STEP 10:

Use Protective Footwear

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Step 10: Use Protective Footwear

Introduction

Basic footwear keeps the feet clean, comfortable, cushioned and protected. Wearing footwear prevents contact with dirt, germs, hot/cold and rough surfaces, and foreign debris (chemicals, sand, rocks, glass, nails, etc.). Footwear also protects the feet from injuries. Pain and areas of pressure can be reduced when appropriate footwear and accommodative insoles are used. Footwear should be comfortable and adjust for swelling, loss of motion and unusual shapes of the toes and feet.

People without feeling in their feet are often unaware of objects inside the footwear or foot injuries because they can't feel pain. Therefore, people without feeling in their feet need to check daily their feet and the inside of the footwear. Good foot care combines the wearing of appropriate footwear with the practice of good skin and nail care of the feet. Identifying early signs of skin damage (redness, warmth, callus, crack, blister, small wounds) and taking immediate action to rest, relieve pressure and/or go for help will help injured areas or wounds heal faster without complications.

It is important to learn how to select footwear. Footwear needs to be periodically cleaned, repaired and replaced. The following are considerations when selecting footwear:

- Match the footwear to the specific foot needs
- Fit the footwear to the foot
- Know what footwear to avoid
- Identify local footwear that is appropriate, affordable and, as much as possible, esthetically pleasing to the person using the footwear

Sometimes the person will need to be referred for custom footwear, assistive technology to facilitate walking or surgery. People who have or have had a history of a wound on the sole of the foot and/or have unusually shaped toes or feet may need to be referred for custom-made shoes and insoles or orthotics. Persons with a drop foot can use an assistive device to help them lift the toes during walking and protect their foot from injury. Referral for surgical correction of the foot may also be needed. Remember that using properly fitting footwear is a key element of good foot care and is effective in preventing disease, injury and infection.

Goals

Select and wear footwear that protects the feet and meets specific foot needs.

Repair and replace worn footwear and special footwear when needed.

Key Messages

1. Using footwear can reduce infections and injuries.
2. At-risk feet with sensory loss need good daily self-care practices along with adequate protective footwear.
3. Unusual foot shapes may require custom-made and fit footwear.

References

- Birke, J., Foto, J., Deepak, S., & Watson, J. (1994). Measurement of pressure walking in footwear used in leprosy. *Leprosy Review, 65*(3), 262-271.
- Brand, P. (1988). Repetitive stress in the development of diabetic foot ulcers. In M. E. Levin & L. W. O'Neal (Eds.), *The Diabetic Foot* (pp. 83-91). St. Louis: Mosby/Elsevier.
- Bus, S., Valk, G., van Deursen, R., Armstrong, D., Caravaggi, C., Hlavacek, P., Bakker, K., Cavanagh, P. (2008). The effectiveness of footwear and offloading interventions to prevent and heal foot ulcers and reduce plantar pressure in diabetes: A systematic review. *Diabetes/Metabolism Research and Reviews,* May-Jun; 24 Suppl. 1:S16280.
- Cross, H. (2007) The prevention of disability for people affected by leprosy: Whose attitude needs to change? *Leprosy Review 78*, 321-329.
- Cross, H., Sane, S., Dey, A., & Kulkarni, V. N. (1995). The efficiency of podiatric orthoses as an adjunct to the treatment of plantar ulceration in leprosy. *Leprosy Review, 66*(2), 144-157.
- Davey, G., Tekola, F., Newport, M. (2007). Podoconiosis: Non-infectious geochemical elephantiasis. *Royal Society of Tropical Medicine and Hygiene, 101*(12), 1175-1180.
- *https://shoes4schools*
- Inlow, S. (2011). A 60-second foot exam for people with diabetes. *Wound Care Canada, 2(*2), 10-11.
- Janisse, D. (1995). Prescription insoles and footwear. *Clinics in Podiatric Medicine and Surgery, 12(*1), 41-61.
- *Lymphatic filariasis: Managing morbidity and preventing disability.* (2013). Global Programme to Eliminate Lymphatic Filariasis. *http://apps.who.int/iris/bitstream/10665/85347/1/9789241505291_eng.pdf*
- Manual de adaptações de palmilhas e calçados/Série A. Normas e Manuais Téncicos Cadernos de prevenção e reabilitação em hanseníase; n. 5, MS, SVSDVE. 2ed. (2008) Brasilia. *http://bvsms.saude.gov.br/bvs/publicacoes/manual_adaptacoes_palminha_calcados.pdf*
- Mascarini-Serra, L. Prevention of soil-transmitted helminth infection. *Journal of Global Infectious Diseases, 3*(2), 175-182.
- Owings, T., Woerner, J., Frampton, J., Cavanagh, P., Botek, G. (2008). Custom therapeutic insoles based on both foot shape and plantar pressure measurement provide enhanced pressure relief. *Diabetes Care, 31*(5), 839-844.
- Root, M., Orien, W., & Weed, J. (1977). *Normal and abnormal function of the foot (Vol. 2).* Los Angeles: Clinical Biomechanics Corp.
- Taye, B., Alemayehu, B., Birhanu, A., Desta, K., Addisu, S., Petros, B., et al. (2013). Podoconiosis and soil-transmitted helminthes (STHs): Double burden of neglected tropical diseases in Wolaita Zone, rural southern Ethiopia. *PLoS Neglected Tropical Diseases, 3*(2), 175-182.

