



Case Report

Volume 2 Issue 1 – October 2017  
DOI: 10.19080/NTAB.2017.02.555580

Nov Tech Arthritis Bone Res

Copyright © All rights are reserved by Dhaval Sagala

# Stress fracture of Ulna midshaft in baseball hitters. A case report of three patients



Jin-Young Park, Dhaval Sagala\*, Seong-Jun Kim, Sang-Hoon Lhee, Kyun-Soo Oh and Kyung-Jin Han

Department of Orthopaedic Surgery, Konkuk University, South Korea

Submission: September 18, 2017; Published: October 04, 2017

\*Corresponding author: Dhaval Sagala, Glocal Centre for Shoulder and Elbow, Department of Orthopaedic Surgery, Konkuk University School of Medicine, Seoul, South Korea, Email: sagaladhaval@gmail.com

## Abstract

Stress fractures mostly, occur in athletes and majority of reported cases are that of lower limb. Among the few reported cases of stress fractures of upper limb, there is no case of stress fracture of ulna mid-shaft in non-dominant forearm baseball hitters. We report first series of three cases of stress fracture of ulna mid-shaft in non-dominant arm of elite baseball hitters. A baseball hitter who has been playing in cold atmosphere for longer duration of time with high speed batting velocity, complaining of sudden pain on ulnar aspect of non-dominant forearm should warrant the trainer and physician to investigate for stress fracture of ulna shaft.

**Keywords:** Stress fracture Ulna mid-shaft; Baseball hitter; Batting machine velocity

## Introduction

The reported cases of stress fractures are largely that of lower limb [1], however upper extremity stress fractures are now being recognized more frequently, Few sports where there has been reported cases of stress fractures of ulna mid-shaft are- polo players, table tennis players, professional tennis , softball pitchers players. The explained mechanism of getting a stress fracture of mid-shaft ulna in these sports was repetitive

supination and pronation of forearm and resultant sustained contraction of flexor muscles. So it is conceivable that baseball hitters would have higher chances to get an ulnar shaft stress fracture as they are subjected to excessive rotation of forearm during the training and playing hours .However there are no reports of stress fractures of ulna in baseball hitters. In this study, we report three cases of stress fractures of ulna in elite baseball hitters.

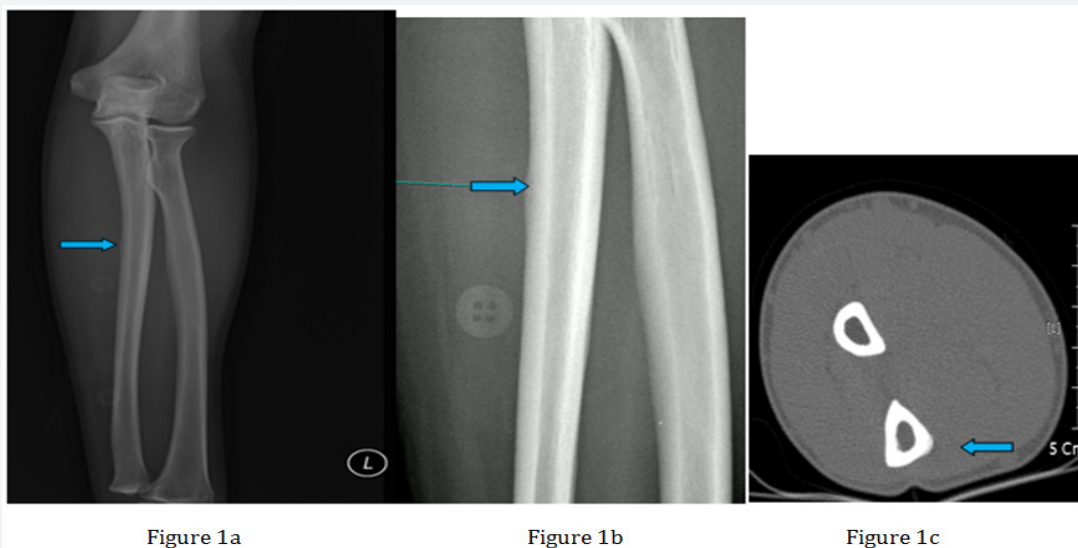


Figure 1a

Figure 1b

Figure 1c

Figure 1a-1b: Arrow pointing at the stress fracture of ulna mid-shaft.

