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Case Report

Olecranon stress fracture in a gymnastics player: Insight into an early detection and integrated care approach: Case report [☆]

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ABSTRACT

We describe a case report of a 13 year-old a gymnastic athlete who was diagnosed with an olecranon stress fracture associated with mild medial epicondyle apophysitis, Following a brief review of the literature on this case, the researchers call attention to the significance of and imaging assessment especially MR in determining the correct diagnosis and identifying concomitant injuries. MRI findings concluded firstly a marked bone marrow edema seen at the posterior medial aspect of the olecranon with linear low signal traversing the olecranon related to a stress fracture. Secondly, subchondral linear low signal and bone marrow edema at the radial head related to another stress fracture/reaction injury. Thirdly, bone marrow edema at the medial apophysis with overlying soft tissue edema suggestive for medial epicondylitis.

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Introduction

Repetitive, high-impact physical activities and sports, such as gymnastics, place significant stress on the growing musculoskeletal system, especially during adolescence [1]. Gymnastics, an athletic discipline that obliges precision and strength, and often requiring athletes to engage in repetitive movements and weight-bearing exercises imposes considerable stress on these also mild medial epicondyle apophysitis developing anatomical components [1,2]. While gymnastics undoubtedly fosters exceptional physical attributes, it also exposes young athletes to a spectrum of musculoskeletal injuries, with overuse injuries emerging as a salient concern. These demands can predispose gymnasts, especially those in their growth years, to a spectrum of musculoskeletal injuries.

Among the various musculoskeletal complaints that young athletes may present with, recurrent pain and unusual joint sounds can raise concerns about potentially stress fracture or serious underlying conditions. Stress fractures (SF) denote microscopic fractures within bone tissue, precipitated by repetitive mechanical loading in the absence of commensurate periods of rest and recovery [3,4]. Adolescents, given their dynamic musculoskeletal growth, manifest an elevated vulnerability to SF. In the adolescent demographic, initial symptoms may be subtle and intermittent, posing diagnostic challenges. However, as the injury advances, the pain can intensify and become persistent. Notably, in select cases, akin to the 1 under consideration, patients may report concurrent joint phenomena such as clicking or popping, further complicating the clinical picture. In this case report, we present a unique case of a 13-year-old female gymnast who experienced a SF affecting an infrequently involved region. The patient has granted permission for publication and the use of their data and photographs.

We showcase of a clinical evaluation and diagnostic journey of SF case. The specific focus of this case is on the investigation of SF and ruling out osteochondral lesions which involving the articular cartilage and subchondral bone, can

result from chronic overuse or traumatic injury. Both conditions require prompt and accurate diagnosis to initiate appropriate management strategies and prevent potential long-term complications. This case report aims to describe the clinical presentation, diagnostic workup, and management of adolescence gymnast's recurrent right elbow pain and clicking sound. This case emphasizes the significance of early detection and personalized intervention to ensure optimal recovery and facilitate the safe return of athletes to the sports. An appropriate method for early detection of stress fractures is crucial in the gymnastics population as it enables less invasive treatment options and prevents further damage to the structural tissues. Additionally, efficient early intervention in stress fractures can help alleviate the adverse psychological impact on athletes by reducing recovery times and minimizing disruptions to their training routines.

Case report

A 13-years-old gymnastic girl with right elbow recurrent pain and clicking sound. She has right elbow minimal trauma 2 days ago. She complains of difficulty with writing and activities of daily living 'ADL' since 2 days. During clinical exam demonstrated limitation of movement of elbow and forearm in addition to clicking with forearm movement. X-ray images shows sclerosis at lateral condyle and radial head (over use), no fracture appears (Figs. 1A and B). Physician advices her for nonsteroidal anti-inflammatory drugs (NSAIDs). MR right elbow scan [Figs. 2 and 3] was done to rule out osteochondral lesion which revealed medial and lateral collateral ligaments appears intact. In addition, the extensor and flexor tendons origin are unremarkable. The tendon origin is unremarkable. The biceps, triceps, and brachialis insertions are intact. Muscles bulk is preserved. No significant muscle signal abnormality.