Step 10: Use Protective Footwear

A Quick Supervisory Checklist for Step 10

Use Footwear	Yes	No	Not Obs	Observations & Recommendations
1. Checks to see if adequate footwear is used for disease and injury prevention				
2. Identifies person with sensory loss to sole of feet who is at risk of injury				
3. Assures footwear is repaired and adapted as needed				
Teaches affected person and caregiver how to:				
4. Select appropriate footwear that is available at the local level				
5. Inspect and clean footwear daily as part of daily foot self-care practices				

Guidelines for Teaching the Module

Health Coach/Facilitator should use the local language and ensure that all terms are found in the local language.

Estimated time: 2–3 hours

Learning Objectives

At the end of the module, participants will be able to:

1. Describe the benefits of using footwear and when footwear should be used
2. Demonstrate how to check fit of footwear and select properly fitting footwear
3. Identify which feet are at risk of injury and in need of footwear
4. Identify which feet need to be referred for assistive devices and/or custom-made footwear and insoles

List of Teaching Activities and Learning Materials

Activity 1

Who Needs Footwear?

Activity 2

Does the Shoe Fit? Sandals, Shoes, Modifications?

Activity 3

Heel-to-Toe Walk or Foot Drop?

Handouts

- Annex 3: Individual Impairment Recording Form (IIRF)
- 10.1 Footwear Indications
- 10.2 Selecting the Correct Footwear Size
- 10.3 Dorsiflexion Assist (Dynamic Elastic) Strap

Activity 1: Who Needs Footwear?

Handouts

- Annex 3: Individual Impairment Recording Form (IIRF)
- 10.1 Footwear Indications

Equipment & Materials

- Flip chart stand and paper
- 4–6 colored markers
- 20 pages of A4 paper
- Tape

Instructions for Teaching the Activity

Room Arrangement: Participants sit in a semicircle and in four small groups.

1. **Health Coach writes on the flip chart the table below:**

NTD / Disease / Other	Needs Footwear: Yes / No	If Yes, Why is Footwear Needed?
Buruli Ulcer		
Diabetes		
Leishmaniasis		
Leprosy		
Lymphatic Filariasis		
Podoconiosis		
Social Transmitted Helminths (STH)		
Trachoma		
Yaws		
Other:		
Other:		
Other:		

2. **Health Coach divides the group into four small groups and gives each group five pages of A4 size blank paper. All groups are given 15 minutes to list and justify who needs footwear and why.**

3. **While still in small groups Health Coach distributes *Annex 3: Individual Impairment Recording Form (IIRF)*. Each group is given an additional 10 minutes to decide which "Yes" response would indicate a need for footwear and/or possible modifications with footwear. Each group lists the "Yes" responses.**

4. **Health Coach requests all groups to return to a semicircle and asks for a volunteer to write responses, when presented, on the flip chart.**

5. **All groups return to a semicircle and each NTD/Disease/Other is identified and each group's response is discussed and recorded on the large flip chart.**

6. **Health Coach distributes handout *10.1 Footwear Indications* and completes any missing information or clarifies as needed.**

7. **The group discusses the "Yes" responses from the IIRF and lists those indicating a need for footwear or possible need for footwear modifications.**
   Some conditions: Complaints of foot numbness/tingling, findings of sensory loss, swelling, cold feet, decreased movement, excessive callus, clawing of toes, pain, wounds, injuries, etc.

