

# Subungual Exostosis

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Subungual exostosis are not uncommon, however, they are infrequently mentioned in the dermatologic literature.

We report herein a case of subungual exostosis in the great toe of 16-year-old female student which was confirmed by histopathologic and radiologic findings.

Histopathologic examination showed that the mass was covered by a dense fibrous tissue which merged into a fibrocartilage cap and bone.

Computed tomography showed a well defined, oval shaped, radiopacity of bony density capped by a radiolucency. (*Ann Dermatol* 1:107-110, 1989)

*Key Words:* Fibrocartilage cap, Subungual exostosis

Many subungual growths are described in dermatologic literature, but bony or cartilaginous tumors are rare.<sup>1</sup>

The diagnosis of this tumor is often difficult, because the clinical appearance of a subungual growth tends to be nonspecific.

The differential diagnosis between subungual exostosis and osteochondroma is not made easily in spite of their radiologic and histopathologic features. This is probably due to an inadequate biopsy or an inadequate histopathologic and radiologic examination.<sup>1,5</sup>

The lesion, though troublesome and distressing to the patient, is benign. It is usually effectively cured by the surgeon whether of bone or cartilaginous origin.<sup>2</sup>

Therefore a radiologic examination should be performed early in the evaluation of a subungual growth to determine its location and its character.

## REPORT OF A CASE

A 16-year-old female student was seen at the

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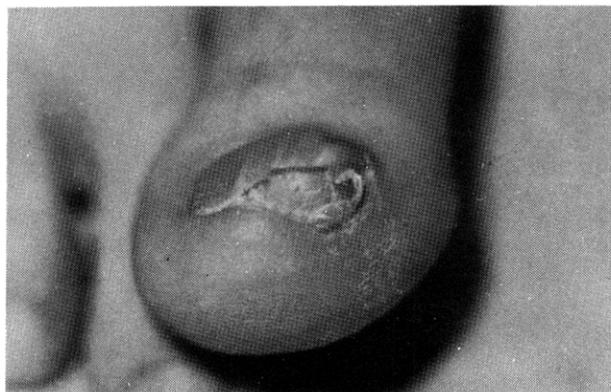
Department of Dermatology, St. Mary's hospital in February 1988 with a tender nodule partially covered with keratotic scales appearing beneath the nail plate of the right great toe (Fig. 1).

The overlying nail plate was deformed and distal portion of the nail was lifted.

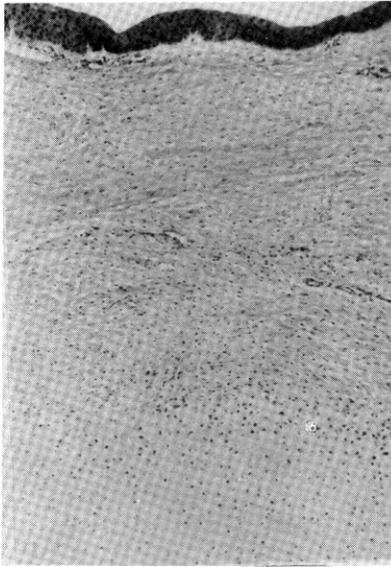
She had been suffering from a painful sensation of pressure in the area of the lesion for 6 months especially when wearing tight shoes. However, she could not recall a specific injury.

After removal of the nail plate, a skin biopsy with a 4 mm punch was performed.

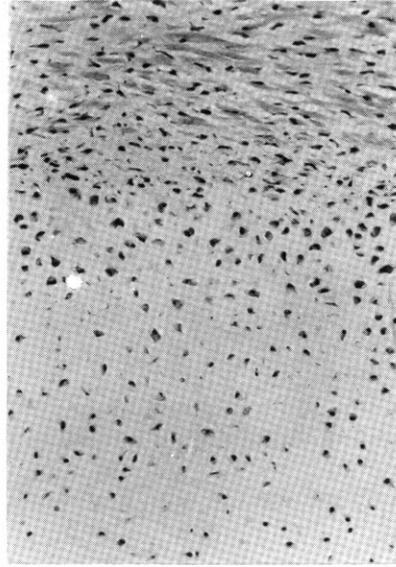
The histopathologic findings included a thick der-



