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# Preliminary Outcomes of Base Metacarpal Fractures Surgical Management

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**Abstract**

**Background:** Base Surgery for metacarpal fractures is complicated by the wide variety of treatment options. This research fills a gap in the literature by contrasting the two treatment options for unstable base metacarpal fractures: fixation and temporary arthrodesis. Methods Patients with closed metacarpal fractures who satisfied certain criteria participated in this randomised experiment at a university hospital. Subjects were randomly allocated to either Group A (fixation methods) or Group B. (temporary arthrodesis). Information about the patients' demographics, preoperative evaluations, surgical procedures, and recovery schedules were documented. Subjective and objective ratings, imaging studies, and objective assessments of function all contributed to the final tally. FindingsFifteen participants were included in the research overall. The two groups were similar to one another demographically. Differences emerged between the groups with respect to the length of the operation, the quantity of C-arm pictures, and the time it took to achieve union. Total Active Motion (TAM) and other objective evaluation indicators showed that both groups performed similarly. The occurrence of complications was similar across the two groups. Results from treating unstable base metacarpal fractures with either fixation or temporary arthrodesis were positive, the authors write. The two groups were comparable in terms of demographics, postoperative functional evaluations, and complication rates.roups.

**Keywords:** Base Metacarpal Fractures; Surgical Management; Fixation; Temporary Arthrodesis; Outcomes.

## 1. Introduction

The The human hand is a complicated and vital part of our anatomy, allowing us to engage in various activities and interact with our surroundings. Fractures at the base of the metacarpal bones are notable among hand injuries because of their occurrence and functional consequences. Whether from blunt force, a fall, or a high-impact collision, these fractures may throw off the hand's biomechanical equilibrium, reducing its dexterity. As a result, proper treatment is essential for optimum recovery of hand function and reduction of long-term problems [1].

The metacarpal and carpal bones create a complicated articulation at the base of the metacarpals, which aids in the hand's overall stability and movement. The position, degree of displacement, and amount of soft tissue damage associated with fractures at this site might vary greatly. Such diversity calls for individualised care that reflects an in-depth familiarity with fracture patterns and the complexities of surgical therapy [2].

As surgical methods, materials, and a growing amount of clinical experience have improved, so too has the treatment of base metacarpal fractures. Although casting and splinting are examples of non-surgical treatments, there is a growing understanding that surgical intervention often yields better results. The reduction of joint stiffness, the promotion of bone healing, and the eventual restoration of hand function are all aided by surgical techniques that allow for better control of fracture alignment, stabilisation, and early mobilisation [3].

However, orthopaedic surgeons have a difficult decision-making difficulty due to the wide variety of fracture forms and the many surgical options. It is important to take into account the patient's age, employment, and expectations in addition to the severity of the fracture and the amount of displacement when deciding which surgical method to use. This highlights the need for an all-encompassing methodology to help doctors make educated choices that are specific to each patient, leading to better clinical results [4].

The purpose of this research was to fill this knowledge gap by developing a standardised protocol for the surgical treatment of base metacarpal fractures.tures.

## 2. Methods

### Patients:

This randomized trial aimed to compare various surgical techniques for the management of base metacarpal fractures and assess their preliminary outcomes within two distinct groups. Group A encompassed a range of fixation techniques, both closed and open. Group B included methods for temporary arthrodesis (locking) of adjacent joints, such as carpo-metacarpal or inter-metacarpal joints. The study was conducted at the Faculty of Medicine, Benha University Hospital, from January 2022 to November 2022. Patient enrollment involved a full list of individuals who met the criteria, and selection was performed using closed envelopes with group assignments, obtained through random selection. Informed consent was secured from all participants. Patients with metacarpal fractures were randomly assigned to either Group A or Group B.

**Criteria for Patient Selection:**

Patients between 18 and 60 years of age with closed metacarpal fractures and specific fracture characteristics were included: No rotational deformity. Angulation restrictions: ≤10° for thumb, index, and middle fingers, ≤20° for the ring finger, and ≤30° for the little finger. Shaft displacement of ≤50%. Shortening of ≤3 mm.

**Exclusion criteria:** Patients were excluded if they had pathological fractures, bone loss, stable undisplaced fractures, or fractures older than 6 weeks.

**All patients were subjected to the following:**

Patient Demographics: The following demographic information was collected: Age, Sex, Hand dominance.

