform a **comprehensive foot evaluation** at *least annually* to identify risk factors for ulcers and amputations. **A**
- **12.22** The examination should include
 - inspection of the skin
 - assessment of foot deformities (such as bunions, hammertoes, and prominent metatarsals, which increase plantar foot pressures and increase risk for ulcerations)
 - neurological assessment (10-g monofilament testing with at least one other assessment: pinprick, temperature, vibration)
 - vascular assessment, including pulses in the legs and feet. **B**
- **12.23** Individuals with evidence of sensory loss or prior ulceration or amputation should have their feet inspected at every visit. **A**

See Foot Exam training – link on website

The Foot Exam

1. Check for symptoms of peripheral neuropathy

- Allodynia: unusual sensitivity or tenderness
- Tingling, prickly
- Pain: burning, sharp or shooting pain
- Numbness

2. Foot Exam

- Inspection** (Deformities, lesions, infection)
- Circulation/pulses** (blood flow)
- Vibration sensation**
- Pressure/protective sensation**

3. Review Footwear

- Appropriate wear
- Fit and size



Foot Exam Components

- Musculoskeletal
- Dermatologic
- Vascular
- Neurologic

Start with Inspection

Look for Deformities

- Inspect both feet and note
- Post-amputation changes
 - Deformities
 - Hammer toes/ claw foot
 - Bunion
 - Padding under metatarsals (adequate or decreased)
 - Rocker bottom foot
 - Other

Look for Lesions

- Red spots
- Raw spots, blisters, cracks, tears in skin
- Maceration between toes
- Callouses
 - Bleeding in callous
- Ulcers
- Bleeding
- Peeling
- Burns
- Black area
- Nail changes

Do shoes fit? What shape are shoes in?

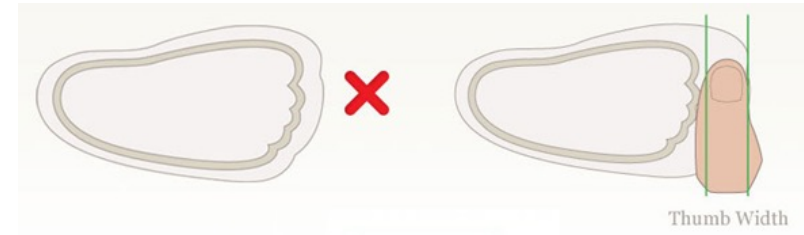
Inspect shoes to determine if they meet the characteristics for the ideal shoe for diabetic-foot

- The shoe should be **foot-shaped**
 - Shoes with pointed toes compress the foot & toes
- The shoe should have a **soft heel counter** that is *firm and rigid enough* to keep the foot in place when walking



Inspect shoes to determine if they meet the characteristics for the ideal shoe for diabetic-foot

- Check **length** (1/2" to 3/4" beyond tip of longest toe) to prevent toes bending inside of shoes & trauma to toenails.



- Check **width**. The sides of the shoe should not compress the sides of the foot, should fit snugly but not tightly.
 - The widest part of foot should be in the widest part of shoe.
 - The correct width allows the toes to rest flat on the insole without being compressed.

pull foot pad out, stand on it & check fit



Inspect shoes to determine if they meet the characteristics for the ideal shoe for diabetic-foot

- The **shoe upper** should be made of leather or other breathable material.
 - The leather (or other material) over the forefoot is as soft as possible.
- Check that shoes have **supportive, cushioned soles** that are thick enough to reduce pressure on the foot & prevent puncture wounds.
- The **inside lining** of the shoes is smooth and free from seams and/or wrinkles.
- The shoe has a **heel height** that is not excessive (under 5 cm [2 inch]).
 - High heels cause abnormal pressure on the foot

Note: Several studies have shown that wearing athletic shoes can reduce plantar pressure and lead to fewer calluses.

