CASE REPORT

Panner's Disease: A Case Report of An Uncommon Cause of Elbow Pain in a Pediatric Patient

Adrienne M. Orriols, BS[1]; Robert J. Cueto, BS[1]; Stephanie B. Ihnow, MD[2]; Stephanie Ryan, MD[3]
[1]Medical Student, University of Florida College of Medicine, Gainesville, FL
[2]Attending Physician, Department of Orthopaedic Surgery and Sports Medicine, University of Florida, Gainesville, FL
[3]Attending Physician, Department of Pediatrics, University of Florida, Gainesville, FL

ABSTRACT

Osteochondrosis of the elbow in pediatric patients, known as Panner's disease, typically results in young, athletic males from repeated valgus stress on the elbow. Clinical symptoms include atraumatic loss of range of motion (ROM) without pain. We present an 8-year-old male with a history of a nondisplaced intercondylar fracture of the right elbow approximately two years prior, presenting to the pediatric primary care clinic with decreased ROM of the same elbow secondary to impingement without associated pain. Our patient was diagnosed with Panner's disease. To avoid further degeneration of the elbow, one must work with a pediatric orthopaedic physician, complete the physical examination, obtain relevant imaging, and instruct the patient to limit elbow activity and treat symptoms through supportive measures of rest, immobilization, ice, and oral nonsteroidal anti-inflammatory drugs.

BACKGROUND

Panner's disease, first described by Dr. Dane Panner in 1927, is a type of osteochondrosis thought to be caused by repeated valgus stresses on the elbow that ultimately result in avascular necrosis of the humeral capitellum.[1–4] The prevalence of Panner's disease is not well-documented, as no available studies provide this estimate in the general population. Osteochondritis dissecans (OCD) is a joint disorder often confused with Panner's disease.[5] While Panner's disease involves the entire capitellum and is treated with rest, OCD lesions typically involve the lateral or central portions of the capitellum and require more aggressive management, usually involving surgery to resolve symptoms.[3,6–9] The prognosis of Panner's disease is excellent, with full functional recovery without any residual deformity expected when using conservative management.[10]

PRIMARY OBJECTIVE

Given that Panner's may be on a continuum of disordered endochondral ossification and the disease's impact on range of motion, pediatricians should be able to recognize this disease and work in conjunction with pediatric orthopaedic physicians to manage patients.

SUBJECT PRESENTATION

An 8-year-old male with a history of a nondisplaced supracondylar fracture of the right elbow approximately two years ago presented to the pediatric primary care clinic with decreased ROM of the same elbow without associated pain. Two years prior, the patient fell while horseplaying, landing on his right arm fully extended. X-ray imaging showed a nondisplaced supracondylar fracture without a concerning malalignment with small joint effusion and mild periarticular soft tissue swelling. The patient was immobilized for six weeks, followed by physical therapy with the return to full activity with full ROM in 8 weeks.

Figure 1
Image at initial visit to pediatrician office two years after elbow injury showing decreased extension of the right elbow.

Now, the patient presented to their pediatrician with concern of limited ROM of the right elbow (Figure 1). Physical examination at this visit showed decreased passive and active flexion and extension range of motion with full pronation and supination range of motion, 2+ radial pulse, and intact median, ulnar, and radial nerves of the right arm. X-ray imaging of the right arm showed fragmentation and flattening of the capitellum consistent with avascular necrosis of the capitellum. This patient was not previously or currently involved in high-intensity sports, including overhead throwing or gymnastics.

Figure 2
Time of presentation to pediatrician's office two years after initial injury, plain film radiograph of injured (right) elbow, anterior-posterior and lateral view.

The differential diagnosis for this patient included Panner's disease, OCD, tendonitis, lateral epicondylitis, ligamentous sprain, fracture, and Little League Elbow. All but Panner's disease and OCD were excluded as the patient did not repetitively use their elbow, such as in overhead sports, and they had no traumatic or instigating events after his primary injury. OCD was excluded, given that it is more prevalent in adolescents and is often identifiable via the presentation of a loose foreign body. Therefore, because of the

patient's male gender, young age, decreased ROM in extension, history of trauma, and unilaterality of these findings, our leading diagnosis was Panner's disease.

