

## Childress's Technique of Calcaneo-talotibial Steinmann Pin Fixation in Unstable Open Fracture Dislocation of the Ankle Joint at Dilchora Referral Hospital in Ethiopia.

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**Background:** open fracture and dislocations of ankle joint are inherently unstable. The objective of the study is to assess the clinical outcome of Childress's method of Calcaneotalotibial pin fixation in the management of unstable open fracture and dislocation of ankle joint.

**Methods:** A prospective study was made from 2004 -2009 on 45 patients with unstable open fracture and dislocations of ankle joint. After proper wound management, reduction of fracture and dislocation Childress technique was used to stabilize the ankle joint. Power drill was used to insert Steinmann pin. Postoperatively Posterior Gutter was applied but no preoperative tourniquet usage in all. Pin removal and application of walking cast done after wound healing in 4-9 weeks.

**Results:** A total of 45 (40 Male 89%, 5 Female 11%) cases of unstable open fracture and dislocations of ankle joint were admitted in our ward between 2004 -2009. Causes were Road traffic accident (RTA) in 39(87%) patients and All other injuries in 6(13%) patients. Clinical outcome was satisfactory in all 45(100%) cases. Hospital stay for most 44 (98%) cases were 4-9 weeks.

**Conclusion:** Childress technique of Steinman pin fixation is a useful option in managing all kinds of unstable open fracture and dislocations of ankle joint.

### Introduction

Open fracture and dislocations of ankle joint are inherently unstable<sup>1,3,4,5</sup>. Childress described and used calcaneotalotibial Steinmann pin fixation for closed unstable fracture dislocation of ankle joint when open reduction is contraindicated due to abrasion or superficial infection<sup>1</sup>. Sharp tipped 5mm Steinmann pin is driven through Os calcis and talus in the distal part of tibia as the first step before introduction of locked Nail in performing calcaneotalotibial arthrodesis as salvage procedure for severe ankle pathology (Post traumatic arthritis and deformity of the ankle)<sup>2</sup>. In an open or grossly disorganized ankle with serious damage to weight bearing part application of medial and lateral splints till the swelling subside then long leg cast for 6-9 weeks and for those with weight bearing part of ankle joint is not seriously damaged application of Calcaneal traction with 5 Kg of weight & elevation of the bed by 25 cm is suggested as management option<sup>3,6</sup>. Some cases of fracture and dislocations ankle joints are prone to amputation (LLA). Amputation is suggested if the foot is cold and sensation is lost<sup>6,7,8</sup>. The objective of the study is to assess the clinical outcome of Childress method of Calcaneotalotibial pin fixation in the management of unstable open fracture dislocation of ankle joint<sup>1</sup>.

### Operational definition

In this study Childress technique of stabilization has a satisfactory clinical outcome as it allows stabilization of ankle joint, relieves pain, avoids equinus deformity of ankle joint, enable wound inspection & treatment of soft tissue, allows early mobilization and activity and avoids late complications (e.g. pin tract infection, pin loosening, calcaneal osteomyelitis)<sup>3</sup>.

### Patients and Methods

A prospective study was made from 2004 -2009 on 45 patients with unstable open fracture and dislocations of ankle joint (Figure 1). After proper wound management, reduction of fracture and dislocation Childress technique was used to stabilize the ankle joint. Power drill was used to insert

Steinmann pin (Figure 2). Postoperatively Posterior Gutter was applied. Postoperative xrays were taken to show the postoperative fracture position (Figure 3). Pin removal and application of walking cast was done after wound healing in 4-9weeks. Each Patient was followed in our Hospital starting from the date of admission up to the date time of removal of the plaster cast (Figure 4).

## Results

There were 40 (89%) male, 5 (11%) female cases with severe unstable open fracture and dislocations of ankle joints (Table 1). Road traffic accident (RTA) was the cause in 39(87%) patients, bullet injury in 4(9%), Fall and Machine injury in 2(4%).

**Table 1.** Distribution of cases with unstable open fracture and dislocations of ankle joint by age and sex at Dilchora Hospital.

