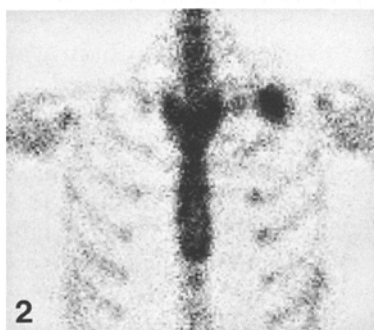


## Case report 630

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**Fig. 1.** A region of left scapula from posteroanterior radiograph of chest shows exostosis of scapular blade

**Fig. 2.** A  $^{99m}\text{Tc}$  MDP bone scan shows intensely increased uptake in the scapular exostosis but no increased uptake in any of the other known osteochondromas

**Fig. 3.** A CT scan shows an osteochondroma without gross malignant features surrounded by an abnormal area of high signal intensity

**Fig. 4.** An axial T2-weighted MRI (TR = 3000 ms, TE = 70 ms) shows again the area with a high signal intensity

### Clinical information

This 25-year-old woman with diaphyseal aclasis (hereditary multiple exostoses) and a long history of crepitus of the left shoulder girdle presented with recent discomfort and swelling in her left scapular region

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and left neck. Plain radiographs showed an osteochondroma of the inner surface of the scapular blade (Fig. 1) and a sessile osteochondroma of the humeral metaphysis. A  $^{99m}\text{Tc}$  technetium-methylene diphosphonate nuclear bone scan showed focal increased uptake in the scapular exostosis but was otherwise normal (Fig. 2). A CT scan (Fig. 3) confirmed the presence of a scapular ex-

ostosis, surrounded by an abnormal area of homogeneous density extending between the muscles of the scapula and chest wall. MRI showed this area to have a high signal intensity with a short T1 and a prolonged T2 (Fig. 4).

Preoperative aspiration with a fine needle showed the presence of fluid. A surgical procedure was performed.

### Diagnosis: Reactive bursa formation surrounding an osteochondroma

An osteochondroma was resected.

The surgical specimen demonstrated a well-developed osteochondroma with a thin, intact cartilage cap, a very marked degree of enchondral ossification and moderate hyperemia (Fig. 5). At operation, the osteochondroma was surrounded by a large bursa containing straw-colored viscous fluid without evidence of significant hemorrhage or malignant cells. The lining of the bursa showed typical mesothelial/synovial characteristics. No evidence of malignant change in the osteochondroma or in the bursa was identified.

### Discussion

Osteochondroma is the most common benign tumor of bone except for non-ossifying fibroma, and usually causes no morbidity [1]. If large enough or located appropriately, it may cause neural or vascular damage by direct subacute trauma [3, 11]. Malignant transformation, usually to

chondrosarcoma, occurs in 1–2% of cases of solitary exostoses and has been reported in 5–25% of cases of multiple exostoses (diaphyseal aclasis) [1, 5, 6]. This dreaded complication is usually heralded by pain or continued growth beyond the age of skeletal maturity. We report a case of bursal formation surrounding a benign scapular exostosis as a cause of clinical growth and discomfort.

Since the description by Orlow in 1891 of "exostosis bursata" [9], there have been few reported cases of reactive bursal formation surrounding an exostosis [1, 2, 6, 7, 10]. Such bursae may explain pain or mass (larger than initially noted) in patients with a benign lesion, symptoms which might otherwise suggest transformation of osteochondroma to chondrosarcoma.

Bursae are more likely to develop around large osteochondromas that produce mechanically significant friction or impingement upon adjacent muscles and tendons [6]. Frequent sites include the subscapular region and popliteal fossa. The bursa typically attaches around the base of the exostosis, has a lining resembling

synovium, and contains a synovial-type transudate. Two types of loose bodies have been described: fibrin rice bodies lying free or attached to the lining, and calcified, chondral loose bodies resembling joint mice [6]. These loose bodies may be discernible on radiographs. The bursa can become inflamed, infected, or hemorrhagic. No reports of bursal formation associated with chondrosarcoma have been identified, however this may be due to the infrequency of both conditions.

CT is especially valuable in establishing the homogeneous fluid nature of the contents of the bursa as well as in evaluating the exostosis itself for signs of malignant transformation, including scattered calcifications within the cartilage cap and destruction or pressure erosion of adjacent bone [8]. MRI is likewise able to establish the homogeneous fluid nature of the contents of the bursa as well as to characterize the thickness of the cartilage cap and show the presence and extent of any associated soft tissue mass. MRI cannot sufficiently evaluate patterns of calcification [12].

Radionuclide bone scanning demonstrates increased uptake in lesions with continued or renewed enchondral ossification, osteoblastic activity, or hyperemia. Qualitative or quantitative analysis of increased uptake does not distinguish benign from malignant exostoses, since there is considerable overlap [4]. A negative scan does not exclude malignancy. Hudson et al. noted that the highest degree of uptake in a benign exostosis was seen in a patient with hemorrhage into a bursa overlying his exostosis.

In *summary*, chondrosarcoma arising in an osteochondroma is a difficult diagnosis to establish on radiological-morphological grounds, especially in low grade lesions. A patient with a painful, enlarging exostosis usually comes to require resection even in the absence of radiographic hallmarks of malignancy. Although many osteochondromas complicated by bursal formation will be resected for relief of symptoms, the identification of a reactive bursa surrounding an exostosis without grossly malig-

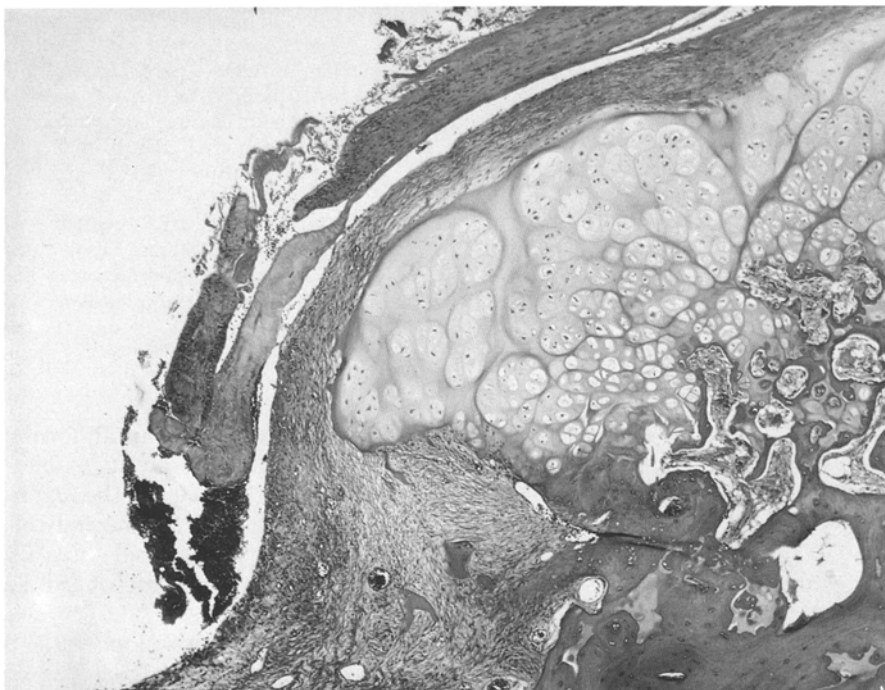


Fig. 5. Whole mount section shows the osteochondroma with intact cartilage cap, extensive enchondral ossification, and hyperemia. Portion of overlying bursa is present (HE,  $\times 60$ )

nant features presages a benign course and will dramatically effect established preoperative plans.

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