After referral to a pediatric orthopaedic physician, it was concluded the patient's symptoms, history, and imaging were consistent with Panner's disease (Figure 2). The patient and his family were instructed to limit elbow activity and treat symptoms through supportive measures of rest, ice, and oral nonsteroidal anti-inflammatory drugs. They were informed that ROM should improve as the capitellum remodels.

Clinical follow-up thus far has been uneventful. At 16 weeks follow-up, the patient's symptoms have not resolved, and he continues to have stable decreased flexion and extension range of motion in the right elbow compared to the left without pain. He was referred to physical therapy to increase elbow ROM.

At the 6-month follow-up, the patient reported no pain and recently improved ROM, though it was still limited compared to the contralateral side. Physical examination shows elbow flexion/extension range of motion of 20-125 degrees with full pronation and supination. Radiographs showed increased ossification compared to 16 weeks of follow-up (Figures 3 & 4).

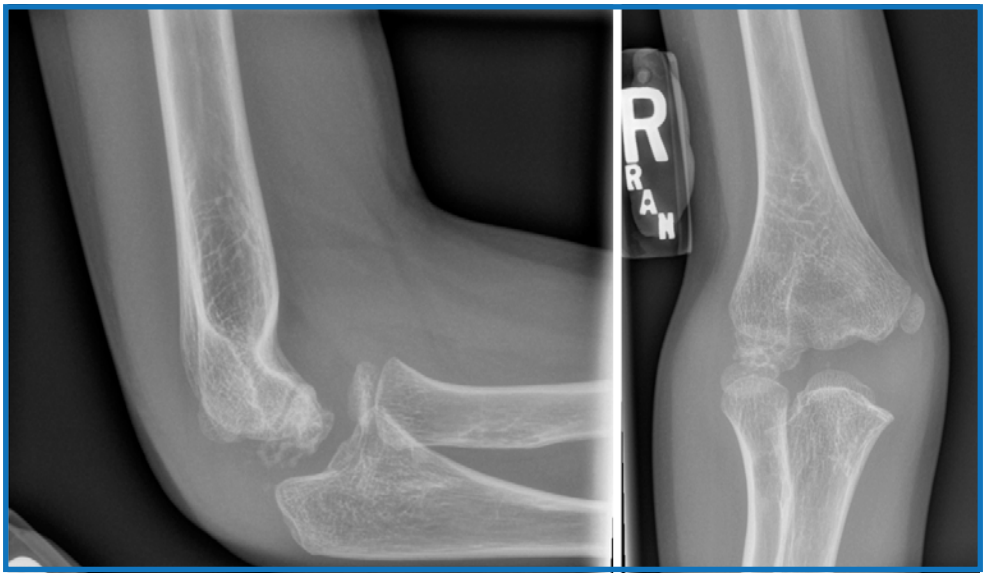

Figure 3
Sixteen weeks after time of presentation to the pediatrician's clinic, plain film radiograph of injured (right) elbow with anterior-posterior and lateral view.

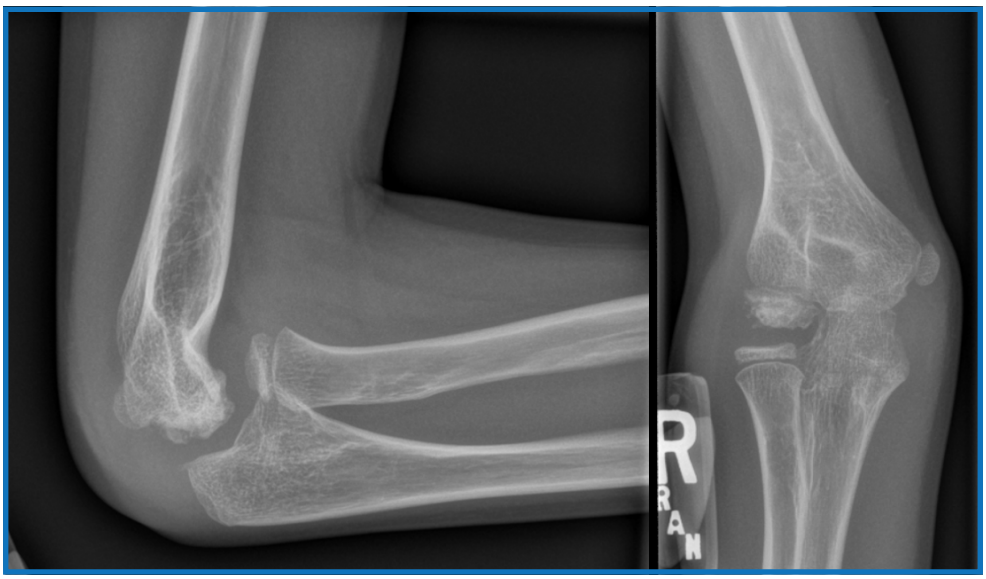

Figure 4
6 months after time of presentation to the pediatrician's clinic, plain film radiograph of the injured (right) elbow with anterior-posterior and lateral view.