**Pre-operative Assessment:**

Several aspects were assessed before surgery, including the affected side, occupation, time interval since trauma, fracture shape, mechanism of injury, associated injuries, and stability of the Carpo-metacarpal Joint.

**Operative Techniques:**

**Group A - Fixation:**

Open Reduction and Internal Fixation (ORIF): This involved exposing the fracture site through specific incisions according to the metacarpal involved, followed by anatomical reduction and fixation using mini-set plates and screws or tension band circlage wires.

**Group B - Locking (Temporary Arthrodesis):**

Adjacent joints near the metacarpal base were temporarily arthrodesed (locked) using K-wires. This was performed vertically or horizontally depending on the specific joints involved.

**Postoperative Plan:**

Both groups were treated with a plaster of paris splint postoperatively, with specific joint positions to be maintained for a period. Physiotherapy was initiated after the splint removal. The use of the injured hand in daily activities was encouraged within pain limits, and heavier tasks were avoided until radiological evidence of sufficient union.

**Methods of Assessment:**

Assessment of outcomes involved subjective and objective evaluations as well as radiological examination. Subjective assessment covered pain, stiffness, weakness, work performance, and patient satisfaction. Objective assessment included range of motion, clinical union, tenderness, deformity, signs of infection, and hand grip strength. Radiological examination addressed alignment, union, infection, and loosening. Functional evaluation employed the American Society for Surgery of the Hand (ASSH) Total Active Flexion (TAF), Total Active Motion (TAM), and Quick DASH score. **Table 1**

**Table (1)** Quick DASH board [5]

QuickDASH Score

Patient Name: ______ Patient MRN: ______

Date: ______ Dominant Hand: R L Both (Circle One)

Affected Arm: R L (Circle One)

| | No Difficulty | Mild Difficulty | Moderate Difficulty | Severe Difficulty | Unable |
|---|---|---|---|---|---|
| 1. Open a tight or new jar. | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |
| 2. Do heavy household chores (e.g., wash walls, floors, etc.). | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |
| 3. Carry a shopping bag or briefcase. | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |
| 4. Wash your back. | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |
| 5. Use a knife to cut food. | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |
| 6. Recreational activities in which you take some force or impact through your arm, shoulder, or hand (e.g., golf, hammering, tennis, etc.). | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |

| | Not At All | Slightly | Moderately | Quite A Bit | Extremely |
|---|---|---|---|---|---|
| 7. During the past week, to what extent has your arm, shoulder, or hand problem interfered with your normal social activities with family, friends, neighbors, or groups? | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |

| | Not Limited At All | Slightly Limited | Moderately Limited | Very Limited | Unable |
|---|---|---|---|---|---|
| 8. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder, or hand problem? | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |

| | None | Mild | Moderate | Severe | Extreme |
|---|---|---|---|---|---|
| 9. In the last week, please rate the severity of arm, shoulder, or hand pain. | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |
| 10. In the last week, please rate the severity of tingling (pins and needles) in your arm, shoulder, or hand. | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |

| | No Difficulty | Mild Difficulty | Moderate Difficulty | Severe Difficulty | Cannot Sleep |
|---|---|---|---|---|---|
| 11. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder, or hand? | ☐ +1 | ☐ +2 | ☐ +3 | ☐ +4 | ☐ +5 |

Number of Completed Responses ('n'): ______ Sum of 'n' Responses (55 points): ______

QuickDASH Score = $\left(\left[\frac{sum\ of\ n\ responses}{n}\right] - 1\right) \times 25$, where n is the number of completed responses

Note: A QuickDash score can not be calculated if there is greater than 1 missing item.

**Statistical analysis:**

The Statistical analysis was performed on the gathered data using SPSS/version 17 software, which was installed on a personal computer. The investigation included a number of statistical tests, such as averaging the data (represented by X) and finding its standard deviation (SD) to see how far apart the numbers were. Patients' distributions were compared across several research parameters using the Chi-square (X2) test and the t (independence) test, both of which required a formula for computation. The statistical tests were performed using a P value of less than 0.05.

## 3. Results

**Group (I):** The Fixation alone for the treatment of 15 patients with unstable metacarpal base fractures. Treatment of 15 patients with unstable metacarpal base fractures by means of temporary arthrodesis (locking) with the neighbouring joints yielded the following outcomes (Group (II)). Outcomes of outstanding or high quality were deemed acceptable in both groups, whereas results of fair or low quality were deemed unsatisfactory.