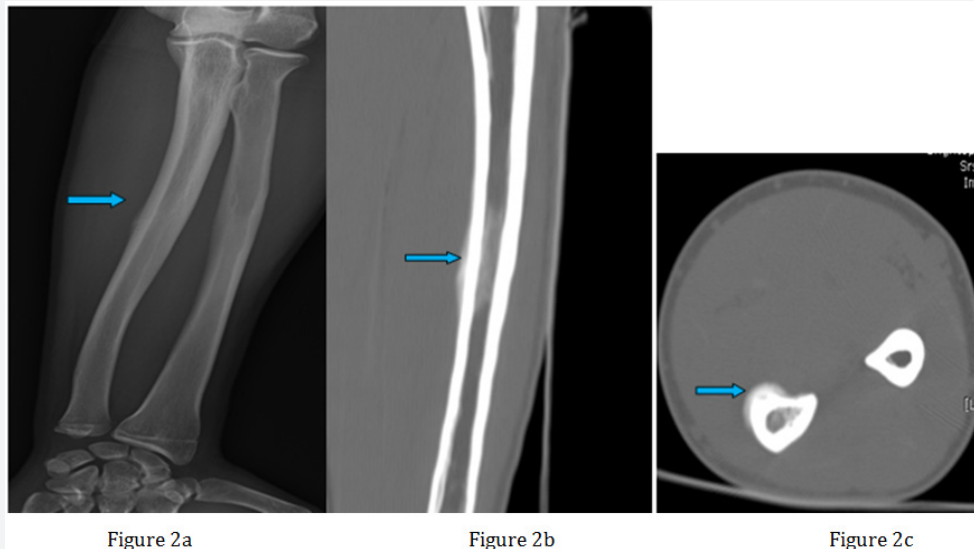
Figure 1c: Axial CT scan. Arrow pointing at callus formation at ulna mid-shaft consistent with stress fracture.

**Case Report**

**Case report 1**

A 17 year old high school baseball hitter started complaining of pain in his left forearm while playing baseball. There was no history of trauma or fall, nor any swelling over forearm. He started

at early age of 10 years with average 10 hours of team training and 4 hours of batting. When he was subjected to additional batting time of 30 minutes with 9 days of continuous training, the symptoms occurred. He had pain typically over mid-shaft ulna while hitting the baseball. X-rays and CT scan confirmed stress fracture of ulna mid-shaft (Figure 1a-1c).