DISCUSSION

Panner's disease primarily occurs in pediatric throwing or gymnastic athletes between the ages of 5 and 12 years due to repetitive valgus stress on the joint.[5,6,11,12] Panner's disease has a stronger predilection in males – 90% of reported cases have occurred in young males.[2] Etiology for this gender discrepancy is highly debated. However, it is believed Panner's disease predominates in young males due to their delay in maturation and participation in throwing sports, such as baseball, causing repetitive stress on the immature skeleton and increased tendency for trauma.[2,5,11,13]

Clinical presentation includes pain, swelling, and limitation in range of motion, defined as 20° loss in extension and loss of flexion in the elbow. Pain is often dull and induced by throwing or upper-body weight-bearing activity (i.e., baseball, gymnastics, tennis, etc.), quickly decreasing with immobilization.[2,5,14] Radiographic imaging may yield non-specific findings such as epiphyseal and contour irregularity, fragmentation of the capitellum, radio-translucent areas, and sclerosis, making it difficult to correlate specific radiographic findings with symptoms.[2,4] Magnetic resonance imaging (MRI), which is more sensitive than radiographs, may also be helpful in early diagnosis of Panner's disease as it may show abnormal areas of marrow signal on T1 and T2-weighted images with intact cartilage.[4,15,16]

Given the similarities between Panner's disease and OCD, there is ongoing debate regarding whether they are a continuum of disordered endochondral ossification.[3,6–8] Prognosis in cases of OCD is less favorable than Panner's disease. Bauer et al.[17] reported that 50% of patients with OCD had persistent elbow symptoms and radiographic osteoarthritis at follow-up (mean 23 years). It is imperative to understand the differences in typical treatment to avoid further degeneration of the elbow, given the differences in typical clinical presentations. OCD is more prevalent in adolescents, is identifiable via the presentation of a loose foreign body, and does not resolve with rest or nonsteroidal anti-inflammatory drugs.[2]

Optimal treatment for Panner's disease is the subject of ongoing debate, with conservative management as the preferred mode of treatment, which includes immobilization for 3-6 weeks, reducing activity, and pain management with nonsteroidal anti-inflammatory drugs.[2,14,15] In a recent literature review, 26% of patients were advised to rest, and 30% of case reports detailed that patients were advised to refrain from strenuous arm activities (baseball, carrying heavy items, etc.).[2] However, there was no specification for the duration of rest.[2] Immobilization of the elbow was preferred in 53% of patients; 30% were placed in a cast, and 17% were given a splint.[2] The duration of cast, sling, and splint use was inconsistent, ranging from 4 weeks to 1 year.[2] Only one case reported arthroscopic debridement and a post-operative cast for four months as a treatment method.[2] Full recovery was described in 37% of case reports. Almost complete recovery was seen in 56% of patients. Irregularity and flattening of the capitellum was still visible on some radiographs at the end of treatment2 Pain was reported by 63% of patients at the end of treatment. Of the case reports that included range of motion, 78% of patients had full range of motion, while a 20° flexion contracture was reported in one patient, and loss of 5° of terminal flexion and extension was reported in another.[2]

A case series by Sakata et al.[14] reported about three patients (males, 6-9 years old) who complained of limited range of motion and pain at the elbow joint of the dominant arm. All were diagnosed with Panner's disease using radiographs or MRI and were treated conservatively by restricting sports activities until the symptoms disappeared. The Mean duration of the rest period was 4.3 months (ranging from 2-8 months). Similarly, Chavda et al.[10] reported a 6-year-old male who presented with persistent pain and swelling of the elbow who demonstrated complete recovery from Panner's disease when treated with rest, a splint, and pain medication.

