

A NATURAL PERSPECTIVE ON THE MANAGEMENT OF BURN WOUNDS CAUSED BY ACID AND BOILED WOUNDS

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Abstract

Burns is one of the most traumatic incidents that one can experience. Burns are of various types, depending on the severity and depth of the burn wound. The patient undergoing treatment tolerates a lot, including excruciating pain, infection, and burn scars-related issues. Traditional approaches are one of the most effective methods to treat burn injuries. Traditional remedies have the ability to reduce the risk of infection additionally they are cost-effective and free of side effects. Despite the fact that there are many advanced technologies for burn care, natural treatments are needed to avoid more complications because these technologies can have significant side effects and toxicity. The aim of this review is to provide readers with information on traditional and herbal treatments for both boiled and acid attack burns. This article focuses on natural resources. This is an effort to investigate and study the pathophysiology of acid and boiled burn wounds in order to learn more about how to treat them effectively. Further scientific studies on enlisted natural resources would be useful for better future management of the above-mentioned conditions.

Keywords: Acid Burn; Boiled Burn; Wound; Infection; Traditional Remedy

Introduction

Burn is one type of skin injury. This injury causes damage to delicate tissues (Abdullahi *et al.*, 2014). These changes in delicate tissues caused by burning harm affected area by creating wound along with unbearable pain (Rowan *et al.*, 2015). Burn wound care is very complicated (Georgescu *et al.*, 2016). While receiving treatment, some patients have died as a result of respiratory failure and unbearable pain (Gerling *et al.*, 2001). It has been discovered that

alternating inflammatory responses can speed up the healing of skin scarring caused by burns. Burn wounds are one of the most painful situations which not only affect the patient's health but also cost money for treatment. To avoid such conditions traditional medicaments are highly recommended (Lateef *et al.*, 2019). Particularly flavonoids, alkaloids, saponins and phenolic compounds are the major dynamic constituents present in various

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species which encourage wound contraction have been recorded (Mannan *et al.*, 2007). A large part of the burn is covered by acid and boiled burn wounds. The acid burn attack is commonly considered as domestic abuse or a case of revenge against women,

Table 1. Accidental boiled burn cause and category

Category	Cause	References
Children (Pediatric)	Traumatise child, in case of disabled child, sometime due to aggression, unwanted child, Domestic violence caused by a hot drink or hot bath, as well as unintentional domestic violence.	(Peck and Priolo-Kapel, 2002)
Adult (Women)	Domestic abuse has been reported mostly in the case of women working in kitchens.	(Van <i>et al.</i> , 2004)
Adult (Men)	Unintentional, accidental and sometime suicidal.	(Groohi <i>et al.</i> , 2002)
Elderly above 50 years	Accidental, due to easy access to flame or boiling water and domestic violence.	(Lari <i>et al.</i> , 2000)

Table 2. Acid attacks on women

Country	Reason of acid attack	Target of attack	Reference
India	Jealousy, forced marriage, social stratification, changes in gender role, due to aggression and molestation.	Face to destroy beauty	(Welsh, 2009)
Bangladesh	Kidnapping and robbery, as well as sexual harassment and indecent abuse.	Face	
Cambodia	Female's exploitation and domestic violence.	Skin and Face	
Sri Lanka	Rejecting the proposal, religion fundament as well as on the basis of attire	Face.	

although it is not limited to women. There are several male victims attacked with acid, the motive for the attack is a property dispute, crime, and abuse (Khoshnami *et al.*, 2017). The Acid attacks result in poor health, and also has a negative impact on a person's life. After the acid attack, they find it difficult to face society and acknowledgment of their own presence (Lehnhardt *et al.*, 2005). The heat or steam from boiling water mainly causes thermal burns. Protein, as well as immunoglobulin, is lost from the body in extreme cases (Church *et al.*, 2006). The burn patient based on the severity of the burn should be treated with extreme caution. The treatment should target scar-free healing and control infection spread (Albertyn *et al.*, 2015).

According to a survey, the incidence of boiled wounds is more common in domestic abuse, accidents, and other unintentional causes (Table 1). On another side, acid attacks are thought to be carried out with the intention of destroying women's and girls' beauty (Table 2). Though in all cases of burn the severity and pain is high along with infections, the burn due to acid attack and boiled burn wound is taken into consideration for availing their proper natural immediate management to reduce secondary complications.