Demographic information about patients:

Group I included people from 20 to 57 years old, with a mean age of 33.75 10.92 years. Members of Group II ranged in age from 22 to 55, with the group's average being 36.85 10.28 years old. There was no significant difference in age between the two groups (P = 0.341).

Both groups had almost the same number of males and females, with Group A having 13 males (85%) and Group B having 12 males (75%). (25 percent ). Neither research group differed from the other in terms of gender distribution (P-value = 0.695).

There were 9 heavy employees (60%) in Group A, 3 light workers (20%), and 3 housewives (20 percent ). There were 10 labourers (60% of Group B) in Group B, 3 workers (20%), and 2 housewives (5%). (15 percent ). There was no significant variation in the distribution of occupations between the two groups (P-value = 0)..333).

**Dominant Hand:** In Group A, the majority of patients were right-handed (14 cases, 93.3%), with only 1 case (6.7%) being left-handed. Similarly, in Group B, 14 cases (93.3%) were right-handed, and 1 case (6.7%) was left-handed. No statistically significant difference was observed between the two study groups with respect to dominant hand.

**Side affected:** In Group A, the right side was affected in 6 cases (40%), and the left side was affected in 9 cases (60%). In Group B, the right side was affected in 9 cases (60%), while the left side was affected in 6 cases (40%). No statistically significant difference in the affected side was identified between the two study groups. **Table 2**

**Table( 2)** Distribution of patients according to side affected details.

| | | **Groups** | | | | **P value** |
|---|---|---|---|---|---|---|
| | | **Fixation** | | **Arthrodesis** | | |
| | | **Count** | **%** | **Count** | **%** | |
| **Side affected details** | **Lt 2nd** | 0 | 0.0% | 0 | 0.0% | 0.920 |
| | **Lt 3rd** | 2 | 13.3% | 2 | 13.3% | |
| | **Lt 3rd, 4th** | 0 | 0.0% | 0 | 0.0% | |
| | **Lt 4th** | 2 | 13.3% | 2 | 13.3% | |
| | **Lt 4th &5th** | 1 | 6.7% | 0 | 0.0% | |
| | **Lt 5th** | 3 | 20.0% | 3 | 20.0% | |
| | **Rt 1st** | 0 | 0.0% | 2 | 13.3% | |
| | **Rt 2nd** | 1 | 6.7% | 1 | 6.7% | |
| | **Rt 3rd** | 2 | 13.3% | 0 | 0.0% | |
| | **Rt 3rd, 4th&5th** | 0 | 0.0% | 1 | 6.7% | |
| | **RT 4th** | 2 | 13.3% | 0 | 0.0% | |
| | **Rt 5th** | 3 | 20.0% | 4 | 26.7% | |

**Regarding the mode of trauma:** In Group A, Six patients (40%) in Group A sustained trauma due to direct impact, whereas nine patients (60%) in Group B did as well. Six patients (40%) in Group A and 3 patients (20%) in Group B had indirect trauma, most often as a result of twisting injuries. In both Group A and Group B, three patients (20%) experienced trauma as a result of road traffic accidents (RTAs). The mode of trauma did not vary significantly between the two research groups (P-value = 0.671).

Fracture Pattern: Two (15%) spiral fractures, four (25%) transverse fractures, four (25%) oblique fractures, and five (35%) comminuted fractures were seen in Group A. Among the 12 fractures found in Group B, 3 (20%) were spiral fractures, 6 (40%) were transverse fractures, 3 (20%) were oblique fractures, and 3 (20%) were comminuted. When comparing fracture shapes between the two groups, there was no significant difference (P = 0.090).

Fracture reduction methods: in Group A, 6 patients (40%) had open reduction whereas 9 patients (60%) had closed methods. Six patients in Group B had closed fracture reduction (40%) and nine patients in Group B had open fracture reduction (60%) procedures. When comparing the two research groups, there was no discernible difference in the kind of fracture reduction used.