8. **Health Coach reinforces the importance of identifying "risks" and taking action to ensure person affected and family understand why protective footwear is needed.**

Step 10: Use Protective Footwear

Activity 2: Does the Shoe Fit? Sandals, Shoes, Modifications?

Handouts

- 10.2 Selecting the Correct Footwear Size

Equipment & Materials

- Flip chart stand and paper
- 4–6 colored markers
- 2 pieces of A4 paper for each participant
- Pen/Pencil for each participant

Instructions for Teaching the Activity

Room Arrangement: Participants sit in a semicircle and then work in pairs.

1. **All participants are asked to stand in a large circle and look at each other's footwear. The Health Coach asks the group to choose those participants who they believe have footwear that fits.**

2. **Participants return to their seats in the semicircle and Health Coach distributes two pieces of A4 paper to each participant.**

3. **Each participant is asked to remove their shoes and to trace around their feet while sitting and then while standing. They do one foot at a time without removing their foot from the paper.**

4. **After all participants have traced both feet when sitting and standing, the Health Coach asks if the foot is the same size when sitting as when standing?**

5. **Health Coach asks participants to place their footwear on top of their foot tracing and to check if any part of the foot is outside the footwear area.**

6. **Participants identify which participants have tracings in which the feet are within the area of their shoe.**

7. **Health Coach distributes handout *10.2: Selecting the Correct Footwear Size* and reviews with participants.**

8. **Health Coach asks the group to divide into pairs and to evaluate the footwear of their partner following the instructions on handout *10.2* and to determine if adequate or not.**

9. **Each pair presents their finding to the group.**

10. **The group chooses which participant is using the best footwear based on criteria presented in the handout.**

Activity 3: Heel-to-Toe Walk or Foot Drop?

Handouts

- 10.3 Dorsiflexion Assist (Dynamic Elastic) Strap

Equipment & Materials

- Example of dorsiflexion assist strap
- Examples of insole material of different density (hardness) and thickness

Instructions for Teaching the Activity

Room Arrangement: Participants sit in a semicircle.

1. **Health Coach walks across the room demonstrating a heel-to-toe walking pattern and then a toe-to-heel (foot drop) walking pattern**

2. **Health Coach asks if any participants have seen someone walk with this toe-to-heel walking pattern and what caused this problem.**

3. **Health Coach discusses toe and foot weakness or paralysis in leprosy and how it can lead to a "foot drop." Health Coach asks participants the cause of this weakness and what should be done. (i.e., neuritis, treatment of reaction/neuritis is acute, strengthening of weak muscles, stretching, self-care, footwear modifications, surgery).**

4. **Health Coach asks for a volunteer who has lace-up shoes, preferably tennis shoes. The Health Coach places the dorsiflexion assist strap around the ankle and then the elastic hook strap is attached to the end of the shoelaces to pull the foot up.**

5. **Health Coach asks participant to push down and then relax so that participants can see the dynamic action of the strap to pull the toes and foot up.**

6. **Health Coach asks participant to walk across the floor demonstrating the action of the dorsiflexion assist strap.**

7. **Health Coach clarifies that this particular strap does not work for people with a fixed contracture or with a foot pulled down by spasticity resulting from a stroke or cerebral palsy.**

8. **Health Coach demonstrates different insoles of varying density (hardness) and thickness and describes how to choose and fit to the footwear.**

Conclusion

In conclusion, the Health Coach summarizes key messages and clarifies any misconceptions.

