

*Research Article***Results Surgical treatment of acute ulnar collateral ligament injuries of thumb M.P.J****Ali Zein Elabedeen A. Alkhoodly, Ahmed F. Sadek, Mohamed K. Elareeny and Elsayed A. Elsayed Abd Ellatif**

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Abstract

Introduction & aim of the work: Partial or complete tear or avulsion of ulnar collateral ligament (UCL) of the thumb metacarpo- phalangeal joint (MPJ) is an often encountered problem; it represents 86% of all injuries to the base of the thumb. **Patients and methods:** Between December 2015 and February 2017, 20 patients with acute UCL injury of the thumb MPJ were surgically managed by three different surgical techniques in the orthopedic surgery department at minia university hospital. **Results:** This study was conducted on 20 patients with acute UCL injury aged 21-40 years of both sexes. They were divided into three groups according to the method of fixation or repair which was basically determined by the size of the avulsed fragment. **Discussion:** The UCL is the main restraint to radially directed stress at the thumb MPJ. Acute thumb UCL injuries are caused by a forced by a forced abduction creating a radial deviation stress at the thumb MPJ.

Keywords: MPJ: Metacarpo-phalangeal joint, UCL: Ulnar collateral ligament, VP: volar plate**Introduction**

Partial or complete tear or avulsion of ulnar collateral ligament (UCL) of the thumb metacarpo- phalangeal joint (MPJ) is an often encountered problem; it represents 86% of all injuries to the base of the thumb⁽¹⁾.

Sudden forceful radial deviation stresses to the thumb MPJ causes the UCL to avulse from the proximal phalanx in approximately 90% of cases. The injury also may occur in the midsubstance or at the metacarpal origin⁽²⁾.

Skiers thumb refers to the fact that this injury is often seen in skiers who fall while holding their ski poles. Prevalence of this injury during skiing varies from 7% up to as high as 32% of all skiing injuries. This makes it the most common injury of upper extremities during skiing⁽³⁾. In children who still have immature skeleton, hyperabduction trauma leads to Salter-Harris type III avulsion of the UCL insertion and rarely to a true rupture of UCL.⁽⁴⁾

Plain X rays are useful in the diagnosis, also magnetic resonance imaging (MRI) because of its excellent soft-tissue resonance and multiplanar capabilities, has been advocated as a means for assessing UCL injuries. Numerous

authors reported good results with ultrasonographic examination of this type of injury⁽⁵⁾.

Delay in the diagnosis, treatment failure, or progressive attenuation of the ligament complex may lead to chronic disability of the thumb MPJ⁽⁶⁾.

Chronic instability leads to constant subluxation of the joint, pain and decreased strength during pinch and other important functions of the thumb. The problem of joint laxity and instability of the injured thumb MPJ can be treated with surgical repair, reconstruction or arthrodesis of the joint.

The purpose of these treatments is to restore pain-free stability and normal function of the MPJ⁽⁷⁾.

Aim of the work

The aim of this study is to compare the outcome for different surgical methods in treating of acute ulnar collateral ligament injuries of the thumb.

Patients and methods

Between December 2015 and February 2017, 20 patients with acute UCL injury of the thumb

MPJ were surgically managed by three different surgical techniques in the orthopedic surgery department at minia university hospital.

Patients recruited for this study were 16 males and 4 females with an average age of 30.5 years [range; 21-40]. As regard the side of injury 15 were in the right hand and 5 were in the left hand.

Sixteen injured thumbs were in the dominant hand and 4 were in the non-dominant hand. The mean time between the occurrence of trauma to the day of surgery was 6 days [range; 1-14] patient's demographic data.

All patients enrolled in this prospective study were interviewed and the details of the proposed surgery were discussed with them. A full informed consent was obtained form each patient including approval of the surgery, all

possible complications, and liability of further surgeries.

Inclusion criteria:

Acute injury: (within 2 weeks).

Age: (20-40) years.

Traumatic.

Patients with isolated ligament injury (bony avulsion or tear of ligament substance)

Exclusion criteria:

Associated stiffness.

Associated tendon injuries.

Patients before skeletal maturity.

Open injuries.

This study was conducted on 20 patients with acute UCL injury aged 21-40 years of both sexes. They were divided into three groups according to the method of fixation or repair which was basically determined by the size of the avulsed fragment.