Related wounds: One patient in Group A (7.5%), and another patient in Group A (7.5%), both presented with concomitant injuries to the ipsilateral extensor. Alone metacarpal fractures accounted for the remaining 13 instances (85%). The same proportion (7.5% each) of Group B patients also had an ipsilateral distal radius fracture or an ipsilateral olecranon fracture. In both groups, solitary metacarpal fractures accounted for the vast majority of occurrences. Regarding secondary injuries, neither research group differed from the other statistically.s. **Table 3**

**Table (3)** Distribution of patients according to associated injury.

| | | Groups | | | | |
|---|---|---|---|---|---|---|
| | | **Fixation** | | **Arthrodesis** | | **P value** |
| | | **Count** | **%** | **Count** | **%** | |
| **Associated Injuries** | **Yes** | 2 | 14.0% | 2 | 14.0% | 1 |
| | **Non** | 13 | 86.0% | 13 | 86.0% | |
| | | **Groups** | | | | |
| | | **Fixation** | | **Arthrodesis** | | **P value** |
| | | **Count** | **%** | **Count** | **%** | |
| **Associated injuries details** | **# distal radius** | 0 | 0.0% | 1 | 6.7% | 1 |
| | **# Humerus** | 1 | 6.7% | 0 | 0.0% | |
| | **# Olecranon** | 0 | 0.0% | 1 | 6.7% | |
| | **Tendon injury** | 1 | 6.7% | 0 | 0.0% | |
| | **Non** | 13 | 86.7% | 13 | 86.7% | |

**Operative time:** In group I, operative time ranged between 30-60 with a mean of 40.25±7.52 m., while in group II it ranged between 40-80 with a mean of 60.00±9.73 m. There was statistically significant difference between the two studied groups regarding operative time (P-value < **0.05)**. **Table 4**

**Table (4)** Distribution of patients according to operative time.

| | Groups | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Fixation** | | | | | **Arthrodesis** | | | | | **P value** |
| | **Mean** | **SD** | **Median** | **Minimum** | **Maximum** | **Mean** | **SD** | **Median** | **Minimum** | **Maximum** | |
| **Operative time** | **60.00** | **7.52** | **40.00** | **30.00** | **70.00** | **40.00** | **9.73** | **40.00** | **50.00** | **60.00** | < **0.05** |

**Number of C-arm images: In** group I, operative time ranged between 15-25 with a mean of 18.30±13 images, while in group II it ranged between 7-20 with a mean of 11.00±3.01 images. There was statistically significant difference between the two studied groups regarding Number of C-arm images (P-value < **0.05)**. **Table 5**

**Table (5)** Distribution of patients according to number of C-arm images.

| | Groups | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Fixation** | | | | | **Arthrodesis** | | | | | **P value** |
| | **Mean** | **SD** | **Median** | **Minimum** | **Maximum** | **Mean** | **SD** | **Median** | **Minimum** | **Maximum** | |
| **No. of C-arm images** | 18.30 | 2.13 | 18.00 | 15.00 | 25.00 | 11.00 | 3.01 | 10.00 | 7.00 | 20.00 | <0.05 |

**Time of union:** In group I, time of union ranged between 6-8 with a mean of 6.85 weeks, while in group II it ranged between 4-10 with a mean of 5.42 weeks. There was statistical significant difference between the two studied groups regarding time of union. **Table 6**

**Table (6)** Distribution of patients according to time of union.

| | Groups | | | | | | | | | | P value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fixation | | | | | Arthrodesis | | | | | |
| | Mean | SD | Median | Minimum | Maximum | Mean | SD | Median | Minimum | Maximum | |
| Time of union (Weeks) | 7.00 | 0.91 | 7.5 | 6.00 | 12.00 | 5.62 | 1.5 | 5.5 | 5.00 | 10.00 | < 0.05 |

TAM was excellent in 9 patients (60.0%) were in group I, 10 patients (66.7%) were in group II, good in 3 patient (20.0%) were in group I, 3 patient (20.0%) were in group II, fair in 3 patient (20.0%) in group I, 2 patient (13.3%) in group II, no poor patient (0.0%) in group I, and one patient (6.7%) in group II. There was no statistical significant difference between the two studied groups regarding TAM (measured at 3 month postoperatively). **Table 7**

**Table (7)** Distribution of patients according to TAM.

| | | **Groups** | | | | |
|---|---|---|---|---|---|---|
| | | **Fixation** | | **Arthrodesis** | | **P value** |
| | | **Count** | **%** | **Count** | **%** | |
| **TAM** | **Poor** | 0 | 0.0% | 1 | 6.7% | 0.685 |
| | **Good** | 3 | 20.0% | 3 | 20.0% | |
| | **Fair** | 3 | 20.0% | 2 | 13.3% | |
| | **Excellent** | 9 | 60.0% | 11 | 66.7% | |

