

Florid reactive periostitis in the fifth phalange of a professional boxer

A case report

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Abstract

Rationale: Florid reactive periostitis is a rare, benign bone and chondrogenic lesion that develops most frequently in the phalanges of the hands. Although the definitive cause of florid reactive periostitis is unknown, the major inciting factor is generally considered to be trauma, including repetitive minor trauma.

Patient concerns: We present a case of florid reactive periostitis affecting two contiguous phalangeal bones of the left fifth phalange of a 23-year-old male professional boxer. The patient had experienced chronic pain around the metacarpophalangeal joint of the left fifth phalange when punching with the left hand; this pain was improved but not resolved after conservative treatment.

Interventions: Plain radiography of the fifth phalange revealed a bulging bone lesion on the volar side of the proximal phalanx and metacarpal of the left fifth phalange. Computed tomography also showed raised bony lesions on the volar side of these bones without bony destruction or intraregional calcification. Surgery was performed and histopathology revealed that the bone specimens comprised a mixture of fibrous connective tissue and relatively immature bone covered by bland osteoblasts.

Diagnoses: These findings were suggestive of a benign bone formation process, and the lesion was diagnosed as florid reactive periostitis.

Outcomes: The pain and tenderness in the left fifth phalange experienced during boxing had completely resolved by 6 months postoperatively, and 12 years postoperatively the patient had full range of motion and no recurrence of pain.

Lessons: Traction force, such as those associated with “leading jabs,” may induce repetitive minor trauma and subsequent periosteal damage, resulting in the gradual development of bulging bone ridges on the volar surface of the proximal fifth phalange and metacarpus of the hand.

Abbreviations: FRP = florid reactive periostitis, MP = metacarpophalangeal, ROM = range of motion.

Keywords: benign bone and chondrogenic lesion, florid reactive periostitis, metacarpals, phalanges, professional boxer

1. Introduction

Florid reactive periostitis (FRP) is a rare, benign bone, and chondrogenic lesion that develops most frequently in the phalanges of the hands and feet.^[1–3] The definitive cause of FRP is unknown; however, the main contributing factor is generally considered to be trauma, including repetitive minor

trauma.^[1–3] We herein present a case of FRP that occurred in the fifth phalange of a professional boxer.

2. Case presentation

A 23-year-old male professional boxer with no significant medical history presented with chronic pain in the left fifth phalange. The patient had been training to be a professional boxer since the age of 14 years. Since high school, the patient had experienced persistent pain around the metacarpophalangeal (MP) joint of the left fifth phalange when punching with the left hand. The patient presented at a clinic due to gradually worsening pain, and was treated conservatively with corticosteroid injections and analgesics. Conservative treatment resulted in some reduction of the pain. Approximately 1.5 years after starting conservative treatment, plain radiographs revealed abnormal bone lesions of the left fifth phalange. The patient was then referred to our institution.

Physical examination revealed tenderness around the MP joint of the fifth phalange without apparent swelling. There were no infectious signs or neurovascular disturbances. The range of motion (ROM) of the affected MP joint was slightly more restricted than that of the contralateral side, and tight clenching of the fist elicited moderate pain requiring an analgesic. Blood chemistry analysis showed no signs of inflammation or other abnormalities. Plain radiography of the fifth phalange revealed a bulging bone

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Figure 1. Preoperative radiography and computed tomography. (A) Oblique and (B) lateral radiographs of the left fifth phalange reveal bony prominences on the volar aspect of the proximal phalanx and metacarpal. Plain computed tomography of the left fifth phalange shows the raised bony lesion on the volar side of the (C) proximal phalanx and (D) metacarpal without bony destruction or intraregional calcification.

lesion on the volar side of the proximal phalanx and metacarpal of the left fifth phalange (Fig. 1A, B). Computed tomography also showed raised bony lesions on the volar sides of these bones without bony destruction or intraregional calcification (Fig. 1C, D).

