

WHO's skin mobile application as an educational tool for frontline health workers

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Key words: World Health Organization; skin NTDs; common skin diseases; app; education; front line health workers

The World Health Organization (WHO) has released an enhanced version of its Skin NTDs App, a valuable tool designed to assist frontline health workers in diagnosing and managing skin-related neglected tropical diseases (skin NTDs) and common skin diseases. The updated app is now available free of charge on both Android and iOS-Apple devices.

To ensure a smooth installation, users may need to delete the previous version from their devices.

This exciting development is the result of a collaborative effort between WHO and Until No Leprosy Remains (NLR). NLR generously transferred the content of its SkinApp, which encompassed information on skin NTDs, 24 common skin diseases and some HIV-related skin conditions, to the WHO Skin NTDs App. This collaboration has resulted

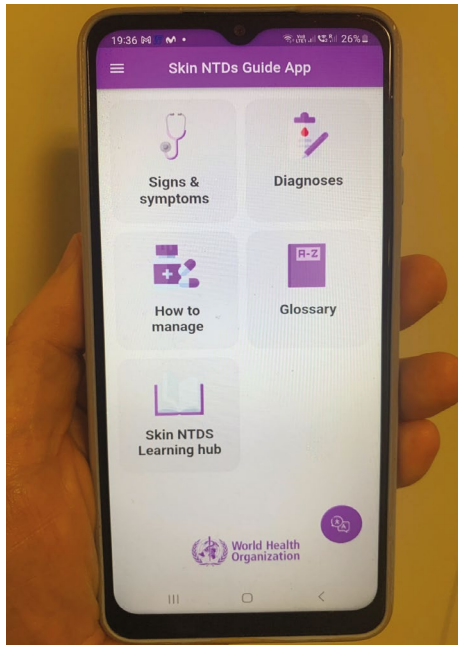


Fig 1. WHO Skin NTDs App homepage.

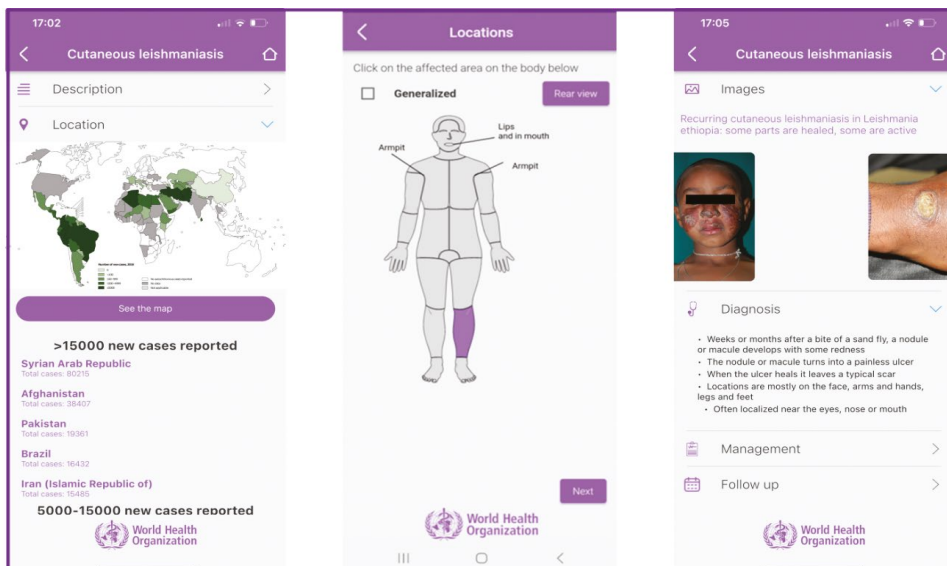


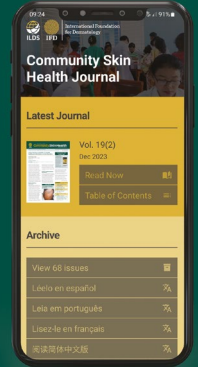
Fig 2. Examples of screenshots from Skin NTDs App.

Download the App!

The CSH App is available on both iOS and Android phones!



SCAN THE QR CODE to download the App on your phone.



in a comprehensive and user-friendly resource that aligns with the latest WHO recommendations.

Key features of the updated app include:

- **Two offline algorithms:** the app operates offline and employs algorithms to assist frontline health workers in making accurate diagnoses and treatment decisions. One algorithm specifically addresses 12 skin NTDs and another one includes 24 common skin diseases

Continued overleaf...

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- **Multilingual support:** the app is available in English and French, with plans to translate it into other languages, such as Kinyarwanda, Portuguese and Spanish, to better serve diverse communities.
- **Learning resources:** the app includes a 'Skin NTDs Learning' section, offering valuable training materials. This content is derived from the WHO manual 'Recognizing neglected tropical diseases through changes on the skin: a training guide for front-line health workers'.¹
- **Filtering by country:** a unique feature of the app is the 'Global Index'. This section shows which skin NTDs are endemic in each country and information has been embedded in the diagnosis tool to fine tune the list of diseases suspected in each case.

WHO encourages all users to download the app, to share it within their networks and to provide valuable feedback for ongoing improvements. Together, we can empower frontline health workers with the knowledge and resources needed to combat skin NTDs effectively.

Please send comments and suggestions to postigoj@who.int



Skin NTDs App on the App Store (apple.com)



Skin NTDs App on Google Play (play.google.com)

Reference

1. World Health Organization. Recognizing neglected tropical diseases through changes on the skin: a training guide for front-line health workers. Available at: <https://apps.who.int/iris/handle/10665/272723> (last accessed 14 March 2024).

Journal Club

Integrative medicine treatment of lymphatic filariasis

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Conflict of interests: Prof. T. Ryan (co-author of featured paper) is an Editorial Board member of *Community Skin Health*

Key words: lymphatic filariasis; lymphoedema; integrative medicine

Narahari SR, Aggithaya MC, Ryan TJ *et al.* Self-care treatment for lymphoedema of lymphatic filariasis using integrative medicine. *Br J Dermatol* 2023; **190**:94-104.

Lymphatic filariasis (LF) is a parasitic infection, which is spread by mosquito. LF is a common cause of lymphoedema in low- and middle-income countries. In its most extreme form, LF can cause massive lymphoedema, known as filarial elephantiasis. LF is suspected in acquired lymphoedema in filaria endemic areas and commonly presents with lower leg and/or genital swelling for more than 3 months. One of the main complications of the disease is recurrent cellulitis, which can be troublesome to manage and contributes significantly to morbidity. Skin manifestations of LF have been shown to impair, disable and disfigure, and causes stigma, discrimination and socioeconomic problems. The World Health Organization (WHO) global programme to eliminate LF aims to reduce transmission of the disease and improve morbidity from LF through annual mass drug administration and care to reduce complications of the disease.

Treatments available worldwide for LF are limited. In high-income countries surgical management, such as lymphaticovenous anastomosis, is commonly practiced. However, this is not financially feasible in many countries where LF is endemic. The Institute of Applied Dermatology in Kerala, India, developed an integrative medicine treatment for management of LF focusing on low-cost interventions using

widely available resources.^{1,2} The approach uses a combination of Indian medicine, Ayurveda, combined with yoga, compression, antibiotics and antifungal treatments.