Pathophysiology of burn

The systemic response to a burn wound is linked to an increase in proinflammatory cytokine levels in the blood. In the presence of a burn injury Tumor necrosis factor (TNF- α) and interleukin-I (IL-I) Leukocytes are a central players in the development of a diverse range of cells. Both cytokines contribute to the development of acute phase protein, fever and a general state of catabolism The synthesis of prostaglandins, platelet-activating factor, and platelet-derived growth factor interleukin-6 (IL-6) is enforced by endothelial cells and macrophages. The acute phase leads to the activation of T-cells. Another proinflammatory cytokine, produced by Natural killer cells (NK cells) and T-helper type-I (Th-I) cells in response to burn injury, is gamma interferon (Placheta *et al.*, 2009).

(Figure 1.) During burn injury endogenous damage-associated molecular patterns (DAMPs) like mitochondrial DNA and double standardised RNA (dsRNA), as well as exogenous pathogen-associated molecular pattern molecules (PAMPs) like lipopolysaccharides (LPS) and peptidoglycans, are released. This causes vascular leakage, an inflammatory reaction and metabolic changes such as increased muscle protein degradation, insulin resistance, and increased cardiac load this leads to hyper metabolism. On the other hand immune with

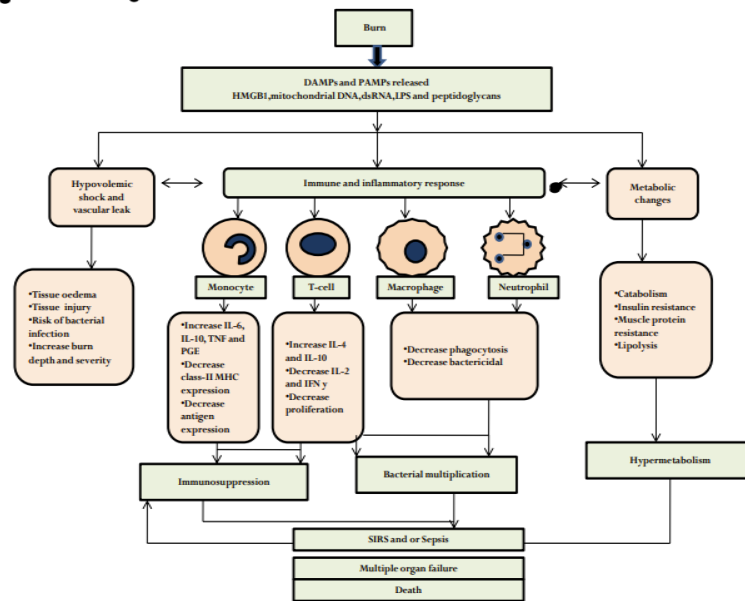


Figure 1. Pathophysiology of Burn

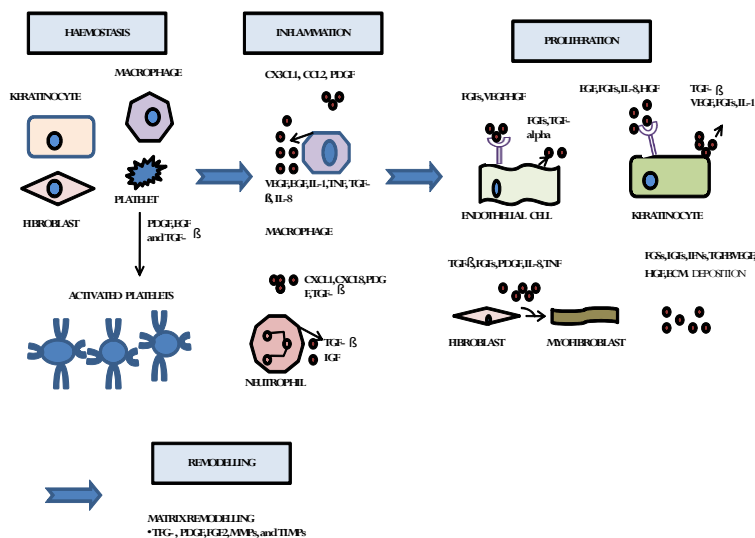


Figure 2. Stages of natural wound healing (CX3CLI- chemokines ligand 1, CCL2- chemokines ligand 2, PDGF- platelet derived growth factor, EGF-epidermal growth factor, TGF β - transforming growth factor beta, IL-8- interleukin 8, CXCL1-, CXCL8- chemokines ligand 8, IGF- insulin like growth factor, FGFs- fibroblast growth factors, VEGF- vascular endothelial growth factor, HGF- hepatocyte growth factor, ECM- extracellular matrix) (Jeschke *et al.*, 2020).

