

## Chitosan on scald Burns: A Case Report

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### ABSTRACT

The management of non-healing wounds presents a significant clinical challenge, often complicated by infection and delayed tissue regeneration. Traditional dressings frequently fall short due to limited antibacterial effects and inability to maintain a moist healing environment. This case report details the application of chitosan in a 1 year-old female with scald injury over anterior chest and face. This case demonstrates chitosan's efficacy in promoting wound bed preparation, augmenting inflammatory cell activity, and enhancing wound tensile strength, thereby supporting its potential as a valuable addition to wound management strategies.

### KEYWORDS

• Chitosan • Wound Healing • Case Report • Biomaterial

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## INTRODUCTION

The management of wounds represents a significant challenge in clinical practice, encompassing a complex and highly coordinated multi-stage biological process. This intricate cascade of events can be substantially disrupted or delayed by various factors, including persistent infection, uncontrolled hemorrhage, and compromised tissue regeneration. These complexities underscore the pressing need for advanced wound care solutions that extend beyond rudimentary physical coverage.

Traditional wound dressings, such as those made from cotton, basic bandages, and gauze, possess inherent limitations that often impede optimal healing outcomes. These conventional materials typically exhibit weak antibacterial effects, rendering wounds susceptible to infection and inflammation. A further drawback

is their tendency to adhere to the delicate granulation tissue, leading to secondary injury and patient discomfort upon frequent removal. Moreover, these dry dressings fundamentally fail to provide the moist environment now recognized as crucial for optimal cellular proliferation, efficient wound closure, and the promotion of scarless healing. Consequently, the development of innovative wound dressing materials is imperative. Such materials must actively accelerate the healing process, effectively prevent infection, and robustly promote tissue regeneration to address the multifaceted demands of contemporary wound management.

In response to these challenges, chitosan has emerged as a particularly promising natural biopolymer. In this article, we share our experience of using chitosan in the case of a scald injury.

## MATERIALS AND METHODS



**Figure 1:** showing scald injury at time of presentation

This research was carried out at a Tertiary Care Centre within the Department of Plastic Surgery following approval from the department's ethical committee. Informed consent was duly obtained. The subject is a 1 year old female patient, with alleged history of accidental burns with hot milk over face, neck and chest (Figure 1). She was taken to local

hospital where primary care was done and referred to JIPMER with delay of 1 hours. Fluid resuscitation was initiated as per parkland formula. Patient had undergone multiple dressings of functional regenerative therapy with scaffold along with amniotic membrane and cyclical NPWT. To hasten the wound decision was made to use chitosan (Figure 2).



Figure 2: Chitosan scaffold applied

## RESULTS

Wound healing was found to be hastened by application of chitosan, proving the efficacy of using chitosan in treatment for wound healing (Figure-3)



Figure 3: Figure showing partial epithilization of the wound over the anterior chest region

## DISCUSSION

Chitosan is a second most available bio polymer<sup>2</sup> after cellulose and it aids in wound healing. Chitosan is a linear polysaccharide, composed of  $\beta$ -linked D-glucosamine and Nacetyl-D-glucosamine. Chitosan effects wound healing by augmenting various steps in wound healing and it also has extrinsic property, which is made use as vector for transporting drugs at the wound site. Chitosan is a bio polymer, common source being crustacean shell. Since its discovery 200 years back, chitosan has been in use for its properties to enhance wound healing since then. Chitosan and its derivatives promote wound healing by enhancing activity of inflammatory cells like neutrophils, macrophages and fibroblasts. It also enhances tensile strength of wound.<sup>1,2</sup>

Following are the advantages of chitosan in wound healing.<sup>3-7</sup>

- 1) Helps in haemostasis, stimulation of wound healing.
- 2) Nontoxic, anti-microbial, biodegradable and bio compatible.
- 3) Chitosan and its derivatives are used as source for delivery of anti-microbial and growth factors at wound site.
- 4) It has activity against fungi, gram negative and gram-positive bacteria.
- 5) Chitosan has broad application in management of variety of wounds like burns wound, incisional skin wounds, surgical site infections, osteomyelitis, etc.

## CONCLUSION

Chitosan with its properties of altering inflammatory mediators and other functions aids in wound bed preparation as noted in this case study. Chitosan may be helpful in the armamentarium of wound management.

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