Narahari *et al.*'s recent paper featured here retrospectively assessed the benefits of a community-based integrative medicine treatment for LF. Patients underwent a community programme of treatment and education around lifelong self-care methods to manage LF, provided by nurse counsellors. The self-care methods recommended included skin washing with soap and water, phanta soaking, yoga and breathing exercises, before and after Indian manual lymph drainage and compression therapy (Figs. 1- 4). Nurses also advised on antibiotics, antifungals and topical steroid for bacterial entry points. Many of the interventions employed aimed to improve skin integrity and in turn reduce the risk of cellulitis and the associated morbidity. However, patients also had focus group discussions around help to improve quality of life, especially focusing on social isolation. After the 2-week intensive phase of in-person sessions, the nurses gave virtual follow up every 2 weeks to improve adherence to self-care techniques.

Limb volume was assessed with the volume displacement technique and circumference measurement. Limb volume was reduced by a mean of 24.5% during the intensive phase.



Fig 1. (a) Girth measurement of lymphoedematous leg using a measuring tape; (b) measurement of volume of limb using water displacement method ('gold' standard in lymphology). (Courtesy of Prof. T. Ryan).

Bacterial entry points such as ulcers, excoriations, eczema and intertrigo were found to be associated with cellulitis and increased limb volume. The integrative medicine approach dramatically reduced the incidence of the bacterial entry points and cellulitis, and improved quality of life.

The reduction of limb volume in subsequent follow-up was minimal compared with the intensive phase; 2.3% between



PHANTA SOAKING	
CHURNA	DOSHA
Yastimadhu (<i>Glyceriza glabra</i>)	Kapha
Manjista (<i>Rubia cordifolia</i>)	Vata
Sariva	Pitta

Manjista

Thriphala

Sariva

Yastimadhu

Fig 2. Soaking with herbal solution (Phanta soaks). (Courtesy of Prof. T. Ryan).



Fig 3. Checking for bacteria entry points. (Courtesy of Prof. T. Ryan).



Fig 4. Patient with compression bandaging performing yoga exercises. (Courtesy of Prof. T. Ryan).

the first and second follow-up. Furthermore, there was a significant difference in limb volume between those with good and poor adherence to self-care measures. These findings emphasize the importance of counselling to improve patient engagement and adherence to self-care measures.

The authors found that the direct cost of the therapy was dependent on limb size and ranged from US\$75.10 to US\$110.70 for the intensive phase. However, they were unable to calculate indirect costs for the patients, which may have contributed to the wide variability in length of follow-up.

This study demonstrated that this integrative medicine approach is an effective, low-cost way of managing LF. Interventions to improve adherence to self-care techniques are likely to be the key to this approach having long-lasting results. If the approach can be integrated into healthcare settings in endemic areas, we can hope to move closer to achieving the WHO global programme aim of reducing morbidity related to LF worldwide. The benefits of this approach may be extended to other causes of tropical lymphoedema such as leprosy and podoconiosis if they are included in neglected tropical disease programmes that provide integrated morbidity management.

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The six basic principles of wound management for low-resource settings

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Key words: Chronic wounds; wound healing; dressings; cost-efficiency; wound bed; ulcers; middle- and low-income.

Abstract

Chronic wounds develop when there is a problem with the natural healing process, leading to prolonged or incomplete resolution. Although the global burden of chronic wounds is still not properly identified, this issue can lead to significant financial, social, physical and mental challenges. Proper wound healing techniques can help offset the devastating effects of chronic wounds in resource-limited settings. In addition to a lack of knowledge, one of the biggest barriers to proper wound care maintenance is the direct and indirect costs generated by the care. This article aims to briefly discuss normal wound healing, provide knowledge on the basic principles of wound healing, and provide information on how to make a simple, low-cost dressing in a resource-limited setting in order to promote skin repair. Healthcare providers at all levels of training and community members should be familiar with these notions to lessen the progression into chronic wounds and shorten care length.

Key learning points

- To discuss normal wound healing.
- To provide knowledge on the basic principles of wound healing.
- To provide a guide on how to make a simple, low-cost wound dressing in resource-limited settings.

Introduction

Although there is no official global data, chronic wounds are estimated to affect approximately 2% of the total population in in the USA.¹ One hospital in South Africa found that 34.6% of their 518 patients in a single day had acute wounds.² One major community-based cross-sectional study in India reported an overall prevalence of chronic wounds of 15.03 per 1000 of the population.³ Low-resource settings around the world, lack of proper wound care materials and trained personnel often lead to chronic wounds and high infection rates.²⁻⁵ The global costs for wound management in the UK alone are GBP £8.3 billion.⁶ There is limited epidemiological and financial data for low- and middle-

income countries.^{2,3,7} Chronic wounds can also lead to chronic pain, decreased physical and social function, loss of productivity and disability.⁷ These effects can often be prevented with prompt and proper wound care. However, the limited resources for wound care in low-income countries remain a major barrier to successful wound healing.^{8,9}

Basic skin anatomy and wound healing physiology

Many health caregivers are not familiar with the key principles surrounding the selection of wound dressings that are required for successful healing. Effective dressings are selected to recreate the body's normal conditions, so understanding the basic anatomy of the skin and the wound healing processes is essential to inform the appropriate choices.

The skin consists of three layers – the protective outer layer called the epidermis, the supportive middle layer called the dermis and the fatty lower layer called the hypodermis (Fig. 1). The role of the skin is to act as a defensive barrier, to regulate body temperature, and to allow us to interact with our environment. A wound is essentially any form of damage to any of the skin's layers. It can be caused by direct trauma such as burns, accidents and animal bites or by medical conditions such as dermatological diseases, venous insufficiency, infections and cancer.

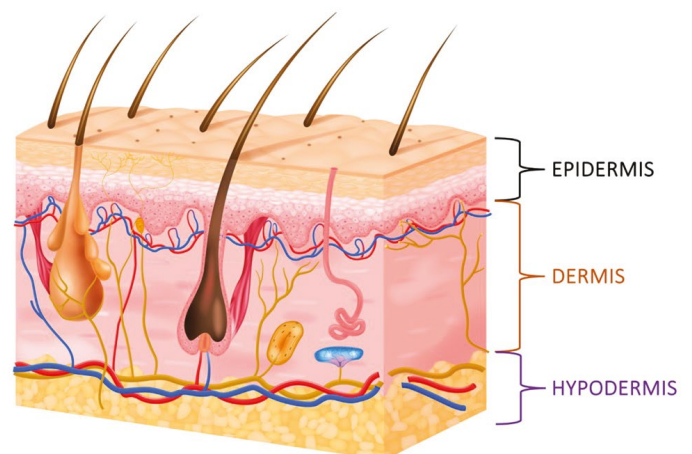


Fig 1. Graphic of the three layers of skin.