1. Wide and Deep Toe Box

Allows for sufficient room for toes and prevents skin abrasions from occurring

2. Laces or buckles

Secures feet firmly to shoes and prevents slippage and risk of falling

3. Firm and rigid heel counter

Holds your heel in place when you are walking

4. One thumb's width spacing

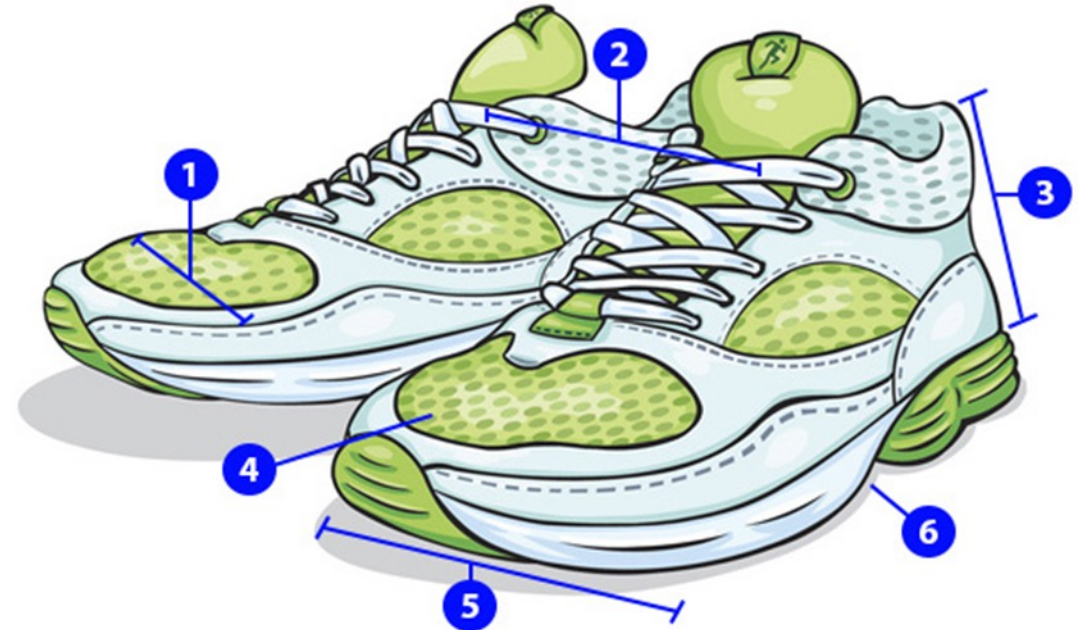
Allows for one thumb's width spacing from the longest toe to the front of the shoe to ensure adequate space for your feet when walking

5. Flexible toe box

Shoe should be flexible only at the balls of the feet so as to encourage efficient toe-off when walking

6. Midsole

Midsole should not be too flexible to maintain stability of the mid-foot



The simplest intervention for a patient who is at risk for ulceration would be a good-fitting, well-cushioned pair of athletic shoes if the patient's foot fits well in the upper area.

These kinds of footwear should not be used by people with diabetes especially those with Diabetic Neuropathy.



Shoes should fit comfortably

Avoid poor-fitting shoes

HEEL



WOMEN WITH DIABETES MUST AVOID WEARING HIGH-HEELED SHOES



Footwear with Toe grip/ Toe ring not advisable for people with Diabetes



People with Diabetes must avoid wearing Footwear without Heel counter



Footnotes – What Not to Wear

If you can't run in them, you probably shouldn't walk in them...



What about Socks

- Observe that socks are being worn with shoes to reduce friction
- Check that socks meet the following criteria:
 - Socks are ***nonconstricting*** with no tight band around ankle or calf.
 - Socks with prominent ***seams*** are worn turned inside-out.
 - Lighter-colored or white socks are worn when there is an open wound to help alert wearers with compromised sensation to a draining wound.
 - Patients with a partial foot require a sock that will conform to the shape without distal prominent seams or excess material at the distal end.
 - A common *misinformation* recommendation: “*Ensure socks are made of absorbent materials, such as cotton*” –
 - Cotton is a natural fiber that is very absorbent, but it holds on to moisture! It doesn’t wick moisture. (Findings show you shouldn't wear cotton socks if you have sweaty feet!)
 - Wool is great for moisture-wicking, but not always best for stretch and durability
 - *A wool and synthetic blend or Acrylic blend* often better

