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Review Article

Chronic Wound Management during COVID-19 Pandemic

Ruke G Milind[1]* and Savai J[2]

[1]*Assistant Honorary Professor, Department of General Surgery, Government Grant Medical College, JJ Group of Hospital, Mumbai University, Mumbai, India*

[2]*Department of Medical Affairs, JBCPL, Mumbai, India*

***Corresponding Author**: Ruke G Milind, Assistant Honorary Professor, Department of General Surgery, Government Grant Medical College, JJ Group of Hospital, Mumbai University, Mumbai, India.

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Abstract

The world is facing a major epidemic of 2019 novel corona virus and according to WHO, there are more than 2.5 million cases worldwide and greater than 1lac deaths with 6% mortality rate. Currently, people of all ages are found to be susceptible but severe illness was rarely seen in children. About 5% of adults, especially those with comorbidities, get critically ill and require intensive care unit (ICU) care with prolonged hospitalization, increasing the health care burden and costs. Currently, chronic wounds are also the leading cause of hospitalization. However, the current global corona virus disease, 2019 pandemic has increased the demand for more hospital beds. Hence, clinicians should provide evidence based care and triage their chronic wound patients, during this COVID-19 crisis that will ultimately help to cope up current hospital bed capacity situation. There are several challenges faced by any clinician while managing chronic wounds during COVID-19 pandemic situation. During such crisis, providing best practice is challenging due to inadequate staff and their availability, patients self-isolation and real or perceived risk of COVID-19 infection. Thus, considering the current situation, goal of every clinician treating chronic wounds showed aim at, early successful treatment of wound infections such that complications can be prevented and thereby preventing amputations and decreasing hospital stay of inpatients. Hence, specific triage is required to differentiate between critical, severe and stable patients followed by focused treatment approach. Importantly, first priority should only be given to critical patients with ICU care. Alternative services like telemedicine with proper patient education should be adopted and homecare services should be provided as continuity of care. ICU facilities and available resources should be used sensibly so that it does not create stress to the hospital services during the pandemic. Thus, every clinician should aim at keeping the chronic wound patients and related health care workers safe during such a highly infective stage of COVID-19 pandemic.

Keywords: *Chronic; Wounds; Corona Virus Disease (COVID); Pandemic; Triage; Intensive Care Unit (ICU)*

Introduction

The world is facing a major epidemic of 2019 novel corona virus (2019-nCoV). According to World Health Organization data as on 22nd April 2020, there are an estimated > 2.5 million cases worldwide with > 0.17 million death accounting for approximately 6% mortality rate [1]. The year 2020 started with the emergence of the 2019 novel corona virus (2019-nCoV) as a threat to the world; shortly afterwards the World Health Organization (WHO) declared it a pandemic on 30th January 2020 [1]. The virus originated in the Wuhan City, China; however, globalization and international travel led to its wide-spread all over the globe. The current pandemic has led to shortage of healthcare resources and has resulted in high mortality and morbidity. About 5% of adults, especially those with comorbidities, were critically ill and required intensive care unit (ICU) care [2]. People of all ages were found to be susceptible but severe illness was rare in children [3]. Currently, chronic wounds are also the leading cause of hospitalization [4]. However, the current global corona virus disease, 2019 (COVID-19) pandemic has increased the demand for more hospital beds. Hence, clinicians should provide evidence based care and triage their chronic wound patients, during this COVID-19 crisis that will ultimately help bed capacity situation [5]. This review focuses on appropriate management approach as a guidance statement for preparedness and managing chronic wounds cases during the COVID-19 pandemic in a resource-limited setting like India to tackle the current hospital bed crisis.

Epidemiology of COVID-19: Global and Indian perspective [1]

Global data: Till April 22nd 2020 a total of 2,579,894 confirmed COVID-19 cases were reported from 210 countries with 179,059 deaths have been reported by WHO. The United States of America has reported the maximum number of confirmed cases with a total of 819,321 followed by Spain with 2,08,389 and Italy with 1,83,957 cases. Although in the last month, Italy reported the maximum number of deaths; however, now USA has surpassed Italy and Spain over the last few weeks with maximum number of deaths around 45,355 cases.

Indian data: A total of 20,471 cases with 652 deaths have been reported from India as on April 22, 2020, reported by WHO. Till date 3,960 cases had fully recovered from COVID-19.

