[Primary Care]

A Unique Incidental Finding in Two Young Dancers: A Case Series

Marshal N. Miller, MD,*† and Jeremy D. Close, MD†

Dancers frequently present to the sports medicine clinic with a variety of lower extremity complaints ranging from acute and traumatic injuries to more chronic, overuse injuries. This case series depicts a similar and unique incidental radiographic finding found in 2 young dancers seen at the same sports medicine clinic. While the findings are likely benign and unrelated to both patients' initial presentation, the finding of acroosteolysis can be found in more serious systemic and genetic processes as well an early finding in repetitive trauma.

Keywords: acroosteolysis; osteolysis; ballet; dance

CASE 1

A 17-year-old ballet dancer originally from Japan presented to the sports medicine clinic with a chief complaint of left foot and ankle pain. He reported that approximately 2 weeks ago, he suffered an inversion injury to the left ankle during ballet practice. He reported mild discomfort at the time of injury, but some worsening discomfort in the foot since. He denied any increase in discomfort in the lower extremity in the weeks leading up to his injury. The pain was mostly in the lateral ankle and in the foot. He denied any significant swelling or bruising, and had not practiced over the previous 2 weeks. He had no prior history of fractures or stress fracture, and denied any history of significant musculoskeletal disorders. He was taking occasional acetaminophen and ibuprofen with moderate improvement in pain. His social history was significant for tobacco use. His past medical history, surgical history, and family history were negative for any significant musculoskeletal conditions.

On physical examination, his weight was 62.7 kg and height was 1.64 m. He was fit, with a lean athletic build and no dysmorphic features. He had full range of motion of the ankle without significant pain. He had 5/5 strength in all ranges of motion. He did have laxity with anterior drawer, but it was symmetric bilaterally. He had mild tenderness over the anterior talofibular ligament, and no calcaneofibular ligament tenderness. His calcaneal squeeze test was negative. There was no discomfort with syndesmotic stressing. Visual inspection of the left foot revealed very slight swelling over the second metatarsal with mild tenderness to palpation at the midshaft. He performed 20 single-leg hops without increased pain. His physical examination was otherwise normal except for as detailed above. The assessment of the patient's condition at that time was a mild left lateral ankle sprain and likely early second metatarsal stress reaction. He was instructed to limit jumping and pounding motions during dance practice. He obtained a radiograph to rule out any significant bony changes.

Follow-up

Four weeks after the initial evaluation, he was able to perform without pain. Radiographs (Figure 1) demonstrated acroosteolysis of the distal phalanges 2 through 5, and were without other significant bony abnormalities.

CASE 2

A 17-year-old ballet dancer, also originally from Japan, presented to the sports medicine clinic with a chief complaint of toe pain and a growth on the dorsum of the left foot between the fourth and fifth digits. He had some increased pain over the previous few weeks in the location due to splitting and cracking of the lesion. He was able to continue dancing, but

From the †Department of Family & Community Medicine, Thomas Jefferson University, Philadelphia, Pennsylvania
*Address correspondence to Marshal N. Miller, MD, Department of Family & Community Medicine, Thomas Jefferson University, 833 Chestnut Street, Suite 301, Philadelphia, PA 19107 (e-mail: marshal.miller@jefferson.edu).
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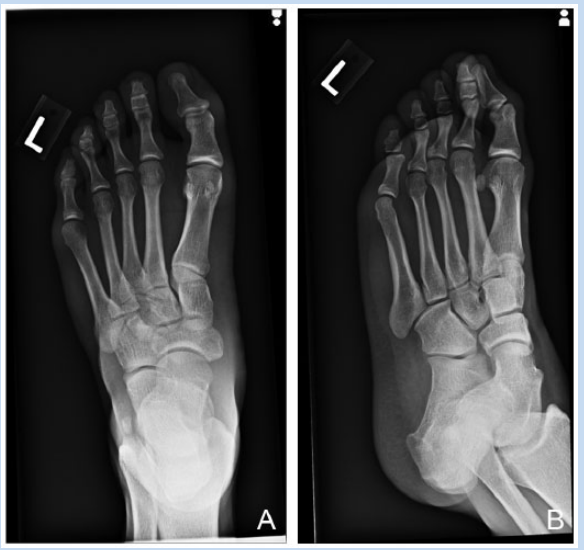

Figure 1. (A and B) Radiographs of patient 1 showing acroosteolysis of distal phalanges.

with discomfort. His past medical, surgical, and family histories were unremarkable, and he denied alcohol, tobacco, or drug use. He took no medications, and the 10-point review of systems was unremarkable other than stated above. On physical examination, his weight was 55.8 kg and height 1.62 m with no dysmorphic features. He had normal peripheral pulses without edema. Visual inspection revealed hypertrophy of the skin between the fourth and fifth digits on the left with a punctate black lesion. He had normal sensation of the toes, and otherwise normal foot examination with no gross bony abnormalities. Radiographs (Figure 2) demonstrated soft tissue swelling over the first through fifth distal digits with concurrent acroosteolysis at the distal tufts of all distal phalanges, most severe at the fifth distal phalanx. The growth was a condyloma and was subsequently debrided and treated with cryotherapy. The patient did well in follow-up and was able to continue dancing.

