



## **Study of negative pressure wound therapy in open tibial fractures in Telangana population a retrospective study**

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### **Abstract**

**Background:** Grade III opens Tibial fractures are devastating injuries Negative pressure wound therapy (NPWT) is an adjunct for many surgeon in treating these fractures, which contributes limb salvage.

**Methods:** Out of 25 patients of grade III tibia fractures 11 patients (group A) treated with NPWT and 14 (group) treated with sterile dressing.

**Results:** 11 (44%) group A treated with NPWT and 14 (56%) with sterile dressing wound infection were 4 (9%) in group A and 9 (36%) in group B. All group A 11 (100%) attained wound coverage in 3 weeks while 7 (28%) patients of group B attained in 3 weeks. A and B wound healed within 6 weeks.

**Conclusion:** NPWT has rapid healing due to early debridement after vacuum closure hence NPWT is an ideal therapy to treat grade-III tibia fracture. As NPWT reduce virulence factors as well as bio-film components.

**Keywords:** NPWT= negative pressure wound therapy, grade-III tibia fracture VAC= vacuum assisted closure, Telangana

### **Introduction**

Tissue demarcation in grade-III open Tibial fractures often continues even after first debridement. In addition, the wound is relatively open to the hospital environment until a flap can be placed <sup>[1]</sup>. The implant used for bony stabilization may compromise regional bone blood flow and may lead to wound problems. These factors contribute to wound bed bacterial colonization. Negative pressure wound therapy (NPWT) has been used for treatment of wounds for over two decades <sup>[2]</sup>. It is widely accepted in the treatment of large, musculo-skeletal wounds and high energy fractures <sup>[3]</sup>. Some of the possible benefits of NPWT include increased blood flow to damaged tissue, decreased interstitial oedema increased granulation of wound beds and increased bacterial clearance <sup>[4]</sup>. Due to increased in the rate of granulation by the effect of NPWT infection of traumatic wounds, bacterial colonization has not been observed <sup>[5]</sup> Hence attempt was made to treat grade-III tibia fractures with negative wound therapy and to evaluate the potential effect of NPWT.

### **Material and Methods**

25 patients visited to orthopaedic department of surabhi institute of Medical Sciences Siddipeth Telangana-502375.

### **Inclusive Criteria**

patients more than 16 years and below 65 years having Grade-III Tibial fractures (Gust stilla) Anderson classification were selected for study suitable for external fixation.

### **Exclusion Criteria**

Diabetic, malignant wounds, wound having anastomatic sites or nerve; connected to neuro-vascular injuries, and immune – compromised patients were excluded from the study.

### **Method**

The Routine blood examination was carried out and culture and sensitive of the pus of wound was studied.

The patients were divided into two groups Group-A (vacuum Assisted Closure group) VAC group, had 11 patients Group B had 14 patients (sterile dressing group). All the patients were treated with wound debridement and external fixation. Infected wound was managed with wound care and antibiotics based on culture and sensitivity report.

To get vacuum support closure of the wound, a polyurethane open celled sponge acquired from upholstery shop, which was cut to contest the shape of the wound and autoclaved was utilized. The whole dressing was closed by clear plastic film to create it air taut. The suction tube neither is nor associated to the suction equipment which was made to work cyclically 20 minutes every 2 hours to get cyclical negative pressure at the wound site.

The duration of study was June-2018 to July-2019.

### **Statistical analysis**

The type of fracture and number of wound infection patients were classified. Data was carried out SPSS software. The ratio of the male and female was 2:1.

**Observation and Results**

**Table-1:** 11 (44%) of type III Tibial fracture was in group A, 14 (56%) type-III Tibial fracture in group B.

**Table-2:** study of wound infections in both groups – 4 (16%) in group A and 9 (36%) in group B.

Wound healing coverage was attained in 3 weeks in all 11 (100%) patients of group A and 7 (28%) patients of group B and both A and B group healed complete within six (6) weeks but earlier converge occurred in NPWT patients.