Wounds: Current perspective

Chronic wounds represent a major medical and financial burden and are associated with significant morbidity and mortality [6]. The Wound Healing Society based on aetiology, classifies chronic wounds into four categories: diabetic ulcers, venous ulcers, pressure ulcers, and arterial insufficiency ulcers [7]. It is estimated that in developed countries, 1 - 2% of the population will experience a chronic wound during their lifetime [8]. Chronic wounds leads to numerous complications that includes infection such as cellulitis and infective venous eczema, haemorrhage, gangrene and amputations of lower extremities. Chronic wounds leads to a vicious cycle as it causes disability and disability worsens the wound outcomes [9]. Chronic wounds have a significant impact on the quality of life of patients causing loss of function and mobility, pain, depression and distress along with prolonged hospitalization [10].

Chronic wounds: Epidemiology

In United States ~2% of the total population are estimated to be affected by chronic wounds and is most commonly observed in the elderly population [11]. Globally, the impact of chronic wounds is also adverse with an estimated prevalence of 6% [12]. The prevalence of different chronic wounds varies depending on its etiologies. For instance, annual prevalence of foot ulcer is estimated to be 4 - 10% and the risk of development of these ulcers in diabetics is estimated to be anywhere from 15 - 25% and 14 to 24% suffer from amputation [13]. According to, one of the largest global epidemiological study which included > 800,000 subjects from 33 countries, reported data suggested global diabetic foot ulcer prevalence of around 6.3%. Data found a lower prevalence of DFU in Europe (5.1%) compared to North America (13.0%). Women appeared to be less prone to foot ulcers than men (3.5% vs. 4.5%). Out of 33 countries, Belgium showed highest prevalence of 16.6% and Australia showed lowest with 1.5% [14,15]. Chronic venous insufficiency leads to a vast majority (70%) of lower-extremity ulcers with global prevalence of around 1%. In USA, elderly people are more vulnerable to venous ulcers with 10 - 35% of the population suffering from some kind of chronic venous issues and 4% (> 65 age group) of the cases having active ulcers.

Around 2.5 million people develop pressure ulcer annually in the United States, which corresponds to a prevalence of 0.8% in the general population [17]. According to one Indian data, the prevalence of chronic wounds is approximately around 4.5/1000 population [18]. Global data suggests that 17.2 million hospital visits are due to wounds, including outpatient and inpatient surgical visits. Majority (57.8%) of these visits occurred in hospital-owned outpatient settings, while 42.2% were inpatient [16]. Thus, overall chronic wounds lead to increased hospital visits and occupancy of hospital beds.

Challenges and goals in the management of chronic wounds during COVID-19 pandemic [5]

There are several challenges that any clinician would face while managing chronic wounds during COVID-19 pandemic situation. The challenges includes critical services that are essential for effective chronic wound management during COVID-19 crisis. During such crisis, providing best practice is challenging due to inadequate staff and their availability, patients self-isolation and real or perceived risk of COVID-19 infection. In addition, alternative services, such as telehealth, in conjunction with face-to-face services may need to be considered for some patients especially those who cannot travel/visit the hospital.

Currently, the mainstay challenge for the healthcare system is availability of hospital beds for handling the current COVID-19 pandemic situation. Though, chronic wounds are also one of the leading cause of hospitalization worldwide. However, every hospital bed is not required for chronic wound patient, which would give room for patient suffering from COVID-19. Thus, considering the current situation, goal for doctors treating chronic wound showed be aimed at, early successful treatment of wound infections such that complications can be prevented and preventing amputations, decreasing hospital stay of inpatients, effective ways of cost reduction and changing the way of approach to manage chronic wound patients and implementing new ways is the need of the hour at the time of COVID-19 crisis.

Management approaches of chronic wounds during COVID-19 pandemic

People with infected diabetic foot ulcer having low immunity are considered to be most vulnerable to corona virus infection causing serious illness and unfavorable outcomes [19,20]. It has been noted that those who died from corona virus infection, had co-existing co-morbidities including diabetes mellitus. Step-wise systematic management approaches includes proper triage of patients, followed by managing active wounds depending on severity with further follow-up/teleconsultation on need basis [5].