There is marked bone marrow edema seen at the posterior medial aspect of the olecranon with subtle traversing

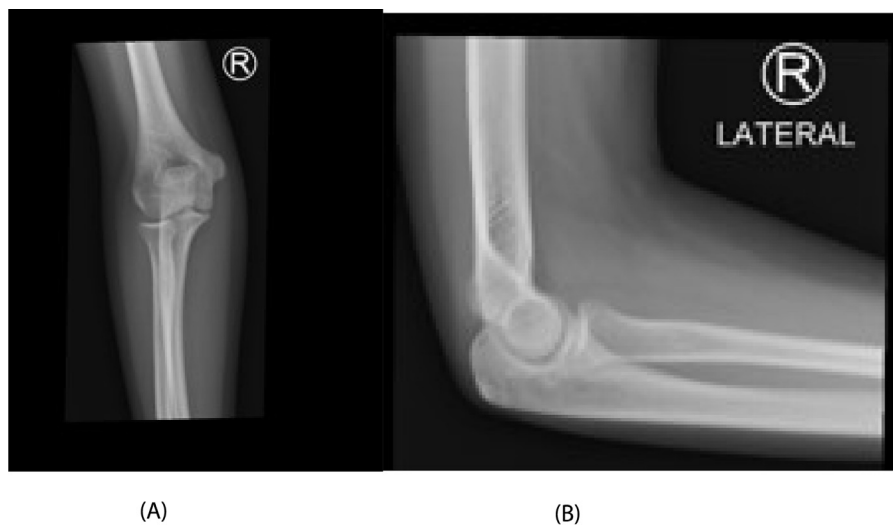


Fig. 1 – x ray of the right elbow Anteroposterior projection (A) lateral view and (B) show normal joint “no fracture”.

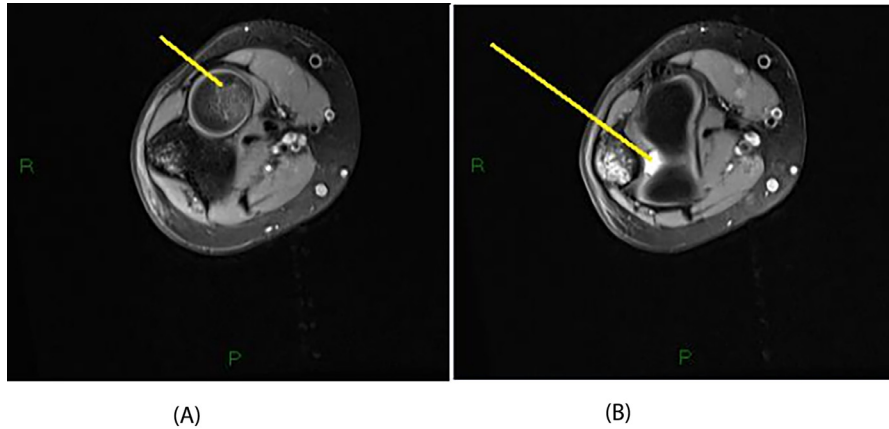


Fig. 2 – MR Axial section of elbow joint marked bone marrow edema seen at the posterior medial aspect of the olecranon with subtle traversing transverse low T1 signal suggestive for stress fracture (yellow arrow).

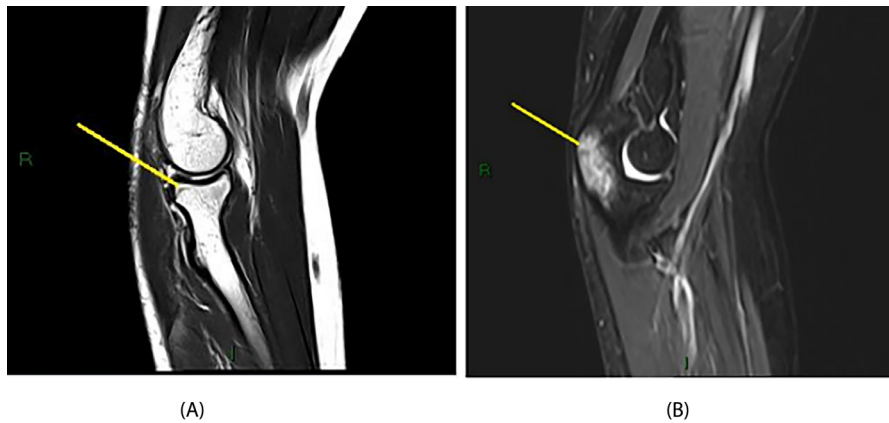


Fig. 3 – Elbow joint imaging: (A) MR sagittal section T1 weighted image shows linear perpendicular T1 low signal at the head and proximal meta-diaphysis indicated fracture (yellow arrow) and (B) STIR image shows mild overlying subcutaneous edema (yellow arrow).

transverse low T1 signal suggestive for stress fracture/reaction injury. Associated with mild overlying subcutaneous edema. Also there is bone marrow edema at the medial epicondylar apophysis associated with minimal widening and fluid signal at the physis, features of mild medial epicondyle apophysitis. There is also bone marrow edema seen at the head and proximal meta-diaphysis of radius with faint linear perpendicular T1 low signal through the anterior medial aspect of the radial head and neck and just abutting the cortex of articular surface, these finding also suggestive for stress injury with possible underlying no displaced occult fracture. No osteochondral lesions. No aggressive osseous lesion. No full-thickness chondral defect. No significant joint effusion.