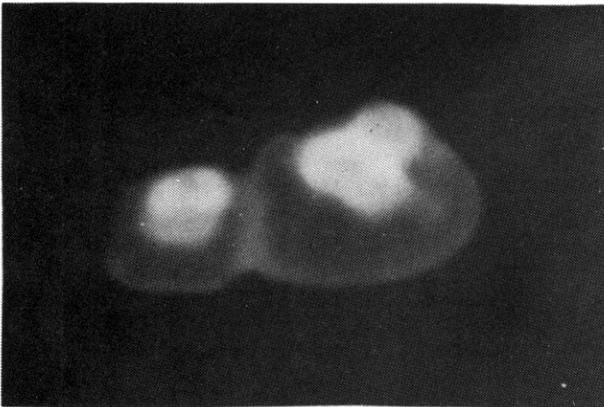
**Fig. 1.** Tender nodule appearing beneath the deformed nail plate of the right great toe.



**Fig. 2.** Histopathologic findings showing thick dermal collagen and a cartilaginous mass in the lower dermis (H & E stain,  $\times 40$ ).



**Fig. 4.** The cartilaginous cap in the lower dermis is noted (H & E stain,  $\times 100$ ).

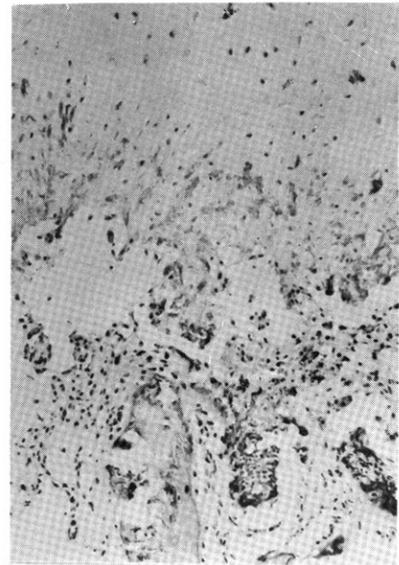


**Fig. 3.** CT findings of the right great toe showing a small, well-defined, oval shaped, bony density attached to the dorsal cortex.

mal collagen and cartilaginous mass in the dermis without specific epidermal change (Fig. 2).

Subungual exostosis or osteochondroma were considered first, and a subungual fibrokeratoma and a cartilaginous tumor of the skin were also included in the differential diagnoses.

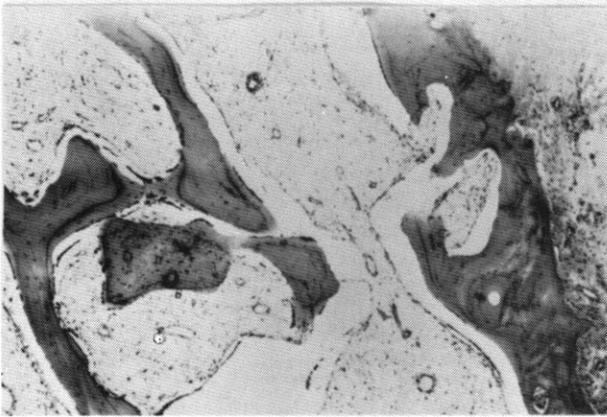
Computed tomography (CT) findings of the right great toe showed a small, oval shaped, smoothly margined bony density attached to the dorsal cortex of the distal phalanx, which suggested a subungual exostosis (Fig. 3). This growth was capped with a radiolucency, which suggested fibrous tissue of fibrocartilage.



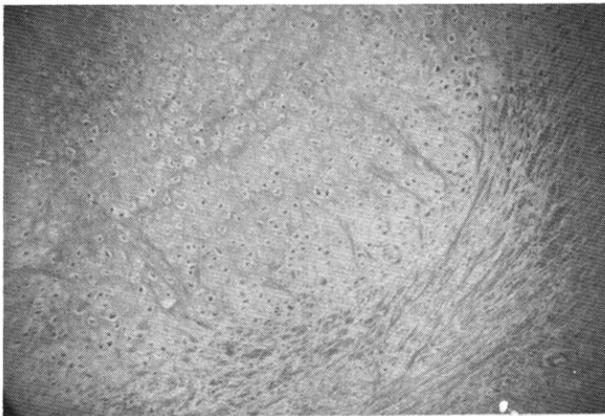
**Fig. 5.** This cartilaginous cap of the subungual exostosis shows enchondral bone formation at its base (H & E stain,  $\times 100$ ).