**Figure 2a:** Plain X-ray of mid-shaft ulna showing stress fracture.

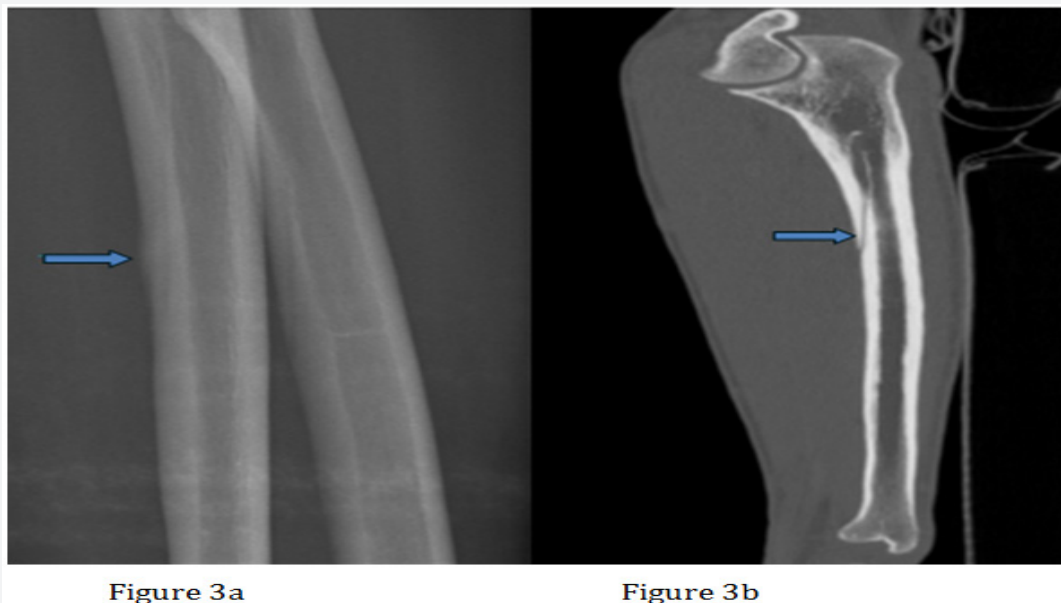
**Figure 2b:** Cortical thickening of ulna diaphysis-indicating a stress fracture.

**Figure 2c:** 3D CT scan of the same patient showing stress fracture of mid-shaft ulna.

**Case report 2**

A 17 year old high school baseball hitter ,with similar timing of start age and training schedule as case 1,complained of pain in his left forearm while hitting the baseball since last.....Again,

in this case, there was no known history of any kind of trauma to the forearm or any other systemic symptomolgy. Stress fracture of ulna diaphysis was diagnosed on imaging, and was advicerest from all physical activities for 6 weeks (Figure 2a-2c).



**Figure 3a:**Arrow pointing to stress fracture of ulna mid-shaft.

**Figure 3b:** CT scan. Arrow pointing at un displaced incomplete long oblique extending from the medial border of proximal third ulna.

### Case report 3

A 19 year old high school baseball hitter complained of pain in his left forearm while playing for his team. The start age was 9 years with 11hrs of training time and 6hrs of batting time and rest period was one day for five day play and second after 13 days play. He was subjected to 30min additional batting time as preparation for coming season game. His average batting machine speed was 148km/hr. On confirmation of ulna shaft fracture on plain X-ray; he was advised rest for 4 weeks.(Figure 3a-3b)

### Discussion

Stress fractures of ulna are result of substantial stress and excessive rotational movement of the forearm. The location and pattern of the fracture is influenced by the activity and mechanism of injury with which it is associated. The middle third of ulna is the commonest site as this region has the thinnest cortex and smallest cross-sectional area morphologically compared to the proximal or the distal third and hence most vulnerable to torsional stress. Consequently, large repetitive pronation torsional forces act on the weakest portion of the ulna shaft, which can result in a stress fracture of the middle third of ulna. In our present series fracture pattern was-undisplaced incomplete long oblique extending from the medial border of proximal third ulna. Reported cases of stress fracture of ulna diaphysis include-polo players [2], table tennis players [3], softball pitchers players [5], weight lifters [6], spin bowlers [7], golfers [8], and kendo player [9].

Possible mechanisms explained in previous reported cases of stress fractures of ulna mid-shaft in non-dominant forearm during a two-handed stroke [4,10-12] are-repetitive wrist dorsi-flexion with the forearm supination during the backswing followed by forearm pronation during the ball strike and follow-through.

Similar mechanism may cause stress fracture of ulna in this present series, which consists of following tetrad:

- i. Longer playing hours,
- ii. Cold atmosphere at playing venue and with
- iii. High speed batting machine
- iv. Pain on ulnar aspect of in non-dominant forearm.

The batter playing at batting machine speed of 130-145km/hr would exert some 26000-35000 Newton of force on the ball. The fast pitch bowler throws ball at average speed of 140-145km/hr. In additional the baseball bat speed, from initial 10kmph reaching to 113kmph (moment just before bat hits the ball) would exert around force of 900N on hand and forearm.

