Soccer player with painful toe

An x-ray revealed the source of the toe nodule and the nail dystrophy.

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A 13-YEAR-OLD GIRL presented to the clinic with a 1-year history of a slow-growing mass on the third toe of her right foot. As a soccer player, she experienced associated pain when kicking the ball or when wearing tight-fitting shoes. The lesion was otherwise asymptomatic. She denied any overt trauma to the area and indicated that the mass had enlarged over the previous year.

On exam, there was a nontender 8 × 8-mm firm nodule underneath the nail with associated nail dystrophy (**FIGURE 1**). The toe had full mobility, sensation was intact, and capillary refill time was < 2 seconds.

- WHAT IS YOUR DIAGNOSIS?
- HOW WOULD YOU TREAT THIS PATIENT?

FIGURE 1
Nodule on third toe leading to nail dystrophy

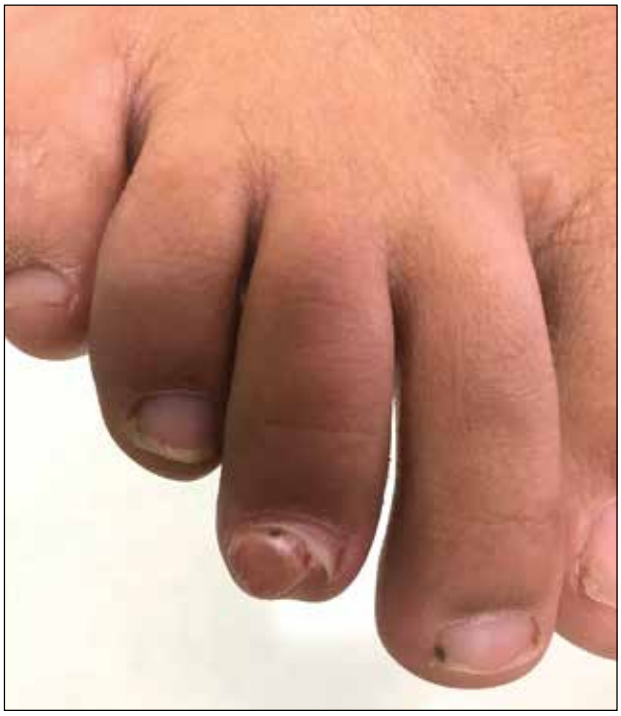

IMAGE COURTESY OF NAVAL HOSPITAL GUAM, AGANA HEIGHTS

Diagnosis: Subungual exostosis

A plain radiograph of the patient's foot showed continuity with the bony cortex and medullary space, confirming the diagnosis of subungual exostosis (**FIGURE 2**).[1] An exostosis, or *osteochondroma*, is a form of benign bone tumor in which trabecular bone overgrows its normal border in a nodular pattern. When this occurs under the nail bed, it is called *subungual exostosis*.[2] Exostosis represents 10% to 15% of all benign bone tumors, making it the most common benign bone tumor.[3] Generally, the age of occurrence is 10 to 15 years.[3]

Repetitive trauma can be a culprit. Up to 8% of exostoses occur in the foot, with the most commonly affected area being the distal medial portion of the big toe.[3,4] Repetitive trauma and infection are potential risk factors.[3,4] The affected toe may be painful, but that is not always the case.[4] Typically, lesions are solitary; however, multiple lesions can occur.[4]

The definitive treatment for subungual exostosis is surgical excision, preferably once the patient has reached skeletal maturity.

Most pediatric foot lesions are benign and involve soft tissue

Benign soft-tissue masses make up the overwhelming majority of pediatric foot lesions, accounting for 61% to 87% of all foot lesions.[3] Malignancies such as chondrosarcoma can occur and can be difficult to diagnose. Rapid growth, family history, size > 5 cm, heterogenous appearance on magnetic resonance imaging, and poorly defined margins are a few characteristics that should increase suspicion for possible malignancy.[5]

The differential diagnosis for a growth on the toe similar to the one our patient had would include pyogenic granuloma, acral fibromyxoma, periungual fibroma, and verruca vulgaris.

Pyogenic granulomas are benign vascular lesions that occur in patients of all ages. They tend to be dome-shaped and flesh-toned to violaceous red, and they are usually found on the head, neck, and extremities—especially fingers.[6] They are associated with trauma and are classically tender with a propensity to bleed.[6]

Acral fibromyxoma is a benign, slow-growing, predominately painless, firm mass with an affinity for the great toe; the affected area includes the nail in 50% of cases.[7] A radiograph may show bony erosion or scalloping due to mass effect; however, there will be no continuity with the bony matrix. (Such continuity would suggest exostosis.)

Periungual fibromas are benign soft-tissue masses, which are pink to red and firm, and emerge from underneath the nails, potentially resulting in dystrophy.[8] They can bleed and cause pain, and are strongly associated with tuberous sclerosis.[5]

Verruca vulgaris, the *common wart*, can also manifest in the subungual region as a firm, generally painless mass. It is the most common neoplasm of the hand and fingers.[6] Tiny black dots that correspond to thrombosed capillaries are key to identifying this lesion.

FIGURE 2

X-ray revealed a bony mass contiguous with cortex of toe

IMAGE COURTESY OF NAVAL HOSPITAL GUAM, AGANA HEIGHTS

Surgical excision when patient reaches maturity

The definitive treatment for subungual exostosis is surgical excision, preferably once the patient has reached skeletal maturity. Surgery at this point is associated with decreased recurrence rates.[3,4] That said, excision may need

to be performed sooner if the lesion is painful and leading to deformity.[3]

Our patient's persistent pain prompted us to recommend surgical excision. She underwent a third digit exostectomy, which she tolerated without any issues. The patient was fitted with a postoperative shoe that she wore until her 2-week follow-up appointment, when her sutures were removed. The patient's activity level progressed as tolerated. She regained full function and returned to playing soccer, without any pain, 3 months after her surgery. JFP

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