Age in Years	Sex		Total
	Male	Female	
< 20	1(2%)	-	1(2%)
21 – 40	35(78%)	3(7%)	38 (85%)
41 – 60	3 (7%)	2(4%)	5(11%)
> 61	1 (2%)	-	1(2%)
<b>Total</b>	<b>40 (89%)</b>	<b>5 (11%)</b>	<b>45 (100%)</b>

**Table 2.** Distribution of Cases with Unstable Open Fracture and Dislocations of Ankle Joint by length of Hospital stay and mechanism of injury at Dilchra Hospital.

Hospital Stay	Mechanism of Injury				Total
	RTA	Fall	Bullet	Machine	
< 3 Weeks	-	-	-	-	-
4-6 Weeks	9(65%)	-	1(2%)	-	10(22%)
7-9 Weeks	29(65%)	1(2%)	3(7%)	1(2%)	34(76%)
>10 Weeks	1(2%)	-	-	-	1(2%)
<b>Total</b>	<b>39(87%)</b>	<b>1(2%)</b>	<b>4(9%)</b>	<b>1(2%)</b>	<b>45(100%)</b>



**Figure 1.** Open fracture and dislocation of ankle joint at the time of presentation

**Figure 2.** Open fracture and dislocation ankle joint after reduction, Stabilization and repair of injured Soft tissue other than the skin.

**Figure 3.** X-ray taken after calcaneotalotibial stabilization by Steinmann pin

**Figure 4.** Cast removal after 6 weeks showed satisfactory clinical outcome on left ankle Joint

Thirty four (76%) stayed in the Hospital for 7- 9 weeks and ten patients (22%) stayed in the Hospital for 4 to 6 weeks. One patient (2 %) stayed for greater than or equal to 10 weeks (Table 2).

Satisfactory clinical outcome and Patient satisfaction were noted in all (100%) cases with calcaneotalotibial pin fixation (Table 3).

**Table 3.** Distribution of cases by Age and Clinical Outcome

Age (Yrs)	Satisfactory	Unsatisfactory	Total	Yes	No	Total
<20	1(2%)	-	1(2%)	1(2%)	-	1(2%)
21-40	38(85%)	-	38(85%)	38(85%)	-	38(85%)
41-60	5(11%)	-	5(11%)	5(11%)	-	5(11%)
>60	1(2%)	-	1(2%)	1(2%)	-	1(2%)
<b>Total</b>	<b>45(100%)</b>	<b>-</b>	<b>45(100%)</b>	<b>45(100%)</b>	<b>-</b>	<b>45(100%)</b>

## Discussion

Majority 39(87%) of unstable open fracture and dislocations of ankle joint were resulted from RTA. The average length of the wound is 8cm with moderate to sever degree of soft tissue injury, gross appearance ranges from clean to contaminated wounds and there was no significant skin defect requiring skin graft in these patients. The absence of satisfactory methods of stabilizing the ankle joints makes the wound management difficult .Childress technique of stabilization showed encouraging clinical outcome & patients satisfaction in all (100%) cases and amputation has been avoided in our series. The inserted pin stabilized the ankle joint , relived pain , avoided equines deformity of ankle joint , enabled wound inspection & treatment of soft tissue , allowed early mobilization & activity & did not result in late complication (e.g. pin tract infection , pin loosening , calcaneal osteomyelitis). Thirty four (76%) stayed in the Hospital for 7 to 9 weeks & Ten cases (22%) stayed for 4 to 6 weeks. The variation in the length of hospital stay was due to the difference in the severity of the injury among patients. Pin removal was done after wound healing in 4-9 weeks & Walking casts were applied for patients before allowing full weight

bearing. The length of hospital stay for such severe injury and time of pin removal is comparable to the result reported by Childress<sup>1</sup>.

## Conclusion

Childress technique of Calcaneotalotibial Steinmann pin fixation is a useful option as a preliminary method of stabilizing these severe injury and also encourages good soft tissue healings in managing all kinds of unstable open fracture and dislocations of ankle joint.

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