Image by macrovector on Freepik

The stages of wound healing

Normal wound healing is described in four overlapping phases (Fig. 2). First, skin damage induces haemostasis. Lasting a few minutes, it limits blood loss but also begins the second phase (inflammatory phase). This phase can last up to 1 week and will allow the body's white blood cells to clear the wound of cellular debris and bacteria. After this, the third phase called the proliferative phase begins. During the 2–3 weeks of this phase, the body's builder cells, also known as fibroblasts, will multiply and lay down the extracellular matrix (granulation tissue). This allows surface-making cells called epithelial cells to cover the wound (epithelialization) and close it.¹⁰ The final phase is called maturation where the fragile scarring tissue will continue consolidating for months. Retraction can also happen in this phase, leading to disability. Sometimes, wound healing stops in one phase (often inflammation) and this leads to chronic wounds.

4 Phases of Wound Healing

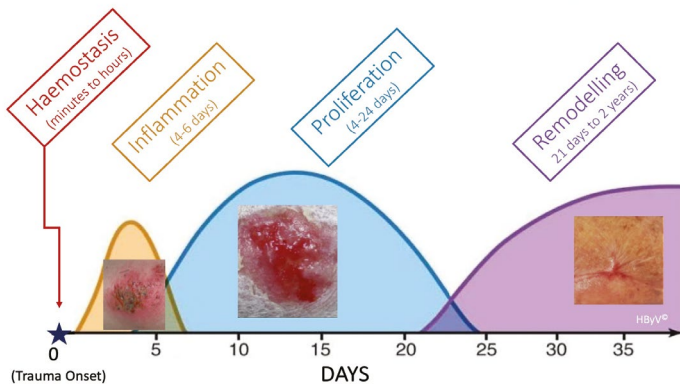


Fig 2. The four phases of wound healing. (Figs 2 - 8 All courtesy of Dr. H. Vuagnat)

The six basic principles of wound management

1. Assess wound cause and other relevant diagnosis

Precise diagnosis of the cause of the wound is key and treating the underlying cause is a first step if applicable. A robust assessment of the wound characteristics directs which management is needed.^{8,9} The TIME-D model (Table 1 on page 9) is a useful clinical tool to characterize wounds.^{11,12} It is based on the tissue's visual appearance (T), presence of inflammation or infection (I), moisture (exudate) content (M), and nature of the extended edge of the wound (E). The 'D' adds a reminder to check for other relevant diagnoses, either additional diseases or factors such as pain, nutritional status, smoking, medication, that can affect wound healing and should be corrected.¹¹

Colour is important to note when assessing tissue. Although not 100% accurate, these colours have become good general standards in describing the wound bed (Fig. 3).

- Black tissue is commonly a sign of necrosis (dead tissue).
- Yellow tissue frequently suggests fibrin deposition, an important protein for initial clotting but of little use in further stages. Tissue with necrosis or fibrin will need to be scraped to allow for proper wound healing.

- Green tissue is frequently a sign of infection and will need to be treated with antimicrobials.
- Red tissue is usually a sign of granulation and pink tissue is usually a sign of epithelization.
- Both red and pink tissue suggests that the wound is healing appropriately.
- More than one type of tissue (i.e. more than one colour) can exist in a wound bed at a time.

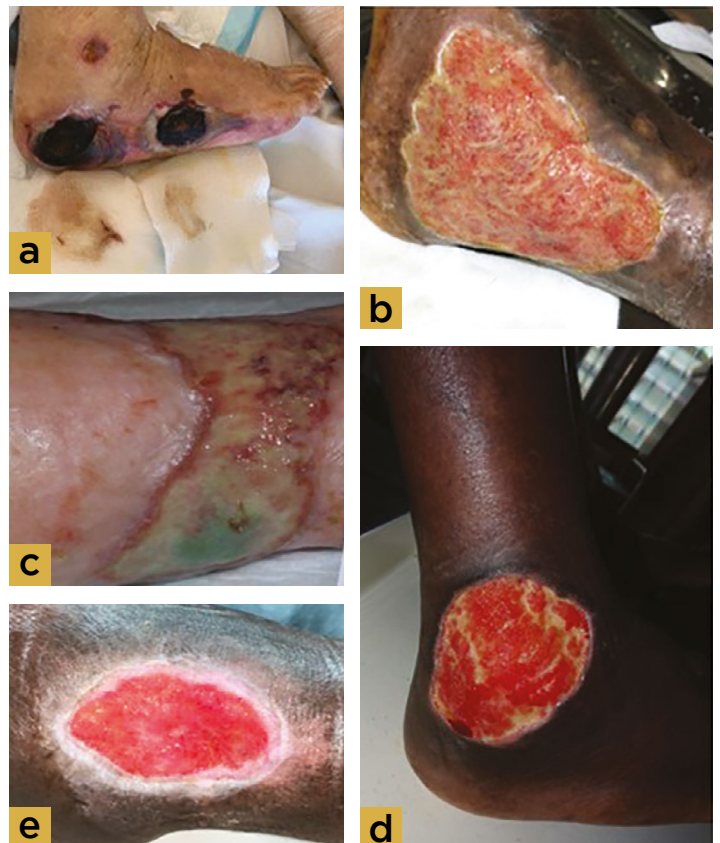






Fig 3. Five important colours for basic tissue assessment and classification. (a) Black usually represents necrosis. (b) Yellow usually represents fibrin deposition. (c) Green usually represents infection. (d) Red usually represents granulation. (e) Surrounding the central granulation tissue is an outer edge of pink tissue which usually represents epithelization.

2. Maintain a controlled moist wound-bed environment

As roughly 70% of the human body is made up of water, it is important for good wound healing to mimic this biological state by maintaining a moist wound bed. A good wound dressing needs to retain necessary moisture yet absorb excess moisture (moisture balance). It will usually also ease pain. Wounds can also produce fluid. This exudate can either be part of the normal healing process or can be a sign of abnormal healing such as poor haemostasis or infection. It is also important to assess the quantity and type of exudate to understand whether the wound is healing well (Fig. 4 overleaf).

Continued overleaf...

The six basic principles of wound management for low-resource settings...continued

Exudate quantity		Description	
None		0	Total absence of exudate
Scant		+	The wound bed seems wet but little exudate is released in dressing
Moderate		++	Exudate is released in moderate quantities
High		+++	Exudate is released in high to very high quantities. Depending on dressing type, it will go through it and induces frequent dressing changes
Exudate Colour		Description	
Serous			Clear, transparent yellowish
Serosanguinous			Transparent pinkish
Sanguineous			Red, thin to a bit more consistent
Purulent			More consistent, white, yellow or greenish looking
Other possible denominations: Seropurulent, Fibrinous, Haemopurulent			

Courtesy of: International Committee of the Red Cross diabetes e-learning

Fig 4. How to classify the quantity and colour of wound exudate.

3. Protect wound and peri-wound skin from further trauma

Since wounds are fragile, one must prevent additional damage that may occur to the wound bed or the weakened skin.⁸ Mechanical damage occurs frequently when dressings stick to the wound and/or adhesive bandages are harshly removed from the skin. Chemical damage can occur when excessive disinfection is used, as many such products, especially if used for too long, can be harmful to the wound bed. Lastly, excessive dryness and coolness can lessen cells' activity and impair healing. Thus, we recommend using nonstick dressings and soaking them, and adhesives, with saline or potable water before removal (Fig. 5). Use of saline or potable water to clean wounds is preferable; only use disinfectants on locally infected wounds.