inflammatory response by the help of monocytes (by increasing IL-6, IL-10, TNF, T-helper cells (increase IL-4, IL-10; decrease IL-2, IFN gamma; and proliferation) along with PGE which (decrease class-II MHC expression; and decrease antigen expression) causes immunosuppression. Macrophages and neutrophils cause bacterial

multiplication (decrease phagocytosis, and decrease bactericidal). These events result in systemic inflammatory response syndrome (SIRS), which is an inflammatory state that affects the entire body and can lead to multiple organ failure and then death (D'Arpa and Leung, 2017).

(DAMPs- damage-associated molecular pattern, PAMPs- pathogen-associated molecular pattern, HMGB1-high mobility group box protein 1, DNA- deoxyribonucleic acid, dsRNA-double standard ribonucleic acid, LPS-lipopolysaccharides, IL-6- interleukin-6, IL-10-interleukin-10, TNF- tumor necrosis factor, PGE-prostaglandin, class-II MHC- major histocompatibility complex, IL-4- interleukin-4, SIRS- systemic inflammatory response syndrome).

Stages Of Natural Burn Wound Healing

Show in Figure 2.

Haemostatis

This stage appears just following a burn injury that involves vasoconstriction, activation, and aggregation, release of clotting and growth factors

like platelet-derived growth factor (PDGF), epidermal growth factor (EGF), and transforming growth factor beta (TGF β) through keratinocytes, platelets, fibroblasts, and macrophages. These forms of fibrin clot and deposit at the affected area of the burn, it acts as a temporary structure for subsequent stages of healing and initiate inflammation stage (Lorente *et al.*, 2000).

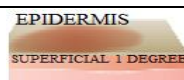
Inflammation

About 24 hours of the injury the inflammation stage will develop and continues depending on the seriousness of the burn. Macrophages and neutrophils produces cytokines and chemokines which includes interleukin-I (IL-I), interleukin-8 (IL-8), tumor necrosis factor (TNF) also growth factors like insulin like growth factor (IGF), transforming growth factor beta (TGF- β), and vascular endothelial growth factor (VEGF) this helps in the removal of pathogens and debris.

Table 3. Classification of burns depending on causes (Josty *et al.*,2000; AlSuleimani and Hiley, 2013; Wactor *et al.*,2000; Arnoldo *et al.*, 2004; Waghmare,2013; Shehan and Peter, 2004 and Maghsoudi and Gabraely,2008)

Type of burn	Cause of burn	Description
Thermal burn	By dry heat (flame burn), by wet heat (scalds), by boiling water.	Thermal burns in the second and third degrees are possible.
Electrical burn	By coming into contact with both high and low voltages.	Electric current flows through the body, causing entrance and exit points.
Flash burn	By welding and all type of (U.V) light.	Expose body from several feet energized electrical conductor or circuit component.
Radiation burn	By X-ray, U.V ray or radiation.	Radiofrequencies damage skin.
Chemical burn	Acid, alkali, and other highly flammable chemicals.	Coagulative necrosis is caused by chemical burns, which are often full-thickness burns.

Table 4. Classification of burns depending on severity and depth

Classification based on severity and depth	Description	Diagrammatic representation	References
Superficial I degree	Only the top layer of the epidermis of the skin is included, and is the least genuine burn.		(Butt <i>et al.</i> , 2019)
Superficial partial II a degree	The skin's epidermis and dermis layers are affected. Skin becomes red, wet epidermal appendages are intact, and pressure blanches with blisters.		(Torpy and Lynn, 2009)
Deep partial II b degree	The dermis of the deeper layer (reticular) is included. Both appendages have been lost, and the skin is dry, translucent, and non-blanching.		(Vaughn <i>et al.</i> , 2012)
Deep III degree	It requires the whole thickness of the flesh. With thrombosed vessels, the skin becomes leathery, oily, translucent, or red.		(Percival, 2002)

Proliferation

The recruitment and activation of fibroblasts and keratinocytes at the wound site is referred to as proliferation stage. Keratinocytes participate in both processes i.e. epithelialization and angiogenesis. The process angiogenesis is triggered by the activation of endothelial cells by growth factors such as vascular endothelial growth factor (VEGF), hepatocyte growth factor (HGF), and fibroblast growth factor (FGF). The remaining fibroblasts are converted to myofibroblasts and used in extracellular matrix deposition (Guillory *et al.*, 2016).