A look at research (or lack of) on recommendations regarding socks:

Sockwear Recommendations for People With Diabetes

Carol B. Feldman, MSN, RN, CDE; Ellen D. Davis, MSN, RN, CDE Diabetes Spectr 2001;14(2):59–61

- Several education sources recommend cotton and wool socks for diabetic patients to help keep feet dry - however, this advice may be based on *tradition* rather than on scientific evidence.
- The available evidence suggests that people with diabetes who have “*normal*” feet should be able to wear whatever socks they find to be comfortable.
 - Socks should fit well, without constricting cuffs, lumps, or uncomfortable seams.
 - Fitted socks are preferable to tube socks.
 - Patients can judge for themselves which type of fabric feels the most comfortable.
- Patients who are *at risk* for ulcer development because of decreased pressure sensation (LOPS) should be advised to wear ***densely padded*** socks.
 - In the studies cited here, the padded socks used were the ***Thorlo brand***, which are made of 100% **acrylic fiber with nylon and spandex** for elasticity.
 - Padded acrylic socks produce less moisture at the skin surface and less blistering in runners than do cotton socks.

Sockwear Recommendations for People With Diabetes

Carol B. Feldman, MSN, RN, CDE; Ellen D. Davis, MSN, RN, CDE

Diabetes Spectr 2001;14(2):59–61

- *“...socks are like towels. If a cotton towel is used to dry the skin after a bath, the **cotton** does well at absorbing the water from the skin, but the towel is then damp because it **retains the moisture**. A characteristic of **acrylic** is that it does not absorb moisture well. However, it is able to **wick moisture** from the skin...”*
- Socks recommended by Dr. Ryder: Balega, Bombas, Coolmax , Smart Wool and Drymax socks

Foot Care

ADA 2023 Standards of Care - Recommendations

- **12.28** Provide general **preventive foot self-care education** to *all people with diabetes*, including those with loss of protective sensation, on appropriate ways to examine their feet (palpation or visual inspection with an unbreakable mirror) for *daily surveillance* of early foot problems. B

ADA 2023 Standards of Care - **Patient Education**

- ***All people with diabetes*** (& their families), particularly those with high-risk conditions, should receive **general foot care education**, including appropriate management strategies.
- This education should be provided to
 - all *newly diagnosed* people with diabetes
 - all people with diabetes as part of an *annual* comprehensive examination
 - individuals with *high-risk* conditions at *every* visit

Evidence suggests that while patient and family education are important, the knowledge is *quickly forgotten* and ***needs to be reinforced regularly.***

ADA 2023 Standards of Care - **Patient Education**

- Patients' understanding of these issues and their physical ability to conduct proper foot surveillance and care should be assessed.
 - Those 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 with their care.*

Patient Self Management: Foot Care Checklist (Dos and Don'ts)

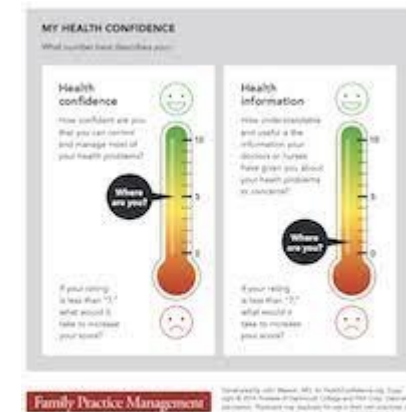
- Wear shoes or slippers at all times (Don't go barefoot)
 - Wear comfortable shoes with socks (not tight; watch seams)
 - Check inside shoe before putting it on
- Keep skin soft, not dry & cracked; use lotion on top & bottom
 - Keep feet dry (not wet), especially between toes, use powder
- Keep feet clean
 - do not soak feet → dry skin & peeling
- Use only lukewarm water (Don't use hot water – test with hand)
 - Do NOT use heating pads or hot water bottles
- Look at feet daily
- Cut toenails straight across
 - Do not use iodine, razors or medicines for corns