Fig 5. Petroleum jelly gauze as primary dressing over wounds in an open fracture. Secondary dressing by gauze and elastic bandage will be added.

4. Promote a clean wound bed and control infection

The wound bed is the foundation for good wound healing; it must be clean and free from infection.⁸ First, all necrosis and fibrin must be removed through a process known as debridement. Large wounds will need instrumental debridement to remove dead tissues (with scalpel blade, scissors, curette). After removal, the fresh wound bed should be rinsed and cleaned with potable water or saline to clear out excess microbes or debris (Fig. 6). Water fit for drinking is fit for wound care. In case of clinically proven spreading or general infection, systemic antibiotic therapy is combined with topical antiseptics.¹³ Because of poor action, resistance risks and sensitization, topical antibiotics are not used routinely now.



Fig 6. Gentle washing of open wound with potable water.

5. Control both peri-wound and limb lymphoedema/oedema

Oedema is excess body fluid in any part of the body that leads to swelling (Fig. 7). In wounds, it is the result of excessive inflammation in which fluids leak through blood vessels to tissues and/or destruction of nearby lymphatics that compromises fluid resorption. Oedema caused by primary medical conditions such as heart failure can worsen oedema at the wound level. Saturated with inflammatory components, including proteases and dead white blood cells, oedema delays wound healing and impairs mobility.⁸ Whenever possible, limit oedema through physical compression (socks or bandages) and increasing physical activity. Compression should not be used, if the limb arteries are obstructed.



Fig 7. Oedema of the left hand and fingers.

6. Prevent or treat physical sequelae/disability

During the healing process, tissue shrinkage can occur. Shrinkage of large wounds and wounds over joints can lead to significant disability (Fig. 8). Active physiotherapy started early can prevent such tissue traction and reduce/prevent resulting disability.⁸ Involving the patient in understanding exercises and correct positioning during the healing process also minimizes the disability risk.

Conclusion

Chronic wounds are a neglected global health challenge that requires more attention. Understanding basic wound



Fig 8. Progression of tissue retraction during the wound healing process, resulting in diminished wrist mobility.

healing principles can help to prevent the development of chronic wounds. This includes assessing for the aetiology of the wound, maintaining a moist wound-bed environment, reducing further trauma to the wound and surrounding skin, keeping the wound clean, limiting oedema and preventing further disability. Minimizing the burden of chronic wounds with simple interventions is achievable in low-resource as well as highly resourced settings. Providing information about basic wound care techniques to all healthcare workers as well as patients and patient families will lead to improved outcomes and reduced healing times.

We encourage the reader to learn more about wound care at OpenWHO, <https://openwho.org/channels/ntd>. (see Wound management in resource-limited settings, In Press).

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CASE ONE FOR DIAGNOSIS

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A 10-year-old schoolboy presented with large pigmented patches on the cheeks and nose that had appeared during the summer holidays. He had a similar episode the previous year. The patches were itchy and had a hypopigmented rim around the central pigmented area (Fig. 1).



Fig 1.

What is the diagnosis?

a) Discoid lupus erythematosus	b) Contact dermatitis
c) Polymorphic light eruption	d) Actinic lichen planus

How to make a basic dressing in a low-resource setting: instruction manual

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Conflict of interests: None.

Key words: Wound; dressing; low-resource setting

Materials needed (See Fig. 1.)

- Soap.
- Clean water (boiled or heated to over 70 °C and allowed to cool).
- Hydroalcoholic solution like hand sanitizer (optional).
- Greasy, moisturizing agent such as petroleum jelly, shea butter, palm oil, coconut oil, olive oil or another moisturizing oil.
- Gauze squares, nonwoven gauze is preferred.
- Tape.
- Plastic film.
- Bandages.
- Waste bag.

Important considerations

- Find a clear and calm area that is clean and with good light.
- This should be away from any toilets, latrines or areas with trash.
- Ensure dirty and clean objects are kept in different containers.
- If pain control is needed, give acetaminophen or paracetamol by mouth around 40 min before starting dressing.
- Make sure you and the patient are comfortable during the dressing process.

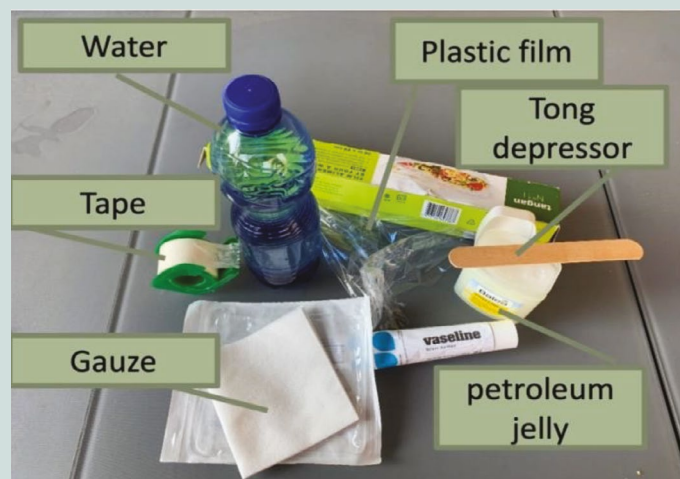


Fig 1. Items required.

Instructions

1. First wash hands with soap and clean water or hydroalcoholic solution.
2. Prepare necessary materials.
3. Wash hands with soap and clean water or hydroalcoholic solution before removing the old dressing.
4. If the dressing sticks, use potable water to remove it. To take off the bandage and sticky tape, pour water or saline over and between the skin and dressing and allow time for the water to soak in. Lift and pull gently from periphery to the centre. Try to peel off, without pain or trauma and use as much water as needed to achieve this.
5. Gently clean the wound and surrounding skin with potable water.
 - Soap can be used if wound is very dirty but remember that it can irritate the skin.
 - Avoid causing trauma to the wound when cleaning.
6. Rinse wound and surrounding skin with saline (NaCl 0.9%) if available.
7. Gently dry the skin surrounding the wound using a dabbing motion. (Do not rub.) Leaving humidity within the wound is not a problem.
8. At this point, use an instrument like the TIME-D model (Table 1) to assess the wound and plan for additional steps.
 - If the skin is necrotic (black) or has fibrin (yellow), you will need to do an instrumental debridement.
9. Wash hands with soap and clean water or hydroalcoholic solution before making the new dressing.
10. To protect the skin around the wound, gently spread a greasy agent such as Vaseline[®], petroleum jelly, shea butter or palm oil over it.
 - Always touch the greasy agent with clean gloves or clean tools if taking it out of a pot. Never go back a second or third time with the same glove/tool, to prevent contamination.
11. Gently spread the greasy moisturizer on some gauze to cover the approximate size of the wound. Place the greasy gauze interface onto the wound. This is the primary dressing, and as a contact layer it must not stick to the wound.
12. Apply a second layer of gauze (without a greasing agent) over the first layer of gauze to help absorb exudate; this is the secondary dressing. It can also help to protect from external trauma. The second gauze layer should be roughly unfolded

