

## Assessment Outcome of Collagen Dressing in the Treatment of Diabetic Foot Ulcers

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### Abstract:

**Background:** Diabetes is fast gaining the status of a potential epidemic in India. The management of diabetic foot ulcers includes relieving the wound using suitable therapeutic footwear. Hence; we planned the present study to assess the outcome of collagen dressing in the treatment of diabetic foot ulcers.

**Materials & methods:** A total of 20 patients with presence of diabetic foot ulcers were enrolled. A Performa was made and complete details of all the patients were recorded. Clinical examination was carried out and all the findings were recorded in a master chart. Collagen dressing was done in all the patients and was changed at regular follow-up visits. Effect of collagen dressing was recorded.

**Results:** Mean wound area before dressing as 29.48 mm<sup>2</sup>, while mean wound area second week after dressing was 15.69 mm<sup>2</sup>. Significant results were obtained while comparing the mean wound area before dressing and second week after dressing.

**Conclusion:** Diabetic foot ulcers treated with collagen dressing are efficacious in terms of reduction in wound area resulting in early wound healing.

**Key words:** Diabetic, foot ulcer, Collagen

### INTRODUCTION

Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease. Diabetes complications are common among patients with type 1 or type 2 diabetes but, at the same time, are responsible for significant morbidity and mortality. The chronic complications of diabetes are broadly divided into microvascular and macrovascular, with the former having much higher prevalence than the latter. Diabetic foot ulcers are common and estimated to affect 15% of all diabetic individuals during their lifetime. The most significant risk factors for foot ulceration are diabetic neuropathy, peripheral arterial disease, and consequent traumas of the foot.<sup>1-3</sup>

The management of diabetic foot ulcers includes relieving the wound using suitable therapeutic footwear. Other recommendations include the use of daily saline or similar dressings that allow a moist wound environment, debridement, antibiotic therapy if osteomyelitis or cellulite is present, optimal control of blood glucose level, and assessment and correction of peripheral arterial insufficiency. Various topical medications and gels have been promoted for ulcer healing and maintenance. In addition to holding the infection, an ideal wound care product should also protect the normal tissues and should not interfere with the normal wound healing. Proteins are the natural polymers, which make up approximately 15% of the human body. Amino acids are the building blocks of all proteins. Collagen is the major protein of the extracellular matrix and is the most abundant protein found in mammals comprising 70%–80% of the skin (dry weight) and 25% of the entire protein. Collagen acts as a structural gallow in the tissues.<sup>4-6</sup>Hence; under the light of above mentioned data, we

planned the present study to assess the outcome of collagen dressing in the treatment of diabetic foot ulcers.

## MATERIALS & METHODS

The present study was with the aim of to assess the outcome of collagen dressing in the treatment of diabetic foot ulcers. A total of 20 patients with presence of diabetic foot ulcers were enrolled.

### Inclusion criteria:

- Patients with diabetic foot ulcers

### Exclusion criteria:

- Patients with diabetic foot ulcers who were known cases of carcinomas and connective tissue disorders
- Patients with diabetic foot ulcer with untreated underlying osteomyelitis
- Patients with diabetic foot ulcers with unstable fractures or lose fragments of bone

A Performa was made and complete details of all the patients were recorded. Clinical examination was carried out and all the findings were recorded in a master chart. Collagen dressing was done in all the patients and was changed at regular follow-up visits. Effect of collagen dressing was recorded. All the results were recorded and analysed by SPSS software.

## RESULTS

Mean age of the patients was 56.9 years. 45 percent of the patients belonged to the age group of more than 55 years. 80 percent of the patients were males. In 75 percent of the patients, mean duration of diabetes was 11 to 15 years. In 50 percent of the patients, the duration of diabetic foot ulcer was less than 10 days while in 20 percent of the patients, it was 31 to 60 days. Mean wound area before dressing as 29.48 mm<sup>2</sup>, while mean wound area second week after dressing was 15.69 mm<sup>2</sup>. Significant results were obtained while comparing the mean wound area before dressing and second week after dressing.