Triage

Diabetic people are at increased risk of morbidity and mortality from COVID-19. Hence, decreasing their hospital visits by differentiating those with non-limb threatening infections from life/limb threatening (Infectious Disease Society of America Grade 3 and 4), forms the basis of triaging. Wound care centers away from hospitals can take care of most patients except in the critical category. During triaging, enquiry should be made about possible COVID-19 symptoms of cough or sore throat or fever and if present, prescribed protocol should be followed. In most cases features of sepsis might be absent or diminished in people with diabetes and the elderly while on the other hand a sepsis in a patient could also be due to COVID [5]. In addition, patient complaints can be, foot pain, erythema, swelling and foot ulcer. Several algorithm/charts would help the clinician to triage, decide and manage the patient as per need basis (Figure 1-5) [5].

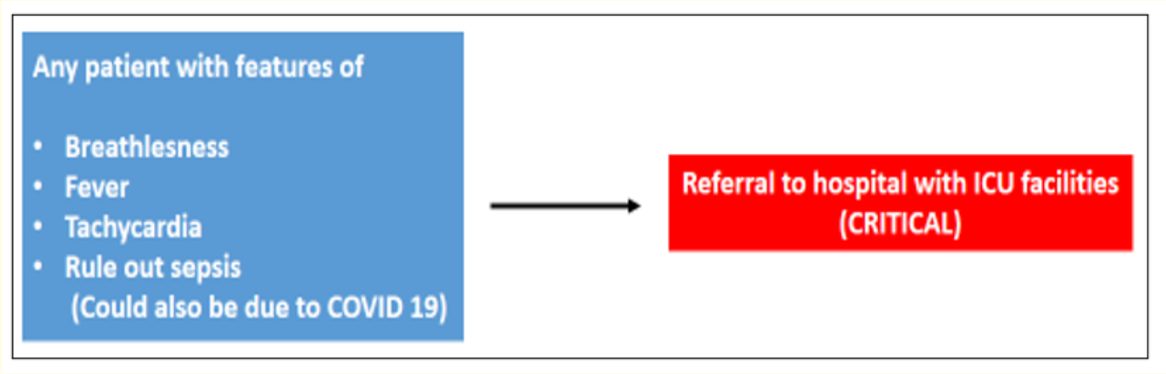

Figure 1: *List of patients symptoms for referral to hospital with ICU facilities (Critical).*

