Two Different Techniques In Treatment of “Mallet Finger” Injury

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Introduction

Flexion deformity of the finger at the DIP (distal interphalangeal) joint, known as ‘’Mallet finger’’ is a condition caused by the disruption of the extensor tendon at the joint alone or combined with fracture of the distal phalanx.

According to the Doyle classification[1] (Figure 1) there are four types:

I - Closed injury with or without small dorsal avulsion fracture;

II - Open injury (laceration);

III—Open injury (deep soft tissue abrasion involving loss of skin and tendon substance);

IV - Mallet fracture, three types:

A = distal epiphyseal injury (pediatrics)
B = fracture fragment involving 20% to 50% of articular surface (adult)
C = fracture fragment >50% of articular surface (adult)

Extensor tendon disruption, occurs when there is a strong force acting on the tip of the fully extended finger, leading to clean disruption of the tendon or avulsion fracture of the distal phalanx with smaller or bigger bone fragment.

Diagnosis is based on the clinical examination (Figure 2) and x-rays (Figure 3).

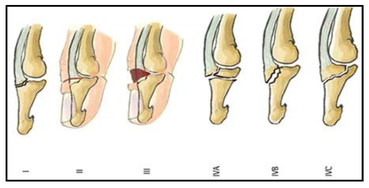

Figure 1. Doyle classification

Figure 2. Clinical findings

Figure 3. X-ray findings

Purpose

The main purpose was to compare results of two different surgical approaches to mallet finger repairs, and to compare our results with results of other studies.

Materials and methods

This is retrospective study of 36 patients that had Mallet finger injuries.

First group (A), consist of 20 patients that were treated with open tenorrhaphy. These patients were treated under digital block to explore the extensor tendons. Tenorrhaphy was performed with 3-0 ethibond, horizontal mattress sutures. (Figure 4 and 5)

In the second group (B) there were 16 patients that were treated with percutaneous tenorrhaphy, using 3-0 prolene suture under the same type of anesthesia. (Figure 6)

All patients were also splinted and results were evaluated first week after the treatment and then after finishing with physical therapy.

We evaluated extension lag of the DIP joint and also flexion of the DIP joint with PIP joint fixed in full extension.

Extensor lag was measured using protractor.

The Crawford classification was used to evaluate both groups.

Dominant hand, type of injury and complications were tabulated.

Figure 4. Open tenorrhaphy

Figure 5. Open tenorrhaphy

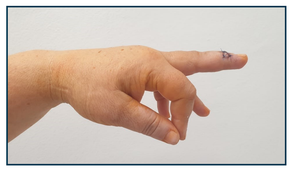

Figure 6. Percutaneous tenorrhaphy

Results

After finishing physical therapy all patient were evaluated.

Movement in DIP joint was 48,2 ± 1,6 degrees in open technique and 51,1 ± 0,6 degrees in patients with percutaneous tenorrhaphy.

Extensor lag was 3,5 ± 0,5 degrees in first group and 3,2 ± 0,8 in second group of patients.

Flexion of the DIP joint was measured with fixed PIP joint in full extension.

According to Crawford classification, we have 23 patient with 0 extension lag and 13 patient with extension lag from 1-10 degrees.

In the first group we have 12 patient with excellent outcome, and 8 with good outcome. 11 patient have excellent outcome from second group, and 5 of them have a good outcome. We have 5 patients with partial skin necrosis, one of them from second group.

Discussion

Multiple studies have been done in the last 10 years regarding treatment of mallet finger injuries, but there is limited information about these two kinds of surgical approach and their results.

Our study showed that the long finger was most commonly injured (27 of 36 patients) presumably because it is the longest finger on the hand and, therefore, most expose.

The ring finger and the little finger were injured during daily activities at home.

The objective of mallet finger treatment is to restore full extension of the DIP joint.

Some authors prefer percutaneous tenorrhaphy while others advocate open treatment.

In percutaneous tenorrhaphy the tendon is repairing not visually and allows scar tissue to fill the small gap in extensor tendon and minimizes extensor deficits. Excellent and good outcome, minimal number of complications, and minimal extensor tendon lag are characteristic of this type of approach.

Early movement in PIP joint allows movement of the lateral slip of the extensor tendon preventing stiffness in MCP and PIP joints.

Conclusion

Mallet finger is more frequent in males (75%) and the dominant hand (88,8%). Long and ring fingers are injured in 97,2% of the cases.

Skin complications (partial epidermolysis) are more common in patients with open tenorrhaphy (20%). 1 of 16 (6,25%) patients with percutaneous tenorrhaphy experienced skin complications. Skin maceration can occur under Bolster dressings used in percutaneous tenorrhaphy.

Final outcome was not affected in any point, therefore we can conclude that open or percutaneous tenorrhaphy treatment of the mallet finger injury can be used as a method of treatment, without different clinical outcome.

Figure 7. After physical therapy - open tenorrhaphy

Figure 8. After physical therapy - percutaneous tenorrhaphy

[1]. Salazar Botero S, Hidalgo Diaz JJ, Benaïda A, et al. Review of Acute Traumatic Closed Mallet Finger Injuries in Adults. Archives of Plastic Surgery. 2016 Mar;43(2):134-144. DOI: 10.5999/aps.2016.43.2.134.