

> THE PATIENT

24-year-old woman

> SIGNS & SYMPTOMS

- Right foot pain while walking
- No erythema or edema
- No evidence of structural abnormalities

> THE CASE

A 24-year-old woman came to our clinic because she had pain in her right foot. Over the previous 4 weeks, she'd noticed increasing pain in the ball of her foot while walking and climbing stairs, particularly in the push-off portion of her gait. She described it as a nagging, localized pain that she rated as a 2 or 3 out of 10. It was an annoyance, but not unbearable. She felt no pain when standing in place or in a non-weight-bearing position.

She denied any trauma to the foot or change in activity, and had been exercising her usual amount (running 2-5 miles per week). Her medical and social histories were unremarkable, and her family history was negative for relevant conditions.

An examination of the right foot revealed no evidence of pes planus, pes cavus, hallux valgus, hammertoes, or other structural abnormalities of the foot or toes. She had no calluses, nor any erythema or edema of the foot or toes. Direct palpation of the medial sesamoid reproduced the patient's symptoms. Passive dorsiflexion and plantar flexion of the first hallux elicited pain only at the extreme ends of range of motion. Active dorsiflexion and plantar flexion of the right first hallux showed 5 out of 5 strength. A mid-foot squeeze test was negative, and the remainder of the exam was normal.

THE DIAGNOSIS

Pain on palpation of the sesamoids prompted us to gather a more detailed history. The patient had never been a dancer or a long-distance or competitive runner. However, upon delving into possible causes of the pain, she admitted that she was a frequent "knuckle cracker," and cracked many joints regularly, including the right first metatarsophalangeal joint (MTPJ). She explained that she cracked this joint by hyper-plantarflexing her big toe against the ground, and had been doing this multiple times a day for many years. In the past 4 weeks, she had noticed significant pain in the right first MTPJ while cracking the joint, but she was having difficulty breaking the longstanding habit.

The patient's description of right foot pain associated with the push-off portion of her gait, and the fact that the pain was exacerbated by the extremes of dorsiflexion and plantar flexion of the great toe, was consistent with MTPJ pain. This, paired with our ability to reproduce the pain by direct palpation of the medial sesamoid, prompted us to make a clinical diagnosis of sesamoiditis. To our knowledge, this is the first case report of sesamoiditis caused by knuckle cracking.

DISCUSSION

Sesamoiditis—chronic pain and inflammation of the hallucal sesamoids—is an overuse or misuse injury that's typically seen in runners and dancers.¹ The hallucal sesamoids are 2 small bones located underneath the head of the first metatarsal and encased within the flexor hallucis brevis tendon that disperses weight from the head of the first metatarsal

Shira Paul, MD;
Jeffrey Leggit, MD
Naval Medical Center
San Diego, Calif (Dr.
Paul); Uniformed Services
University of the Health
Sciences, Bethesda, Md
(Dr. Leggit)

shira.r.paul.mil@med.mil

The authors reported no potential conflict of interest relevant to this article.

➤ To our knowledge, this is the first case report of sesamoiditis caused by knuckle cracking.

during the push-off portion of gait.² Runners and dancers place significant, repetitive axial loading on the sesamoids, which often leads to injury.¹ Although our patient initially seemed to have no typical risk factors for developing sesamoiditis, she later revealed that she regularly cracked the MTPJ, which we believe led to her injury.

Interestingly, despite the common assumption that long-term “cracking” of joints can lead to adverse effects such as osteoarthritis, research has not supported this assumption.^{3,4} A retrospective case-control study of patients with and without hand osteoarthritis found no association between knuckle cracking and osteoarthritis, and the prevalence of osteoarthritis was not higher in patients who cracked their knuckles more frequently and for more years.⁴

Nonetheless, there have been reports of acute injuries associated with knuckle cracking, consistent with forcing a joint past its normal range of motion, as is typically done in knuckle cracking.⁵ In forcefully plantarflexing her great toe against a surface until a “crack” was elicited, our patient may have injured the sesamoid by forcing it along the head of the first metatarsal. Conversely, her injury may have been caused by the repetitive displacement of the sesamoid past its usual location, resulting in chronic irritation.

Differential diagnosis includes fracture and stress injury

The differential diagnosis for subacute to chronic pain localized to the sesamoids includes repetitive stress injury (sesamoiditis or capsular strain), fracture or stress fracture, osteoarthritis, osteonecrosis, and gout.^{1,2} Given our patient’s age and lack of erythema and edema, osteoarthritis and gout were unlikely.

To treat the injury, eliminate the behavior that caused it

Imaging studies may not be necessary in cases of suspected sesamoiditis because such studies are often negative for sesamoiditis and stress fractures of the sesamoids, and because they typically would not affect how the injury is initially treated.^{1,2,6} In cases in which radiographic confirmation of sesamoiditis is necessary to rule out more serious pathology, 99mTc-methylene diphosphonate (99mTc-MDP) bone scan and magnetic resonance imaging (MRI) are far more sensitive than plain films.¹ While a 99mTc-MDP bone scan will show increased uptake at the sesamoids, it has been replaced by MRI, which will show bone marrow edema of the sesamoids and can rule out fracture or osteoarthritis.¹

Sesamoiditis is typically managed with a combination of ice, analgesics, activity modification, and/or orthoses.² Of course, the key to successfully treating sesamoiditis (and all musculoskeletal injuries) is to not only make the diagnosis, but to find the underlying cause in order to prevent continued—or worsening—pain.

■ **Our patient** agreed to close follow-up rather than imaging. We established that the only inciting event was the cracking of her MTPJ, and that she should try to eliminate this action before trying other interventions. Our patient stopped cracking her MTPJ and her pain completely resolved in 2 weeks. She remains symptom-free.

THE TAKEAWAY

Ask about knuckle cracking when taking the history of a patient who presents with sesamoiditis, which is characterized by chronic pain and inflammation of the hallux sesamoids. **JFP**

References

1. Nwawka OK, Hayashi D, Diaz LE, et al. Sesamoids and accessory ossicles of the foot: anatomical variability and related pathology. *Insights Imaging*. 2013;4:581-593.
2. Boike A, Schnirring-Judge M, McMillin S. Sesamoid disorders of the first metatarsophalangeal joint. *Clin Podiatr Med Surg*. 2011;28:269-285.
3. Castellanos J, Axelrod D. Effect of habitual knuckle cracking on hand function. *Ann Rheum Dis*. 1990;49:308-309.
4. Deweber K, Olszewski M, Ortolano R. Knuckle cracking and hand osteoarthritis. *J Am Board Fam Med*. 2011;24:169-174.
5. Chan PS, Steinberg DR, Bozenta DJ. Consequences of knuckle cracking: a report of two acute injuries. *Am J Orthop*. 1999;28:113-114.
6. Yang RH, Chu YK. Hallux sesamoiditis manifested on bone scan. *Clin Nucl Med*. 2013;38:1019-1021.