DISCUSSION

Acroosteolysis is characterized by bony resorption of the terminal digital tufts of the distal phalanges of either the hands or feet.[7] The differential for acroosteolysis includes systemic conditions such as scleroderma, as well as inflammatory arthritidies such as psoriatic and rheumatoid arthritis.[1,3,5,8,12] It can also be associated with vascular, toxic, metabolic, traumatic, and infectious etiologies.[2,4-6,9] It has been described as a component of various rare, genetic syndromes, and can be idiopathic in etiology.[7,10,11]

Acroosteolyis may be a hallmark feature of rare genetic syndromes, including pyknodysostosis, an autosomal-recessive disorder also characterized by short stature of less than 150 cm, generalized diffuse osteosclerosis with a tendency for fracture after minimal trauma, hypoplastic clavicles, and other craniofacial abnormalities.[10] Acroosteolysis is also seen as the primary feature in Hejdu-Cheney syndrome, an autosomal-dominant or sporadic familial form of idiopathic acroosteolysis. Persons with this syndrome typically have characteristic facies, short stature, and delayed puberty. The upper limbs tend to be affected to a greater degree in this syndrome, with acroosteolysis appearing late in childhood with characteristic transverse lytic defects across the shafts of the phalanges of the

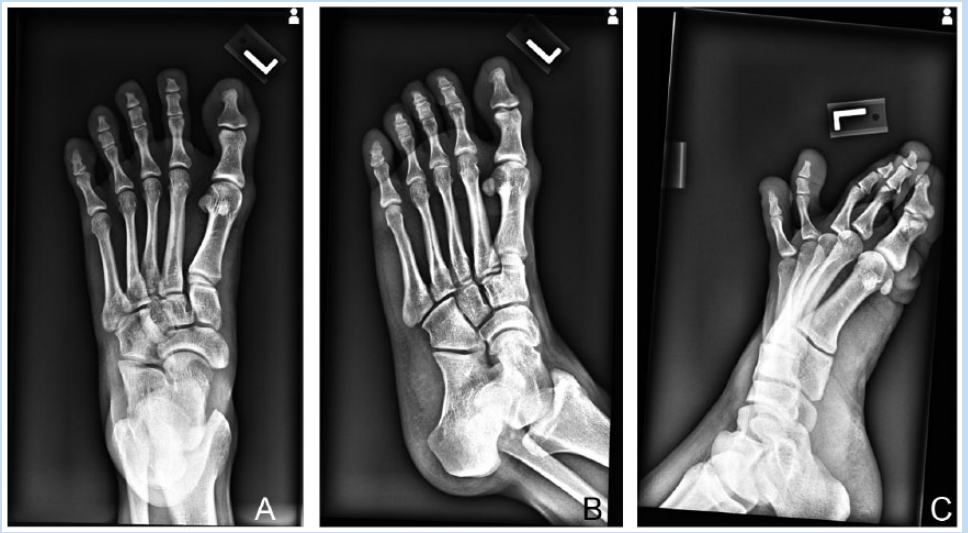

Figure 2. (A-C) Radiographs of patient 2 showing acroosteolysis of distal phalanges.

upper extremity with relative sparing of the feet. As with pyknodysostosis, there is a high incidence of fractures, but contrary to pyknodysostosis, bones tend to be osteopenic or osteoporotic on radiography.[7,11]

Acroosteolysis has also been reported as a radiographic finding in several connective tissue disorders and inflammatory arthritidies.[1,3,5,8,12] As many as one-third of patients with systemic sclerosis may show signs of moderate to severe acroosteolysis on radiography and ultrasonograpy.[1,3] Acroosteolysis is a strong predictor of digital ischemia and disease progression in patients with systemic sclerosis.[5] Acroosteolysis, and more generally osteolysis, is likewise a common radiographic finding in patients with inflammatory arthritis such as rheumatoid or psoriatic arthritis. In cases of psoriatic arthritis, acroosteolysis may be seen preceding the onset of clinical psoriasis or psoriatic arthropathy and may be the first evidence of disease.[12] Findings of osteolysis differ somewhat across these disease processes, much as arthritic symptoms differ in that joint and digit involvement is typically more symmetric in rheumatoid arthritis compared with psoriatic arthritis.[8]

The differential for acroosteolysis also includes acquired forms resulting from repetitive mechanical or thermal trauma,[6] as well as exposure to various chemical compounds, most notably vinyl chloride.[2,4,9] Reversible cases of acroosteolysis have been reported in individuals who worked in the polymerization and autoclaving of vinyl chloride.[4,9] Among these patients, Raynaud phenomenon is the most common presenting feature, which typically correlates with vascular narrowing and vasospasm, and may precede bony changes.[2]

Review of the literature has shown rare cases of acroosteolysis in the setting of repetitive mechanical stress and trauma, with 1 case being reported in an avid surfer.[6] The absence of prior fractures or stress-related injuries in either dancer despite years of strenuous dance practice or any other typical phenotypic features argues against any of the aforementioned hereditary syndromes. While other systemic conditions or toxic exposures cannot be fully excluded, neither patient exhibited any symptoms characteristic of connective tissue disorders or inflammatory arthritis or reported history of exposure. The finding of diffuse acroosteolysis across the distal phalanges of both dancers in this case series argues in favor of repetitive trauma being the causative etiology in both cases. To our knowledge, this case series represents the first documented case reports of acroosteolysis occurring in the setting of repetitive mechanical trauma from dance.

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