

## ORIGINAL RESEARCH

### Ligamentotaxis- A Novel Approach for Treating Acute Hand Injuries

(Lt. Col.) Dr Shavinder Dogra<sup>1</sup>, (Col.) Dr R.K. Singhal<sup>2</sup>

<sup>1</sup>Classified Spl surgery and Plastic Surgeon, Assistant Professor, Command hospital (WC) Chandimandhir, Panchkula Haryana;

<sup>2</sup>Senior advisor Anaesthesia, Assistant Professor, Command hospital (WC) Chandimandhir, Panchkula Haryana;

#### ABSTRACT:

This case series attempts at describing an economical, easily reproducible method of ligamentotaxis for hand injuries. Evaluation was made of the cases managed by this method and advantages over the older methods of Buddy strapping, K-wire fixation, plate fixation .circlage and external fixation.

**Key words:** Ligamentotaxis, hand injures.

**Corresponding author:** Dr. R.K. Singhal

**This article may be cited as:** Dogra S, Singhal RK. Ligamentotaxis- A Novel Approach for Treating Acute Hand Injuries. J Adv Med Dent Scie Res 2017;5(8):104-106.

#### INTRODUCTION:

Given the extent of fine motor movements the hands are involved in, the importance of an early and adequate fracture fixation is important.

The methods in common use are Buddy strapping, K-wire fixation, plate fixation and external fixation[1]. These methods are marked by various complications such as mal-union and non-union (Buddy strapping), accidental removal, migration, wire fracture and infection (K-wire), While plate and external fixation avoid these complications, both are time consuming and technically demanding[2].

The technique being described is a low cost, easily reproducible method of fracture fixation which significantly improves upon Buddy splinting using commonly available articles.

#### METHOD:

All cases of fracture metacarpal and phalangeal bones were considered for management by this simple method. Associated neurovascular injury and an unwilling pt were the only exclusion criterion.

A POP volar cast is applied ensuring 20°-30° extension of the wrist, 80°-90° flexion at metacarpophalangeal joints and full extension of the interphalangeal joints( Fig 2a,2b). Items required for this simple methods are easily available and shown in Fig 1. A small hole is drilled in the distal part of the cast and a 10cc/20cc syringe is fixed perpendicular to the splint. Hooks for application of traction are fixed to the nail plate with a fast sealing adhesive (fevi-quick), augmented by adhesive technique. The hooks are anchored to the syringe using rubber bands or gloves. Distance between the middle finger and syringe should be nearly 14 cm, adequate padding is a pre-requisite considering immobilization will be required for 3-4 weeks. Follow-up x-rays were done on day 1, 8 and after weeks 4 and 6. Pts undergo weekly follow-up on OPD basis. Post-splint removal pt undergoes 2 weeks of active and assisted-passive mobilization for 2 weeks if required. Unrestricted hand use is allowed after 8 weeks.



Fig 1 – POP Bandage,Crepe bandage,Glove , 10cc syringde,feviquick,safety pin,blouse hooks and rubber band.



Fig 2 a



fig 2 b

### DISCUSSION:

Immobilization is a well established pre-requisite for allowing bone healing[2]. In case of hand injuries immobilization has been found to be tolerated poorly. Provision of early mobilization could greatly help towards this. The anatomic attachments of hand bones and surrounding soft tissue envelope are the mainstay of conservative management. On fracture the phalangeal and metacarpal bones generally angulate volar-wards[5]. The traction helps in avoiding this angulation as well as any other displacement. Moreover the splint avoids any abnormal pull[6]. Bone healing and recovery of range of movement are provided for concurrently. Since immobilization for more than three weeks post injury has been shown to be associated with poor outcomes therefore

supervised rehabilitation is done to facilitate attainment of full flexion at the proximal interphalangeal joints and to prevent the development of extension lag contractures[7].

In case of open fractures the wound is closed by suturing after a thorough wash and debridement and then the traction applied. This case series includes cases where ligamentotaxis was applied within a week of injury and continued till three or four weeks of injury since there is a chance of displacement till third or fourth weeks. No displacement or non-union was seen in this case series. After discontinuing the splint fortnightly review was done till eight weeks and then bi-monthly till 6 months. Radiographs were sufficient for monitoring.



Roentgenogram image before the splint application ( comminuted displaced fracture proximal phalanx Index finger).



Roentgenogram image after the splint application (consolidated fracture proximal phalanx Index finger).

Advantages of this method:-

1. Shorter rehabilitation period.
2. Only one intervention as opposed to plating/external fixation where two interventions are required.
3. Economical.
4. Avoids risks associated with anaesthesia.

**CONCLUSION:**

This case series saw excellent results with the use of ligamentotaxis in hand injuries both intra-articular as well as extra-articular fractures.

Simple hook traction can even be applied at the primary health care centre level and can be converted to transverse K-wire (skeletal traction) at secondary health care centre (Fig 3a,3b).



Fig 3a



Fig 3b

**REFERENCES**

1. Rex C, Patel K, Sandeep KM .A method of treating comminuted phalangeal fractures by ligamentotaxis using a single Kirschner wire. *J Hand Surg Eur Vol.* 2017 Nov;42(9):971-972. doi: 10.1177/1753193417718417. Epub 2017 Jul 4.
2. Shah Jehan, Th angavel Chandraprakasam, Sathya Th ambiraj. Management of Proximal Phalangeal Fractures of the Hand Using Finger Nail Traction and a Digital Splint: A Prospective Study of 43 Cases.*Clinics in orthopaedic surgery* 2012;156-162
3. Shim WC<sup>1</sup>, Yang JW, Roh SY, Lee DC, Kim JS. Percutaneous cerclage wiring technique for phalangeal fractures. *Tech Hand Up Extrem Surg.* 2014 Mar;18(1):36-40.
4. Teoh LC<sup>1</sup>, Tan PL, Tan SH, Cheong EC. Cerclage-wiring-assisted fixation of difficult hand fractures. *J Hand Surg Br.* 2006 Dec;31(6):637-42. Epub 2006 Sep 29.
5. Koul AR, Patil RK, Philip V. Traction splints: eff ective nonsurgical way of managing proximal phalanx fractures. *J Trauma.* 2009;66(6):1641-6.
6. Barton NJ. Fractures of the shafts of the phalanges of the hand. *Hand.* 1979;11(2):119-33.
7. Jagannath B Kamath, Nikil Jayasheelan, Amaranth Savur, and Rejith Mathews Outcome of unstable fractures of metacarpal and phalangeal bones treated by bone tie, *Indian J Orthop.* 2016 May-Jun; 50(3): 316–321.