



ISSN: 0975-833X

RESEARCH ARTICLE

OBSERVATIONS ON THE OPERATIVE TREATMENT OF OPEN PHALANGEAL FRACTURES BY GANTRY TECHNIQUE

***Maajid Shabeer Peerzada**

Department of Orthopaedics Senior Resident, GMC Srinagar, India

ARTICLE INFO

Article History:

Received 02nd September, 2015
Received in revised form
08th October, 2015
Accepted 25th November, 2015
Published online 30th December, 2015

Key words:

Phalangeal Fracture, Gantry Technique

ABSTRACT

60 patients in the age group 20-50 years with open phalangeal fractures of hand were treated with 'gantry fixation' from jan 2013 to jan 2015. There were 50 males and 10 females. Right hand was involved in 35 and left hand was involved in 25 patients. All fractures were operated in emergency operation theatre. The patients were allowed supervised ROM exercises of the adjacent joints and were followed up for 24 weeks. 54 (90%) patients had good to excellent results, while as 5 (8.33%) patients had fair and 1 (1.66%) patient had poor results. It was observed that gantry fixation of phalangeal fractures is easy safe and reliable method of treating fractures of the hand.

Copyright © 2015 Maajid Shabeer Peerzada. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Maajid Shabeer Peerzada. 2015. "Observations on the operative treatment of open Phalangeal fractures by gantry technique", *International Journal of Current Research*, 7, (12), 24378-24380.

INTRODUCTION

Because of rapid industrialization and increase in the incidents of crime and road traffic accidents in our society, fractures of small bones of hand are very common. These fractures although easily recognised are difficult to treat because of malunion and stiffness of the adjacent joints. Most of these fractures can be treated conservatively, but in a relatively small number of patients with unstable fractures operative treatment is indicated. There are two types of fixation: internal according to AO standards, and external for a selected group with open unstable fractures or severe soft-tissue injuries. The use of an external device reduces further damage to the delicate soft tissues and bone, allows wound care and enables exercise of the finger joints at an early stage. There have been few reports of the use of external fixation for these injuries (Ashmead *et al.*, 1992; Bilos and Eskestrand, 1979; Freeland, 1987; Hochberg *et al.*, 1994; Parsons *et al.*, 1992; Pritsch *et al.*, 1981; Riggs and Cooney, 1983; Schuind *et al.*, 1991; Schuind *et al.*, 1993; Seitz *et al.*, 1987; Shehadi, 1991; Smith *et al.*, 1987).

MATERIALS AND METHODS

This was a prospective study conducted on 60 patients attending the emergency of Department of Orthopaedics GMC Srinagar from jan 2013 to jan 2015.

**Corresponding author: Maajid Shabeer Peerzada,
Department of Orthopaedics Senior Resident, GMC Srinagar, India.*

Patients were admitted and managed as per ATLS protocol. Primary treatment was given in the form of analgesics, IV antibiotics, antiseptic dressing. Radiograph of the hand was done in both AP and lateral views.

Inclusion criteria

Proximal phalangeal fractures of fingers
Proximal phalangeal fractures of thumb
All open fractures
Age group 20-50 years

Exclusion criteria

Closed fractures
Intra-articular fractures
Fractures with vascular injuries of digits.

All patients were operated under regional anaesthesia under tourniquet control using image intensifier. Routine protocol of examination under anaesthesia, wound debridement and fracture stabilisation was used in all patients. Fractures were stabilised by passing two vertical k-wires, one each through proximal & distal fragment of the fractured phalanx or through normal healthy areas above & below the injured phalanx. The fractured fragments were manipulated and reduced using the two vertical k-wires. Reduction was maintained by two transverse k-wires connecting two vertical k-wires. Reduction and position of k-wires was checked under image intensifier.

Pin sites were dressed and stay suture closure of the wound was done. Hand was kept elevated for the first 24 hours. Patients were kept on IV antibiotics for a period of 5 days followed by oral antibiotics depending on the severity of the wound and encouraged to do ROM of adjacent joints as early as possible.

Patients were followed up at 24 hours, 1 week, 2 weeks, 4 weeks, 6 weeks, 12 weeks and final follow-up was done at 24 weeks. At each follow-up, alignment, ROM of the adjacent joints and distal neuro-vascular status was recorded. K-wires were removed at 3 weeks but removal was delayed in infected fractures. Functional assessment at final follow-up was done as per (Duncan *et al.*, 1993) Duncan *et al.* functional score. Functional assessment based on total active range of movement in degrees of each injured finger separately according to Duncan *et al.* (1993)

Finger	Thumb	Result
220-260	119-140	Excellent
180-219	98-118	Good
130-179	70-97	Fair
<130	<70	Poor

RESULTS

Our study included 60 patients, out of which 50 (83.33%) were males and 10 (16.66%). Right hand was involved in 35 (58.33%) and left hand in 25 (41.66%) patients. Out of 60 patients 45 (75%) were manual workers while as 15 (25%) were sedentary workers. 80% patients reported to hospital in first 24 hours while as rest 20% reported in 24-48 hours interval.