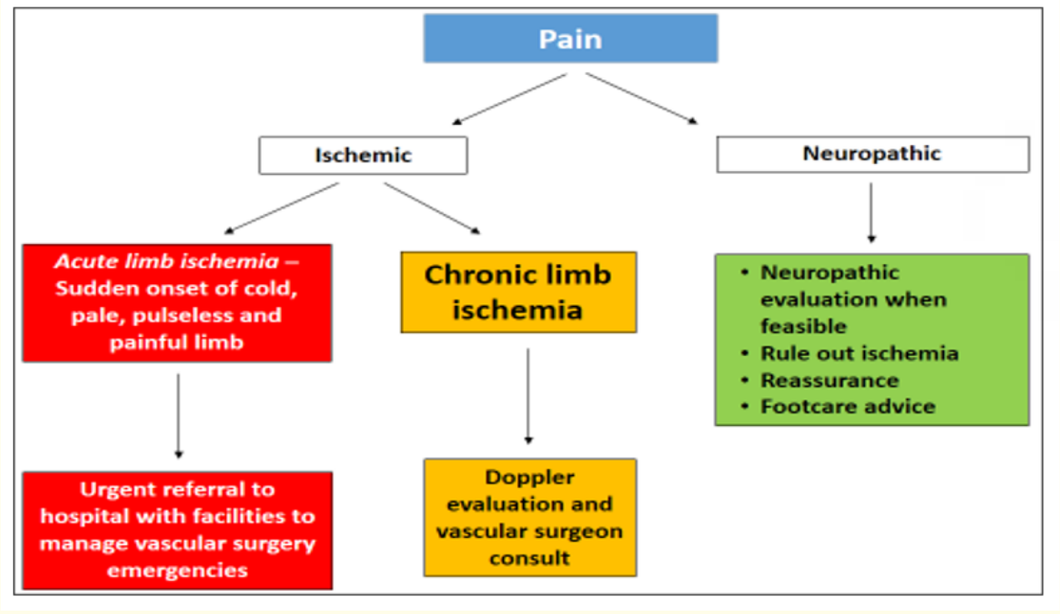

Figure 2: *Management of patients without active wounds.*

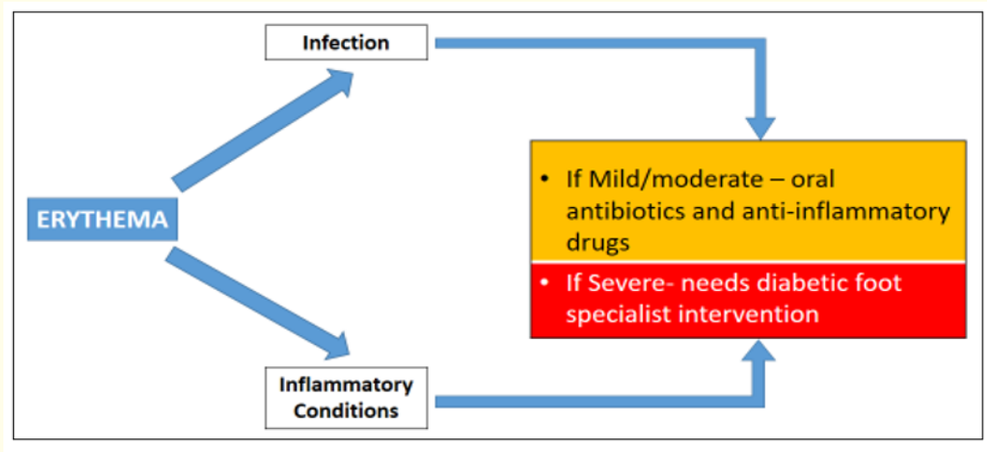

Figure 3: *Algorithm for managing patients with erythema.*

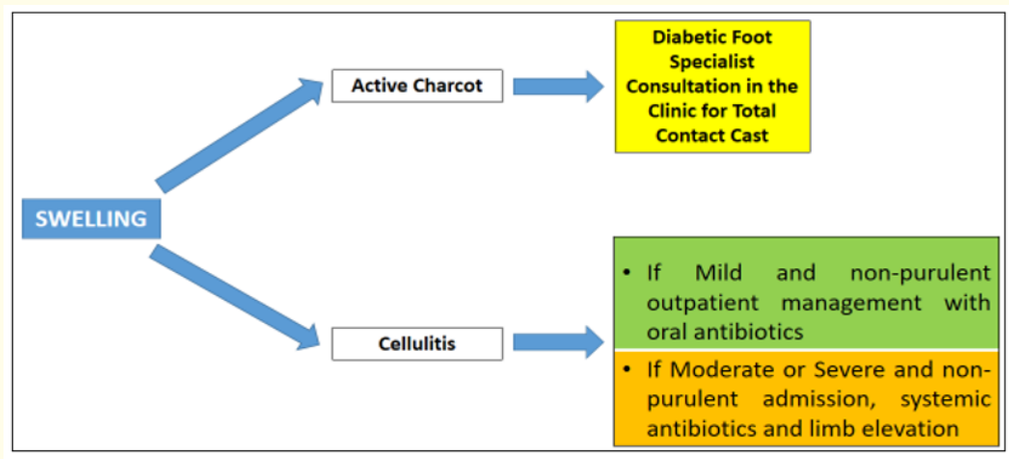

Figure 4: *Algorithm for managing patients with swelling.*

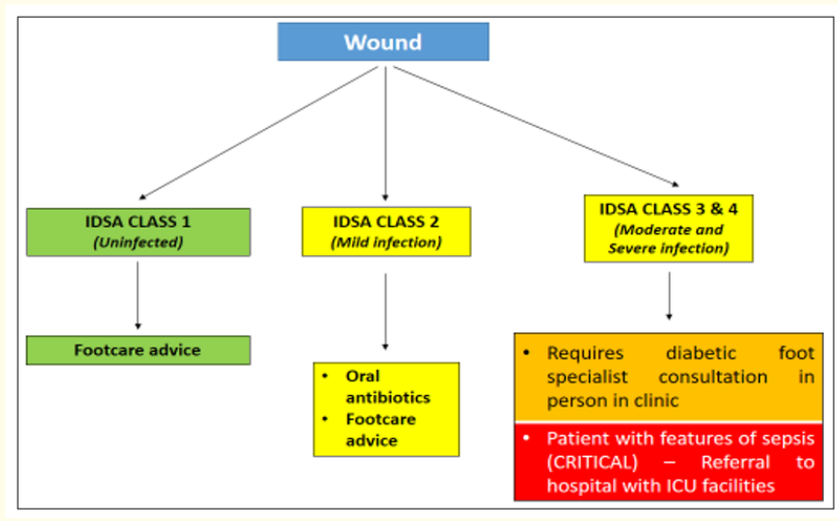

Figure 5: *Management of patients with wounds.*

Chronic wound evaluation does not restrict itself to the assessment of the infection alone. Various subgroup of patients which are presented with additional features must also be considered. A record of the all the events must be kept in a simple and scientific manner in order to provide a continuous care in a multispecialty multidisciplinary manner, so that the condition of the patient can be shared among the involved specialties in order to understand the exact condition of the patient.

