



# POP BOOT TRACTION; ITS EFFICACY IN PRE-OP MANAGEMENT OF ACUTE FRACTURES OF UPPER END OF FEMUR

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**ABSTRACT... Introduction:** Fractures of upper end of femur are generally applied some traction pre-operatively. Traditionally either skin or skeletal traction is applied. In this study we applied traction via POP Boot with a T behind ankle in 354 cases of fracture upper end of femur during pre-operative management and the results were compared with those of skin and skeletal traction. **Objectives:** To see whether effective pre-op traction can be applied via POP Boot in upper femur fractures and what are the complications and cost effectiveness as compared to skin and skeletal traction. **Study:** In 354 patients POP Boot was applied and 3 kg traction applied to the injured limb with fracture femur while in 50 cases skin traction and in another 50 cases skeletal traction was applied. **Design:** It's a randomized prospective double blind study. **Settings:** Study was carried out in tertiary care hospitals including combined military hospitals of Rawalpindi, Muzaffarabad and Kharian. **Period:** Study was conducted between the periods of 10 Sep 2003 to 20 Sep 2012 (9 years and 10 days). **Methods:** All patients have either simple or comminuted fracture of upper end of femur. All patients were adults and received same amount of analgesia. 3 kg traction was applied as standard in all cases. All patients were operated for their fracture femur within 2 to 10 days of applying traction. **Results:** Results were compared in terms of pain control, reduction achieved, rotational control, and discomfort during application of traction, complications, and cost effectiveness and compared with standard skin and skeletal tractions. **Conclusion:** POP Boot traction is an easily applied, effective and cost effective way of traction which has very low rate of complications and should be used for pre-op traction in all adult cases with upper femur fracture.

**Keywords:** Skin Traction, Skeletal Traction, POP (plaster of Paris) Boot Traction, Acute Hip Fracture, AVN (avascular necrosis)

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## INTRODUCTION

Although there are studies which question the beneficial effects of application of traction in acute hip fractures altogether<sup>4</sup>, but application of some sort of traction either skin or skeletal during pre-op phase remains the standard part of management of such fractures. The main advantages of traction application are pain control and assistance in reduction of fracture. Pain control is directly related to the control of movements both axial and rotational at fracture site.<sup>7</sup>

There are claims that pre-op traction application may also reduce the future complication of a vascular necrosis of head of femur in intra-capsular fracture neck of femur<sup>4</sup> but concrete clinical evidence to support this is lacking. Skin

traction can cause mechanical shearing, ischemia because of tight bandages, ulceration, blister formation and allergy to adhesive strapping.<sup>3</sup> Skeletal traction is an invasive procedure in which a metal pin is passed either through tibia or femoral condyle under local anesthesia. In this study we use a POP-Boot to apply traction to the injured limb and compare it with the traditional skin or skeletal traction.

## MATERIAL AND METHOD

### Type of study

Randomized Prospective Study

Types of Participants/ Inclusion Criteria:

- Skeletally mature (more than 16 years of age)
- Fully conscious patients (no element of head injury)

- Having fractures of upper femur (neck or sub trochanteric region)
- Internal fixation done within 2 to 10 days

### Exclusion Criteria

- All patients less than 16 years of age (skeletally immature)
- Patients having ace tabular fractures or pelvic injury
- All patients who remained on traction for more than 10 days (to avoid delayed complications)
- Terminal cases-only to be treated by traction
- Fractures fixed within 24 hours of injury

### Types of Intervention

- 354 patients were applied POP- boot traction with a T behind ankle
- 50 patients were applied skin traction
- 50 patients were applied skeletal traction under local anesthesia via upper end of tibia or femoral condyle

### Standardization

- All patients were applied traction on admission day
- 3 kg traction was applied in all cases as standard
- Inj. Dicloran 75 mg I/M x 08 hourly was given in all cases during first 48 hrs if otherwise not contra-indicated
- Inj. Tramol 50 mg I/V x 08 hourly was given, if Inj. Dicloran was contra-indicated
- After 48 hrs oral analgesia, Tab. Paracetamol was given as a routine 1-2 tab x 08 hourly

### Data Collection

- Observations were made by the House officers or Medical officers of the ward on daily basis during pre-op period, patients were specially checked for pressure sores in dependant areas, blisters, skin ulceration and allergic reaction.
- All cases were consequently operated and received some sort of internal fixation or partial hip replacement by the same surgeon.

### Bias in Study

- Patients already having skin ulceration or

fragile skin or history of skin allergy were not managed by skin traction

- Only short term effects of different tractions were compared and long term outcome were not studied (e.g. AVN etc.)
- Patients operated within the first 24 hours of admission were not included in the study



Figure-1. Skeletal Traction

### RESULTS

Pain control was assessed during the first 48 hours as described by the patient in terms of good, fair, little or nil. Good pain control was achieved in 30% (15) cases of skin traction, 40% (20) with skeletal traction and 59.8% (212) with POP-boot traction. Fair in 40% (20) cases of skin traction, 40% (20) of skeletal traction and 25% (177) of boot traction. Little or nil in 30% cases of skin traction, 20% of skeletal traction and 15.2% of POP-boot traction.

Adequacy of reduction was checked in X-ray after 48 hours of traction; good reduction (overlap <1cm) was achieved in 60% (30) patients with skin traction, 90% (45) patients with skeletal traction and 85% (240) patients with POP- boot traction.