Handout 10.1: Footwear Indications

Disease or Foot Situation	Type of Footwear Needed	Other Care
Soil transmitted helminths (STH)	Use proper fitting footwear (sandals and/or shoes) found commercially or at the market	• Good food washing, foot hygiene and waste disposal
Persons with leprosy/diabetes/ lymphatic filariasis with normal foot structure and sensation		• Self-care and daily checks of feet and footwear • Repair and replace footwear as needed
Podoconiosis	Socks and closed shoes	• Good foot hygiene after working or playing in the environment
Persons with ***sensory loss*** to sole of foot (leprosy, diabetes, or other neuropathies such as toxic or alcohol)	Adequate fitting extra depth footwear which allows for soft .05–1cm EVA insert and has a firm, thicker outer sole to protect against sharp objects (thorns, glass)	• Self-care and daily checks of feet and footwear • Repair and replace footwear as needed
Persons with unusually sized or shaped feet with high-pressure areas, with or without sensory loss	Custom-made insoles and footwear to fit the foot	• Self-care and daily checks of feet and footwear • Repair and replace footwear as needed
Foot drop from weakness or paralysis ***but not from spasticity***	Dynamic dorsiflexion assist strap	• Daily checks of feet and use of assist strap
Persons with ***sensory loss*** to sole of foot (leprosy, diabetes, or other neuropathies such as toxic or alcohol ***with injury/ulcer***)	Adequate-fitting, extra-depth footwear which allows for custom-made insert and has a firm, thicker outer sole to protect against thorns, glass	• Contact HCW • Rest and wound care • Self-care and daily checks of feet and footwear • Repair and replace footwear as needed • Refer to surgeon for debridement, if needed
Work puts feet at risk of injury	Properly fitting shoes with protection	• Periodic cleaning, repair and replacement as needed

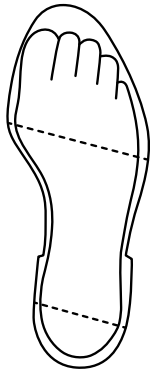
Step 10: Use Protective Footwear

Handout 10.2: Selecting the Correct Footwear Size

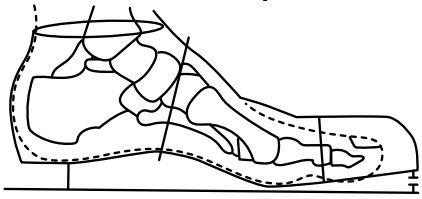
To choose the correct footwear, check the following while standing:

- Distance from heel to end of large toe (or second toe if longer) + 1cm
- Distance from heel to end of fifth toe
- Distance from heel to first metatarsal head
- Distance from heel to fifth metatarsal head
- Width around foot at first and fifth metatarsal heads
- Width at heel
- Height (depth) from arch to top dorsal part of foot
- Height (depth) from bottom of foot to top of toes

Footwear Length and Width



Footwear Depth

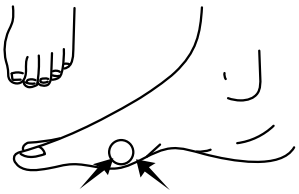


Shoe/Sandal Fit

"Fit the shoe to the foot, not the foot to the shoe." (Dennis Janisse)

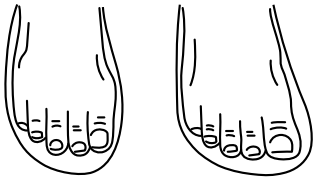
1. **The widest part of the foot should fit the widest part of the shoe**

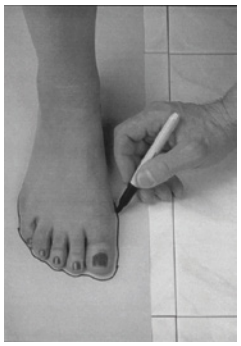
   WHY: The widest part of the shoe should also be the "break" point of the shoe. The shoe should bend in the same position as the foot.

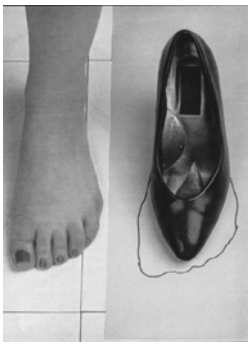


2. **The shape of the shoe must fit the shape of the foot**

   FORE FOOT TEST: While standing, draw around the foot and then lay the shoe on top of the image drawn. Does the fore foot fit within the shoe?