The below table 1 enlists the condition of the foot and organ system, status of the different types of ulcers among various patients. A preliminary impression of the condition of the patient is derived based on a holistic evaluation of the patient.

	Types of Wounds	Types of Foot	System involved	Action Plan	Site of Treatment	Urgency
Critical	Acute or Chronic • Limb threatening • Life threatening wounds	IDSA - Severe infections • Acute limb threatening infection • Gas gangrene • SIRS/Sepsis	Multiple organ systems • Lungs or kidney injury • Breathelessness	Liaison with ICU care facility	ICU Care	First priority
Severe	• Acute or Chronic wounds • IDSA-Moderate infections • Dry gangrene • Worsening foot ulcers	• IDSA - Moderate infections • Chronic limb threatening ischemia • Active Charcot foot	Other systems unaffected	Evaluation with treating doctor at his hospital/clinic Referral to higher centres	Hospital care	Second priority
Guarded	Improving foot ulcer	• IDSA - Mild infection/uninfected • Neuropathy • Inactive Charcot foot	Other systems unaffected	Teleconsultation Home visit	Home (visit by Healthcare worker where feasible)	Third priority
Stable	• Uncomplicated venous ulcers • Healed ulcers • No wounds	Normal	None	Teleconsultation Reassurance	Home	Fourth priority

Table 1*: Wound patients triage and action plan depending on types of wounds, foot and site of treatment [5].*

Australian clinical triage guide has also laid down clinical guidance for the clinicians for managing people with diabetes related foot disease during the COVID-19 pandemic (Table 2).

	Foot disease conditions	Maintain usual triage plan	COVID-19 potential impact on clinical care
Critical	• Foot ulcer with systemic infection • Acute limb-threatening ischaemia	Refer immediately to Emergency department including for urgent surgical review	Hospital inpatient care
Highly serious	• Foot ulcer with local infection • Chronic limb-threatening ischaemia • Acute or suspected Charcot foot	Refer same day to Interdisciplinary High Risk Foot Service (iHRFS) and/or if chronic limb-threatening ischaemia to a vascular specialist	• Initial consultation to occur face-to-face • Follow-up consultations may be mix of face-to-face and by telehealth • Consultation frequency may be reduced
Serious	• Foot ulcer without infection or ischaemia	• Refer to interdisciplinary High-Risk Foot (iHRFS)	• Initial and follow-up consultation may be mix of face-to-face and telehealth • Consultation frequency may be reduced
Stable	• Healed foot ulcer • Healed amputation • Chronic Charcot foot	Refer routinely to podiatrist for maintenance care	• Initial and follow-up consultation may be mix of face-to-face and telehealth • Consultation frequency may be reduced • Home visits may be considered

Table 2: *Wound patients triage and action plan and clinical care during COVID-19 impact [21].*

Teleconsultation [5]

In the present situation of COVID-19, telemedicine/telehealth is alternative approach for diagnosing, treating and managing patients. Almost all patients except critical ones can be triaged via teleconsultation. Figure 6 depicts a systematic teleconsultation protocol which helps the clinician manage the patients with wounds adequately.

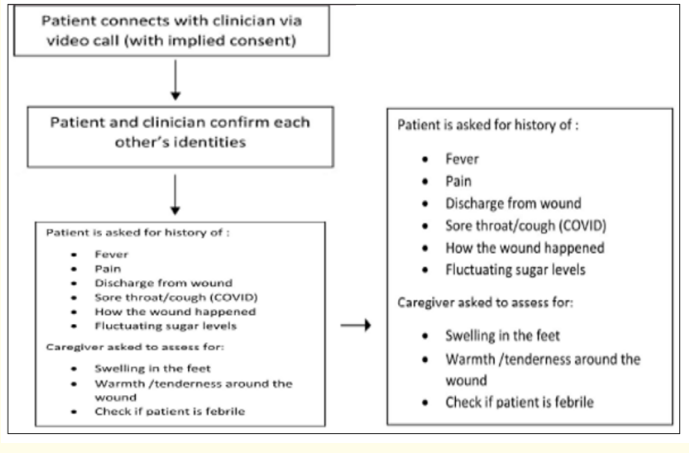

Figure 6: *Teleconsultation protocol.*

Teleconsultation is incomplete without patient education. The key elements of which are as represented in table 3.