Table 1. TIME-D Model for Assessing Wounds

T	Tissues	Is the tissue viable? Assess and approximate the state of the tissue using a colour scale	Black Tissue suggests Necrosis/Death Green Tissue suggests Infection Pink Tissue suggests Epithelialisation	Yellow Tissue suggests Fibrin Red Tissue suggests Granulation
I	Inflammation/ Infection	Does the wound show signs of inflammation or infection? Assess for inflammation or infection to inform appropriate treatment	Signs of infection include: <ul style="list-style-type: none"> • Delayed/halted healing • Foul odor • Easy bleeding of wound bed • Wound breakdown or changes in colour • Worsening pain 	
M	Moisture	Is moisture level optimal? Assess any fluid or exudate to ensure that moisture homeostasis necessary for proper healing	Quantity: None, Scant, Moderate, Heavy Texture and Colour: Serous (transparent), Serosanguineous (transparent pink), Sanguineous (bloody), Purulent (pus-like, thick white or greenish) Odour: No Malodour, Slight Malodour, Moderate Malodour, Strong Malodour	
E	Edges	Are the edges advancing properly? Assess the edges to better understand the type of wound, optimize treatment, and visualize epithelialization	Wound edges are classified as the following: Indistinct/diffuse = unable to clearly distinguish wound outline Attached = skin is flat and even with wound base Not Attached/Undermined = base of wound is deeper than edge of wound Rolled Under/Thickened = soft to firm and flexible to touch Hyperkeratotic = callous-like tissue formation around wound and at edge Fibrotic/Scarred = hard, rigid to touch	
D	Disease	Does the patient have other diseases? Assess patient for other comorbidities that can impair wound healing	Important Factors to Consider are: Diabetes, Cardiovascular disease, Tobacco use, healthcare access, nutrition status, pain, social and psychological factors, financial ability, immunosuppression, adherence to plan, beliefs about the illness	

and bunched or ‘fluffed’, to look like a bridal veil, rather than neatly folded (see Fig 2).

- If there is too much exudate or excess fluid, add additional gauze layer(s) or a high absorbent dressing to absorb excess fluid.

13. Apply plastic film that is slightly bigger than the gauze, on top of the gauze layers to prevent moisture loss and diminish bacterial contamination; this is the tertiary dressing.
14. Apply tape all around the edges of the plastic film to secure gauze and plastic film in place. Avoid heavy-sticking tapes to prevent mechanical damage of the skin when the tape is removed in the future.
15. Wrap the area in bandages to help secure the dressing in place and offer a final protective barrier. Make sure the bandages are bigger than the wound area so everything can be covered.
16. Unless the patient has a peripheral arteriopathy (i.e. impaired arterial supply as evidenced by weak or absent peripheral pulses), all wounds benefit from compression, so use the elastic bandage to provide it, starting distally and working proximally up a limb, in a circular and ascending manner, with greater pressure below than above to allow drainage. Each turn of the bandage overlaps the previous by 2/3 of its width, leaving 1/3 uncovered. Check it is not TOO TIGHT – you should be able to put your finger between the wraps of the bandage.
17. Throughout all the process, evaluate pain and give appropriate pain control, such as acetaminophen or paracetamol.
18. Ideally, for noninfected wounds, dressings can be changed twice a week if they are not soaked through by exudate and do not stick at removal. If the wound is infected, it may require daily changes.
19. Wash hands with soap and clean water or hydroalcoholic solution after finishing the new dressing.



Fig 2. Second layer of gauze over wound, roughly bunched or ‘fluffed’, as a bridal veil.

20. Store clean items, dispose of waste properly and clean any instruments.
21. Wash hands with soap and clean water or hydroalcoholic solution.
22. Repeat these steps for dressing changes for as long as needed until new skin has formed over the wound bed.
23. Advise the patient to move at all times despite the bandage. If needed for wounds at or near a joint, provide instructions for exercises to maintain the joint’s mobility.
24. Once the skin is closed, it remains fragile, it must be protected from sun and mechanical forces (blows or shear forces). Use of an emollient (same greasy agent as in point 10) in a thin layer to hydrate it twice a day for at least a few months is optimal.

The information provided is not intended to be a substitute for professional medical advice, diagnosis or treatment. All information is to be adapted to the patient’s unique condition.

Enhancing photography skills using smartphones in resource-limited settings

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Conflict of interests: Claire Fuller is a member of the ILDS board of directors and of the CSH editorial board.

Key words: Teledermatology; telehealth; store and forward; smartphone; iPhone; Android.

Abstract

Teledermatology aims to increase access to dermatological care through either store-and-forward (S&F) or live interactive technology. S&F teledermatology can help connect clinicians and remote dermatologists from anywhere in the world using images and clinical information. As the static images serve as the basis for interpretation, making diagnoses and ultimate therapeutic plans, the quality and type of photographs submitted are integral to the success of the programme. Photography guides have been developed from telemedicine associations for ideal clinical circumstances and obtaining professional-level photographs. We have adapted this training for iPhones and Androids in resource-limited settings for S&F teledermatology.

Key learning points

- Teledermatology is particularly useful in connecting patients with poor specialty care access with providers across the globe.
- As static images serve as the basis for interpretation, making diagnoses and ultimate therapeutic plans in store-and-forward teledermatology, the quality and type of photographs submitted are integral to the success of the programme.

Introduction

Telemedicine allows for the distribution of healthcare through electronic means, facilitating long-distance provider and patient interactions. Improved technology has made telemedicine more convenient and reliable, particularly in the post-COVID-19 era.¹ Dermatology, being a visually dependent specialty, is particularly suited for this mode of healthcare.² As much of the developing world has limited access to physicians and specifically subspecialty care, teledermatology is one of various modalities to enable healthcare to reach rural areas.³ Much of teledermatology occurs asynchronously, through store-and-forward (S&F) technology, in which patient history and photos of skin lesions are documented in an electronic communication system and sent to a dermatologist who then evaluates the case and provides their expert recommendations. As static images serve as the basis for interpretation in S&F, the quality and type of photographs submitted are integral to making accurate diagnoses and therapeutic plans. The

American Telemedicine Association has developed a guide for taking photographs in ideal clinical circumstances.⁴ We have adapted this training for smartphones such as iPhones and Androids, to be used in the field in resource-limited settings.

Prior to the initiation of any teledermatology encounter, informed consent is of course essential, as required by local or national guidelines. This can be done in writing or verbally and should include an explanation of the benefits and risks of telemedicine in a language that is simple and understandable by the average patient.⁴

How-to

Physical environment: The room or environment should ensure patient privacy. The patient should be positioned so that they are comfortable. Background lighting from windows or other sources should be minimized and additional indoor lighting may be necessary to effectively illuminate the patient. Distracting backgrounds should be reduced, although this can be a challenge in resource-limited settings. A nonreflective blue or grey background is best. This can often be achieved by either positioning the patient directly in front of a plain wall or placing a patient gown or drape under the patient.

Views: For a generalized rash, taking three images can effectively represent the rash.