Other detrimental effect on hitting is that of lower temperature. All players hit the ball under zero temperature (-3 to -5 °C). It is well established that cold produces a decrease in

physical performance by decreasing the contractile function of muscles. Long playing hours along with rest free playing days could have also added to the risk factors.

In our present series all the players, after getting diagnosed of stress fracture of ulna were advice complete refrainment from all sorts of sports activities for four to six weeks. It was followed by rehabilitation program of stretching and strengthening exercises for next four to six weeks before returning to any sort of sports activity.

### Conclusion

Stress fractures of mid-shaft ulna though infrequent are not rare. In our present series of three patients, it is a conjuncture of longer playing hours, cold atmosphere at playing venue and with high speed batting machine that resulted in stress fracture of ulna mid-shaft. We recommend to trainers and physicians to have a suspicion of stress fracture of ulna diaphysis a baseball player with complaining of pain on ulnar aspect of in non-dominant forearm.

### References

1. Matheson GO, Clement DB, McKenzie DC, Taunton JE, Lloyd-Smith DR, et al. (1987) Stress fractures in athletes: A study of 320 cases. *Am J sports Med* 15(1): 46-58.
2. Clark RJ, Sizer PS, Slauterbeck J (2002) Stress Fracture of the Ulna in a Male Competitive Polo Player. *Am J Sports Med* 30(1): 130-132.
3. Petsching R, Wurnig C, Rosen A, Baron R (1997) Stress fracture of the Ulna in a Female table tennis tournament player. *J Sports Med Phys fitness* 37(3): 225-227.
4. Ki Un Jang (2004) Ulnadiaphyseal stress fracture of the non-dominant arm in a tennis player of two-handed back hand stroke. *Korean Society of Sports Medicine* 22(1).
5. Tanabe S, Nakahira J, Bando E, Yamaguchi H, Miyamoto H, et al. (1991) Fatigue fracture of the ulna occurring in pitchers of fast-pitch softballers. *Am J sports Med* 19(3): 317-321.
6. Wein-Chin Chen, Wan-Yi Hsu, Jiunn-Jer Wu (1991) Stress fracture of the diaphysis of the ulna. *International Orthopaedics* 15: 197-198.
7. Koskinen SK, Mattila KT, Alanen AM, Aro HT (1997) Stress fracture of the ulnar diaphysis in a recreational golfer. *Clin J Sports Med* 7(1): 63-65.
8. Hsu MC, Lue KH, Lin ZI, Lu KH (2005) Stress fracture at the junction of the middle and distal third of the ulnar diaphysis in a spinner bowler: a case report and a review of the literature. *Knee Surg Sports Traumatol Arthroscopy* 13: 499-504.
9. Sujino T1, Ohe T, Shinozuka M, (1998) Bilateral stress fractures of the ulnae in a Kendo (Japanese fencing) player. *Br J Sports Med* 32: 340-342.
10. Young CC, Raasch WG, Geiser C (1995) Ulnar stress fracture of the nondominant arm in a tennis player using a two-handed backhand. *Clin J Sport Med* 5(4): 262-264.
11. Bollen SR, Robinson DG, Crichton KJ, Cross MJ (1993) Stress fractures of the ulna in tennis players using a double-handed backhand stroke. *Am J Sports Med* 21(5):751-752.
12. Fragnière B, Landry M, Siegrist O (2001) Stress fracture of the ulna in a professional tennis player using a double-handed backhand stroke. *Knee Surg Sports Traumatol Arthroscopy* 9(4): 239-241.



This work is licensed under Creative Commons Attribution 4.0 License  
DOI: [10.19080/NTAB.2017.02.555580](https://doi.org/10.19080/NTAB.2017.02.555580)

### Your next submission with Juniper Publishers

will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats  
( Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>