Temporary splinting was performed for several weeks to reduce finger pain; however, nonoperative treatment was unsuccessful and surgery was performed. Informed consent was obtained for surgery and for publication of this case. Surgery was performed via the palmar approach through a Brunner incision. The ulnar neurovascular bundle was protected and retracted radically, and the flexor tendons and tendon sheath were elevated with the periosteum. Macroscopically, a 1 cm × 2 cm glossy, grayish-white, bulging bone mass was found on the volar side of the proximal phalanx and metacarpal of the left fifth phalange without invasion or evidence of spread to the dorsal side (Fig. 2). There was no synovial tissue swelling or neurovascular involvement. After resection of the raised bony ridges, the periosteum with the flexor tendon and sheath was reattached to the volar floor of the phalangeal and metacarpal bones.

Microscopically, the bone specimens exhibited a mixture of fibrous connective tissue and relatively immature bone covered by bland osteoblasts (Fig. 3A). Calcification and cartilage formation were only rarely identified. There were no atypical features such as prominent nuclei or high mitotic activity (Fig. 3B). These findings were suggestive of a benign bone formation process, and the lesion was diagnosed as FRP.

The patient was encouraged to begin ROM exercises on postoperative day 1, and exercises related to boxing were permitted from 3 months postoperatively. The pain and tenderness in the left fifth phalange experienced during boxing had completely resolved by 6 months postoperatively. In addition, the limited ROM had completely recovered, and plain radiography showed that there was no recurrence of the bony ridges (Fig. 4). In a telephonic interview conducted 12 years postoperatively, the

patient stated that he had retired from professional boxing and had no limited ROM or recurrence of pain.

3. Discussion

In 1981, Spjut and Dorfman^[3] reported on 12 patients with a painful osteoblastic proliferation arising from the periosteum of

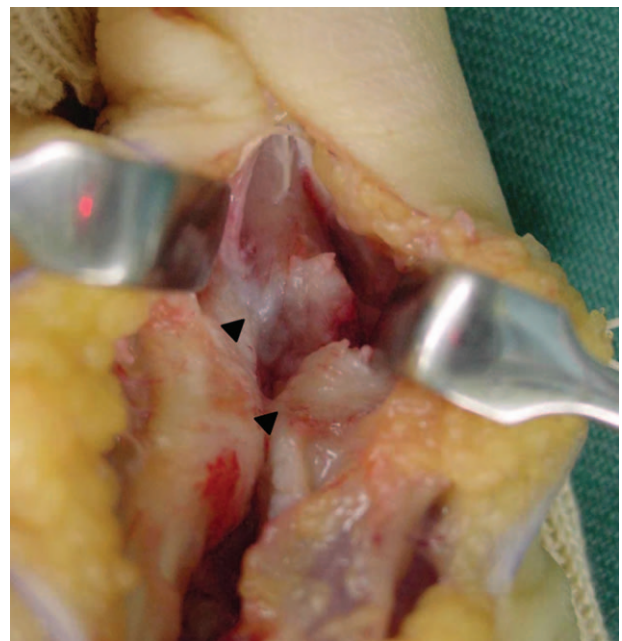


Figure 2. Perioperative photograph. Before resection, a bony prominence characterized by bony ridges (arrowheads) is seen on the volar surface of the proximal phalanx and metacarpal around the proximal interphalangeal joint.

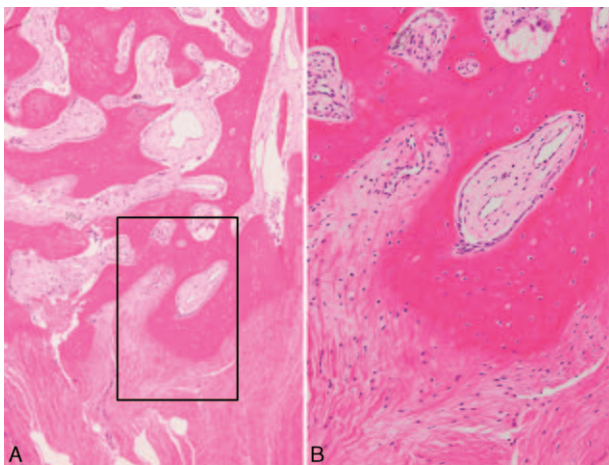


Figure 3. Histological evaluation of pathological tissue specimen. (A) The specimen consisted of fibrous tissue (lower panel) with transition to immature bone formation (upper panel) (hematoxylin and eosin, $\times 40$). (B) The immature bone was covered by bland osteoblasts. Atypical histological features, such as high mitotic activity or prominent nuclei, were rarely identified within the bone and fibrous tissue (hematoxylin and eosin, $\times 100$).