- a vertically oriented photo of the patient showing the extent and distribution of the rash;
- a medium distance (~24 inches/cm) photo can demonstrate the arrangement and configuration; and
- a close-up to highlight a representative lesion is recommended.

When taking a close-up image, the primary lesion must be clearly identified, focused and centred. In general, the image should be taken in a perpendicular plane to that of the lesion. It is also important to ensure that the location/anatomy is identifiable in at least one of the images (Fig. 1). Oblique photos may also be considered to show skin surface changes. For subtle lesions, consider identifying the lesion with adhesive labels, surgical tape or washable markers. Measurement tools can also be helpful to show the size and distribution of lesions.

Orientation and framing: As most anatomical units are longer than they are wide, orienting the camera vertically will allow for maximal utilization of space. The camera should be at the level of the lesion in question with the lesion centred in the field of view. The framing of the skin lesion should show the extent of involvement and should include both involved

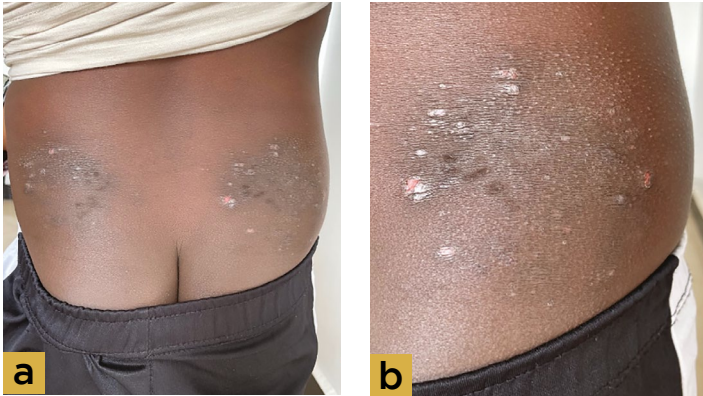


Fig 1. (a) and (b) Multiple photos from varying distance can help show the distribution and morphology of the rash.

and uninvolved areas. It is also recommended to document symmetry when possible. If only one hand is involved for example, showing both hands in one image allows the viewer to compare the involved area with the uninvolved side (Fig. 2).



Fig 2. Framing should show both involved and uninvolved areas. Document symmetry when possible.

Smartphone use: First, ensure that the smartphone camera lens is clean by using a soft, lint-free cloth to gently wipe the lens. A microfiber cloth is ideal, but any soft cloth will suffice. Next, open the camera application. Tap the lightening-shaped icon to use flash to eliminate shadows, or turn off the flash if it causes an unwanted glare. Most smartphones have the ability to autofocus. Autofocus can be used by placing the lesion of interest in the centre of the frame. Tapping the screen at the

site of the lesion will allow the camera to focus on a particular part of the photo. Tap the sun icon and drag it up and down to adjust the brightness. Click the shutter button to take a photo. Preview the last photo taken by tapping the icon on the lower left of the screen (Fig. 3).

Conclusion

Teledermatology is particularly useful in connecting patients with poor specialty care access with providers across the globe. As mobile technologies continue to advance, the possibilities for teledermatology remain far reaching. We hope that this photography guide will help train those taking photos in the field with smartphones for S&F teledermatology.

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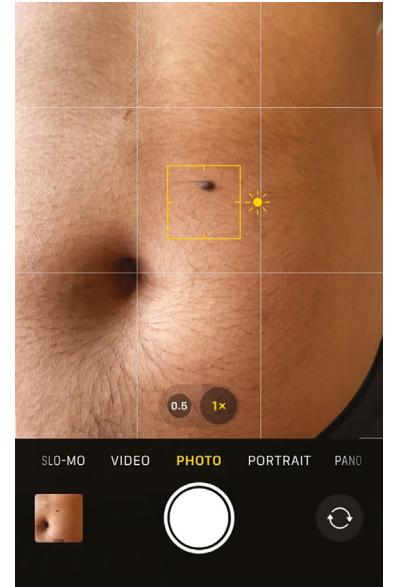


Fig 3. Screenshot of a smartphone camera application.

CASE TWO FOR DIAGNOSIS

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A 29-year-old previously healthy man from Matale, Sri Lanka, presented with moist hypopigmented wart-like growths in his genital region for 2 weeks (Fig. 1). These were neither painful nor itchy. He reported that he had a painless genital ulcer 1 month back, which had resolved on its own without any medication.

He was bisexual and his last unprotected sexual encounter had been with a casual male partner 2 months ago.

Which microscopic investigation would help in the diagnosis?

- a) Multinucleated giant cells in Tzanck smear
- b) Clue cells in wet mount
- c) Spirochetes in dark field
- d) Gram-negative bacteria in Gram stain

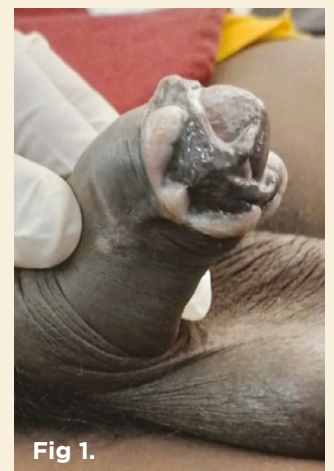


Fig 1.

DermLink Grants

DermLink Grants is an annual grants programme that provides support for a member society of the International League of Dermatological Societies (ILDS), or affiliated or observer societies, to undertake initiatives that help patients with skin disease in underserved regions of the world. The programme runs on a yearly basis, which means that all projects must be completed within 12 months of being awarded. Each year, we receive applications from dermatologists and non-governmental organizations around the world seeking funding to support their projects on skin diseases such as leprosy, skin neglected tropical diseases, albinism and scabies in low-resource areas. Through the DermLink Grants Programme, the ILDS provides support across 18 countries annually.

Currently, there are three types of DermLink Grants: materials and equipment; individual training; and field and community projects. Each type allows different amount of funds to be disbursed if the application is successful. The DermLink Grants Programme also welcomes collaborations between organizations and/or countries. If you are interested in more information about this Grants Programme, please contact us at dermlink@ilds.org.

Podoconiosis: observations from clinical field work in Ethiopia

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Conflict of interests: None.

Key words: Podoconiosis; Ethiopian Government Guidelines.

Abstract

Background: Podoconiosis is an incurable, but preventable and treatable, neglected tropical disease (NTD). Mineral particles and pathogens found in alkaline, volcanic soil enter plantar skin via breaches causing an inflammatory reaction, skin oedema and damage to superficial lymphatics. It has a severe impact on quality of life. Following inclusion in the World Health Organization (WHO) list of NTDs in 2011, podoconiosis became a health priority for the Ethiopian Government. The Second Morbidity Management and Disability Prevention Programme 2016 for filariasis and podoconiosis targeted 100 *woredas* (districts) with a high prevalence of podoconiosis to try to eliminate or reduce the impact of the disease by 2020. The Ministry of Health's subsequent Third National Neglected Tropical Disease Strategic Plan 2021–2025 set further targets for podoconiosis.