Foot Self-Care requires Patient Activation

- Help them understand their role in preventing injury/amputations
 - Gain framing vs scare tactics – *“You can help / your role is important”*
 - Consider *Patient Activation* assessment [My Health Confidence \(aafp.org\)](http://myhealthconfidence.org)
- Consider health literacy –
 - use demonstration and pictures – explain the “why” for do’s & don’ts
 - handing them a typed list for foot care not very effective –
 - can provide illustrated “list”
 - <https://diabeteseducation.novocare.com/content/dam/c4c-website/Foot%20Care%20for%20People%20with%20Diabetes.pdf>
 - http://main.diabetes.org/dorg/PDFs/foot_care_for_a_lifetime.pdf
 - <https://www.worlddiabetesfoundation.org/sites/default/files/Basic%20foot%20care%20guide.pdf>

“Who is responsible for your health?”

- You
- Your doctor (“I don’t know anything”)
- You & your doctor

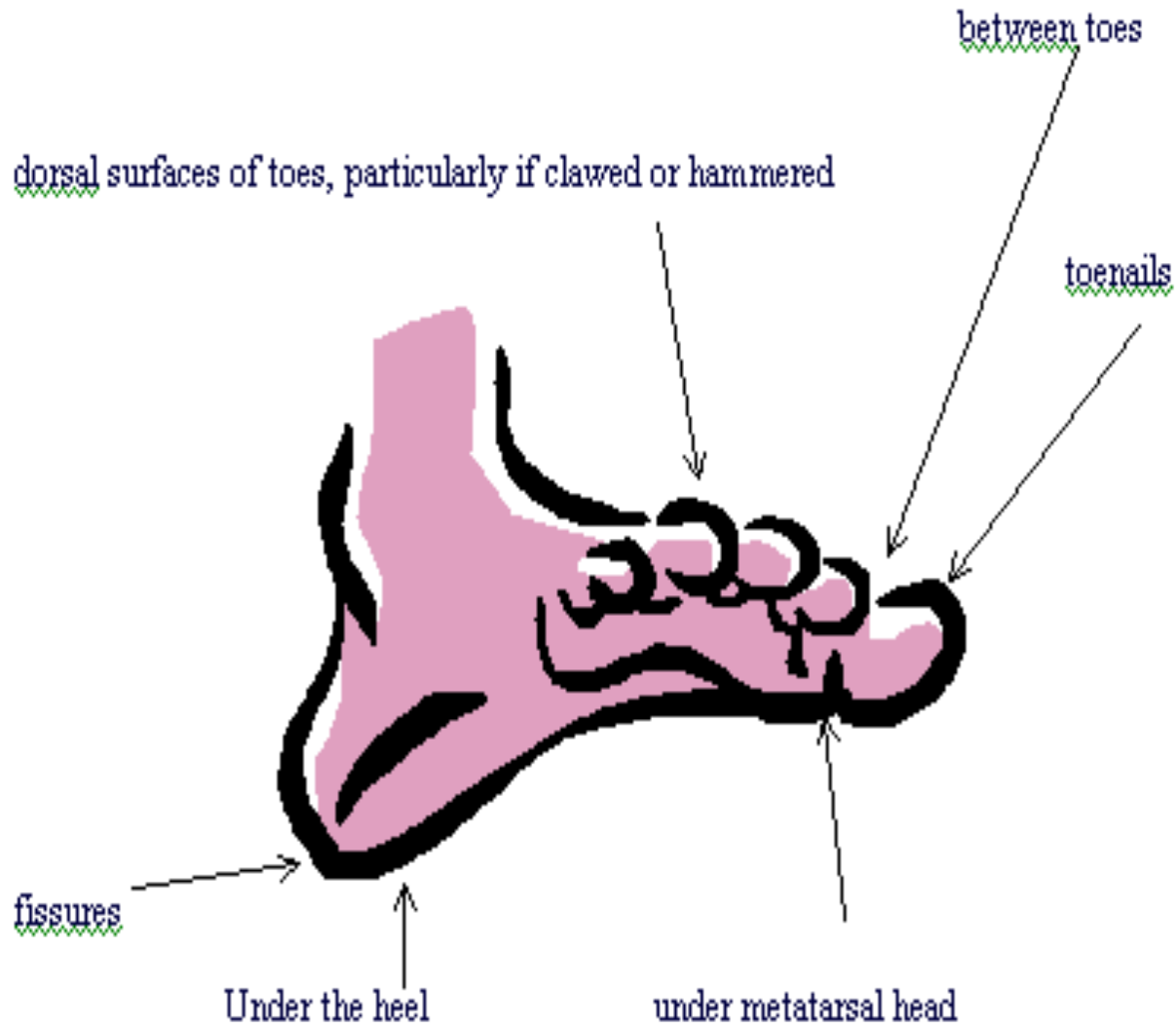


If you can not feel what you are stepping on
Do NOT go Barefoot



- Do not walk barefooted at home.
- This is to prevent injuring your feet when:
 - An object accidentally drops on your foot, or
 - You accidentally hit your foot against an object, or
 - You accidentally step on a sharp object
- Remember: Always wear protective cushioning slippers at home to protect your feet

Look at Your Feet EVERY Day



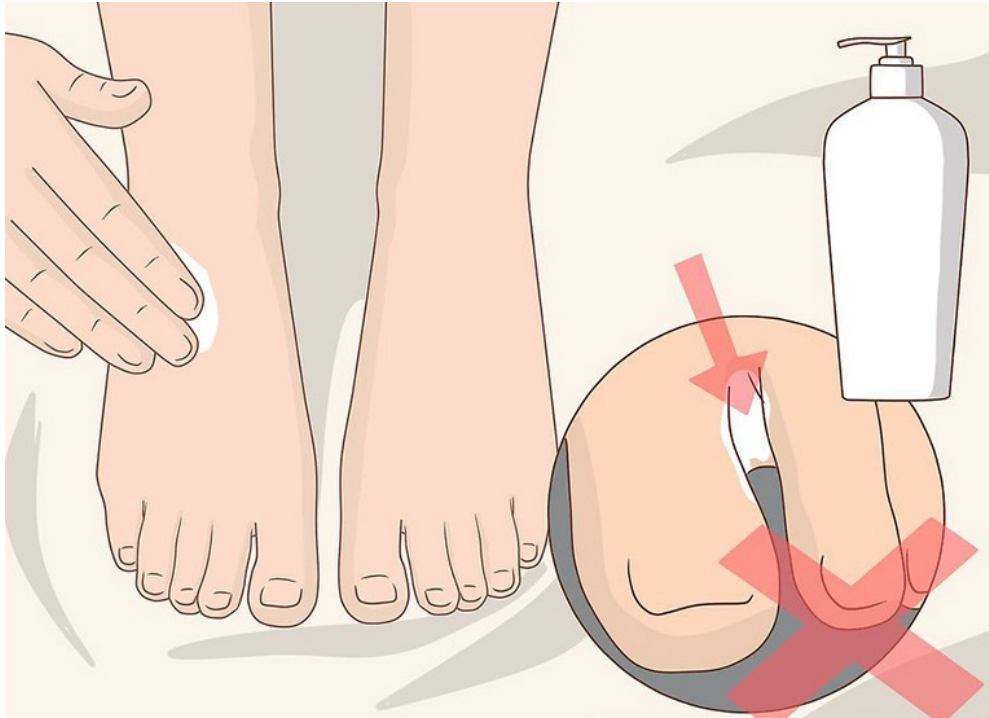
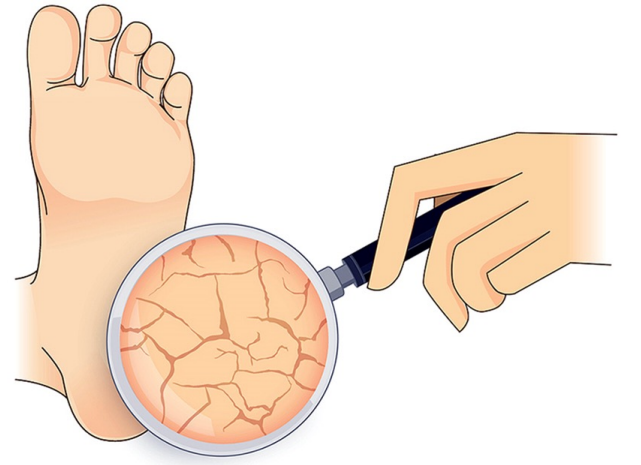
- Check feet daily for
 - Blisters
 - Hard skin
 - Wounds
 - Sudden changes in skin color
 - Cracks in skin
- Look out for signs of infection
 - Redness
 - Pus / Discharge
 - Warmth
 - Fevers / Chills
 - Swelling
 - Foul smell
 - Pain