**Table 1:** Demographic data

Variable		Number	Percentage
Age group (years)	Less than 40	4	20
	40 to 55	7	35
	More than 55	9	45
Gender	Males	16	80
	Females	4	20

**Table 2:** Distribution of patients according to duration of diabetes

Duration of diabetes	Number of patients	Percentage of patients
Less than 10 years	1	5
11 to 15 years	15	75
16 to 20 years	3	15
More than 20 years	1	5
Total	20	100

**Table 3:** Distribution of patients according to duration of diabetic foot ulcer

Duration of diabetic foot ulcer	Number of patients	Percentage of patients
Less than 10 days	10	50
11 to 20 days	2	10
21 to 30 days	3	15

<b>31 to 60 days</b>	4	20
<b>More than 60 days</b>	1	5
<b>Total</b>	20	100

Table 4: Comparison of wound area at different time interval

<b>Parameter</b>	<b>Before dressing</b>	<b>Second week after dressing</b>	<b>p- value</b>
<b>Mean wound area before dressing (mm<sup>2</sup>)</b>	29.48	15.69	0.000(Significant)
<b>+SD</b>	4.26	4.74	

## DISCUSSION

Diabetes mellitus is a major public health problem with rising prevalence worldwide and in the year 2015 around 415 million people were known to have diabetes. Diabetic foot is one of the most significant and devastating complication of diabetes and is defined as a group of syndromes in which neuropathy, ischemia and infection lead to tissue breakdown, and possible amputation. Prevention of diabetic foot ulceration is critical in order to reduce the associated high morbidity and mortality rates, and the danger of amputation. A number of contributory factors work together to cause foot ulceration in patients with diabetes. These include peripheral neuropathy; mechanical stress and peripheral vascular disease.<sup>6-10</sup>Hence; under the light of above mentioned data, we planned the present study to assess the outcome of collagen dressing in the treatment of diabetic foot ulcers.

In the present study, mean age of the patients was 56.9 years. 45 percent of the patients belonged to the age group of more than 55 years. 80 percent of the patients were males. In 75 percent of the patients, mean duration of diabetes was 11 to 15 years. In 50 percent of the patients, the duration of diabetic foot ulcer was less than 10 days while in 20 percent of the patients, it was 31 to 60 days. Sundresh NJ et al observed the effectiveness in healing of normal dressing and dressing with collagen powder. 55 patients were found to be with diabetic foot ulcer. Out of 55 patients 25 patients had received collagen powder dressing and 30 patients had received normal dressing. To examine the relationship between pain and wound healing, pain levels were compared in subjects who received collagen powder dressing and normal dressing. They found high number of males (61.81%) had foot ulcers when compared to females (38.18). The prevalence of the diabetic foot ulcer progressively increases with increasing age. Their study shows that collagen powder dressing increasing the healing rate when compared with the normal dressing in diabetic foot ulcer patients.<sup>10</sup>

In the present study, mean wound area before dressing as 29.48 mm<sup>2</sup>, while mean wound area second week after dressing was 15.69 mm<sup>2</sup>. Significant results were obtained while comparing the mean wound area before dressing and second week after dressing. Zhang X et al compared the efficacy of nine dressings in healing DFU. A literature search was performed of the MEDLINE (PubMed), EMBASE and Cochrane Central Register of Controlled Trials (CENTRAL) databases. Reports published from 1993 to 2017 focusing on dressings for healing DFU were identified. Twenty-one RCTs, with a total of 2159 patients, were included in the present study. They recommended that the most suitable dressing should be selected taking into consideration exudate control, comfort, and cost.<sup>11</sup>Wang C et al examined the effects of honey dressing on wound-healing process for DFUs. They searched for evidence regarding honey dressing used in the treatment of DFUs in various databases. We selected randomized controlled trials (RCTs) and quasi-experimental studies for meta-analysis. The meta-analysis showed that honey dressing effectively shortened the wound debridement time, wound healing time, and bacterial clearance time; it increased the wound healing rate and

bacterial clearance rate during the first one to two weeks of use. Their findings suggested that honey dressing effectively promotes healing in DFUs.<sup>12</sup>

## CONCLUSION

Diabetic foot ulcers treated with collagen dressing are efficacious in terms of reduction in wound area resulting in early wound healing. However; further studies are recommended.

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