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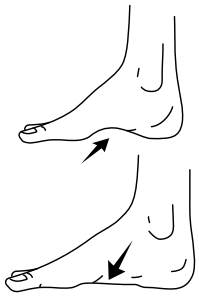
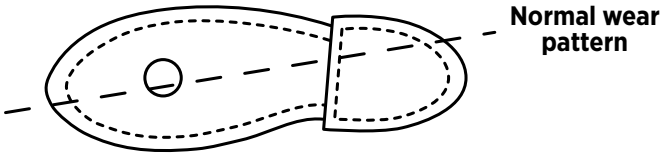
Handout 10.2: Selecting the Correct Footwear Size (continued)

3. Ask person to stand and inspect for: • Correct length and width • Comfort • Heel fit • Satisfactory closures **Observation:** Foot will elongate during weight bearing from about 0.6cm–1cm. Some heel slip is normal but not always tolerated.	
4. Visual inspection of footwear : • Are there existing modifications of the footwear or insoles or orthotics? • Does the user have good sensation or do they have a loss of foot sensation? • What is the current fit of the shoe or sandal?	
• Check sole wear	• Wear should be evenly distributed • Firm and thick enough to prevent thorns or other sharp objects from penetrating the shoe
• Heel wear pattern should show wear distribution on the outside of the heel	
• Vamp (front part of footwear)	• Should fit snug, not too tight over the foot and give adequate toe room • When insoles or orthotics added, is the room still adequate?
• Arch	• Hugs arch area and ball of the foot • Fits at the widest part of the footwear
• Lacing or closures	• Too close or too far apart • Person needs easy opening and closure
• Inside of the shoe	• Should show normal wear; lining intact, no odor, stains from wounds or excessive sweating • Are nails, rough stitching or other things which can injure the foot found inside?
• Check insoles	• Are protective/accommodative insoles needed? • Are soft insoles of 0.06-1cm found in footwear of people with sensory loss? • Is there adequate room inside the shoe to insert the insole?
• Check the foot for injury or pressure areas (redness, callus) caused by footwear	• No rocks, nails or rough stitching should be felt • Lacing and closures not pulled too tight • Foot bandages do not make footwear too tight • Special accommodative insoles may be needed along with the footwear to improve foot function and decrease areas of pressure

Step 10: Use Protective Footwear

Handout 10.3: Dorsiflexion Assist (Dynamic Elastic) Strap

(Elastic attached to lift foot and toes up when the foot dorsiflexors are weak or paralyzed)

Image: Leather/stiff cloth with EVA soft protective backing with Velcro straps. Hook attached to elastic strap/elastic tire tubing strap.

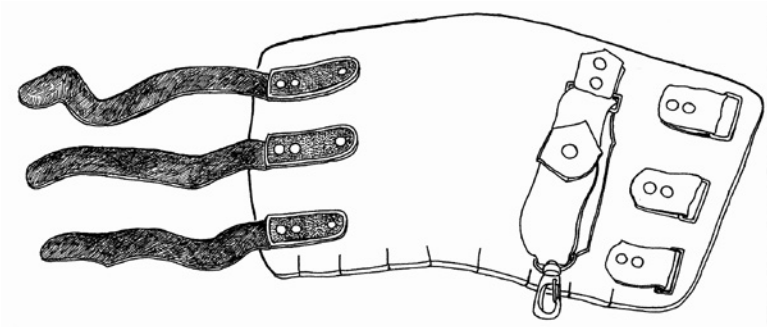
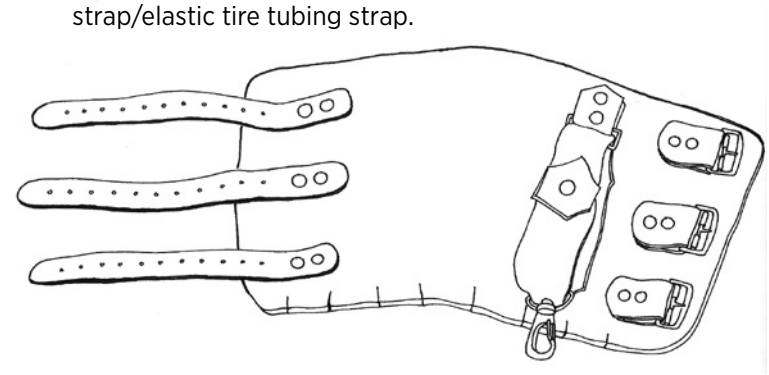


Image: Leather/stiff cloth with EVA soft protective backing with leather straps. Hook attached to elastic strap/elastic tire tubing strap.



Note: Does not effectively work for a foot drop with contractures or spasticity caused by a stroke, cerebral palsy or other.