The various modes of injury encountered

Table 1. MODES OF INJURY

S.No	Mode of injury	Number of patients
1.	Band -saw	35
2.	RTA	14
3.	Fall	6
4.	Domestic	5

Table 2. Site of Trauma

S.no	Site of fracture	No of patients
1.	Proximal phalanx	50
2.	Middle phalanx	10

Table 3. Type of Fracture

S.no	Type of fracture	No of patients
1.	Transverse	19
2.	Oblique	15
3.	Spiral	15
4.	comminuted	11

Table 4. Site involved

S.No	Involved finger	No of patients
1.	Index	18 (30%)
2.	Middle	15 (25%)
3.	Thumb	15 (25%)
4.	Ring	8 (13.33%)
5.	Little	4 (6.66%)

Table 5. Final result

S.no	Result	No of patients
1.	Excellent	29 (48.33%)
2.	Good	25 (41.66%)
3.	Fair	5 (8.33%)
4.	Poor	1 (1.66%)

DISCUSSION

The main aim of fixation of phalangeal fractures is to limit unnecessary exploration and trauma to the important soft tissues and fragile gliding surfaces of the phalanges. Different methods of fixation of the phalangeal fractures have been used with the aim of achieving anatomical reduction, rigid fixation and early mobilization. Single K-wire fixation of these fractures was previously employed. but it does not afford any resistance to rotatory and distractive forces across the fracture. Crossed pin fixation, although providing rigid stability has the disadvantage of keeping the fracture ends apart, thus contributing towards non-union (Steven, 1988). In addition, early mobilization of the fingers is impaired due to soft tissue transfixion. There has been an increasing tendency to ORIF of these fractures by plates and screws with newer A. O. techniques (Simonetta, 1970).

Mini plate and screw fixation is being currently employed in advanced hand centres, but requires unnecessary and iatrogenic dissection of delicate and functionally crowded areas and secondary intervention for removal of the implant. However in a general orthopaedic center like ours, and due to the huge rush of patients a system must be devised which is easily applicable and cost effective, which is provided by gantry external fixator. The results of our series are comparable to the studies done by Charles *et al.* (1986), Fahmy *et al.* (1990) and Javaid *et al.* (2002)

REFERENCES

- Ashmead, D., Rothkopf, D.M., Walton, R.L. and Jupiter, J.B. Treatment of hand injuries by external fixation *J Hand Surg [Am]* 1992; 17: 954-64.
- Bilos, Z.J. and Eskstrand, T. 1979. External fixator use in comminuted gunshot fractures of the proximal phalanx. *J Hand Surg [Am]*; 4:357-9.
- Charles P. Melone. Rigid Fixation of Phalangeal and Metacarpal Fracture. *Ortho Clin Nor Am.*, 1986; 17; 421-35.
- Duncan, R.W., Freeland, A.E., Jabaley, M.E. and Meydrech, E.F. 1993. Open hand fractures: an analysis of the recovery of active motion and of complications. *J Hand Surg [Am]*; 18:387-94.
- Fahmy, N.R.M. The Stockport serpentine spring system for the treatment of displaced comminuted intra articular phalangeal fractures *J Hand Surg* 1990 : 15B. 303-11.
- Freeland, A.E. 1987. External fixation for skeletal stabilization of severe open fractures of the hand. *Clin. Orth.*, 214:93-100.
- Hochberg, J. and Ardenghy, M. 1994. Stabilization of hand phalangeal fractures by external fixator. *W V Med. J.*, 90:54-7.

- Javed, A. April-June 2002. Bhat, SuhailMaajid. Results of Open Proximal Phalangeal Fractures by "Gantry Technique"jk science 01 -1 No.2.
- Parsons, S.W., Fitzgerald, J.A. and Shearer, J.R. 1992. External fixation of unstable metacarpal and phalangeal fractures. *J Hand Surg [Br].*, 17: 151-5.
- Pritsch, M., Engel, J. and Farin, I. 1981. Manipulation and external fixation of metacarpal fractures. *J Bone Joint Surg [Am]*; 63-A:1289-91.
- Riggs, S.A. Jr, Cooney, W.P. 1983. III. External fixation of complex hand and wrist fractures. *J Trauma* 23:332-6.
- Schuind, F., Cooney, W.P. III, Burny, F., An, K.N. 1993. Small external fixation devices for the hand and wrist. *Clin Orth.*, 293:77-82.
- Schuind, F., Donkerwolcke, N. and Burny, F. External minifixation for treatment of closed fractures of the metacarpal bones. *J OrthopTrauma.*, 1991;5:146-52.
- Seitz, W.H. Jr, Gomez, W., Putnam, M.D., Rosenwasser, M.P. 1987. Management of severe hand trauma with a mini external fixator. *Orthopedics*; 10:601-10.
- Shehadi, S.I. 1991. External fixation of metacarpal and phalangeal fractures. *J Hand Surg [Am]*16:544-50.
- Simonetta, C. Tile use of "A.O" plates in the hand. *Hand*, 1970; 2 : 43-45.
- Smith, R.S., Alonso, J. and Horowitz, M. 1987. External fixation of open comminuted fractures of the proximal phalanx. *Orthop Rev.*, 16: 937-41.
- Steven, V.F., Edwin, F.L., Janes, S. and Allen T.F. Comparative mechanical properties of various K. wire configuration in transverse and oblique phalangeal fractures. *J Hand Sllrgt.*, 1988; 13(a) : 246-53.
