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Case Report

Copazan Herbal Gel and Thermal Burn Management: From Science to Burn Site Management: One Year Experience Based Preliminary Study

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Abstract

Burns are a prevalent and burdensome critical care problem. The priorities of specialized facilities focus on stabilizing the patient, preventing infection and optimizing functional recovery. As continuation to our interest in designer functional biomaterials for biomedical application in this article we report the use of Copazan Herbal Gel[R] a medical grade isotonic hydrogel made from high molecular–weight biopolymer that promotes wound healing in the thermal burn as well as report several biologically properties of the commercially available material. Combined understanding of mechanism of wound healing and biological properties of designer biomaterial Copazan Herbal Gel lead to a successful application to large thermal (water) huge.

Keywords: *Thermal Burn; Copazan Herbal gel; Healing*

Introduction

Acute thermal injuries require medical treatment affect nearly half a million Americans each year, with approximately 40000 hospitalization and 3400 death annually [1]. Thermal burns from dry sources (fire or flame) and wet sources (scalds) account for approximately 80% of all reported burns [2] and can be classified based on the depth of burn [3,4]. In addition to local injury at the site of burn, severe thermal injury over a large area of the skin, roughly 20% total body surface area (TBSA) or greater, results in acute systemic responses collectively known as burn shock [5]. The edema that forms in the interstitial space forms rapidly in the first 8 h following burn injury, and continues to form more slowly for at least 18h [6]. According to one model, the burn wound can be di- vided into three zones based on the severity of tissue destruction and alterations in blood flow [7]. The central part of the wound, known as the zone of coagulation, is exposed to the greatest amount of heat and suffers the most damage. Proteins denature above 41°C (106°F), so excessive heat at the site of injury results in extensive protein denaturation, degradation, and coagulation, leading to tissue necrosis. Around the central zone of coagulation is the zone of stasis, or zone of ischemia, which is characterized by decreased perfusion and potentially salvageable tissue [8-11]. In this zone, hypoxia and ischemia can lead to tissue necrosis within 48h of injury in the absence of intervention [12]. The mechanisms underlying apoptosis and necrosis in the ischemic zone remain poorly understood, but appear to involve immediate autophagy within the first 24h following in- jury and delayed-onset apoptosis around 24 to 48h postburn [12]. Other studies have shown apoptosis to be active as early as 30 minutes postburn depending on the intensity of the burn injury [13]. Oxidative stress may play a role in the development of necrosis, as preclinical studies have demonstrated promising reductions in necrosis with systemic antioxidant administration [13]. At the outermost regions of the burn wound is the zone of hyperemia that receives increased blood flow via inflammatory vasodilation and will likely recover, barring infection or other injury [13]. Although burns are different from other wounds in some respects, such as the degree of systemic inflammation healing of all wounds is a dynamic process with overlapping phases [14]. The initial inflammatory phase brings neutrophils and monocytes to the site of injury via localized vasodilation and fluid extravasation, thereby initiating an immune

response that is later sustained by the recruitment of macrophages by chemokines [15]. The inflammatory phase serves not only to prevent infection during healing, but also to de- grade necrotic tissue and activate signals required for wound repair [16]. Following, and overlapping with the inflammatory response, the proliferative phase is characterized by keratinocyte and fibroblast activation by cytokines and growth factors [17]. In this phase, keratinocytes migrate over the wound to assist in closure and restoration of a vascular network, which is a vital step in the wound healing process [18]. This network of communication between stromal, endothelial, and immune cells determines the course of healing, including closure and revascularization. Overlapping with the proliferative phase, the final phase of healing involves remodeling the wound [19]. During the remodeling phase, the wound scar matures as collagen and elastin are deposited and continuously reformed as fibroblasts become myofibroblasts [20]. Myofibroblasts adopt a contractile phenotype, and thus are involved in wound contracture [21]. The conversion from fibroblasts to myofibroblasts controls a delicate balance between contraction and re-epithelialization that, in part, determines the pliability of the repaired wound [22]. In addition to fibroblast conversion, apoptosis of keratinocytes and inflammatory cells are key steps in the termination of wound healing and the overall final appearance of the wound [23].

For many years the effects the effect of herbal medicine on burn wound. Herbal product seem to possess moderate efficacy with no or less toxicity and are less expensive as compared with synthetic drugs.