**Discussion**

In the present study of Negative pressure wound therapy in open Tibial fractures in Telangana population out of 25 Tibial III grade fractures 11 (44%) patients treated with NPWT and 14 (56%) with sterile dressings (Table-1) wound infection was observed in 4 (16%) in group A and 9 (36%) in group B (Table-2). Wound healing coverage attained in 11 (100%) in NPWT group A in 3 weeks but 7 (28%) in group B and both groups healed completely within six (6) weeks but earlier coverage occurred in NPWT is a significant satisfaction to orthopedician. These findings are more or less in agreement with previous studies [6, 7, 8].

It is established fact that, tibia is notorious bone in healing due to less vascularity hence tibia is called bone with tendons [9] hence VAC by NPWT has a significant role by a significant role to heal grade III fractures. In NPWT there is increase in granulation, enhance local blood flow and decrease bacterial burden and infection rates and enhances early coverage of wound otherwise in grade III tibia fracture salvage of limb is challenging [10]. In the English literature, little information is available regarding NPWT, like bony stabilization fixation in terms of length of time for external fixation or when internal fixation was performed [11]. Moreover no detailed information of other factors, including hardware used (stainless steel versus titanium, locking constructs, plate length or dimension of bony defects if existed but only it was confirmed that NPWT is one of the potential factor that reduces the rate of infections considerably nearly 80% [12]. It was not mentioned that how much bone was exposed, dimension of wound, the extent of wound contamination or the need of bone grafting. However it is an effective strategy for the management of contaminated wounds.

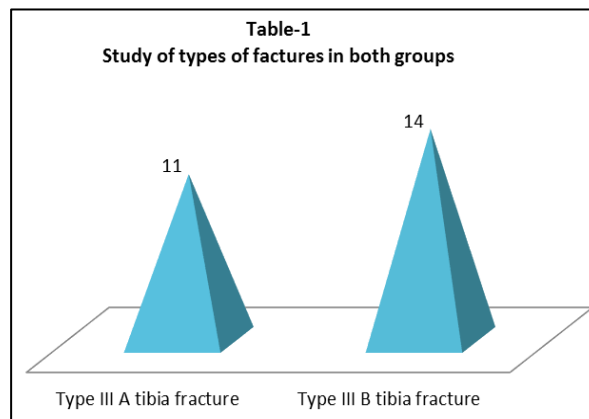
**Summary and Conclusion**

NPWT showed a significant and sustained decreased in bacterial infection as early as 42 hours after initiation of therapy but this study demands further patho-physiological, nutritional, micro biological, genetic study because exact formation and mechanism of granulation and gravity of negative pressure and factors of early healing are still un-clear.

- This research work is approved by Ethical committee of Surabhi Institute of Medical Sciences Siddipeth Telangana-502375.
- No conflict of interest
- No Funding

**Table 1:** Study of types of fractures in both groups

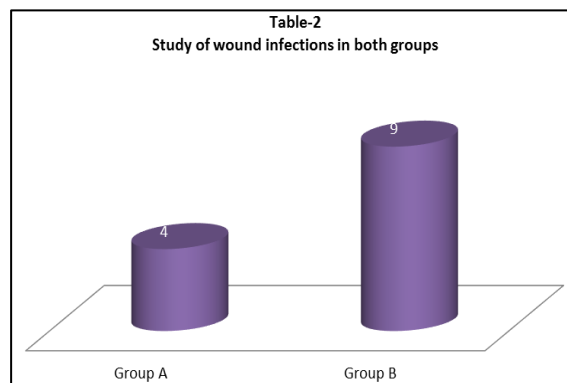
Type of fracture	Number 25	Percentage (%)
Type III A tibia fracture	11	44
Type III B tibia fracture	14	56



**Fig 1**

**Table 2:** Study of wound infections in both groups total no of patients: 25

Wound	Group A	Group B
Infection present	4 (16%)	9 (36%)



**Fig 2**

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