Objectives: To visit Ethiopian health centres in areas with a high prevalence of podoconiosis and capture the experiences of health centre staff and patients and compare observations with Government guidelines.

Methods: Observational visits were made by a clinician with a nursing background to four Ethiopian health centres over 2 days in a high prevalence region of the Boreda District. Informal interviews with staff and patients were held at the two health centres with the highest registered numbers of patients with podoconiosis.

Results: The two health centres with the most patients with podoconiosis were caring for 300 and 163 patients, respectively. Five healthcare staff were interviewed (one health officer who covered all four of the centres; three health officers from one of the two centres and one from

the other). They identified issues accessing treatment materials that limited their ability to educate patients to undertake the correct podoconiosis treatment. Twelve patients with podoconiosis with an age range of 24–87 years were interviewed over the 2 days. Patients were mainly subsistence farmers ($n=10$) who reported that they could not afford to purchase treatment materials and they struggled to travel the long distances needed to access clean water for limb washing. These factors adversely had an impact on attainment of Government targets.

Conclusions: The Ethiopian Government guidelines on podoconiosis are very challenging as all the patients seen in the study were unable to afford, or easily access, the products required to prevent and treat the disease. Health centres require a consistent stock of all the materials required to teach and demonstrate podoconiosis prevention and treatment. Supplying free soap, disinfectant and emollients to individuals with the disease would be helpful. Lack of affordability of protective shoes was also an issue.

Key learning points

- The Ethiopian Third National Neglected Tropical Disease Strategic Plan 2021–2025 contains challenging targets for the prevention and treatment of podoconiosis.
- Poverty affects patients' ability to access the materials required to prevent and treat the disease.
- Walking long distances to access clean water and health centres is a further disincentive for patients.
- Consistent supplies to health centres of the materials required to demonstrate treatment and educate patients are essential.

Introduction

Podoconiosis affects some of the poorest people in the world resulting in bilateral leg oedema and leg pain with loss of workdays and income. Mineral particles and pathogens found in alkaline, volcanic soil enter plantar skin via breaches causing an inflammatory reaction, skin oedema and damage to superficial lymphatics. It has a severe impact on quality of life.

An estimated 1.5 million individuals (1% of the population) are affected by podoconiosis in Ethiopia, with 35 million people at risk of the disease. A five-stage disease severity assessment system is used for assessing patients with podoconiosis.¹

Government guidelines for care of podoconiosis recommend: (1) washing both limbs twice daily with clean water at room temperature using ordinary soap; (2) soaking the limbs for 15–20 min in a basin with cool clean water and dilute antiseptic; (3) drying well with a clean towel; and (4) applying emollients.

The Second Morbidity Management and Disability Prevention Programme 2016 (MMDP) for filariasis and podoconiosis targeted 100 *woredas* (districts) with a high prevalence of podoconiosis to try to eliminate or reduce the impact of the disease by 2020. The Ministry of Health's Third National Neglected Tropical Disease Strategic Plan 2021–2025² set out new priorities for podoconiosis, increasing: (1) the number of endemic *woredas* providing management and disability prevention services from 100 to 345; (2) the number of individuals regularly wearing proper shoes from 50% to 100%; (3) individuals with proper, regular foot hygiene practice in endemic *woredas* from 50% to 100%; and (4) the proportion of endemic *woredas* with at least one podoconiosis patients' association from 25% to 100%.

Materials and methods

In 2022 clinical observational visits were arranged by the Ethiopian Collaborative Research and Training Center for Neglected Tropical Diseases, Arba Minch University (CRTC NTDs AMU) to visit four health centres (HCs) in the highland areas of the Boreda District, Gamo Gofa Zone. Informal discussions with staff and patients focused on two of the HCs that cared for the highest number of patients registered with podoconiosis ($n=300$ and $n=163$ patients, respectively). The clinical observer also examined patients' legs and feet.

Results

Staff interviews: A total of five health officers (nurses with BSc degree qualifications) were interviewed (the health officer who covered all four centres, plus three health officers at one centre and one at the other). Each HC had at least one trained nurse who had undertaken a 3-day training course at CRTC NTDs on the diagnosis and treatment of podoconiosis, as advised in the Third National Neglected Tropical Disease Strategic Plan 2021–2025.³ Following the initial patient assessment, staff reported that patients either attended the HC or were visited at their home by a health extension worker monthly for the first 3 months, then every 12 months to address any issues and reinforce the self-care regimen. If patients had an acute attack of leg pain (acute dermatolymphangio-adenitis, ADLA) for more than 24 h, HC nurses gave injections of procaine penicillin for 7–10 days to prevent septicaemia. All nursing staff reported problems accessing the medication and materials required to demonstrate the required skin care regimen and meet the guidelines. One of

the centres visited had a chart on the wall (Figure 1) in English entitled 'Control and prevention of podoconiosis'.

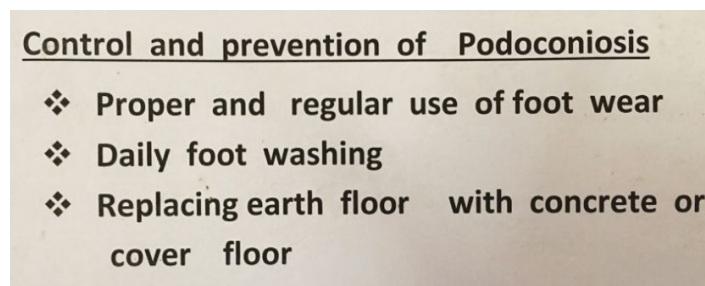


Fig 1. Wall poster used in a Government health centre about podoconiosis care.

Patient interviews: A total of 12 patients with podoconiosis (9 female, 3 male) attended one or other of the two centres on one of the two study days and were interviewed. Their ages ranged from 24 to 87 years; three of the women were in their 20s but the remainder were all aged > 65 years. Most patients ($n=10$) were subsistence farmers. Most ($n=11$) had Government health insurance that provided healthcare to them and their families at a cost of 300 birr (USD \$5.6) a year.

All patients said they undertook long walks to access water from standpipes and to reach the HC. One woman and her daughter, both with podoconiosis, had walked 10 km to reach the centre over unmade roads.

On examination, all patients had podoconiosis stages 1 to 3. A typical diseased foot and damaged footwear is captured in Figure 2.

No wounds or fungal infections were present in any of the patients.



Fig 2. Feet of a patient with podoconiosis and their unprotective broken sandals.

All patients stated they understood the importance of washing their feet and legs (to reduce the bacterial load and remove soil particles from their legs and feet), helping to restore their skin function. All washed their feet and legs with water every evening. The water was obtained from standpipes a long distance from home, carried in containers (Figure 3).



Fig 3. Water containers waiting to be filled at a standpipe early morning.

No patients used a towel, soap, disinfectants or emollients as they said they were unaffordable. The approximate monthly cost of skin treatment obtained from local shops in the Boreda area was as follows:

Continued overleaf...

