

# Assessment of Efficacy of Negative Pressure Wound Therapy (NPT) and Moist Wound Dressing (MWD) in Treating Patients with Diabetic Foot: A Comparative Study

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## ABSTRACT

**Introduction:** Diabetic foot is portrayed by a traditional group of three of neuropathy, ischemia, and disease. The foot has a few compartments, which are between conveying and the disease can spread from one into another, and absence of agony enables the patient to proceed with ambulation additionally encouraging the spread. Hence; we planned the present study to assess and compare efficacy of negative pressure wound therapy (NPT) and moist wound dressing (MWD) in treating patients with diabetic foot.

**Material and methods:** The present study included patients who underwent treatment for diabetic foot from June 2014 to July 2016. A total of 20 patients with diabetic foot ulcers were included in the present study. All the patients were divided into two study groups as follows; Group A: 10 patients who were treated with MWD, Group B: 10 patients who were treated with NPT. Vernier calliper was used for the measurement of the depth of the ulcers and improvements seen in the ulcer were classified according to Wagner scale. All the results were analysed by SPSS software.

**Results:** Among the NPT group and MWD group, 60 percent and 70 percent of the subjects were males respectively. Only two subjects each in both the study groups had diabetic foot ulcer from past one month. Non- Significant results were obtained while comparing the duration of ulcer in between the two study groups. Mean depth of the ulcer among the patients of the two study group were 20 and 18 mm respectively. Non- significant results were obtained while comparing the Wagner score in between patients of the two study groups.

**Conclusion:** NPT appears to be an equally effective treatment option for treating patients with diabetic foot ulcers.

**Keywords:** Diabetic, Moist Wound Dressing, Negative Pressure Wound Therapy

## INTRODUCTION

Diabetic foot is frequently a significant feared handicap, with long extends of hospitalization, and inconceivable, mounting costs, with the steadily dangling final product of an excised appendage. The apparition appendage plays its own merciless joke on the officially dampened mind.<sup>1,2</sup> The diabetic foot, no big surprise, is a standout amongst the most dreaded complication of diabetes. Diabetic foot is portrayed by a traditional group of three of neuropathy, ischemia, and disease.<sup>3,4</sup>

Disease in a diabetic foot is an appendage undermining condition on the grounds that the outcomes of profound contamination in a diabetic foot are sadder than somewhere else basically in view of certain anatomical quirks.<sup>5</sup> The foot has a few compartments, which are between conveying and the disease can spread from one into another, and absence of agony enables the patient to proceed with ambulation additionally encouraging the spread.<sup>6,7</sup> Hence; we planned the present study to assess and compare

efficacy of negative pressure wound therapy (NPT) and moist wound dressing (MWD) in treating patients with diabetic foot.

## MATERIAL AND METHODS

The present study was conducted in the department of general medicine of the medical institute and included assessment of patients who underwent treatment for diabetic foot from June 2014 to July 2016. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. A total of 20 patients with diabetic foot ulcers were included in the present study. All the patients were divided into two study groups as follows;

- Group A: 10 patients who were treated with MWD,
- Group B: 10 patients who were treated with NPT.

Once every three days, the NPT dressing was changed. Exclusion criteria for the present study were as follows:

- Patients with history of any other systemic illness,
- Patients with any known drug allergy,
- Patients with renal failure,
- Patients with history of receiving radiation therapy or chemotherapy

During the study time period, complete inspection of the wound dimensions was done twice a week. After completely washing and cleaning the ulcers, moist dressing was done two times a day. In all the patients, complete demographic details along with medical history and clinical examination details of wound was recorded and assessed.

Vernier calliper was used for the measurement of the depth of the ulcers and improvements seen in the ulcer were classified according to Wagner scale. Following criteria were used for consideration of final results:

- Amputation less than below knee: Minor amputation,
- Amputation above knee or below knee: Major amputation
- Complete treatment

## STATISTICAL ANALYSIS

All the results were analysed by SPSS software. Chi- square test and student test were used along with Mann- Whitney test for

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the assessment of level of significance. P- value of less than 0.05 was taken as significant.

**RESULTS**

P- Value for comparison of various demographic and clinical details of the patients is highlighted in Table 1. Among the NPT group and MWD group, 60 percent and 70 percent of the subjects were males respectively. Only two subjects each in both the study groups had diabetic foot ulcer from past one month. Non-Significant results were obtained while comparing the duration of ulcer in between the two study groups (P-value > 0.05). The mean size of ulcer in the patients of the NPT group and MWD group were 38.1 cm<sup>2</sup> and 35.9 cm<sup>2</sup> respectively. Mean depth of the ulcer among the patients of the two study group were 20 and 18 mm respectively. Table 2 and Graph 2 show the p-value for comparison of Wagner score before and after the treatment in the two study groups. Non- significant results were obtained while comparing the Wagner score in between patients of the two study groups (P-value > 0.05).

**DISCUSSION**

Diabetic foot is a standout amongst the most noteworthy and obliterating confusions of diabetes, and is characterized as a foot influenced by ulceration that is related with neuropathy as well as fringe blood vessel ailment of the lower appendage in a patient with diabetes.<sup>8-10</sup> The pervasiveness of diabetic foot ulceration in the diabetic populace is 4–10%; the condition is more regular in more seasoned patients.<sup>11</sup>

The best quality level for diabetic foot ulcer treatment incorporates debridement of the injury, administration of any contamination, revascularization strategies when shown, and off-stacking of the ulcer. Different strategies have additionally been proposed to be advantageous as extra treatments, for example, hyperbaric oxygen treatment, utilization of cutting edge wound care items, and negative-pressure wound treatment.<sup>12,13</sup> In any case, information so far have not given satisfactory proof of the adequacy and cost-viability of these extra treatment strategies.<sup>14</sup> Hence; we planned the present study to assess and compare efficacy of negative pressure wound therapy (NPT) and moist wound dressing (MWD) in treating patients with diabetic foot. In the present study, we didn't observe any significant difference in the values of Wagner score in between the patients of the two study groups (Table 2) (P-value > 0.05).

