

# Effectiveness of Wrap Therapy for Management of Pressure Ulcer in Tertiary Hospital

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## ABSTRACT

**INTRODUCTION:** Pressure ulcer is a worldwide problem. Several treatment methods are being used for the management. Whichever method is used, it must be easy, accessible and cost effective. The aim of this study was to find out the effectiveness of wrap therapy for management of pressure ulcer.

**METHOD:** Hospital based prospective study was carried out in tertiary hospital within 16 months period among 49 patients (30 in wrap group, 19 in control group) having pressure ulcer stage II and III. Daily assessment and pressure ulcer score for healing (PUSH) calculation were done before dressing. Student 't' test was used to see the statistical difference on PUSH score between wrap and control group.

**RESULT:** Most of patient had pressure ulcer on sacrum (56.7% in wrap and 57.9% in control) with 60% in stage II and 40% in stage III. The duration of pressure ulcer management ranged from 7 to 58 days (mean 11.8, SD 9.1) in wrap group and 7 to 42 days (mean 14.5, SD 9.2) in control group. There was no difference in PUSH mean score between wrap and control group ( $p=0.138$ ). Similarly, the PUSH score was not difference for pressure ulcer stage II ( $p=0.338$ ) and stage III ( $p=0.752$ ) among both groups up to 18 days of management.

**CONCLUSION:** Wrap therapy is not inferior to conventional method and it can be used as an alternative method.

**KEY WORDS:** Pressure Ulcer, Pressure Ulcer Score for Healing, Wrap Therapy.

## INTRODUCTION

Pressure ulcer is a common problem in clinical practice which generates substantial expenses.<sup>1</sup> It is serious health concern in acute care, long term care and home care setting with prevalence depending on the patient factors (age, physical impairment) and treatment setting.<sup>2-6</sup> Different methods are being used for the management of pressure ulcer including hydrocellular dressing,<sup>7</sup> pulsed electro-magnetic field therapy,<sup>8</sup> honey therapy,<sup>9</sup> hydrotherapy and hydration therapy<sup>10</sup> demanding trained personnel and high cost.

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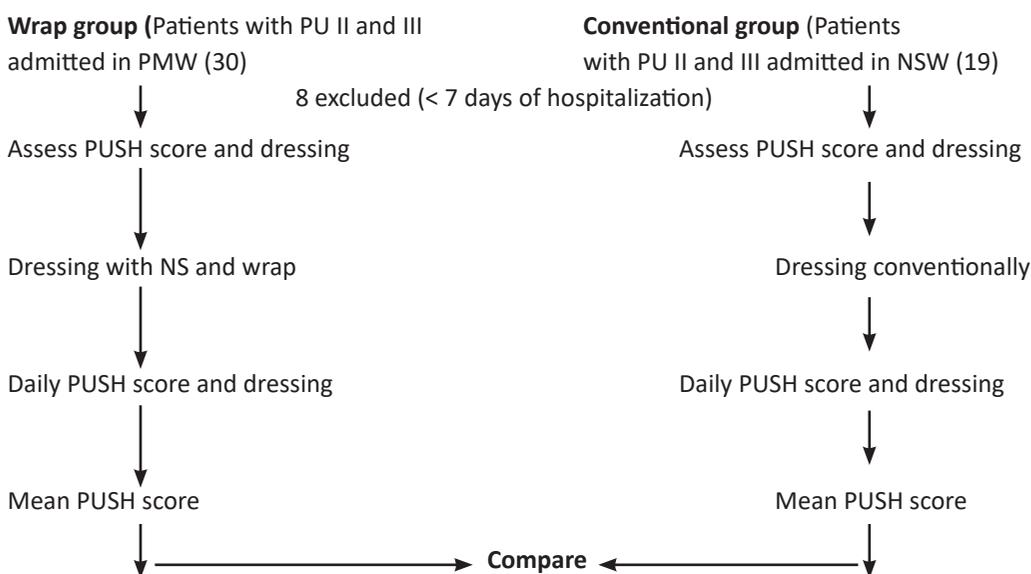
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Wrap therapy uses food wrap as a wound dressing.<sup>11</sup> The main principle is to maintain moisture inside the wound and to debride necrotic tissue by autolysis mechanism.<sup>12</sup> Many studies using wrap therapy could be found in the literature but none has been conducted in Nepal. Therefore, this study aimed to find out the effectiveness of wrap therapy for management of pressure ulcer in tertiary hospital.