If symptoms do not self-resolve with rest, it is recommended to obtain further workup for OCD, including an MRI, to determine if surgical intervention is needed and avoid further degeneration of the elbow.[4,6,7] surgery may be necessary if fragments become loose or displaced in the elbow.[11,20]

In conclusion, a previously healthy child with a new onset of painless, limited ROM of the elbow should be suspected of Panner's disease. Conservative management should resolve symptoms with appropriate imaging and in conjunction with a pediatric orthopaedic physician. If symptoms persist, a pediatrician and pediatric orthopaedic physician should consider a further diagnosis of OCD and obtain further imaging studies, such as MRI, for more invasive treatment options.

REFERENCES

1. Panner HJ. A peculiar affection of the capitijlijm humeri, resembling Calve-Perthes disease of the hip. *Acta Radiol*. 1929;10(3):234-242.
2. Claessen FMAP, Louwerens JKG, Doornberg JN, et al. Panner's disease: Literature review and treatment recommendations. *J Child Orthop*. 2015;9(1):9-17.
3. Kobayashi K, Burton KJ, Rodner C, Smith B, Caputo AE. Lateral compression injuries in the pediatric elbow: Panner's disease and osteochondritis dissecans of the capitellum: *J Am Acad Orthop Surg*. 2004;12(4):246-254.
4. Stoane JM, Poplausky MR, Haller JO, Berdon WE. Panner's disease: X-ray, MR imaging findings and review of the literature. *Comput Med Imaging Graph*. 1995;19(6):473-476.

5. Leahy I, Schorpion M, Ganley T. Common medial elbow injuries in the adolescent athlete. *J Hand Ther*. 2015;28(2):201-211.
6. Singer KM, Roy SP. Osteochondrosis of the humeral capitellum. *Am J Sports Med*. 1984;12(5):351-360.
7. Ruch DS, Poehling GG. Arthroscopic treatment of Panner's disease. *Clin Sports Med*. 1991;10(3):629-636.
8. Wasylynko D. A rare cause of chronic elbow pain in an adolescent baseball player: a case report. *J Can Chiropr Assoc*. 2016;60(3):226-232.
9. Kramer DE. Elbow pain and injury in young athletes. *J Pediatr Orthop*. 2010;30(Suppl 2):S7-S12.
10. Chavda S, Abeid KA, Alhajri KK, Hasan NHA. Osteochondrosis of humeral capitellum though rare is a known condition in young children. High level of awareness is required to adequately diagnose and treat appropriately. *J Orthop CASE Rep*. 2021;11(7).
11. Kaeding CC, Whitehead R. Musculoskeletal injuries in adolescents. *Prim Care Clin Off Pract*. 1998;25(1):211-223.
12. Klingele KE, Kocher MS. Little league elbow: valgus overload injury in the paediatric athlete. *Sports Med*. 2002;32(15):1005-1015. doi:10.2165/00007256-200232150-00004
13. Duthie RB, Houghton GR. Constitutional aspects of the osteochondroses. *Clin Orthop*. 1981;(158):19-27.
14. Sakata R, Fujioka H, Tomatsuri M, et al. Treatment and diagnosis of Panner's disease. A Report of three cases. *Kobe J Med Sci*. 2015;61(2):E36-39.
15. Baker CL, Romeo AA, Baker CL. Osteochondritis dissecans of the capitellum. *Am J Sports Med*. 2010;38(9):1917-1928.
16. Bowen RE, Otsuka NY, Yoon ST, Lang P. Osteochondral lesions of the capitellum in pediatric patients: role of magnetic resonance imaging. *J Pediatr Orthop*. 2001;21(3):298-301.
17. Bauer M, Jonsson K, Josefsson PO, Lindén B. Osteochondritis dissecans of the elbow. A long-term follow-up study. *Clin Orthop*. 1992;(284):156-160.
18. Smith RJ. Involvement of the carpal bones with metastatic tumor. *Am J Roentgenol Radium Ther Nucl Med*. 1963;89:1253-1255.
19. Mishra M, Agarwal A. Think beyond tuberculosis: it can be Panner's disease in the child's elbow. *J Orthop Traumatol Rehabil*. 2018;10(1):79.
20. Stanitski CL, DeLee JC, Drez D. *Pediatric and Adolescent Sports Medicine, Volume 3 (Volume 3)*. WB Saunders; 1994.