Sr. no.	Key elements
(i)	Use footwear with socks indoors and while walking around the house
(ii)	Twice daily examination of both the feet in presence / absence of caregiver
(iii)	Wash the feet twice daily, dry it and apply moisturizer
(iv)	Patients are advised to use any comfortable protective footwear indoors. Separate set of footwear for indoor and outdoor should be used to avoid contamination of the place of living
(v)	Watch for danger signs like callus, ulcer, blister, fever, redness, warmth, pain and discharge
(vi)	Patients should be taught the application of a simple non-adherent dressing via teleconsultation and further should be advised for simple offloading measures.
(viii)	Assess patient's mental state during the pandemic and address his fear during the consultation and offer mental health support if necessary.

Table 3: *Patient education for chronic wound patients during COVID-19 pandemic [5].*

Suggestion for telemedicine: 1) The fact both the doctor and patient agrees for Telemedicine consultation in Covid 19 scenario is an implied consent. Medicolegally important aspect of this practice. 2) Requirement of a good camera at the patient end. 3) Good internet connection at both ends is mandatory. 4) Caregiver following all asepsis and Covid protocol and then confirming findings like measurement of fever, local warmth, condition of wound is added advantage. 4) Any time tele consultation can be stopped, if difficult to advice. An in person consultation should be suggested.

Battling COVID-19: Safety and ethical issues [5]

The following table 4 enlists the safety and ethical guidelines which needs to be followed while battling with COVID-19 infections while dealing with chronic wound patients.

Guidance
All elective cases are to be postponed
Consent discussion with patients must cover risk of COVID-19 exposure and potential consequences
Structured system of transfer of COVID positive patients to the OT, via communication between surgeon, anaesthetist & staff
Presume entire OT is contaminated and hence: - Follow negative pressure in OT / allow 30 minutes time between cases for air exchange - Minimal number of staff in the OT - Hospital charts, pagers, and cell phones must be left outside the OT - All single-use equipment in the room should be thrown away at the end of the case - Electrosurgery units should be set to the lowest possible settings for the desired effect
All members to wear standard surgical PPE
Clinicians are more likely to infect themselves when removing their PPE. Proper gowning & removal to be assisted and monitored by colleague

Table 4: *Safety and ethical issues guidance to be followed while battling with COVID-19 infections while dealing with chronic wound patients.*

Key recommendations for wound care management in times of COVID-19 [5,22]

- Patients should use simple non-adherent dressings, which would not require any specialized equipment or experienced clinicians.
- Patient or care takers should continue to monitor the patient's ulcer and feet for infection or other signs of deterioration.
- Patient should know who to contact and where to go if his/her ulcer gets infected.
- During crisis patients should be educated for effective offloading:
    - Effective offloading accelerates ulcer healing, prevents deterioration, reduces infection and hospitalization rate;
    - Reduces need for more frequent ulcer debridement and sometimes dressings, and also helps to reduce the number of necessary clinical visits during these times;
    - During crisis, 1st choice of offloading includes use of removable knee-high walkers; if not available alternatively, ankle-high devices, such as ankle-high walkers, forefoot offloading shoes, healing sandals etc. can be used. If none of the above options are available then, felted foam and appropriately fitting footwear can be used (Figure 7).

Figure 7: *Offloading devices.*

Conclusion

COVID-19 is a serious global pandemic crisis currently, leading to mass hospitalization and isolation. However, on the contrary chronic wounds is also the leading cause of hospitalization, worldwide. Since, during COVID crisis, hospital bed requirement would increase; wound care practitioners should take necessary steps to minimize hospital admission of wound patients. Specific triage is required to differentiate between critical, severe and stable patients and focused treatment approach should be applied accordingly. First priority should

only be given to critical patients with ICU care. Appropriate technology should be used to be in touch with the patients at home who are unable to travel. Alternative services like telemedicine with proper patient education should be adopted. Homecare services to provide continuity of care and patients should be shifted at the appropriate time to the hospital. ICU facilities and available resources should be used sensibly so that it does not create stress to the hospital services already reeling under the burden of COVID 19 pandemic. Thus, the aim is to keep the chronic wound patients and related health care workers safe during such a highly infective stage of COVID-19 pandemic.

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