

## Original Research Article

# A comparative study of collagen granules vs conventional dressing in the management of chronic ulcer

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### ABSTRACT

**Background:** A chronic wound is a wound that does not heal in an orderly set of stages and in a predictable amount of time the way most wounds do; wounds that do not heal within three months are often considered chronic. Aim of this study the efficacy of topical use of collagen granules in wound healing.

**Methods:** In this prospective study, a total of 60 patients were divided into two groups, according to type of dressing i.e. for group A patients collagen granules were used and for group B patients normal saline dressing was used. Collagen granules used for this study was Medfil II.

**Results:** The Mean ulcer size at day 1 in group A was 16.29 cm<sup>2</sup> with a SD of 6.07cm<sup>2</sup>. In Group B, the mean ulcer size at day 1 was 14.73 cm<sup>2</sup> with a SD of 6.37 cm<sup>2</sup>. The Z value is 0.93 and p value is >0.5. This is comparable but statistically not relevant.

**Conclusions:** The use of Collagen Granules dressing accelerated the rate of wound healing in chronic ulcers In this study authors found that the rate of wound healing was significantly better in using Collagen Granules but after 2 weeks.

**Keywords:** Chronic Ulcer, Collagen granules, Normal saline

### INTRODUCTION

Collagen is the most abundant family of proteins found in the human body. The function of nearly all systems and organs of the body is dependent on collagenous structures About 70 percent of the dry weight of the skin is collagen. Use of collagen for wound healing has drawn tremendous interest from scientists in recent years. Because of the involvement of and interaction between a myriad of chemical and biological factors, no single research work on the role of collagen in wound healing can be complete. In almost every instance, conclusions have to be drawn from a number of references. A chronic wound is a wound that does not heal in an orderly set of stages and in a predictable amount of time the way most wounds do; wounds that do not heal within three months

are often considered chronic.<sup>1</sup> Authors now know that wounds re-epithelialise much faster or develop granulation tissue faster when treated with dressings which allow moist wound healing. Authors recognize that occluding wounds does not lead to infection. Even though many modalities of wound care have come up to assist a surgeon, example the use of compression bandages to treat venous ulcer the problem of chronic wounds management still remains.<sup>2,3</sup>

### METHODS

A prospective study was carried out in this Centre from June 2016 on the patients with chronic foot ulcer. Patients were divided into two groups Group A consisted of 30 (dressing with use of collagen granules) and Group B 30

(dressing with normal saline). A well written and informed consent was obtained before starting every procedure. Case report was maintained for each patient. Collagen Granules used for this study was Medifil II made by human biosciences. The patients with diabetic ulcers, venous ulcer, arterial ulcers, and pressure ulcers were included in the study while patients above 80 years, immuno-compromised state, malignancy, tuberculosis,

leprosy were excluded from the study. Wounds were measured using a sterile transparent paper placed on the wound to mark wound borders. The remaining paper was kept in formalin chamber for other dressing. The two largest perpendicular diameters were measured using a ruler (in millimeters). To calculate the wound area, these two diameters were multiplied.

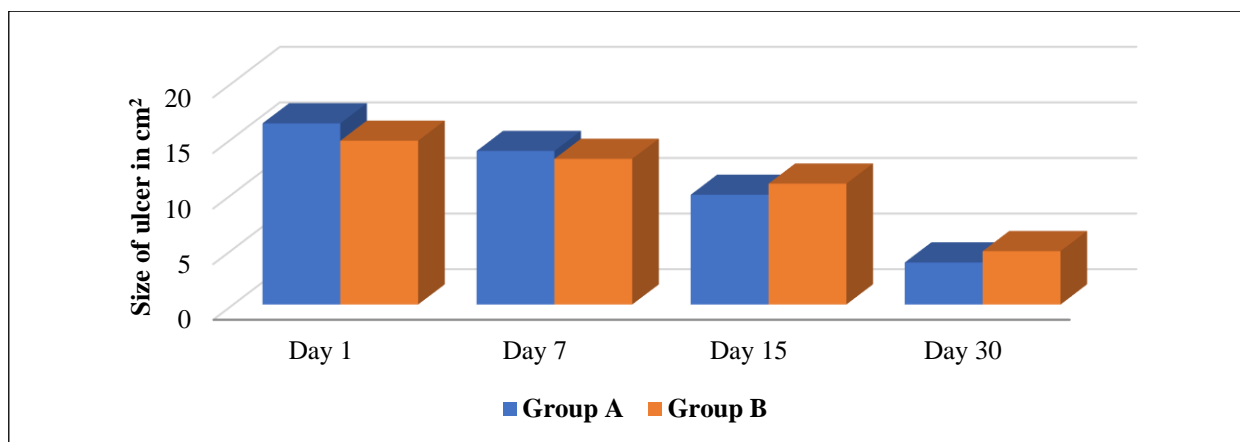


Figure 1: Comparison of ulcer size at day 1, 7, 15 and 30 in group A and group B.