For complete removal of the tumor mass, the patient was transferred to the Department of Plastic Surgery. Under local anesthesia, the tumor was resected and curetted.

Histopathologic sections from the excised specimen revealed a cartilaginous cap between the dermis and enchondral bone formation. The cartilage cap was stained positively with Fontana-Masson stain and negatively with Verhoeff-van Gieson stain, which is diagnostic for the fibrocartilage cap of the subun-



**Fig. 6.** The enchondral bone tissue beneath the cartilaginous cap is distinct (H & E stain,  $\times 100$ ).



**Fig. 7.** Positively stained cartilaginous cap using Fontana-Masson stain ( $\times 100$ ).

gual exostosis (Fig. 4-7).

No recurrence was noted after 5 months of follow up, but the nail plate was still deformed.

## DISCUSSION

Subungual exostosis recognized first in 1817 by Dupuytren,<sup>6</sup> is defined as a benign bony growth projecting outward from the surface of a bone and characteristically capped with cartilage. It occurs most often, as in this case, on the dorsal or dorsomedial surface of the great toe. It can occur on the lesser and even on fingers.<sup>2,4</sup>

A striking finding is that the most common site of a subungual exostosis is the inner aspect of the great toe.<sup>3</sup>

Several theories regarding etiology have been proposed, but, are not proven. Trauma, either a major injury or repeated episodes of minor trauma are be-

ing proposed as causative factors.<sup>2</sup>

The triad of pain due to the collision of the nail plate with the expanding exostosis, nail deformation and the radiologic features is usually diagnostic.<sup>3</sup>

However, the diagnosis usually is made late because the clinicians are often reluctant to take a biopsy and thus fail to obtain the diagnostic microscopic findings.

If the biopsy specimen which was obtained from the digit by a punch or simple surgical procedure shows bony or cartilaginous structure, subungual exostosis, osteochondroma, enchondroma and primary or secondary subungual calcification should be considered in the differential diagnosis.<sup>3,5</sup>

Norton reviewed some of the differential features of subungual exostosis and osteochondroma.<sup>7</sup>

Although osteochondroma is by far the most common benign neoplasm of the bone, subungual tumors in the hands or feet are extremely rare. The occurrence in the toe is less than one percent.<sup>8-10</sup>

Osteochondroma, commonly evoking the same symptoms as subungual exostosis, is reported to have a male predominance and often a history of trauma.<sup>9</sup>

Radiologic examination of an osteochondroma shows a well defined sessile bony growth with a hyaline cartilage cap, while that of a subungual exostosis shows trabeculated cancellous growth with an expanded distal portion which is covered with radiolucent fibrocartilage.<sup>2</sup>

The fibrocartilage of a subungual exostosis consists of the growing layer and an ossifying layer.<sup>2</sup>

These characteristics differentiate subungual exostosis from the conventional osteochondroma. For their diagnosis radiologic and histopathologic findings are very important.

The most common bony tumors found in the phalanx are enchondromas, but solitary enchondromas of the distal phalanx are very rare.<sup>3</sup>

Other conditions which commonly occur in subungual location such as verruca, granuloma pyogenicum, epidermoid cyst, glomus tumor, epidermoid carcinoma and keratoacanthoma should be considered in the clinical differential diagnosis.<sup>2,9,11</sup>

In the Korean literature, 3 cases of subungual exostoses have been described.<sup>12-14</sup>

However diagnostic descriptions of their radiologic and histopathologic features were not fully presented. Except for the case reported by Chae et al,<sup>14</sup> the diagnostic fibrocartilage cap was not mentioned.

In the evaluation of subungual tumors it is most important that the radiologic examination, including anteroposterior and lateral films be carried out prior to either biopsy or definitive surgery; it may save the patient from unnecessarily drastic surgery.<sup>2</sup>

CT of the lesion will provide the exact relationship of the bone with the tumor mass by defining the width of the tumor mass and by showing how much of the long bone is involved.

If dermatologists as well as other clinicians were more familiar with the clinical and pathological features of these tumor, improper treatment because of misdiagnosis would be avoided.

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