Rotational control was assessed clinically by measuring the external rotation of foot. It was 18% (09) with skin traction, 70% (35) with skeletal traction and 90% (318) with POP-boot traction.

Complications occurred in 20% of patients with

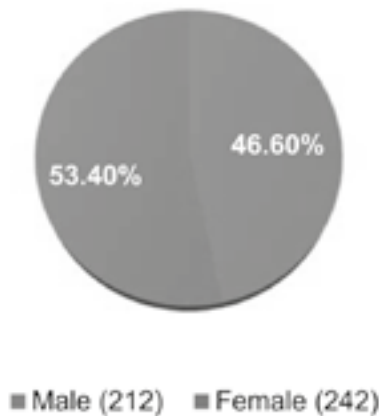
skin traction (skin ulceration 03, allergic reaction 05, injury of skin in 02 patients). Rate of pin tract infection was 16% (08). In one patient it was severe. Bone got exposed after repeated curettage and rotation flap had to be done on the medial aspect of tibia to cover the bone. Complications occurred only in 2.2% (08) cases with POP-boot traction (mainly skin ulceration).

In skin traction 50% (25) patients demanded inject able analgesia after 48 hours, 30% (15) patients with skeletal traction required inject able analgesia while about 20% (71) with POP- boot traction needed inject able analgesia.

Cost of skin traction is about Rs. 500/-, skeletal traction Rs. 500/- while only about Rs. 150/- with POP-boot traction.

Total Patients - 454
Males - 212 (46.6%)
Females - 242 (53.4%)
Mean Age - 68.2 years (Range 16-110 years) (SD ± 9.1)

**Table-I.**



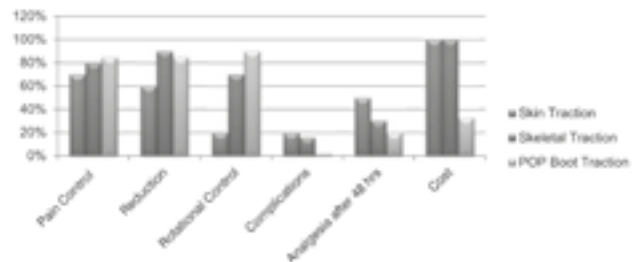
**Fig-2.**

**DISCUSSION**

Pre-op application of traction to acute hip fractures remains the standard practice all over the world. It helps in pain reduction, assists in fracture reduction, controls rotational element and may reduce the risk of development of AVN of head of Femur in intra-capsular fracture of neck of femur.<sup>4</sup>

	Skin Traction	Skeletal Traction	POP Boot Traction
<b>Pain Control (Good &amp; Fair)</b>	70%(35)	80%(40)	84.8%(300)
<b>Reduction (Good)</b>	60%(30)	90%(45)	85%(301)
<b>Rotational Control</b>	20%(10)	70%(35)	90%(318)
<b>Complications</b>	20%(10)	16%(08)	2.2%(08)
<b>Analgesia after 48 hrs</b>	50%(25)	30%(15)	20%(71)
<b>Cost</b>	Rs. 500/-	Rs.500/-	Rs. 150/-

**Table-II.**



**Fig-3.**

Although, there are studies which recommend no use of traction during pre-op phase especially if the fracture is fixed within first 48 hours of admission. However, the evidence is not very conclusive. In our setup, because of the work load and paucity of orthopedic surgeons, pre-op management usually goes beyond 48 hours after admission and application of some sort of traction in acute hip fractures is a routine.

Skin traction cannot be applied in patients with skin disease, ulceration, or allergy to adhesive dressing.<sup>9</sup> It is ineffective in obese patients as one cannot go beyond 3 kg of traction because of traction injury risk to the skin.<sup>10</sup> It does not control the rotational element well and thus pain control is not as good. Moreover, it is cumbersome to apply.

Skeletal traction is quite effective but it needs operative intervention as a metallic pin is passed under local anesthesia either through upper tibia or via femoral condyle. More weight can be applied in case of heavy patients. Application

is not pain free and complications specially pin tract infection is not that uncommon-(18% in this study). Control of pain is almost comparable to POP-boot traction. However, better reduction can be achieved by applying more weight. In very sick or terminal patients this may be continued as the sole mode of management internal fixation is considered dangerous.<sup>12</sup>

POP-boot traction with a T behind the ankle is a simple and effective way in controlling the pain and achieving pre-op reduction in patients with acute fractures of upper end of femur. It is easy to apply, cost effective and controls rotational element better than skeletal traction. It is non-operative and much safer to skin as compared to skin traction. There is no risk of traction injury to skin or allergy to adhesive strapping. It is almost complication free (2.2%), minor skin ulcerations.

## CONCLUSION

Whenever traction is applied for fracture of upper end of femur during pre-op management not longer, than 10 days, POP-boot application with a T behind the ankle is an effective and safe way to do that. It is easy to apply and is cost effective, can be applied anywhere by paramedical staff. Controls pain and rotational element better than skin and skeletal traction. There are no risks involved like skin ulcerations, blisters, traction injury to skin, allergy to adhesive strapping and pin tract infection as is the case in routinely applied skin or skeletal traction. The rational use of POP-boot traction is recommended in all cases of acute upper femur fractures during pre-op management. Any long term effects like development of AVN in intra-capsular fracture neck of femur were not studied.

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3	Dr. Shahid Majeed	Analysis, Proof Reading patient care	