Remodeling

It is the final stage of natural healing of burns. At this stage, EMC used growth factors to remodel the granulation tissue. Tissue inhibitor metalloproteinases (TIMPs) and matrix metalloproteinases (MMPs) contribute in tensile strength. Burn wound healing is influenced by the start of the inflammatory cascade, the severity of the injury, and the diet. The oxidative stress represented by inflammatory mediators and a rise in nitric oxide level may be the cause of the labeled capillary leakage (Adams *et al.*, 2009).

Burn Wound Sepsis

For the burnt patient, it is a series of calamitous and lethal complications (Kennedy *et al.*, 2010). All burns get contaminated with dirt, pollutant, and bacteria, causing the healing time to be slowed and the burn situation to become more difficult, potentially leading to death (Ekrami and Kalantar, 2007). Bacteria enter further into the skin due to the depth and surrounding of the burn and cause serious infection. Burn wound infection, urinary tract infection, and bloodstream infections are the three most common nosocomial infections seen in burn patients (MacKenzie *et al.*, 2006).

Classification of burn wound

Burns are classified based on the causative life type, the degree of the attack, and the tissue response. Burns are divided into five types depending on the source, according to the article's key concern (Table 3) (Rice and Orgill, 2019). The burns are then classified into five categories based on the severity and depth of the burn (Table 4).

Burn wound healing challenges and advancements

1. Clinical practices in burn injury: Skin grafting, skin substituent, wound dressings, and negative pressure.

2. Challenges faced by burning injuries: Infection, pain, and scarring.
3. Advances seen during burn wound healing: Skin tissue engineering, innovative material, and advanced technologies (Evers *et al.*, 2010).

Clinical practices in burn injury

Skin grafting

Skin grafting is one of the most important techniques for dermatologists which help them to perform reconstruction of the delicate tissue. In this technique, the free skin transplanted to the part of the body where skin grating has to done. The outcomes of this technique are utilized to accomplish the reconstruction of the tissue for the healing of burn wounds (Ratner, 2003).

Skin substitutes

Skin substitutes are a useful and important feature of biopolymers that have been improved to meet existing injury treatment needs, such as the preservation of tissue integrity, scar-free recovery, and tissue reconstruction (Sahana and Rekha, 2018).

Wound dressing

Wound healing is a complicated and complex mechanism that necessitates a comfortable environment in order to progress. Many products have been developed to treat specific types of wounds, such as burn wounds, by focusing on different aspects of the healing process dressing should be selected wisely (Dhivya *et al.*, 2015).

Negative pressure wound therapy (NPWT)

Scientific evidence also NPWT can be used to treat burn wounds, according to research. NPWT works by increasing the rate of granulation in tissue formation. NPWT also helps in improving the infection caused by contamination (Dedmond *et al.*, 2007).

Challenges faced by burn injury

Infection

As a result of the extent and severity of the burn, bacteria penetrate further into the skin, causing severe infections (Sharma, 2007). Burn wound infections are one of the more serious infections, and they can take longer and need more effort to heal against most infections. As a result, treatment should be performed with more sensitivity (Sjöberg *et al.*, 2003). Because it has been seen that

microorganisms colonize this may impact the health of the patient in the future (Rafla and Tredget, 2011).

Pain

Burn injury causes major intense pain. Due to this persistent pain, stress related problems may be developed in patients. It has been recorded that burn injury pain is one of the major clinical concerns for the patients who are going through this painful harm. Burn pain treatment should be upgraded because available treatment is not enough to provide full relief in pain (Summer *et al.*, 2007).

Scarring

It has been recorded that after recovery of burn injury scars remains on the affected part of the injury. To treat scars traditional remedies are the most suitable option. There are a lot of basic burn scar treatments, but their effectiveness may take some time to manifest. Massage therapies, moisturizer, and lotion can be used to speed up scar healing (Anthonissen *et al.*, 2016).