Table {1}: MPJ FLEXION PRE& POST-operatively

	preoperative	Post operative	P value
MPJ flexioon⁽⁰⁾			
Range	15-40	45-60	0.0001*
Mean±SD	24.2±5.6	53.5±6.5	

Tabel {2} Differences between pre-operative and post-operative results in group 1 (minni score (n=7)).

	preoperative	Postoperative	P value
MPJ flexion⁽⁰⁾			
Range	20-25	45-60	0.0001*
Mean±SD	22.8±2.6	50.7±7.3	
Vallguus stress test⁽⁰⁾			
Range	34-44	12-24	0.0001*
Mean±SD	39.1±3.4	18±4.3	
Mayo wrist score			
Total/100			0.0001*
Excellent (90-100)	0(0%)	1(14.3%)	
Good (80-90)	0(0%)	2(28.6%)	
Satisfactory (60-80)	0(0%)	39(42.9%)	
Poor (below60)	7(100%)	1(14.3%)	

Discussion

The UCL is the main restraint to radially directed stress at the thumb MPJ. Acute thumb UCL injuries are caused by a forced abduction creating a radial deviation stress at the thumb

MPJ. In 90% of cases, the UCL avulses form the proximal phalanx. Although firm operative indications are lacking, these injuries are treated both operatively and non-operatively⁽⁵⁾.

Ulnar collateral ligament tears that are associated with avulsed bony fragments which are displaced or involve a significant portion of the joint surface should be reduced anatomically and fixed with pull-through sutures, wire-loop fixation, tension band wiring, K-wiring and intra-fragmentary screws depending on their size.⁽⁶⁾

Numerous methods to reattach the UCL to bone have been described. traditionally, a transosseous suture was tied on the radial side of the thumb outside the skin over a button or the bone. Today a suture anchor is more likely to be other repairs have also been described, including repairing the UCL to the adductor or the periosteum⁽⁷⁾.

Treatment results are highly satisfactory regards MPJ stability, pinch strength, opposition and grip strength, range of motion of the MPJ and the interphalangeal (IP) joint, and absence of pain⁽⁸⁾

Summery and conclusion

A partial or complete rupture of the ulnar collateral ligament of the MPJ of the thumb, skier's thumb, is an often-encountered problem. It can occur with any fall on an outstretched hand when a thumb that is already in abduction receives an extra valgus stress. The injury occurs commonly as distal avulsion of the ligament from its insertion in the base of the proximal phalanx with or without bony fragment, also rarely occurs as proximal avulsion or mid-substance tear.

Nonsurgical management of incomplete tears usually results in full recovery of thumb MPJ stability and motion. In contrast, complete ruptures often are associated with a stener lesion and have little potential for regaining stability without surgical intervention. In these cases, acute anatomic repair of the UCL almost uniformly restores strength, stability, and motion to the thumb MPJ. In neglected cases, UCL insufficiency occurs, increasing the likelihood of pain, weakness, and premature degenerative arthritis.

Different surgical techniques can be used. The UCL can be fixed with a suture anchor or with transosseous stitches. Small bone fragments can

be removed; larger ones can be fixed with a K-wire or with miniscrew.

The aim of this study is to evaluate the different techniques in the treatment of acute thumb ulnar collateral ligament injury. Twenty patients were included in this study, for all patients preoperative radiographs and US were done. Follow up period was 3 months and the results were evaluated by Mayo wrist score both pre and post-operatively.

In this study three different methods of fixation were used depending on the size of the fragment screw, K-wire, and two hole mini plate pull out suture. The results were comparable between the three groups which reflect the fact that different surgical techniques can be used. Which one applies depends on the anatomy of the lesion and can often only be decided upon during surgery

References

- 1- Kaplan EB. kaplan's functional and surgical anatomy of the hand: Lippincott Williams & Wilkins; 1984.
- 2- katolik LI, friendrich Jtrumble TE. Repair of acute ulnar collateral ligament injuries of the thumb metacarpophalangeal joint: a retrospective comparison of pull-out sutures and bone anchor technique's. Plastic and reconstructive surgery. 2008; 122(5):1451-6.
- 3- Kessler I a simplified technique to correct hyperextension deformity of the metacarpophalangeal joint of the thumb. J bone joint surg. Am. 1979;61(6):903-5.
- 4- koslowsky T, K, Gausepohl T, heidemann J, Penning D, Koebke J. Ultrasonographic stress test of the metacarpophalangeal joint of the thumb. Clinical orthopaedics and related research. 2004;427:115-9.
- 5- lee SJ, Montgomery K. Athletic hand injuries. Orthopedic clinics of north America. 2002; 33(3):547-54.
- 6- loebig T, Anderson D, Baratz M, Imbriglia J. Radial instability of the metacarpophalangeal joint of the thumb : Abiomechanical investigation. Journal off hand surgery. 1995;2091) :102-4.
- 7- loouis DS, huebner J, hankin FM. ruptuure and displacement of the ulnar collateral ligament of the metacarpophalangeal joint

- of the thumb. Preoperative diagnosis. J bone joint surg AM. 1986; 68(9):1320-6.
- 8- Mahajan M, Rhemrev SJ. Rupture of the ulnar collateral ligament of the thumb-a review. International journal of emergency medicine. 2013;6(1):31.
- 9- Mayer SW, Ruch DS, Leversedge FJ. The influence of thumb metacarpophalangeal joint rotation on the evaluation of ulnar collateral ligament injuries: Abio-mechanical study in a cadaver model. The journal of hand surgery. 2014;39(3):474-9.