## RESULTS

The Mean ulcer size at Day 1 in group A was 16.29 cm<sup>2</sup> with a SD of 6.07 cm<sup>2</sup>. In Group B, the mean ulcer size at Day 1 was 14.73 cm<sup>2</sup> with a SD of 6.37 cm<sup>2</sup>. The Z value was 0.93 and p value was >0.5. This is comparable but statistically not relevant. The mean ulcer size at day 7 in Group A was 13.81 cm<sup>2</sup> with a SD of 5.49 cm<sup>2</sup>. In Group B, the mean ulcer size was 13.10 cm<sup>2</sup> with SD of 6.39 cm<sup>2</sup>. The Z value was 0.42 and the p value was >0.05. This is comparable but statistically not relevant. The Mean ulcer size at day 15 in Group A was 9.87 cm<sup>2</sup> with a SD of 4.58 cm<sup>2</sup>. In Group B, the mean ulcer size was 10.87 cm<sup>2</sup> with SD of 5.84 cm<sup>2</sup>. The Z value is 0.67 and the p value is >0.05. This was comparable but statistically not relevant. The mean ulcer size at day 30 in Group A was 3.78 cm<sup>2</sup> with a SD of 2.47 cm<sup>2</sup>. In Group B, the mean ulcer size was 4.35 cm<sup>2</sup> with SD of 2.87 cm<sup>2</sup>. The Z value was 2.87 and the p value was <0.01. This is comparable and statistically relevant.

## DISCUSSION

Ulcer size was compared between the test and the control group on day 1, day 7, day 15 and day 30. The results were analysed by Unpaired Student's t-test and a p value of <0.01 was considered significant. A study done by Jaiswal et al in 2006 in AFMC showed a similar male: female ratio.<sup>4</sup> Males being more involved in physical work and labour. In this study authors found that the rate of wound healing was significantly better in using collagen granules but after two weeks. Up till two weeks, the rate of healing was similar as compared to conventional dressing. In a similar study done by Singh et

al, it was found that out of 60 patients of the collagen group, 42 (70%) wounds showed complete closure with collagen dressing in six weeks or lesser.<sup>5</sup> This was comparable with this study. In another study done by Veves and Sheehan on 276 patients of diabetic foot ulcer divided equally into two groups, one group was treated with collagen and the second with other dressing materials.<sup>6</sup> They found no significant difference in the completeness of healing of wounds when old wounds (>six months old) were compared. But the healing was better in wounds of less than six months duration treated with collagen dressings. Although in this study authors found that after 4 weeks, there was a significant improvement in ulcer size even in older ulcers. Various etiologies that were considered in this study were arterial ulcers, diabetic ulcers, venous ulcers and pressure ulcers. 60% of the cases were Diabetic ulcers with equal distribution in the test and the control group. 25% of the cases were venous ulcers out of which 60% were in Group A (9 out of 15) and 40% in Group B (6 out of 15). 10% of the cases had ulcers due to Arterial insufficiency with an equal distribution in both the groups. 5% (3 cases) of the cases were pressure ulcers with two cases enrolled in Group A and one in Group B. A study conducted by Rai et al in 1998 compared similar etiology of cases but had more cases of venous ulcers and arterial ulcers than diabetic ulcers.<sup>7</sup> A Study by S Bhattacharya et al showed excellent results by using Collagen sheets on patients with toxic epidermal necrolysis (TEN).<sup>8</sup> Mason and read demonstrated that microfibrillar collagen triggered adhesiveness of platelets and stimulated the release phenomenon producing aggregation of nearby platelets.<sup>9</sup> Piatkowski et al established that pressure ulcers treated with collagen dressings showed a superior

response of healing by having a positive effect on angiogenesis and superior reduction of inflammation.<sup>10</sup> Elgharably et al presented first evidence from a preclinical setting explaining how a collagen-based dressing may improve wound closure by targeting multiple key mechanisms.<sup>11</sup> Martorell-Calatayud et al established that the use of porcine type I collagen dressings as an adjunct or definitive tool for the closure of surgical defects on the scalp measuring more than 5 cm in which periosteum has been removed proved to be simple, inexpensive, and effective.<sup>12</sup> Mathangi et al used collagen based dressings in superficial and partial thickness burns. 73% of all cases healed without any infection and complete epithelialisation was seen within 6 weeks.<sup>13</sup>

## CONCLUSION

The use of collagen granules dressing accelerated the rate of wound healing in chronic ulcers. In this study authors found that the rate of wound healing was significantly better in using collagen granules but after two weeks. Uptill 2 weeks, the rate of healing was similar as compared to conventional dressing. In this study authors had male predominance. Thus reducing the ulcer size can help patient to early return to work. Early return to work does reduce the financial burden on the patient.

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