As visualized in extension, the ulnar nerve lies within the cubital tunnel and reveals normal configuration and signal. The visualized parts of median and radial nerves are unremarkable. We determined the damage as a stress fracture and reaction injury at olecranon with possible underlying nondisplaced occult fracture at radial head. Also, mild medial epicondyle apophysitis. Athlete referred to orthopedic and then

for physiotherapist. She treated conservatively then improved afterwards.

Discussion

Elbow injuries is frequent in the gymnastic, olecranon, and radial head fracture are the result of the repetitive upper extremity weight bearing required in high-level gymnastics [5]

Six endochondral bone ossification foci may be seen in the pediatric elbow. Regardless of temporal variations due to patient sex and ethnicity, these centers ossify in a consistent fashion. The medial epicondyle, radial head, trochlea, olecranon, and lateral epicondyle typically develop in 2-year intervals after the capitellum, which typically occurs by age 1 years. The medial epicondyle fuses last, between the ages of 14 and 16 years, as the centers gradually mature and fuse [6].

Olecranon stress fractures are most commonly reported in the gymnastic, in this case both olecranon and radial head were affected.

The main signs and symptoms include pain on extension regardless of the presence of effusion or history of significant trauma, bilateral radiographs of the elbows should be included in the first evaluation. In addition to asymmetry and damage, this will aid in locating epiphyseal clefts, which may be bilateral and have normal versions, to confirm bone edema suggesting a fracture or stress damage, magnetic resonance imaging may be conducted. Our advice is for athletes to wear a long-arm cast for 4 weeks or until discomfort subsides if an injury has been discovered. It is not advised to begin full weight bearing until around 3 months following diagnosis. A progressive return-to-play procedure should be implemented for athletes after immobilization, commencing with achieving full range of motion. A return-to-weight-bearing protocol is then implemented [5].

Olecranon and radial head fractures is treated surgically or nonsurgically, nonsurgical options for therapy could include of anti-inflammatory drugs, physical therapy, ice treatment, and lots of rest. Additionally, you could be required to put your arm in a cast for a few weeks. The bones must remain immobile for a period in order to recover properly. The majority of patients who choose nonsurgical treatments discover that, after about 9 weeks, their condition has dramatically improved [7].

The surgical approach was carried out while the patient was under general anesthesia, with the afflicted extremity positioned cross-chest and a tourniquet inflated. The posterolateral Boyd's method allowed for the complete exposure of all fractures. By starting lateral at the supracondylar ridge at the level of the superior border of the forearm and continuing just a little more lateral, crossing directly over the lateral epicondyle, this method is beneficial for reaching both the proximal ulna and the radial head by a single skin incision [8].

In all patients, postoperative X-rays of the elbow were obtained, Early mobilization was the major objective, however postoperative rehabilitation procedures varied greatly across patients based on the quality of the bone detected intraoperatively and the existence of a coronoid fracture [8].

Through a comprehensive evaluation and a series of diagnostic imaging studies, we are illuminating the complexities and challenges encountered in assessing such cases within the field of sports medicine. This case emphasizes the significance of early detection and personalized intervention to ensure optimal recovery and facilitate the safe return of athletes to their respective sports.

The location and status of the stress fracture are more important in prognosis than the choice of treatment. An early diagnosis is crucial to ensure the athlete's well-being and a safe return to sport. This takes a minimum of 12 weeks [9].

The body should have healed physiologically by the time it was time to resume sports. Athletes should have little to no deficiencies in parameters including discomfort, swelling, range of motion, and strength [9].

For young athletes, preventing injuries and advancing safety education are crucial. Sports medicine specialists offer advice on proper warm-up and cool-down techniques, how to use safety equipment, and how to avoid injuries. Teaching young athletes the value of rest, recuperation, and reporting any injuries encourages a proactive attitude toward their health [10].

Finally, many of the gymnasts had never undergone official fall prevention training. In fact, it's debatable whether or not a sportsperson can be trained to refrain from extending their arm to break a quick fall. Despite instructions to the contrary, it is possible that extending the arms during a fall is a reflex action designed to protect other body parts. However, if an athlete received schooling early in their career, a roll or tuck position can come naturally to them following a fall.

Patient consent

Consent for publication has been obtained from the patient's parent.

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