

# Radiological features of simple (unicameral) bone cysts

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When encountering a radiologically benign lucent bone lesion in a child, a simple bone cyst is a reasonable diagnostic consideration. Simple or unicameral bone cysts are expansile, serous-fluid-containing defects, that are not true neoplasms. Peak age ranges between 3 and 14 years in 80% of cases. The incidence is estimated at 3% of all bone lesions, with a male to female ratio of 2:1.<sup>1</sup> The aetiology of these lesions is poorly understood. Various hypotheses have included dysplastic processes, synovial cysts, and abnormalities in the local circulation. The majority (94%) of these cysts occur in the proximal humerus and femur.<sup>2</sup> Less frequent sites include the calcaneus (2%), ilium (2%), talus, tibia and



Fig. 2. In addition to the visualised pathological fracture, a 'fallen fragment' is demonstrated which is almost pathognomonic of a simple bone cyst.

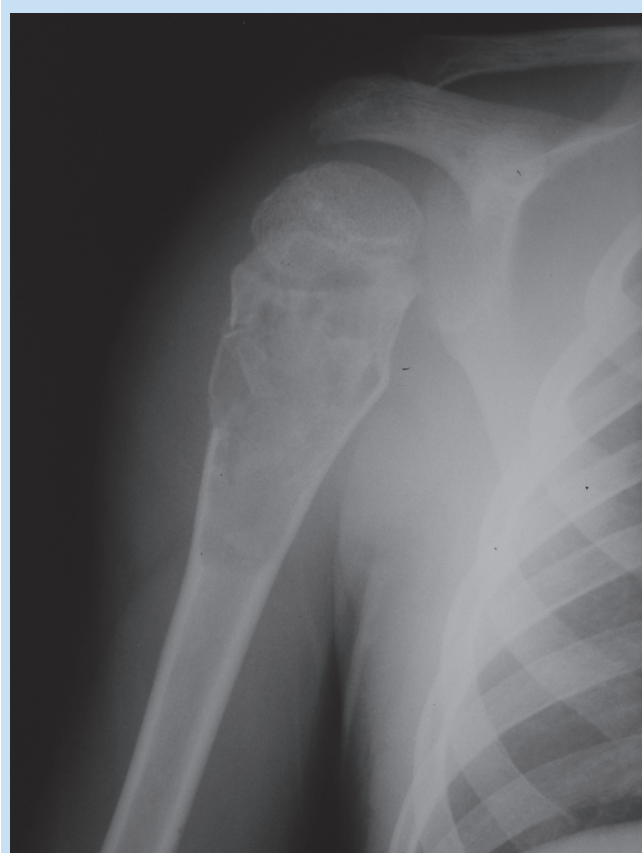


Fig. 1. An expansile medullary, radiolucent lesion in the proximal humeral metaphysis extending to the growth plate is seen. This is the appearance of a simple bone cyst. A common complication is a pathological fracture which is seen to disrupt the cortex laterally in this patient.

fibula.<sup>3</sup> Most often a single bone is affected.<sup>4</sup> The most common complication, a non-displaced pathological fracture (66% of cases), is often the presenting complaint.

The radiological features on plain radiographs include a centrally (medullary) located, expansile lesion of the metaphysis (Fig. 1). Cortical thinning without disruption is seen.<sup>2</sup> As a result of the fracture and the fact that this is a hollow/fluid-filled unicameral lesion, a 'fallen fragment/leaf' may be visualised (Fig. 2). The 'fallen leaf' sign is virtually pathognomonic of a multiloculated bone cyst.<sup>5</sup> This distinguishes it from other low-density lesions such as an aneurysmal bone cyst, which is more septated or contains a more solid matrix. Follow-up X-rays demonstrate that the growth plate moves away from the cyst as the child grows (Fig. 3). This explains why two-thirds of these lesions are not in contact with the growth plate when discovered in children older than 10 years.<sup>6</sup> CT can be useful to evaluate the extent of the cyst, especially if pelvic bones are affected. Hounsfield units will help to differentiate lipomas from fluid-filled cysts.<sup>7</sup> Typically MRI will demonstrate a low-signal intensity on T1-weighted images and high-signal intensity on T2-weighted images in the typical simple bone cyst.<sup>7</sup> Double-density fluid



Fig. 3. As the same patient ages, the lesion is seen in the diaphysis, having moved away from the growth plate. This is typical for simple bone cysts.

levels, septation and high-signal intensity (T1- and T2-weighted) of the upper fluid layer, indicative of serous fluid or extracellular methaemoglobin, strongly suggest the bone cyst in question is an aneurysmal bone cyst, rather than a unicameral bone cyst.<sup>8</sup>

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