the small tubular bones, and initially used the term FRP to describe this condition. FRP is a rare calcifying and ossifying soft tissue lesion that occurs most commonly in the phalanges.^[1-5] Most affected patients are aged 20 to 40 years, and women are more commonly affected than men.^[1-5] FRP occasionally mimics reactive conditions such as fracture calluses, myositis ossificans, and neoplastic lesions.^[1-10] As the patient in the present case was a professional boxer, a fighter's fracture or fatigue fracture was initially suspected. However, the bulging bone lesion was separately present on the volar side of the proximal phalanx and metacarpal bone, across the MP joint.

The major differential diagnosis of FRP is extraskeletal osteosarcoma.^[1-3,9-11] Although sarcomas rarely occur in the fingers, the radiologic appearance of FRP occasionally resembles that of juxtacortical osteogenic sarcomas.^[1-3,9-11] In the present case, histological examination revealed osteoid, bone, and cartilage on a background of fibroproliferative stroma without evidence of malignancy.

The histological feature of FRP is characterized by a mixture of reactive proliferation of fibroblasts and osteoblasts with concomitant woven bone formation without a cartilage cap.^[1-3] FRP appears to be similar to bizarre parosteal osteochondromatous proliferation (Nora lesion) and reactive bone cartilage forming lesions such as osteochondroma.^[1] It has been proposed that FRP most likely represents a developmental step between a fibro-osseous pseudotumor of the digits and acquired osteochondroma (Turret exostosis).^[1] Although differentiation between FRP and bizarre parosteal osteochondromatous proliferation is difficult,^[1,12] histological examination in the present case showed no evidence of the distinct layer of periosteum covering a cartilage cap that is characteristic of bizarre parosteal osteochondromatous proliferation.^[1,13,14] Hence, the lesion was diagnosed as FRP on the basis of the histological and radiological findings.

FRP usually only involves 1 bone; however, there are a few reported cases of FRP involving 2 contiguous phalangeal bones.^[8,9] In the present case, the FRP occurred on the proximal phalanx and metacarpal of a finger in the left hand of a right-handed patient. Although the pathogenesis of FRP remains



Figure 4. Postoperative radiographs. (A) Oblique and (B) lateral radiographs of the left fifth phalange reveal no recurrence of the lesion.

unclear, the involvement of minor trauma is suspected, as patients with FRP have a history of trauma.^[1-3] If FRP is induced by repetitive minor trauma, then it would be expected to develop in the dominant hand, which is more frequently used in daily life. In this patient, however, the FRP occurred in the nondominant left hand; this may have been because the patient was a professional boxer who performed repetitive blows using the left hand. This patient was an orthodox boxer, performing the lead blow, or so-called "jab," with the left hand. Orthodox boxers are prone to sustaining more repetitive trauma to the left hand than to the right hand, and the left fifth phalange is involved in repetitive power gripping during the jabs. In this case, the radiological and histological findings showed reactive osteochondral lesions, which might have been caused by the traction force to the bundled structures of the flexor tendons to the phalangeal bones. Thus, the traction force of the leading jabs may have contributed to the periosteal damage, creating bulging bone ridges on the proximal phalanx and metacarpal of the left fifth phalange over time.

Marginal resection is generally recommended as the treatment of FRP. However, several authors reported a high recurrence rate of FRP after resection.^[1-3] Although FRP did not recur in the present case, long-term follow-up studies might be needed.

Considering the pathogenesis of FRP, we would expect many case reports of professional boxers with FRP. However, to the best of our knowledge, there are no previous case reports of FRP in professional boxers. Therefore, genetic or other factors may play a role in the development of FRP, or the lesion may be overlooked in the boxing profession. Thus, further clinical studies are needed to elucidate the pathogenesis of FRP.

4. Conclusion

We report a case of FRP affecting 2 contiguous phalangeal bones of the left fifth phalange in a professional boxer. The traction force of the repetitive leading jabs may have induced periosteal damage, creating bulging bone ridges on the proximal phalanx and metacarpal of the left fifth phalange over time.

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