## METHOD

Hospital based prospective study was conducted in two wards namely Paying Medical Ward (PMW) and Neuro Surgical Ward (NSW) of Bir Hospital of National Academy of Medical Sciences (NAMS) within 16 months (September 2016 to January 2018) period. The patients having pressure ulcer (PU) Stages II and III, as per National Pressure Ulcer Advisory Panel (NPUAP) classification, were included in this study. There were total 57 patients with 30 cases in wrap group, 19 cases

in conventional group and 8 cases were excluded.



The details of patient’s bio-demographic information, diagnosis, associated problems, biochemistry profile were recorded on first day of assessment and on subsequent days as needed. Before dressing, the pressure ulcer was carefully observed for type of tissue of wound and any discharge with amount and type. The size of pressure ulcer was measured in terms of length and width by using metal scale in centimeter (cm). Depending on size of wound, the amount of exudate and type of tissue of ulcer, the pressure ulcer score for healing (PUSH) score was calculated. The PUSH score ranged from 0 to 17.

In wrap group, the wound was cleaned by using normal saline (NS) from center to periphery by using sterile technique. Proper cleaning was done with saline puff to remove the exudates as needed. The food wrap plastic was cleaned by sterile NS. The wound was covered by plastic and was fixed with paper tape around the ulcer. Daily dressing was done in morning shift by trained duty nurse. The wound was assessed daily before dressing and PUSH score was obtained.

Wound with deep undermining or large cavities were not packed and cutaneous tissue was not incised to open the undermining ulcer. Neither hydrogen peroxide nor surgical debridement were used to manage thick necrotic tissue. Once the ulcer granulated properly and healed or it became stage I, then the wound was not wrapped. It was cleaned with NS only and kept open to enhance healing.

Before start of the study, ethical clearance was obtained from the institutional review board of NAMS. Consents were obtained from the patients or their immediate family members in cases of absence of capacities. Privacy and confidentiality of the patient were maintained throughout the study.

In order to prevent contamination, the two methods were used separately in two different wards. One day training was provided by the principal investigator on the wrap therapy for PMW staff, on the continuing use of usual practice for NSW staff and on the use of pro forma for both PMW and NSW staff. The wrap therapy was done by the selected four nurses who were usually present in the morning shift to bring the uniformity in measurement. The principal investigator regularly supervised the patient and wrap therapy.

The data was entered and analysed by using SPSS version 11.5. Student ‘t’ test was used to see the statistical difference in PUSH score between wrap and conventional group in daily basis.

## RESULT

The participants` age ranged from 20 to 89 years with half of them in 60-79 years in both groups. Male to female ratio was 1:1 in wrap group whereas 2.3:1 in conventional group (Table 1). Most of the patients had pressure ulcer on sacrum (wrap 56.7% and conventional 57.9%) with secondary site on buttock

and greater trochanter with multiple ulcers too. In terms of degree of pressure ulcer, the ratio was 1.5:1 for second and third degrees in wrap group and reverse scenario was seen in conventional group. Most of the ulcers were of large size (>24 cm<sup>2</sup>) in wrap (53.3%) and of 12.1 – 24.0 cm<sup>2</sup> size in conventional (42.1%). Light to moderate exudates from wound were seen in 60% on the first day of enrollment. The prime duration to develop ulcer was within 72 hours with mean  $3.8 \pm 2.8$  days in wrap group and  $11.5 \pm 10.2$  days in conventional group (Table 2). The patients were managed till hospitalization for their medical problem which ranged from 7 to 47 (mean  $11.8 \pm 9.11$ ) days in wrap and 7 to 56 (mean  $4.5 \pm 9.2$ ) days in conventional group.