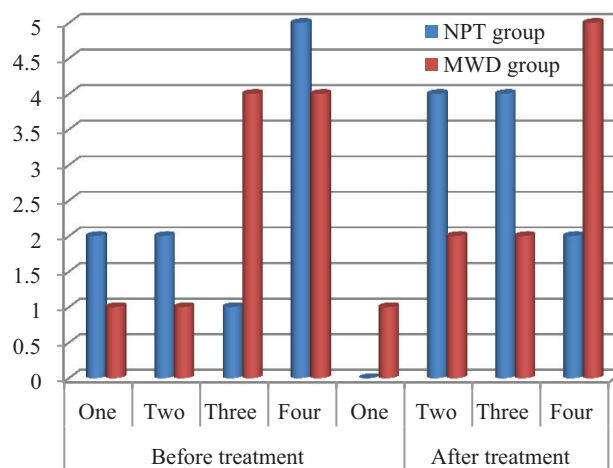
Nather A et al decided the adequacy of vacuum-assisted closure (VAC) treatment in the mending of constant diabetic foot ulcers. An electronic vacuum pump was utilized to apply controlled negative weight equally over the injury surface. Changes in wound measurement, nearness of wound granulation and contamination status of diabetic foot ulcers in 11 back to back patients with diabetes were taken after through the span of VAC treatment. Mending was accomplished in all injuries. Nine injuries were shut by part skin uniting and 2 by auxiliary conclusion. The normal length of treatment with VAC treatment was 23.3 days. Ten injuries demonstrated diminishment in wound size. All injuries were agreeably granulated and cleared of bacterial contamination toward the finish of VAC treatment. VAC treatment was helpful in the treatment of diabetic foot disease and ulcers, which after debridement, may give uncovered ligament, sash or potentially bone. These included beam removal wounds, wounds post-debridement for

Parameters		NPT	MWD	P-value
Gender	Male	6	7	0.26
	Female	4	3	
Ulcer duration (months)	One	2	2	0.42
	Two	1	2	
	Three	4	3	
	Four	1	1	
	Five	0	1	
	Nine	1	1	
	Above nine	1	0	
Wound location	Right foot	4	4	0.71
	Left foot	4	5	
	Bilateral	1	1	
	Figures	1	0	
Size of ulcer (cm <sup>2</sup> )		38.1	35.9	0.91
Depth of ulcer (mm)		20	18	0.67

**Table-1:** P-value for comparison of demographic and clinical details of the patients

Wagner score		NPT group	MWD group	P-value
Before treatment	One	2	1	0.26
	Two	2	1	
	Three	1	4	
	Four	5	4	
After treatment	One	0	1	0.31
	Two	4	2	
	Three	4	2	
	Four	2	5	

**Table-2:** P-value for comparison of Wagner score before and after the treatment in the two study groups



**Figure-1:** NPT group, MWD group comparison

necrotising fasciitis, wounds post-seepage for sore, a heel ulcer and a sole ulcer. It could plan ulcers well for conclusion through split-skin uniting or auxiliary conclusion in great time. This diminished cost of VAC treatment, as treatment was not drawn out to achieve more noteworthy lessening in wound territory. VAC treatment likewise gives a clean, more controlled resting condition to vast, exudating wound surfaces. Expansive diabetic foot ulcers were in this way made more manageable.<sup>15</sup> Eginton MT et al contrasted the rate of wound recuperating and the Vacuum Assisted Closure device trade mark (VAC) to regular damp dressings in the treatment of vast diabetic foot

wounds. Diabetics with huge delicate tissue deformities of the foot were considered for enlistment. Patients were randomized to get either sodden cloth dressings or VAC medications for 2 weeks, after which they were treated with the option dressing for an extra 2 weeks. Wounds were shot week by week and wound measurements ascertained in a blinded manner with spatial investigation programming. Percent change in wound measurements were computed and thought about for every week by week appraisal and more than 2 weeks of treatment with each dressing sort. Ten patients were enlisted in the trial, yet two were lost to development and two were pulled back. Finish information were accessible for examination on seven injuries in six patients. Normal length, width, and profundity of the injuries at start of the trial was 7.7, 3.5, and 3.1 cm, individually. Just the injury profundity was altogether diminished throughout the weeks of the trial to 1.2 cm. VAC dressings diminished the injury volume and profundity altogether more than damp bandage dressings (59% versus 0% and 49% versus 8%, separately). VAC dressings were related with a lessening in every single injury measurement while wound length and width expanded with clammy dressings. In rundown, over the initial half a month of treatment, VAC dressings diminished injury profundity and volume more viably than soggy cloth dressings. Negative-weight wound treatment may quicken conclusion of substantial foot wounds in the diabetic patient.<sup>16-18</sup>

## CONCLUSION

From the above results, the authors concluded that NPT appears to be as effective as other therapeutic options for treating patients with diabetic foot ulcers. However, future studies are recommended.

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