COMPARATIVE STUDY BETWEEN TRANSARTICULAR PINNING THE METACARPOPHALANGEAL JOINT AND CROSS PINNING FROM THE BASE FOR PROXIMAL PHALANX FRACTURES

Ahmed Elsayed Semaya, Mohammad Hasan Ahmad, Islam Mohamed Abdelmaksoud, Amr Gamal Ahmed Eid

Department of Orthopaedic Surgery and Traumatology, Faculty of Medicine, Alexandria University

Introduction

Fractures of the proximal phalanx are common injuries encountered in both adult and pediatric populations. These fractures can result from various trauma mechanisms, including sports injuries, falls, and direct blows. Prompt and effective treatment is crucial to restore the function of the hand, maintain joint stability, and prevent long-term complications such as malunion, stiffness, and joint contractures. Among the treatment modalities for these fractures, surgical intervention is often indicated when conservative management fails to achieve or maintain proper alignment.

Several surgical techniques are employed to ensure optimal outcomes, with transarticular pinning and cross pinning from the base being two widely used approaches. Transarticular pinning involves the insertion of pins across the metacarpophalangeal (MCP) joint to stabilize the fracture, ensuring accurate alignment while minimizing disruption to the surrounding soft tissue. This method offers a straightforward approach with secure fixation but may pose potential risks, such as articular cartilage damage and limited postoperative joint movement.

On the other hand, cross pinning from the base, which involves placing pins at the base of the proximal phalanx without crossing the MCP joint, presents an alternative stabilization technique. This approach aims to provide adequate fracture fixation while preserving the integrity of the joint surface, potentially allowing for improved postoperative mobility and decreased risk of joint-related complications. However, cross pinning may present challenges in achieving secure and stable fixation, especially in complex fracture patterns.

Aim of the Work

The aim of this study was to compare between transarticular pinning of the metacarpophalangeal joint and cross pinning from the base of the proximal phalanx for treatment of proximal phalanx fractures.

Subjects and Methods

This prospective study included 40 patients (divided into two groups of 20 each) with extra-articular short oblique or transverse proximal phalanx fractures treated at Elhadra University Hospital using K-wires for either transarticular pinning of the metacarpophalangeal (MCP) joint or cross pinning from the base of the proximal phalanx. Patients aged 18-60 years were included, while those with multiple finger fractures, comminuted fractures, tendon or soft tissue injuries requiring repair or reconstruction, and intra-articular fractures were excluded.

Comprehensive history taking and physical examinations, including neurovascular assessments, were conducted. Radiological evaluations using plain X-rays (antero-posterior, lateral, and oblique views) guided the treatment. Postoperatively, patients were placed in a slab for three weeks to facilitate early range of motion and followed clinically and radiologically for at least six months, with assessments at 2 weeks, 4 weeks, 6 weeks, and 3 months. Outcomes were measured based on X-ray findings for reduction quality, loss of reduction, and union, along with clinical evaluations of the total active range of motion (TAM).

Results

The comparison of total active movement (TAM) outcomes between the transarticular pinning and cross-pinning groups revealed similar results at both three and six months post-treatment. At three months, 5.0% of patients in each group had poor movement (<180°), while fair movement (180° - 219°) was observed in 30.0% of the transarticular group and 25.0% of the cross-pinning group. Good movement (220° - 240°) was seen in 25.0% and 20.0% of the respective groups, with excellent movement (>240°) in 40.0% of the transarticular group and 50.0% of the cross-pinning group. Mean TAM scores were 229.3 ± 24.69 for the transarticular group and 236.1 ± 30.47 for the cross-pinning group. At six months, the trend persisted with 5.0% in both groups having poor movement, fair movement in 25.0% (transarticular) and 20.0% (cross-pinning), and good movement in 20.0% for both. Excellent movement was recorded in 50.0% of the transarticular group and 55.0% of the cross-pinning group. The mean TAM scores at six months were 233.7 ± 24.26 for the transarticular group and 240.0 ± 29.69 for the cross-pinning group. Statistical analysis showed no significant differences in TAM outcomes between the groups at both time points (p values > 0.05) (Table 1).

Table : Comparison of total active movement (TAM) outcomes between both study groups.

TAM	Transarticular (n = 20)		Cross pinning (n = 20)		Test of Sig.	p
	No.	%	No.	%		
3 months						
Poor (<180°)	1	5.0	1	5.0	FET= 0.751	0.918
Fair (180° - 219°)	6	30.0	5	25.0		
Good (220° - 240°)	5	25.0	4	20.0		
Excellent (>240°)	8	40.0	10	50.0		
Min. – Max.	170.0 – 266.0		172.0 – 283.0		t= 0.770	0.446
Mean ± SD.	229.3 ± 24.69		236.1 ± 30.47			
Median (IQR)	231.5(212.0–248.5)		238.5(213.0–262.0)			
6 months						
Poor (<180°)	1	5.0	1	5.0	FET= 0.516	1.000
Fair (180° - 219°)	5	25.0	4	20.0		
Good (220° - 240°)	4	20.0	4	20.0		
Excellent (>240°)	10	50.0	11	55.0		
Min. – Max.	175.0 – 269.0		178.0 – 285.0		t= 0.735	0.467
Mean ± SD.	233.7 ± 24.26		240.0 ± 29.69			
Median (IQR)	236.5(217.0–253.5)		243.5(217.0–265.5)			

Table2: Comparison of the quick disabilities of the arm, shoulder, and hand (Quick-DASH) scores between both study groups.

Quick -DASH (6 months)	Transarticular (n = 20)		Cross pinning (n = 20)		Test of Sig.	p
	No.	%	No.	%		
Satisfactory	3	15.0	2	10.0	FET= 0.424	1.000
Good	15	75.0	16	80.0		
Excellent	2	10.0	2	10.0		
Min. – Max.	2.30 – 20.50		2.30 – 25.0		U= 162.500	0.314
Mean ± SD.	11.26 ± 4.27		10.42 ± 5.63			
Median (IQR)	11.40 (9.0–13.60)		9.0 (6.80–13.60)			

Conclusion

This study demonstrated that both transarticular pinning and cross pinning from the base of the proximal phalanx are effective techniques for the treatment of extra-articular proximal phalanx fractures. Both methods resulted in satisfactory functional outcomes, allowing early mobilization and achieving good to excellent total active motion (TAM) in the majority of patients by six months. No significant difference was found between the two techniques in terms of range of motion, Quick-DASH scores, or complication rates.

The choice between transarticular and cross pinning techniques can be made based on individual fracture characteristics, surgeon preference, and patient factors, as both approaches provide stable fixation and promote fracture healing. Early rehabilitation and regular follow-up are essential components of the treatment strategy to ensure optimal recovery and prevent stiffness.

2024 ©Alexandria Faculty of Medicine
CC-BY-NC