

## Conservatively treated isolated capitatum fracture: Case report

### *Konservatif tedavi edilen bir izole kapitatum kırığı: Olgu sunumu*

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#### ABSTRACT

Capitatum fractures contributes 1% of all carpal bone fractures. Isolated fracture of capitatum is a rare entity which is seen in the literature as case reports. Any delay in diagnosis can cause complications such as nonunion, avascular necrosis, malunion and secondary arthrosis. We present in this paper the early result of the conservative treatment of an isolated nondisplaced capitatum fracture which was diagnosed late and emphasize the importance of the diagnosis and treatment of capitatum fracture. *J Clin Exp Invest* 2015; 6 (3): 306-308

**Key words:** capitatum, fracture, conservative treatment

#### INTRODUCTION

The midcarpal joint and capitatum has an important role in the wrist function [1]. Therefore having an intact distal carpal row including the capitate is critical to have an intact wrist function without preliminary osteoarthritis. Only 1% of carpal bone fractures are capitatum fractures [2,3]. Capitatum fractures often accompany with other fractures around the wrist [2-4]. Isolated fracture of capitatum is a rare situation which is seen in the literature as case reports [5-7]. Because of its strong ligamentous anatomy, isolated capitatum fracture is rare [2]. The usual trauma mechanism is indirect trauma due to hyperextension injury, but direct trauma can be also the etiology although it's seen relatively rare [2].

The diagnosis of nondisplaced capitatum fractures can be sometimes challenging because of superposition with other carpal bones. In undiagnosed cases complications such as nonunion, avascular necrosis, malunion and secondary arthrosis can be seen [3,8]. Computed tomography (CT), and magnetic resonance imaging (MRI) studies might be necessary in selected cases if there is a high clinical suspect [7,9].

#### ÖZET

Kapitatum kırıkları karpal kemik kırıklarının %1'ini oluşturmaktadır. İzole kapitatum kırığı nadir olarak görülür ve literatürde olgu sunumları olarak yer almaktadır. Kapitatum kırıklarının tanısındaki gecikmeler kaynamama, avasküler nekroz ve sekonder artroza neden olabilir. Bu yazımızda tanısında gecikme olan ve konservatif tedavi ettiğimiz bir izole kapitatum kırığının erken dönem sonuçlarını bildirerek nadir görülen bu kırığın tanı ve tedavisinin önemini vurgulamak istedik.

**Anahtar kelimeler:** Kapitatum, kırık, konservatif tedavi

Conservative treatment has a role in nondisplaced capitatum fractures but the displaced fractures and a capitatum fracture accompanying with other fractures around the wrist needs open reduction [5-7]. We present in this paper the early results of the conservative treatment of an isolated nondisplaced capitatum fracture with a delay of diagnosis and emphasize the importance of the diagnosis and treatment of capitatum fracture.

#### CASE PRESENTATION

A 34 year old female art teacher presented to our outpatient clinic with right wrist pain started after a fall on outstretched hand during bike ride two weeks ago. The patient had treated as soft tissue trauma after direct X-rays were taken by the first physician she presented after initial trauma. Since there was no amelioration of the symptoms she had evaluated by two different physicians with the same diagnosis. On her physical examination in our clinic there was a pain and tenderness in the center of the dorsal site of the right wrist intensifying just on the capitate bone. When we repeated the anteroposterior and lateral X-rays no significant bone pathology was

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seen (Figure 1a). CT reveals an isolated transverse waist fracture of the capitulum without displacement (Figure 1b).



**Figure 1.** a) The initial AP X-ray of the right wrist, b) The axial CT scan of the right wrist of the patient showing the fracture line of the capitulum, c)The MRI of the right wrist of the patient on the first presentation



**Figure 2.** a) The X-ray at the 3<sup>rd</sup> month follow -up.

Because of the late diagnosis an MRI study was performed and it revealed no findings of devascularization and any accompanying ligamentous injury (Figure 1c). We treated the patient with a short arm plaster of Paris bandage for 4 weeks. After that she had no pain and tenderness on her right wrist with normal X-ray findings. We started exercises for regaining the wrist range of motion and muscle strength. On the 3<sup>rd</sup> month follow-up the X-rays were normal and the muscle strengths and range of

motion of the right wrist were completely regained and the patient was symptom free (Figure 2).

## DISCUSSION

Capitulum is the largest carpal bone located in the distal row [2]. During wrist functions the carpal rows act like single units. However, there is an individual carpal bone movement of about ten degrees and the midcarpal joint has an important role in the wrist extension [1]. If a malunion, nonunion or avascular necrosis of capitulum occurs it can directly cause joint limitation and a painful wrist [3,8]. This is more important for individuals with fine wrist activities during their occupational and daily life. The patient we presented was an art teacher who has to perform fine wrist movements during her daily occupational activities. Therefore the successful treatment had an extra significance in this case.

Capitulum fractures can be seen after direct blunt trauma or indirect trauma with fall on hyperextended wrist [2,3]. The hyperextension trauma can cause multiple carpal fractures as seen in Fenton syndrome [3,4]. Isolated capitulum fractures with displacement of proximal fragment after high energy trauma have been reported by, Colonna et al. and Thompson et al [5,6,]. Schrijver et al. reported an isolated capitulum fracture after sports trauma which has a relatively low energy [7]. The fracture in our case was occurred with a low energy trauma during bike ride. Isolated capitulum fracture is seen less frequently after a low energy trauma as in our case which occurred after a fall during amateur bike ride.

The challenge during initial diagnosis of carpal bone fractures is a well known issue. Especially the diagnosis of the carpal bone fractures other than scaphoid is more prone to be neglected because of their rareness [2,5]. Therefore every wrist trauma patient needs for a careful physical examination considering the possibility of any fracture of any carpal bone including capitulum. The direct X-ray should be evaluated simultaneously with repeated physical examinations. It is critical for the examiner that having knowledge about the topology of the wrist bones including the capitulum. Also the increased pain with wrist extension might be a positive sign for capitulum or related injuries because of the contribution of distal row to wrist extension [1]. If the initial X-rays reveal no bone pathology and there is significant clinical suspicion one might consider further imaging studies like CT or MRI. Although CT can be enough for the diagnosis of an occult capitulum

fracture, in some cases the fracture might be visible only on MRI [2,9]. In case of delayed diagnosis MR is a useful diagnostic tool for evaluation of vascularity of the capitatum [7,8]. In our case the fracture was still not visible on the direct X-rays two weeks after initial trauma. CT scan revealed the isolated nondisplaced capitatum fracture. We also took MRI to examine the vascularity of the capitatum and to rule out any ligamentous injuries.

Fractures around the wrist especially distal radial fractures can be treated successfully with conservative measures [10]. Conservative treatment of capitatum can be decided by a clinician with peace of mind based on the stable anatomy of the capitatum. Schrijver et al. reported two cases of isolated capitatum fractures treated conservatively [7]. If the fracture is displaced open reduction may be obligatory [4-6,]. Because of low number of cases, there is no prospective, randomized, controlled study on the isolated capitatum fractures. Therefore, there is no scientific evidence that can direct the clinician to the best treatment. We treated the nondisplaced isolated capitatum fracture conservatively with short arm plaster of Paris bandage successfully. The functional result was acceptable at the end of the treatment.

In conclusion, isolated capitatum fracture is a rare situation. The diagnosis can be challenging as in all carpal injuries. We emphasize with this report that it is useful to keep this rare occasion in mind for preventing misdiagnosis. In every wrist trauma case it is critical to have a careful physical examination and to get further radiological examinations in selected patients.

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