Use a Mirror if needed to see Bottom of foot



If body build or mobility limitations don't allow patient to hold the mirror to inspect bottom of foot, can put mirror on floor and hold foot over it or have someone help

Keep Skin Soft - Prevent Dry, Cracked Skin



- Moisturize the skin at the top and bottom of your feet and lower leg
- *Avoid* moisturizing in between the toes as this can lead to fungal infection or wet skin at area.

Cut toenails straight across



smooth nail edges with a nail file



Check that there is nothing in your shoes before wearing them

- Before wearing your shoes, always check to ensure that there is nothing hidden in them (for example, sharp objects or small objects).
- Also, always wear socks or stockings with shoes to prevent blisters from forming on your feet due to skin being continuously rubbed against the shoe.



Patient Education on Footwear

- The selection of ***appropriate footwear and footwear behaviors*** at home should also be discussed (e.g., no walking barefoot, avoiding open-toed shoes or slippers).



Tight, restrictive shoes can cause long term damage.

Tips for buying shoes for patients with diabetes



1. When buying shoes, make sure they are comfortable from the start and have enough room for your toes.
2. Don't buy shoes with pointed toes or high heels. They put too much pressure on your toes. The heel should be no more than $\frac{3}{4}$ inch high.
3. Have your foot measured each time you buy shoes. Stand during the measurement.
4. Shop late in the day, when your feet are largest.
5. Know that size varies depending on the manufacturer. Always try more than one size to find the best fit.
6. Try on both shoes and walk around to check comfort. Base fit on the larger foot.
7. Allow at least a thumbnail (about $\frac{1}{2}$ to $\frac{3}{4}$ inch) of space at the end of your longest toe in the shoes you select. Make sure you can wiggle your toes.
8. Try the shoes on with the type of socks you will wear.
9. Choose leather uppers, a stiff heel, inside cushioning, and flexibility for the ball of the foot.
10. Select the best material. The outer sole should be made of soft material with laces or Velcro tabs.
11. For serious foot problems, buy a shoe that is specially molded to your foot.

It's always a good idea to have a healthcare professional check the fit of your shoes.

<https://www.diabetesselfmanagement.com/managing-diabetes/complications-prevention/how-to-choose-footwear/>

[Assessing footwear in patients with diabetes - Wound Care Advisor](#)



<https://jfootankleres.biomedcentral.com/articles/10.1186/s13047-017-0244-z>
Diabetic Foot Australia guideline on footwear for people with diabetes

Teach Foot Care

- At time of annual foot exam for patients with or without neuropathy
- For patients with neuropathy, look at feet every visit (inspect for lesions) & re-enforce foot care
 - Just knowing you will look helps re-enforce
- Provide simple handout & do teach back
 - “I’m not sure if I explained it clearly, in your own words can you tell me what you are supposed to do to take care of your feet”
- Ask patients to call if they note raw spots, red areas, etc.
- New data shows low-cost efforts reduce amputations
 - *“Early recognition of at-risk feet, pre-ulcerative lesions, and prompt treatment of ulcerations and other lower-extremity complications can delay or prevent adverse outcomes.”*