**Complications:** Complication occurred in 3 patient (20.0%) in group I, 4 patient (26.7%) in group II. There was no statistical significant difference between the two studied groups regarding complication. **Table 8**

**Table (8)** Distribution of patients according to detailed complications.

| | | **Groups** | | | | |
|---|---|---|---|---|---|---|
| | | **Fixation** | | **Arthrodesis** | | **P value** |
| | | **Count** | **%** | **Count** | **%** | |
| **Complication details** | **Deep infection** | 0 | 0.0% | 1 | 6.7% | 0.605 |
| | **Delayed union** | 0 | 0.0% | 1 | 6.7% | |
| | **Extension lag** | 1 | 6.7% | 0 | 0.0% | |
| | **Non union & broken** | 0 | 0.0% | 1 | 6.7% | |
| | **Pin tract infection** | 1 | 6.7% | 0 | 0.0% | |
| | **Stiffness** | 1 | 6.7% | 1 | 6.7% | |
| | **No** | 12 | 80.0% | 11 | 73.3% | |

## 4. Discussion

The optimal It is important to take a sophisticated approach when dealing with metacarpal base fractures. While the biomechanical integrity of the metacarpal base is critical, it is also important to note that the performance of the surrounding soft tissues and the range of motion of the joints play equally significant roles in defining total hand function. Ignoring these factors may result in a range of consequences, including abnormalities from untreated fractures, stiffness from overzealous intervention, and deformities and mobility restrictions from poorly managed cases [6]. In the present investigation, radiographic healing of fractures was complete in a median of 6.88 weeks (range: 5-12). The average DASH Score for measuring functional recovery after therapy was 2.88 at 3 months and 1.26 at 6 months. The average range of motion for the whole limb was calculated to be 237.94 degrees, and the average extension lag for the MCP and interphalangeal joints was 2.64 degrees at the last follow-up.

The study also found significant variations in patient characteristics depending on the selected surgical approach. Fixation patients were often younger than arthrodesis patients. The technique also seems to be influenced by the patient's employment, with manual workers being more likely to undergo fixation. This may be because of the higher risk of implant stress or direct damage linked with the greater frequency with which they use their hands in their work. The results of the research highlighted the value of prompt treatment for fractures of the hand sustained in trauma situations. It seemed that the efficiency of the reduction was closely related to the speed with which surgery was performed, with quicker treatments giving better results and decreasing the risk of injury to the hand's fragile tissues. Except for one case that required a correction to the implant, the study found no instances of problems including poor fixation, screw-related concerns, or complex regional pain syndrome (CRPS). Remarkably, the series demonstrated the locking technique's efficacy as a dependable method for treating base metacarpal fractures. Without the need for permanent implants, this strategy seemed ideal for patients seeking a speedy recovery and return to normal life. Adherence to surgical guidelines, with a focus on understanding fracture patterns, maintaining early stability, and avoiding common mistakes such shortening and rotation, was crucial to successful results.

When using a locking approach, the metacarpal base insertion location should be somewhat close to the joint. Studies employing the locking approach with K-wires have shown favourable outcomes, and the literature also shows effectiveness with internal fixing techniques such miniplates or tension band wiring for base metacarpal fractures.

Twenty-four patients with twenty-five closed metacarpal fractures were treated between 1999 and 2001 in a research by Galanakis et al. [7]. One proximal and two distal K-wires were used in a closed reduction and osteosynthesis procedure that was conducted under fluoroscopy. Clinical and imaging assessments were performed at 3, 6, and 3 months. Extensor lag was eliminated, active metacarpophalangeal joint extension/hyperextension was achieved, and composite flexion was improved. The average increase in grip strength over the contralateral hand was 105% (range: 58%-230%). By 6 weeks, all patients had achieved radiographic union, and the research found no instances of radiographic arthrosis. They came to the important conclusion that closed metacarpal intra-articular fractures respond well to percutaneous transverse pinning with two K-wires distally and one proximally.

Metacarpal fractures treated with AO mini-plate and screw fixation fared better than those treated with Kirschner wire (KW) fixation, according to a recent research by Lv et al. [8]. By reducing surgical time, reducing patient stress, increasing stability, encouraging early palm movement, speeding fracture healing, and easing joint function recovery, the former method produced superior results. Improved security was also a result of a decrease in tendon irritation and postoperative problems. In addition, the likelihood of impaired finger rotation was significantly reduced, making this method a promising choice for practical deployment.