Advances seen during burn wound healing

Skin tissue engineering

The aim of skin tissue culture is to re-grow the skin by cell culture and polymer chemistry. This method is often used in the treatment of burn wounds caused by acid or thermal (boiled water) sources (Gauglitz, 2013).

Innovative material and advanced technologies

There are a variety of new and advanced technologies available today to replace old methods such as allograft, keratinocyte culture, and xenograft (Atiyeh *et al.*, 2005; Lineen and Namias, 2008).

Natural remedies for burn due to acid and boiled wounds

Our ancestors used various approaches to find the medicinal potential effects of plants and animals for the treatment of many different human diseases, some of them passed on from generation to generation (Yuan *et al.*, 2016). There are many pieces of research which positive results from the application of traditional remedies on burn healing (Bahramsoltani *et al.*, 2014). Traditional care also aids in the relief of the financial stress associated with a patient's treatment. Natural remedies are more random than advanced surgical procedures (Chaudhary, 2018).

1. *Carica papaya* (latex)

The latex of *Carica papaya* is very helpful in the treatment of burns. Latex contains chymopapain and papains, all of which have antimicrobial properties and are capable of tissue desloughing which helps in preventing infection (Gurung and Skalko-Basnet, 2009). The normal skin tissue after burn becomes dead sometimes turns into sloughy wounds the prime reason behind non-healing. Preventing the spread of infection and removal of eschar are part of the burn wound treatment. The enzyme chymopapain and papain both have the potential to digest dead cells along with softening of the affected skin area. From various literatures it has been confirmed that papaya latex are found beneficial in delivering less painful, scar less, and cleaner treatment of burns (Shuid *et al.*, 2005).

2. Honey (*Apis mellifera*)

Honey has antimicrobial as well as moisturizing properties, making it useful in the treatment of burns. Due to the levulose and fructose in honey; it is also facilitates tissue regrowth (Molan, 2001). Wound swabs have shown a substantial reduction in infection rate, early tissue granulation before and after treatment with honey. Honey is being approved and used by doctors as an alternative cure for burn injuries. In various studies, honey has been shown to be helpful in superficial and partial thickness burn (Subrahmanyam, 2007).

3. *Arnebia euchroma* (roots)

Arnebia plants are Iran based. They are beneficial in burns as they are having antimicrobial and anti inflammatory activities. *Arnebia euchroma* roots with goat lipid seen as burn cure. It increases well organized collagen bands, more fibroblasts with inflamed cells. The two main components of *Arnebia euchroma* are arnebin-1 and shikonin. Arnebin-1 reduces wound diameter and gap volume, as well as facilitating cell replication, migration, and vessel development, resulting in dense granulation tissue and wound re-epithelization. These actions play a significant role in improving burn wound healing because the shikonin derivative is reduced by oxygen into the shikonin semiquinone radical.

4. *Malva sylvestris* (flowers)

Malva sylvestris are Iran based plants. They are used in treatment of burn the plant are having anti microbial, anti inflammatory and anti tumor activities *malva sylvestris* flowers with cold cream widely seen as cure for burn injuries. *Malva sylvestris* contains phytochemical components such as malvone A: 2-methyl-3-methoxy-5, 6-dihydroxy-1, 4 naphthoquinone, mentioned component could be responsible for antimicrobial activity due to

individual or additive effect. This demonstrates its traditional use in the treatment of burn wounds (Pirbalouti *et al.*, 2009).

5. Combretum

Combretum is a broad and widely distributed genus. It contains 200 to 250 species of antifungal, antibacterial, antihyperglycemic, anti-inflammatory, cytotoxicity against tumour cell lines, antimalarial, antioxidant, and anti-venom properties (Roy *et al.*, 2014). Combretum glutinosum is a plant native to Senegal. In Senegal, the trunk bark of glutinosum is used as a common remedy for burn wounds. Owing to the inclusion of tannin and a triterpenoid chemical, the aqueous extract of bark has both soothing and anti-inflammatory topical action (Barboza *et al.*, 2020). Combretum mircanthum is a plant native to Mali. The root extract is used to treat burns. According to the findings, there are four more species of Combretum that have antimicrobial activity and have no side effects, making them useful in the healing of burn wounds. Those four species are Combretum imberbe, Combretum nelsonii, Combretum albopunctatum, and Terminalia sericea (Masoko *et al.*, 2010).