Post-question - which options are correct

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Extra Slides, Resources & References

SUMMARY – Foot Care

- Goal is to identify high risk feet – prevent complications (ulcers & amputations) and improve patient outcomes
- Peripheral sensory neuropathy is the factor most associated with foot ulcers
- ADA recommends an annual comprehensive foot exam & foot care education for all people with diabetes
- People with diabetes with high-risk feet need more frequent inspection of their feet & repeat education to ensure they understand the need for attention to foot care
- Footwear assessment should be part of the foot exam & patient's foot care education
- Teaching foot care requires engaging patients/caregivers and ensuring they understand (use of pictures, demonstration) and addressing patient activation

Importance of shoes that fit well

- It's important to have shoes that fit well and allow pressure to be distributed evenly over the foot.
- Your footwear should be long and wide enough but not too loose either.
 - If your shoes are too short, there's a greater risk of developing problems including hammer toes, blisters, corns and damaged nails. Hammer toes can occur if your toes are forced to bend inside your shoes, which, over time, can lead to tendons and muscles in the foot being affected and this can lead to deformation of the foot.
 - Corns and damaged toes can occur if your toes do not have some room for movement and therefore rub against the end of your shoe. Blisters can occur either on or around the toes or at the heel if shoes are too tight.
 - If shoes are not wide enough, your feet can be pressed and rub against the sides of the shoe which can lead to corns, calluses, blisters or bunions forming.
 - Any form of damage or change to the skin or shape of the foot can lead to loss of surface skin and wounds and foot ulcers forming.
- Note that if you have neuropathy, you may not be able to feel whether your shoes are uncomfortable or if they are causing damage. It's important therefore that you check your feet daily for any signs of damages or change.

Importance of shoes that fit well

- Getting the right fit
 - To ensure you get shoes that fit well, it's recommended to have your feet measured and the shoes properly fitted.
 - It's better to visit a shoe shop and try the shoes on before you buy.
 - Try shoes on both feet. Don't be tempted to just try on one shoe as most people's feet tend to be at least slightly differently sized.
 - It's advisable to wear new shoes at home for relatively short periods of time, say 20 minutes.
 - Check that your feet do not show any signs of poor fitting such as redness or any marks on your skin. If your shoes show signs of not being the right shape or fit, and you have not worn your shoes outside, you may be able to return the shoes and pick a better fitting pair.
 - There is specialized footwear available such as extra wide or extra deep footwear and prescription footwear to deal with certain foot care needs.

Picking a good shoe

- Natural materials, such as leather, tend to be the best material for footwear as it provides good support and reduces sweating.
- It is advisable to avoid wearing high heeled shoes where possible as this can cause parts of the foot to withstand an inappropriately high amount of pressure.
- Pick shoes which match the shape of your foot and avoid shoes that do not, such as shoes with pointed ends.
- Checking your feet - It's important to check your feet daily for any signs of wear or rubbing caused by your shoes. It's also important to look for any other signs of damage or changes in appearance of your feet at the same time.
- Note that if you are buying specialist footwear, such as extra deep or extra wide footwear, by mail order or from the internet, it's important that the shoes fit well. As with non-specialist footwear, it's useful to try the shoes on for short periods in the home and/or check the fit with a podiatrist before beginning to wear the shoes outside.
- This way, if there are any problems with the footwear, you may be able to return them.

Picking a good shoe

- Orthoses (shoe inserts) - Shoe inserts are cushioned in soles which help to spread out and relieve pressure on the base of the foot. Shoe inserts may use foam or gel to reduce pressure on the sole of the foot.
- Extra deep shoes - Extra deep shoes provide more space within the shoe and are a good pick if you experience red marks or signs of pressing on the top of your feet.
- Extra deep shoes may also be useful if you are using shoe inserts, which therefore slightly raise the level of your feet inside your shoes.
- Extra wide footwear - Extra wide shoes may be needed for a number of reasons including if you experience swollen feet, bunions or have naturally wider feet.
- A good number of shoe suppliers provide wide fitting shoes these days, allowing you to pick wider fitting shoes for sports, formal or casual wear.
- Prescription footwear - If you have specific footwear needs, such as need specialist footwear to enable healing to take place, you may be provided with footwear on prescription.

