Original Article

Suzuki Frame In The Management Of Intraarticular Fracture Of Base Of The Middle Phalanx.

Mohd Rafeeq Wani, Imran Qayoom, Haazim Haneef Pandit

Abstract:

Introduction: Intraarticular fractures of phalanges are mostly associated with subluxation or dislocation of the interphalyngeal joint and pose a challenge for the treating surgeon. Anatomic reduction and stable fixation followed by early mobilization of the involved joint is necessary to prevent stiffness.

Aim and Objective: The aim of this study was to evaluate the results of suzuli frame in intraarticular fractures of base of the middle phalanx.

Materials and Methods: The study included 15 patients with intra-articular fractures of base of middle phalanx of fingers of hand. Inclusion criteria were Adults patients with age >18 years,all sexes, intra-articular fractures of base of middle phalanx of any finger. The patients were managed with Suzuki pin and traction frame. Informed written consent was taken from all the patients and

Results:A total of 15 patients were included in the study. The average age of the patients in the present study was 33.46 ± 9.37 years (Range: 18-60 years). The mean flexion at PIP joint was 81.73 ± 18.72 degrees and the mean extension at PIP joint was -4.46 ± 3.12 degrees. The mean total ROM at the PIP joint at the final follow-up was 85.53 ± 19.24 degrees. Pin tract infection was seen in 20% of cases and was the commonest complication of the study.

Conclusion: With our experience with the suzuki frame, we find it easy to apply, cost effective and can be made with easily available materials. We achieved good results with this frame with very low complication rates and less joint stiffness.

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INTRODUCTION

The interphalangeal joints are hinge type of synovial joints which permit flexion and extension of fingers. Phalangeal fractures account about 10% of all fractures [1]. Intraarticular fractures of phalanges are mostly associated with subluxation or dislocation of the interphalangeal joint and pose a challenge for the treating surgeon. Anatomic reduction and stable fixation followed by early mobilization of the involved joint is necessary to prevent stiffness. Various surgical options for managing these fractures include krischner wire fixation,external fixators both dynamic and static,open reduction and internal fixation and volar plate arthroplasty [2-5]. Suzuki et al in 1994 described a new pins-and-rubber traction system, now known as suzuki frame, for treating these type of fractures [6]. The aim of this study was to evaluate the results of Suzuki frame in intraarticular fractures of base of the middle phalynx.

MATERIALS AND METHODS

The present study was a prospective study conducted in the department of orthopedics, Government Medical College, Srinagar. The study included 15 patients with intra-articular fractures of base of middle phalanx of fingers of hand. The patients were managed with Suzuki pin and traction frame. Informed written consent was taken from all the patients and ethical approval was taken from the institutional ethical committee for the study.

Inclusion criteria

Inclusion criteria were Adults patients with age >18 years,all sexes, intra-articular fractures of base of middle phalanx of any finger.

Author Affiliations

Mohd Rafeeq Wani, M.B.B.S. M.S. Orthopedics, Senior resident Government Medical College Srinagar.Imran Qayoom, M.B.B.S. M.S. Orthopedics, Senior resident Government Medical College Srinagar.Haazim Haneef Pandit, M.B.B.S. M.S. Orthopedics, Senior resident Government Medical College Srinagar.

Correspondence

Haazim Haneef Pandit, M.B.B.S. M.S. Orthopedics, Senior resident Government Medical College Srinagar.
Email: haazim888@gmail.com
Contact number: 8825094137

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Exclusion criteria

Patients with age <18 years, open injuries, associated fractures of involved hand, extra-articular fractures and injuries of thumb were excluded from study.

After clinical evaluation an anteroposterior and lateral radiographs of the involved finger were taken. Prophylactic antibiotic [cefuroxime 1.5 gm intravenous] was given half an hour before surgery. All the patients were operated under local anesthesia using digital block.

Under C-ARM guidance, two long k wires of 1.2mm size were passed one proximal and one distal to the fracture across the joint. The wires were bent and frame was built as per the method described by the Suzuki [6]. The patients were discharged the same day from the hospital and active range of motion of the involved joint were started. K-wires were removed at 4 weeks. Minimum final follow up for every patient was 6 months.

The statistical analysis of the data was performed using SPSS statistics programme version 20 (IBM, Armonk, NY, USA).

RESULTS

A total of 15 patients were included in the study. The average age of the patients in the present study was 33.46 ± 9.37 years (Range: 18-60 years). The injuries were observed predominantly in males with a male to female ratio of 4:1. Machine and work related injuries, were the commonest mode of injury observed (40%) followed by sports related injuries (33.33%). Dominant hand was involved in 60% of patients. Middle finger was most commonly involved (60%), while as little finger (6.67%) was the least common. Volar plate avulsion pattern fracture with dorsal subluxation of the PIP joint was observed in 40% patients. Patient characteristics are given in Table 1.