**Table 1: Bio-demographic information**

Variables	Wrap Therapy (N=30)	Conventional Therapy (N=19)
<b>Age group (in years)</b>	<b>N (%)</b>	<b>N (%)</b>
20-39	4 (13.3)	5 (26.3)
40 – 59	8 (26.7)	4 (21.1)
60 – 79	15 (50.0)	9 (47.4)
≥ 80	3 (10.0)	1 (5.3)
Mean	$59 \pm 16.4$	$55 \pm 18.2$
<b>Gender</b>		
Male	15 (50.0)	13 (68.4)
Female	15 (50.0)	6 (31.6)
<b>Ethnicity</b>		
Brahmin	10 (33.3)	4 (21.1)
Chhetri	6 (20.0)	6 (31.6)
Janajati	10 (33.3)	8 (42.1)
Other	4 (13.3)	1 (5.3)

The PUSH score gradually decreased between wrap and conventional therapy with slight fluctuation in certain days (Figure 1). The mean PUSH score gradually decreased in both second (Figure 2) and third (Figure 3) degrees. However, there was no significant difference in mean PUSH score on daily basis between wrap and conventional groups and between second and third degrees (Table 3). The number of cases gradually decreased after 7 days and drastically decreased after 14 days. Therefore, the mean scores were compared

only up to 18 days though few patients were managed for longer days.

**Table 2: Variables of pressure ulcer**

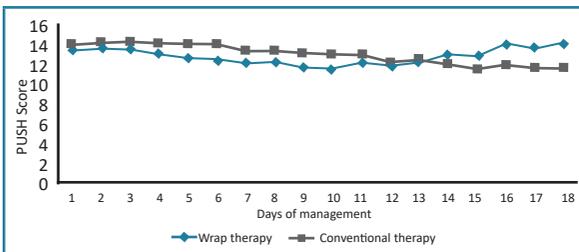
Variables	Wrap Therapy (N=30)	Conventional Therapy (N=19)
<b>Primary site</b>	<b>N (%)</b>	<b>N (%)</b>
Sacrum	17 (56.7)	11 (57.9)
Buttock	10 (33.3)	4 (21.1)
Greater trochanter	2 (6.7)	2 (10.5)
Heel	1 (3.3)	2 (10.5)
<b>Secondary site *</b>		
Sacrum	4 (13.3)	2 (10.5)
Buttock	6 (20.0)	1 (5.3)
Greater trochanter	7 (23.3)	1 (5.3)
Acromiam process	4 (13.3)	1 (5.3)
Spine	1 (3.3)	1 (5.3)
<b>Degree of pressure ulcer</b>		
Second degree	18 (60.0)	8 (42.0)
Third degree	12 (40.0)	11 (58.0)
<b>Size of pressure ulcer (in cm<sup>2</sup>)#</b>		
2.1 – 3.9	1 (3.3)	0
4.1 – 8.0	4 (13.3)	0
8.1 – 12.0	3 (10.0)	4 (21.1)
12.1 – 24.0	6 (20.0)	8 (42.1)
≥ 24	16 (53.3)	6 (31.6)
<b>Exudate amount#</b>		
None	3 (10.0)	1 (5.3)
Light	11 (36.7)	5 (26.3)
Moderate	10 (33.3)	11 (57.9)
Heavy	6 (20.0)	2 (10.6)
<b>Tissue type#</b>		
Superficial ulcer with epithelial tissue	4 (13.3)	3 (15.8)
Pinky or beefy red granulation tissue	8 (26.7)	7 (36.6)
Yellow and white tissue adhere to the ulcer	18 (60.0)	5 (26.3)
Black, brown tan necrotic tissue	0 (0.0)	5 (26.3)

