

# Measuring Intracompartmental Pressure Of Extremities In Burn Patients Using Whiteside And Saline Water Column Methods: A Comparative Study

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## Abstract

Compartment syndrome is a serious complication in burn patients, particularly those with circumferential or electrical burns involving extremities. Early diagnosis and intervention are critical but challenging due to unreliable clinical signs. This study evaluates two methods for measuring intracompartmental pressure (ICP)—the Whiteside method and the saline water column method—based on accuracy, ease of use, and correlation with clinical and intraoperative findings. Conducted on 50 patients over a year in a tertiary burn care center, the study demonstrates that ICP measurement significantly aids decision-making, reducing limb loss and improving overall outcomes.

**Keyword:** burns, compartment syndrome, compartment pressure, limb pressure, whiteside method,

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Date of Submission: 10-12-2024

Date of Acceptance: 20-12-2024

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## I. Introduction

Burn injuries affecting extremities, particularly circumferential and electrical burns, pose a significant risk for compartment syndrome, a condition of elevated pressure within a closed muscle compartment leading to ischemia and potential limb loss. Traditional clinical signs, known as the "Five P's" (Pain, Pallor, Paraesthesia, Paralysis, Pulselessness), are often unreliable.

This study compares two methods of ICP measurement: the Whiteside method, a traditional invasive technique, and the saline water column method, a simpler alternative.

## II. Materials And Methods

### Study Design

- Duration:** December 2022 to November 2023
- Setting:** Tertiary burn care center (Government Kilpauk Medical College)
- Sample Size:** 50 patients divided into two groups:
  - **Group A:** Whiteside method (25 patients)
  - **Group B:** Saline water column method (25 patients)

### Inclusion Criteria

- Total Body Surface Area (TBSA) <40%
- Patients aged >16 years
- Electrical burns or circumferential limb flame burns
- Hemodynamically stable

### Exclusion Criteria

- Associated injuries (e.g., fractures, head injuries)
- Lack of consent

**Procedure**

- **Whiteside Method:** Utilized a sphygmomanometer, IV extension tubes, an 18-gauge needle, a 10-cc syringe, and a three-way stopcock.
- **Saline Water Column Method:** A simple setup using a saline drip system to measure ICP.

**Table 1: ICP Thresholds**

Condition	ICP Range
Normal	0-8 mmHg
Impending Compartment	10-30 mmHg
Compartment Syndrome	>30 mmHg

**III. Results**

**Table 2: Age and Gender Distribution**

Age Group (Years)	No. of Patients
16-35	16
36-55	28
>55	6

**Table 3: Gender**

Gender	Group A	Group B	Total
Male	18	16	34
Female	7	9	16

**Table 4: Causes of Burns**

Etiology	Group A	Group B
Electrical Burns	18	16
Flame Burns	7	9

**Table 5: Pressure**

Pressure	Group A	Group B	Total
Normal	5	6	11
Impending compartment	12	15	27
Compartment	8	4	12

**Table 6: Management**

Management	Group A	Group B
Surgery	13	14
Conservative	12	11

All patient in compartment syndrome underwent surgery  
 But in impending compartment syndrome: Group A (5/12) = 41.6%  
 : Group B (10/15) = 66.3%

**Table 7: Ease of method**

	Group A	Group B
Easy	4	2
Medium	13	5
Difficult	8	18

**Table 8: Pain Accuracy**

	Group A	Group B
Mean	6.28	6.32

**Table 9: Accuracy and Ease of Use**

Parameter	Group A	Group B
Accuracy	83.3% correlation	41.6% correlation
Ease of Use	Simpler	Moderate difficulty

**Clinical Pictures**

**Case 1**



**Case 2**



**Case 3**



**Case 4**



**Case 5**



**IV. Discussion**

The results indicate that the Whiteside method is more accurate in detecting impending compartment syndrome and is easier to perform. Whereas saline water column method is difficult and less accurate. This dichotomy underscores the potential for combining these methods to optimize burn care.

**V. Conclusion**

ICP measurement is critical for managing burn patients with limb involvement. Accurate assessment helps prevent complications like limb loss, reduces surgical stress, and improves patient recovery. While the Whiteside method excels in accuracy and easy in technique ensures its practicality in resource-limited settings.

### **References**

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