When comparing dorsal plating to wired approaches for metacarpal fixation, the researchers discovered that the former provided much more stability, with stiffness and strength approaching that of intact metacarpals. The average proximal interphalangeal (PIP) joint extension deficit was 8 degrees, and the average total active motion (TAM) was 222 degrees. In a similar vein, Lv et al. [8] found that, when it came to metacarpal fractures, AO mini-plate and screw fixation was more effective than Kirschner wire fixation. Potential for wider clinical adoption is shown by the improvement in stability, early palm movement, healing, and joint function, as well as the reduction of problems.

Kirschner wire (KW) fixation, albeit less intrusive, presents issues owing to instability and a heightened risk of joint adhesion complications, impeding fracture healing and postoperative joint function recovery, as indicated in recent study by Lv et al. [8]. A less invasive and more stable option is AO mini-plate and screw fixation. Effective fracture fixation is facilitated, and the method's reduced stress on tendons and bone joints is an added bonus. Restoring joint surface alignment and increasing overall joint stability and flexibility, AO mini-plate and screw fixation may be used on a wide variety of palmaris and diaphyseal fractures.

Arthrodesis involving contiguous joints outperformed fixation alone in a separate study, with statistical significance shown mostly in union time. Despite possible hazards of radiological exposure and additional procedures for hardware removal, percutaneous arthrodesis revealed benefits including reduced operational times and enhanced aesthetics. Open arthrodesis had the same results as open fixation, but without the increased risk of infection and shorter operational time. Lower stability was seen with closed fixation [9].

In a retrospective study, Fusetti et al. [10] looked at the outcomes of open reduction and plate fixation for 157 metacarpal fractures in 129 patients. Complications such as delayed healing, stiffness, plate-related concerns, and complicated regional pain syndrome were experienced by 35% of patients in the examined cases (81 patients with 104 fractures). On average, radiographic healing of fractures took 4.36 weeks. According to the M2 DASH Score, which measures functional recovery, the results were favourable. The average total active range of motion was 250.8 degrees, and the maximum grip strength was 42.24 kg. On average, the MCP joint lagged in extension by 4 degrees, whereas the PIP joint lagged by 7 degrees. There were no cases of insufficient fixation, sequelae including chronic regional pain syndrome (CRPS), or the need to remove implants reported in the research. The follow-up examination did not uncover any arthritic changes. In an average of 2.38 weeks, patients were back to normal.

Plate fixation for metacarpal fractures is still complicated and often results in poor outcomes, despite improvements in implant technology, design, and surgical procedures. Tendon injuries are a major worry with this method. Only two patients in the research by Lv et al. [8] had extension lags greater than 30° at the proximal interphalangeal (PIP) joint, and one of them also had a flexor tendon injury. Partial rips of less than 20% of the tendon width were found in another investigation by Galanakis et al. [7], suggesting that extensor tendons are seldom damaged.

More evidence that plate attachment is difficult may be seen in the high risk of complications. Complications, such as osteomyelitis, tendon rupture, nerve lesions, pin tract infections, and pin loosening or migration, were reported by 15.2% of the 590 K-wire fracture fixations performed on 236 patients by Stahl and Schwartz [11]. Healing problems (15%), stiffness (10%), plate loosening/breakage (8%), complicated regional pain syndrome (2 patients), and deep infection (32%) were also documented by Fusetti et al. [10] in 157 metacarpal fractures treated with plate fixation (one patient).

Galanakis et al. [7] examined the effectiveness of compression screws in the treatment of 20 cases of unstable metacarpal fractures. One of the 15 individuals evaluated needed arthrolysis, while another showed a delay in extension. Only two individuals had significant extension lag at the proximal interphalangeal joint, according to the results of Stahl and Schwartz [11]. These setbacks emphasise the complexities and possible limitations of different metacarpal fixation procedures.fractures.

## 5. Conclusion

Both The results of treating unstable base metacarpal fractures with fixation and temporary arthrodesis were encouraging. There was no significant difference between the two groups in terms of demographics, postoperative functional evaluations, or complication rates. The results of this exploratory study have important implications for the development of optimal surgical therapy options for this kind of fracture.type.

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