The mean flexion at PIP joint was 81.73 ± 18.72 degrees and the mean extension at PIP joint was -4.46 ± 3.12 degrees. The mean total ROM at the PIP joint at the final follow-up was 85.53 ± 19.24 degrees. Pin tract infection was seen in 20% of cases and was the commonest complication of the study. One patient developed painful arthritis of the PIP joint at final follow up and was advised for arthrodesis of the joint but was not ready at that time. The complications of the study are summarized in Table 2 and two of the cases are shown in Fig 1.

Table 1-Patient characteristics:

Total patients	15
Age	Age group 18-60 years Mean age 33.46 ±9.37
Sex	Males=12 (80%) Females=3 (20%)
Hand involved	Dominant=9 (60%) Non-dominant=6 (40%)
Finger involved	Middle finger=9 (60%) Ring finger=5 (33.33%) Little finger=1 (6.67%)
Mode of trauma	Machine/work related=6 (40%) Sports =5 (33.33%) Assault =1 (6.67%) Others =3 (20%)
Pattern of fracture	Dorsal plate=4 (26.67%) Volar plate=6 (40%) Comminuted =5 (33.33%)
Range of motion of the involved joint	Flexion =81.73 ±18.72 Extension = -4.46 ±3.12 Total ROM = 85.53 ±19.24

Table2-Complications:

Pin site infection	3 (20%)
Arthritis of joint involved	1 (6.67%)
Osteomyelitis	0
Non union	0

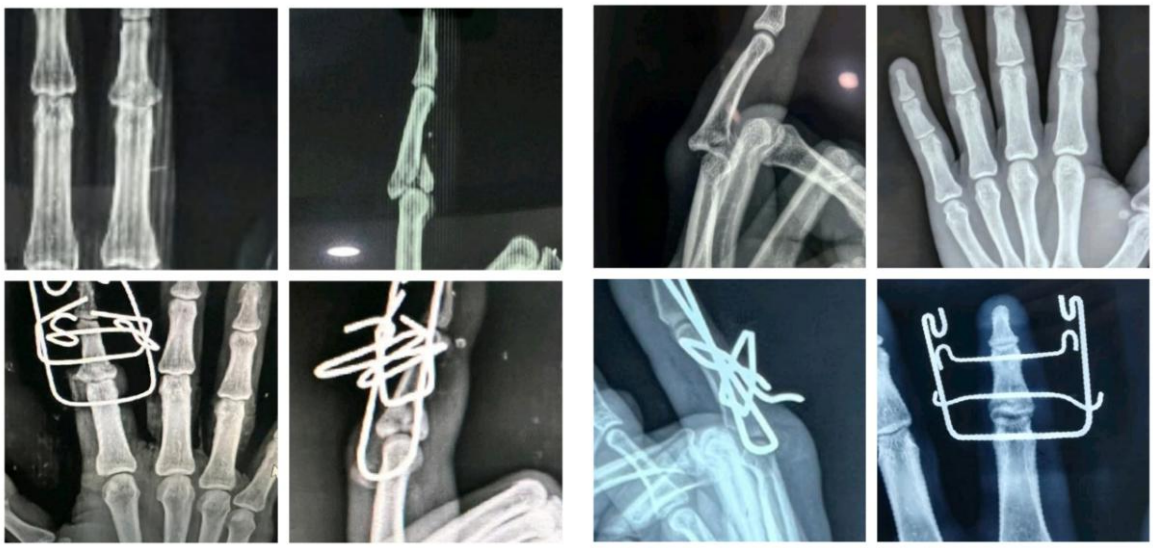

Fig 1: Pre and post-operative radiographs of two of the patients with fracture of base of middle phalynx with dorsal subluxation managed with suzuki frame.

DISCUSSION

The goal of treatment in fractured articular phalangeal joints is to achieve near normal range of motion. In addition, it should maintain the articular congruity and thus prevent arthritis of the involved joint. Conservative methods usually fail to ensure stability in these fractures. Open reduction and fixation many a times is difficult in these fractures. Hence various indirect reduction methods have been described in the literature with variable success rates. One of the common method is the use of external fixators.

Suzuki et al described a frame consisting of pins and rubber bands for these fractures [6]. Suzuki frame is an easy to apply and stable frame [12]. In addition, it allows early range of motion unlike many other devices.

In the present study the mean range of motion was around 85.53 degrees. The results were in agreement of many other previous studies [13-16]. Most common complication seen in the present study was pin tract infection. Similar results were seen by the other studies [17-19]. One patient developed arthritis of the joint. The patient had severely comminuted fracture and the mean range of motion was reduced to around 40 degrees. The patient reported with pain during daily activities. The patient was given an option of arthrodesis of the involved joint but was not ready at that time.

The limitations of the study include the small sample size, short term follow-up and exclusion of thumb injuries.

CONCLUSION

With our experience with the suzuki frame, we find it easy to apply, cost effective and can be made with easily available materials. We achieved good results with this frame with very low complication rates and less joint stiffness.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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