\* Multiple responses,

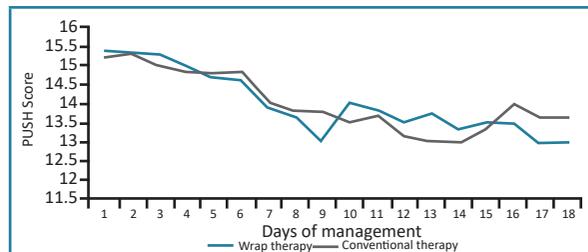
#on first day of enrollment in study

**Table 3: Comparison of mean PUSH score between wrap and conventional groups in second and third degrees PU**

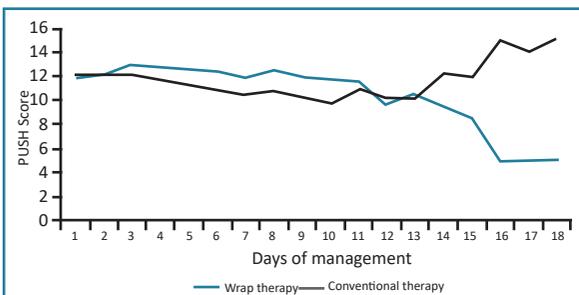
Daily mean score	Overall score in both group			Second degree			Third degree		
	Wrap therapy	Conventional therapy	P-value #	Wrap therapy	Conventional therapy	P-value #	Wrap therapy	Conventional therapy	P-value #
Day 1	13.4	13.8	0.5	12.1	12.0	0.9	15.3	15.2	0.8
Day 2	13.4	14.0	0.4	12.2	12.2	0.9	15.3	15.3	0.9
Day 3	13.4	14.1	0.3	12.1	12.8	0.4	15.2	15.0	0.6
Day 4	12.8	14.0	0.1	11.5	12.8	0.2	14.9	14.8	0.8
Day 5	12.5	13.8	0.07	11.1	12.7	0.1	14.6	14.7	0.8
Day 6	12.3	13.8	0.07	10.8	12.5	0.2	14.5	14.8	0.6
Day 7	11.9	13.1	0.1	10.5	11.8	0.3	13.9	14.1	0.7
Day 8	12.1	13.2	0.1	10.7	12.4	0.2	13.5	13.8	0.7
Day 9	11.5	13.0	0.1	10.3	12.0	0.3	13.0	13.7	0.7
Day 10	11.3	12.8	0.2	9.9	11.8	0.3	14.0	13.5	0.3
Day 11	12.2	12.8	0.5	11.0	11.5	0.7	13.8	13.6	0.5
Day 12	11.6	12.0	.08	10.2	9.6	0.8	13.5	13.2	0.8
Day 13	12.0	12.3	0.8	10.2	10.5	0.9	13.7	13.0	0.6
Day 14	12.8	11.8	0.4	12.3	9.5	0.4	13.3	13.0	0.2
Day 15	12.7	11.4	0.5	12.0	8.5	0.5	13.5	13.3	0.7
Day 16	14.0	11.7	0.4	15.0	5.0	-	13.5	14.0	0.9
Day 17	13.5	11.5	0.5	14.0	5.0	-	13.0	13.6	0.5
Day 18	14.0	11.5	0.4	15.0	5.0	-	13.0	13.6	0.4
# t test									



**Figure 1: Daily comparison of PUSH score between wrap and conventional groups**



**Figure 3: Comparison of PUSH score of third degree PU between wrap and conventional groups**



**Figure 2: Comparison of PUSH score of second degree PU between wrap and conventional groups**

**DISCUSSION**

There was no significant differences in reduction of mean PUSH score between wrap and conventional therapies. The reduction in mean PUSH score was almost similar in second and third degrees between wrap and conventional groups up to 14 days. Third degree with wrap had much better PUSH outcome than conventional therapy. This is strongly supported by the findings of the study conducted by Bito.<sup>11</sup> Similarly, the efficacy of plastic wrap therapy has been shown by Takahasi in the treatment of chronic wound with equal rate of healing at 1.4 cm<sup>2</sup>/week.<sup>13</sup> Another study

among patients of age 60 years and above showed that polyvinylidene (PVL) food wrap dressing was more effective than conventional ointments and gauze dressings for severe pressure ulcers. The test group showed greater improvement in DESIGN scores than the control group throughout the observation period, and the difference reached statistical significance at 12 weeks ( $p < 0.05$ ). The incidences of local wound infection in the two groups were not statically different ( $p > 0.999$ ).<sup>14</sup>

Dressing should not be tightly sealed and there should be not any occlusion and direct pressure over wound. The complete wrap over wound maintains moist environment for wound healing, prevents entry of external pathogen, enhances necrotic tissue autolysis and absence of occlusion promotes granulation. The plastic wrap therapy has been shown to be non inferior for any kind of wound (skin ulcer, chronic wound, burn, pressure ulcer).<sup>11,12,13</sup>

## CONCLUSION

Wrap method is non inferior and can be used as an alternative method.

## LIMITATION

There were few limitations of the study. First, the patients were admitted for other (medical and surgical) problems. They were usually discharged or transferred after improvement of their conditions, therefore the researchers could not manage the pressure ulcers till they were completely healed, as this was hospital based study. Second, there were less number of participants in both groups due to restriction in inclusion criteria as NPUAP second and third degrees only. Third, bias might have been there by staff on treatment and wound evaluation though two separate wards were allocated for wrap and conventional methods to reduce the bias.

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