6. Capsicum annum l. (leaves)

This plant is native to Ethiopia. The burn wound was treated with the leaf extract. Capsicum annum is not only nutritious, but it also has pharmacological benefit. It is one of the common herbs used to treat burn wounds since it has a range of pharmacological properties such as antioxidant, antimicrobial, and anti-inflammatory properties (Parvez and Yadav, 2010). The presence of phytochemical components such as capsaicin, cis-capsaicin, dihydrocapsaicin, capsiate, as well as capsaicinoids and their metabolites, gives the plant antimicrobial and anti-inflammatory properties, which aid in pain relief and inflammation inhibition (Khan *et al.*, 2014).

7. Allium sativa (stem)

The plant is native to northeastern Iran and central Asia; it is usually referred to as garlic in Asia (Arzanlou and Bohlooli, 2010). After the decoction process, the stem portion is cleaned and applied to the burn area with sesame oil for treatment (Inngjerdigen *et al.*, 2004). Mainly the burn caused by acid or boiled water. According to a literature review, crushed garlic cloves given orally can control pseudomonas aeruginosa, the bacteria that causes burn wound infection in patients with various burn sizes. Garlic's antimicrobial and antifungal properties were first studied clinically in the nineteenth century (Erzanlou *et al.*, 2007). The

extract of garlic was as effective as 1 percent silver sulfadiazine in decreasing the amount of bacteria after topical application of 10 percent (v/v) garlic extract on region of burn wound with P.aeruginosa on mice, according to a literature review. Changes in the lipid profile of cell membranes were found to be the mechanism behind the antimicrobial activity (Ghalambor and Pipelzadeh, 2009).

8. Guiera senegalensis (leaves)

Tropical Africa is the origin of this plant. The part of the leaves applied to the burn in paste form after grinding those (Silva *et al.*, 2003). The leaves are having antimicrobial activity (naphthalene ketone derivative) against gram positive and gram negative this helps in preventing and controlling the infection caused by burn. Owing to the presence of guieranone, it also has antifungal properties (Dirar and Devkota, 2020).

9. Lawsonia inermis (leaves)

Australia, Asia, and Northern Africa are origin of henna plant (*Lawsonia inermis*). The leaves are dried, powdered, then ground into a paste and added to the burn to control infection by inhibiting microbial growth (Muhammad and Muhammad, 2005). *Staphylococcus aureus*, *Fusarium oxosporum*, *streptococci sp.*, *Aspergillus Niger*, *Candida albicans*, and *Pseudomonas aeruginosa* colonizing at the burn site which cause infection complications (Hadisi *et al.*, 2018). This can be avoided and control by the help of henna plant. The henna plant consist of many phytochemical constituents (tannic acid, mannite, gallic acid) the major component responsible for antimicrobial activity is 2-hydroxynaphthoquinone (lawsone) due to which henna plants inhibit the growth of microorganism. From review literature it has been concluded by a study that henna loaded gelatin oxidized starch mat dressing can be used to treat burns. Henna loaded gelatin dressing showed mild inflammatory response with less macrophages, antibacterial activity and antifungal activities at burn site this indicate that they could be promising burn wound dressing (Aliasl and Khoshzaban, 2013).

10. Aloe vera (leaves)

The origin of this plant is Southeastern Europe, South Africa and to Western Indian oceans (Teka and Kassahun, 2020). Burns have long been treated with aloe vera, but clinical evidence is insufficient. The aloe leaf has potential to increase the rate of epithelization and helps in faster recovery (Khorasani *et al.*, 2009). The aloe vera leaves consists of various bioactive compounds with therapeutic activities such as antiseptic (lupenol,

salicylic acid, nitrogen, cinnamonic acid, phenols and sulphur), anti-inflammatory (peptidase bradykinase, C-glucosyl chromone, lupenol, cholesterol, beta-sterol) along with antifungal and antibacterial activities (Sahu *et al.*, 2013). From a systemic review it has been Because of the occurrence of glycoprotein in aloe plants, the study was performed to assess the potential of aloe plants in the treatment of burns. This reveals that aloe leaf successfully accelerating the speed of healing process along with epithelization rate (Maenthaisong *et al.*, 2007).