Videos from Global Health Media

- [Choosing well-fitting shoes in the market](#)
- [Choosing well-fitting shoes in the shoe store.](#)
- [The diabetic foot exam](#)
- [Taking care of your feet](#)

ADA & ACFAS resources (for patients)

- http://main.diabetes.org/dorg/PDFs/foot_care_for_a_lifetime.pdf
- <https://diabetes.org/healthy-living/seniors/foot-care-tips>
- <https://diabetes.org/diabetes/foot-complications>
- Poster(the PDF)
<https://diabetesjournals.org/clinical/article/39/2/225/40621/Taking-Care-of-Your-Feet>
- From American College of Foot and Ankle Surgeons
<https://www.foothealthfacts.org/conditions/diabetic-foot-care-guidelines>

CDC (for patients) & Indian HS Resources

- [Diabetes and Your Feet - CDC](#)
 - <https://www.cdc.gov/library/features/healthy-feet>
 - <https://www.cdc.gov/diabetes/library/factsheets/diabetes-and-healthy-feet.html>
- <https://www.ihs.gov/sdpi/sdpi-community-directed/diabetes-best-practices/foot-exam/>
-

Foot care handouts with pictures for patients

- https://www.google.com/search?q=Foot+care+handouts&rlz=1C1GCEA_enUS1041US1041&oq=Foot+care+handouts+&aqs=chrome..69i57j0i22i30l6j0i390l3.10173j0j7&sourceid=chrome&ie=UTF-8
- http://main.diabetes.org/dorg/PDFs/foot_care_for_a_lifetime.pdf
- <https://www.worlddiabetesfoundation.org/sites/default/files/Basic%20foot%20care%20guide.pdf>

- <https://www.diabetesselfmanagement.com/managing-diabetes/complications-prevention/how-to-choose-footwear/>

<https://www.healthxchange.sg/diabetes/essential-guide-diabetes/diabetes-foot-care-how-choose-shoes-good-support-fit>

ADA 2023 Standards of Care

- [12. Retinopathy, Neuropathy, and Foot Care: Standards of Care in Diabetes—2023 | Diabetes Care | American Diabetes Association \(diabetesjournals.org\)](#)
- <https://diabetesjournals.org/spectrum/article/14/2/59/716/Sockwear-Recommendations-for-People-With-Diabetes>
- Simple approach to patient activation [Health Confidence: A Simple, Essential Measure for Patient Engagement and Better Practice | AAFP](#)

- <https://blog.wcei.net/diabetic-toenails-watch-for-change>
- <https://blog.wcei.net/diabetic-toenails-top-tips-for-proper-trimming>
- <https://blog.wcei.net/dry-skin-alert-foot-xerosis-in-diabetic-patients>

- [How Diabetes Affects the Feet](#)
- [Diabetes Foot Care: 10 Steps to Healthy Feet](#)
- [Diabetes Foot Care: How to Avoid Foot Complications](#)
- [Diabetes Foot Care: What to Do During an Emergency](#)

“A thorough examination of the feet should be performed annually in all people with diabetes and more frequently in at-risk individuals”

Table 12.1: International Working Group on the Diabetic Foot risk stratification system and corresponding foot screening frequency

Category	Ulcer risk	Characteristics	Examination frequency*
0	Very low	No LOPS and No PAD	Annually
1	Low	LOPS or PAD	Every 6–12 months
2	Moderate	LOPS + PAD, or LOPS + foot deformity, or PAD + foot deformity	Every 3–6 months
3	High	LOPS or PAD and one or more of the following: <ul style="list-style-type: none"> • History of foot ulcer • Amputation (minor or major) • End-stage renal disease 	Every 1–3 months

Adapted with permission from Schaper et al.

LOPS, loss of protective sensation; PAD, peripheral artery disease.

*Examination frequency suggestions are based on expert opinion and patient-centered requirements