Podoconiosis: observations from clinical field work in Ethiopia

...continued

- soap bar: 110 birr (USD \$2.02);
- bleach: (5% NaOCl) for disinfecting water = 15 mL daily added to 6 L water (90 birr [USD \$1.66], 450 ml);
- petrolatum/Vaseline emollient: (30 birr [USD \$0.55] 150 g jar);
- Whitfield's ointment (for fungal infections) (100 birr [USD \$1.84] per tube);
- the total cost of 1 month's treatment = 330 birr (USD \$6.07). This was unaffordable for the patients seen.

All patients wore shoes but none were protective against exposure to the soil. Most wore broken plastic sandals (Figure 2), risking soil ingress to the foot. No patients were able visit the centre after the first visit unless they required a course of antibiotic injections for ADLA, which typically occurred about once a month. No podoconiosis patients' associations in their vicinity were reported by patients or staff.

Discussion

Inaccessibility to healthcare and unaffordable costs:

Accessing healthcare in the mountainous regions of Ethiopia, the terrain where podoconiosis mainly occurs, is difficult because of poor road systems and long distances and is costly both in time and money. Health facilities may charge for treatment unless patients are covered by Government health insurance or are extremely poor. Therefore, patients only attended the centre initially and when they required antibiotic injections for ADLA. The total cost of 1 month's treatment of regular skin care was 330 birr (USD \$6.07), which was unaffordable for the patients seen.

The importance of the daily use of soap for washing legs was reported in a central Ethiopian community-based cross-sectional study of 638 individuals that reported 582 (91.2%) of people washed their legs with soap and water and 410 (64.3%) twice daily.³ A total of 40 (6.3%) of people had podoconiosis, which was reported as four times higher in those who washed their feet in water only compared with those who used soap and water ($P=0.005$). Although soap is important for skin cleaning, disinfected water and emollients are also necessary for improving skin condition and reducing ADLA.

Our previous trial ($n=193$), sought to improve podoconiosis treatment in Ethiopia through skin care and education.⁴ Three months of daily washing with soap, soaking the feet and legs in disinfected water and emollient application resulted in a very positive impact on quality of life, reduced skin breaches and a reduction from a baseline of 4.44 days a month of number of days participants were unable to work owing to ADLA to nil.⁴

The HC poster (Figure 1) would have been more useful for patients if it was a pictorial depiction of the correct procedure for washing and drying the feet and legs and applying emollients as patients could not read English. Also, concreting the earth floors in patients' homes was unaffordable for most patients.

Knowledge of health staff: Not all of the HC staff had received training on the prevention and treatment of podoconiosis although they had the disease guideline. The importance of training was noted in the Churko 2019 study,⁵ which was undertaken following the 2016 MMDP podoconiosis guideline in the Gamo zone. This reported on the knowledge of 320 health

professionals, half of whom were diploma nurses. Seventy nurses (21.9%) thought podoconiosis was an infectious disease, 38 (11.9%) thought it was caused by a parasite and 71 (22.2%) believed it was caused by a curse or evil eye. Only 37 (11.6%) had treated a patient with podoconiosis and 191 (59.7%) felt they had inadequate knowledge and skill to provide treatment. Most of the nurses, 311 (97.2%) had no guideline for managing the disease in their health facility.⁵

Lack of access to clean water: Water access is a major challenge in sub-Saharan Africa, where 187 million people access water from unprotected wells, rivers, lakes and ponds. Water accessed from 'protected' sources, such as standpipes, is often contaminated with harmful bacteria. All the patients we spoke with obtained water from standpipes. No one used bleach to disinfect the water. Although no one in the present study said that accessing sufficient water for washing was a problem, other studies have reported issues. A filled 25-L water container weighs 25 kg (Figure 3) and is very difficult to carry. Consequently, using water for washing legs and feet is a low household priority, resulting in poor foot hygiene and poorly managed disease.⁶ A study in the Boreda area of 280 patients with lymphoedema reported that 89 (31.8%) of respondents walked 30 min each way to collect water, more than 75% fetched < 50 L a day and those carrying 50 L daily or less were 38% less likely to have good foot care practice.⁷

Conclusion

Two years after the publication of the Third National Neglected Tropical Disease Strategic Plan 2021–2025, further work is still required by the Ethiopian health service if podoconiosis is to be effectively managed. Adequate stocks of materials in HCs are essential. While soap, bleach, emollients and protective shoes remain unaffordable, podoconiosis will remain an issue and continue to adversely impact on the individual's quality of life and economic situation, their families and the country.

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Personal view: gaining therapeutic power!

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Conflict of interests: None.

In all five continents of the world, Ministers of Health are declaring that lockdown was a consequence of COVID-19 and that it explains the high prevalence of mental health problems in all age groups. It resulted in loneliness because of social distancing and masking.

It was the father of modern medicine, Sir William Osler in Oxford, in the early 20th century whose therapeutic power was said to be friendship. Another Oxford professor much more recently said 'Friendship is the single most important factor for health, well-being and happiness'.¹ As a dermatologist, I have highlighted previously that one sees many lonely and isolated people and that people affected by leprosy over the

past 1000 years were the best example as social distancing was the key to management.² Patients I have seen with lymphatic filariasis were often lonely too, as their family and community socially distanced them because of their appearance and odour. Management of skin disease must always be friendly and this can be taught by example to community health workers without the current fear of further overloading their curriculum, as they may be the first to meet such patients in isolation. It will give them tremendous therapeutic power.

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DIAGNOSIS ANSWERS



Case One

d) Actinic lichen planus

Discussion

Actinic lichen planus is reported in the literature as a rare subtype of photosensitive lichen planus that mostly affects children and young adults.

However, it is not uncommon in schoolchildren in tropical countries during the hot summer months. The exact aetiology is unknown; yet, natural and artificial ultraviolet radiation appears to be the predominant precipitating factor.

Often a clinical diagnosis, characterized by the central pigmented patch surrounded by a hypopigmented halo, actinic lichen planus on dermoscopy demonstrates characteristic Wickham's striae (a white lace-like pattern) on skin lesions.

Treatment with sunscreens, topical steroids and if needed, a short course of oral steroids is usually successful.



Case Two

1. Condylomata lata in secondary syphilis 2. c) Spirochetes in dark field

Discussion

Condylomata lata is a cutaneous manifestation of secondary syphilis typically affecting the anogenital area. These lesions are moist and demonstrate high amounts of teeming spirochetes in dark field microscopy. Syphilis serology is invariably reactive in these cases.

Syphilis is a common sexually transmitted infection caused by the spirochete *Treponema pallidum*. The incubation period varies from 2 to 12 weeks.

There are four clinical stages of syphilis.

1. Primary stage – an ulcer or multiple ulcers occur in anogenital or oral regions.
2. Secondary stage – 2–8 weeks after the primary stage, multiple systems get involved. Mucocutaneous manifestations like skin rashes, condylomata lata and alopecia are commonly seen.
3. Latent stage – the latent stage of syphilis is a period when there are no visible signs or symptoms.
4. Tertiary syphilis – some people with untreated syphilis do not develop tertiary syphilis. If it does develop, the patient's vital organs could get affected 10–30 years later.

A single injection of long-acting Benzathine benzylpenicillin G can cure the early stages of syphilis if there is no neurological or ocular involvement. Partner evaluation and treatment is also important.

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