11. *Solanum tuberosum* (peel)

The origin of potato plant is America. Various experiments have shown that using the peel of a boiled potato as a burn dressing reduces the severity of the burn (Hijmans, 2003). As added, the perfect dressing should be non-adherent, antiseptic, non-antigenic, non-allergic, inexpensive, and readily accessible (Haesler, 2017). Boiled potato dressing is one such choice that has all of the characteristics of a perfect wound dressing. Dressing of boiled potato peel helps in pain relieve and allow epithelium regeneration. It also provide moist environment which helps in dehydration of burn wound and faster healing of the burn (Buck and Velde, 2010).

12. Laponite

It is a synthetic clay mineral. The laponite can be used as burn treatment because it consist antibacterial properties. For burn treatment laponite developed and formulated in forms like hydrogel, sponges and films. From review it is found that laponite in combination with mafedine has tested for burn wound dressing in-vitro. This test shows that the high ion exchange capacity of laponite structure accommodate mafedine molecule in its inter layer spaces. This helps in preventing spread of infection and healing of burn wound faster (Ghadiri *et al.*, 2014).

13. Cow urine

According to a literature review, cow urine is commonly used as a healing agent especially in Nepal, to treat inflammation of burn wounds. The antibacterial activity of cow urine was determined using the agar disc diffusion method, and the antioxidant activity was determined using the 2,2diphenyl 1-picrylhydrazyl free radical (DDPH). According to a report, the antioxidant activities of cow urine increase dramatically as altitude rises (Bhandari *et al.*, 2020).

14. Cow dung

It has been found from a review that the cow dung is one of the most widely used home remedies

for burn wounds in many rural societies. The antimicrobial activities identified against pathogenic microorganisms such as staphylococcus aureus, bacillus substilis, and E.coli. Collagenases, elastases, and matrix-metalloproteinase (MMPs) are proteolytic enzymes which are implicated in the wound healing method. These enzymes often added to commercial debriding ointments used to remove non-viable tissue from wounds. The presences of such proteases are may be one of the factors contributing to efficacy or suspected efficacy of cow dung using to treat burns (Gololo *et al.*, 2019).

15. Gentian violet paint

According to a survey review 400 patients with various aetiologies of burns admitted to a burn ward with total body surface area burns ranging 15% to 50 %. Group-I consists of patients who were undergoing conventional care. Group-II consists of those who used gentian violet paint locally. From this it was discovered that local application of gentian violet paint healed the burn wound in 6-8 weeks without excessive sepsis or need for skin grafting. This shows that gentian violet paint is a cost-effective solution for burn wound treatment (Choudhary *et al.*, 2013).

16. Electrolyzed oxidized water irrigation

From a survey it has been reported that in a study rat burn wound model with *Pseudomonas aeruginosa* infection treated by electrolyzed oxidized water (EOW) due to its bactericide activity. The rats were divided into three groups: group-I with no irrigation, group -II with physiologic saline irrigation, and group-III with EOW irrigation. The survival rates, endotoxin levels and blood culture were determined. The survival rate in group-III (with EOW irrigation) was substantially higher than other two groups. This concluded that electrolyzed oxidized water irrigation helps in preventing burn wound sepsis (Nakae and Inaba, 2000).

Conclusions

This research looked into the pathophysiology and natural healing of burns caused by acid and boiling, which is a social hazard. This article discusses the use of various bioactive moieties obtained from natural resources to control burn. This study focused also on the use of natural remedies in the overall treatment of all types of burn injuries. It also included clinical evidence of traditional remedies with their beneficial effect in the treatment and management of acid and boiled burns along with their mode of action. According to the studies, it has been found most

traditional burn treatments work by inhibiting bacteria or other types of infection, increasing tissue regrowth or improving epithelization rate. Another encouraging finding of this research is that natural remedies help to remove scars that often remain after burn treatment. Many new and advanced tools are now available for the treatment of burns. The more sophisticated technology become, the more it would cost, along with unintended consequences, so we should concentrate our efforts on natural remedies due to their lower cost and toxicity. There have been several clinical studies on burn injuries that would be benefited by the present review article in developing improved treatment for management of burn. Also, be beneficial socioeconomically in first-aid care due to improved healing property of natural remedies.

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