As continuation to our interest in designer functional biomaterials for biomedical application in this article we report the use of Copazan Herbal GelR a medical grade isotonic hydrogel made from high molecular–weight biopolymer that promotes wound healing in the thermal burn as well as report several biologically properties of the commercially available material.

Clinical Case: Copazan Herbal Gel and Thermal Burn (Scald, Second degree (partial thickness).

Copazan Herbal Gel is a medical grade isotonic hydrogel made from high molecular–weight biopolymer that promotes wound healing in humans and animals. Additional benefits of the natural oils such as oleo di copaiba, calendula oil and rosehip oil provide the additional anti-inflammatory, pain-management and wound healing properties to address all aspects of healing and wound management. Copazan Herbal Gel is ideal for human and animals with wounds, burns, grazes and as a general first aid.

Case study description

Patients age: 43 years
Sex: Female
Cause: Hot water burn
Therapy: Washed with cold water for 20 minutes. Applied Copazan Herbal Gel 3x a day, non-adhesive sterile dressing used to protect the blister.

Figure 1: *After 30 minutes 3x a day, non-adhesive sterile dressing used to protect the blister.*

Figure 2: *After 7 days using Copazan Herbal Gel (3x a day, non-adhesive sterile dressing used to protect the blister).*

Figure 3: *After 6 month using Copazan Herbal Gel (1x a day at night).*

Results

- No allergic reactions related to the product were noted.
- No itching of the wound were noted throughout then healing process.
- No pain relief medication was necessary.
- Very good aesthetic outcomes.
- Infection Control
- Stays on the wound
- Use with or without bandage
- Non-toxic

Biochemical properties of Copazan Herbal Gel Summary

Copazan Herbal Gel[R] is a medical grade isotonic hydrogel made from high molecular–weight biopolymer that promotes wound healing *in vitro*. As part of *in vitro* evaluation of the Copazan Herbal GelR the parameters such as cytotoxicity, bioadhesion, inhibition zone and assessment of free radical capacity defense properties of the materials were measure and potential clinical application s of this promising material are reported.

Performance of Copazan Herbal gel [24-27]

• **Properties**	• **Copazan Herbal Gel**
• Cell Viability percentage (1)	• 107%
• Moist Environment (2)	• Yes
• Protective Film Effect	• Yes
• Anti-inflammatory and analgesics	• Yes
• Cell multiplication enhancement	• Yes
• Wound Contraction (3)	• Yes
• Bacteriocidal	• Yes
• Bacteriostatic	• Yes
• Stays where applied(4)	• Yes
• Non-toxic	• Yes
• Use with or without bandage	• Yes

(1): Standardized MTT assay determining cell viability percentage and viable cell counting.

(2): Hydrophilic: Copazan Herbal Gel absorbs 6 times its own weight in wound excudate.

(3): With its involvement in 4 stages of wound healing and tissue regeneration. Copazan Herbal Gel accelerates the wound healing contraction phase.

(4): Stays where applied product application on vertical wound exposed to wound exudate without the use of bandage. Copazan Herbal Gel poses excellent bio adhesive properties.

Copazan Herbal Gel is scientifically formulated and extensively tested medical grade gel, which incorporates state of the art science and exclusive natural ingredients boosting the angiogenesis phase of tissue regeneration [24-27].

Properties	Chitosan	Aloe Vera Gel	Copaiba Oil	Calendula Oil	Rosehip Oil
Wound healing	Yes	Yes	Yes	Yes	Yes
Antimicrobial activity	Yes	Yes	Yes	Yes	Yes
Tissue Regeneration	Yes	Yes	Yes	Yes	Yes
Analgesia	Yes	Yes	Yes	Yes	Yes
Bioadhesion	Yes	Yes	Yes	Yes	Yes
Antioxidant	Yes	Yes	Yes	Yes	Yes
Anti-inflammatory	Yes	Yes	Yes	Yes	Yes

Results of *in vitro* testing published elsewhere

Conclusion

Copazan Herbal Gel[R] is a medical grade isotonic hydrogel made from high molecular–weight biopolymer that promotes wound healing *in vitro* and *in vivo*. Further *in vivo* investigations are currently in the development and undoubtedly will lead to further validation of the use of Copazan Herbal Gel as effective designer biomaterial for wound healing application.

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