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## Ultrasound of wrist and hand masses



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### KEYWORDS

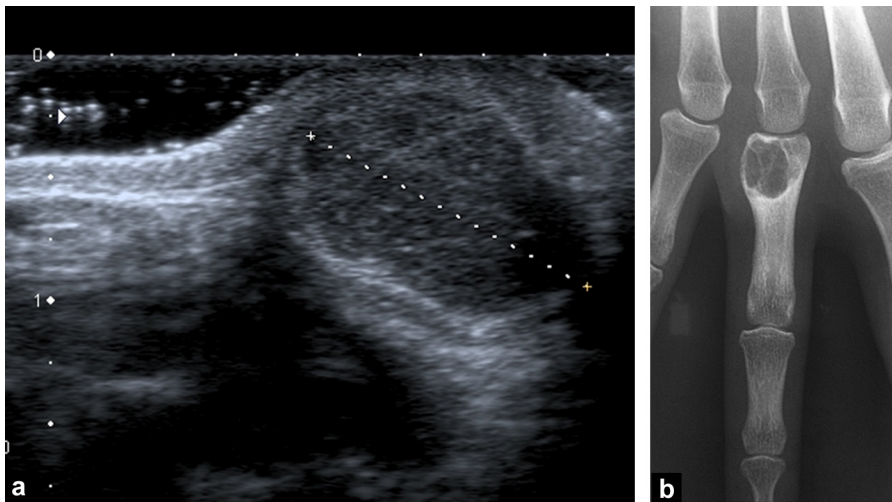
Ultrasound;  
Ganglion cyst;  
Soft tissue tumor;  
Hand;  
Wrist

**Abstract** Ultrasound is a useful tool to investigate soft tissue masses in the wrist and hand. In most situations ultrasound helps distinguish between a cyst and a tissue mass. This article provides a simple clinical approach to the use of ultrasound imaging for the diagnosis and preoperative assessment of wrist and hand masses.

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Wrist and hand masses account for 12.8% of soft tissue tumors [1]. Wrist and hand masses can be benign (76.5%) or malignant (12.3%) or can be pseudomasses (11.2%) [1]. Clinical examination of the wrist, particularly palpation, can often reveal these swellings early and provide a straightforward diagnosis particularly in rheumatic disease, tenosynovitis or cysts. In these situations, imaging is only needed for pretreatment assessment, before infiltration or surgery. X-ray imaging (standard radiographs or even second line computed tomography [CT]) can show calcifications, ossifications or disease of adjacent bones (Fig. 1), which are often not visible on ultrasound [2]. X-ray imaging can also diagnose many swellings such as exostoses, Nora lesions, soft tissue chondromas when they are calcified and pseudomasses due to microcrystalline rheumatic disease or secondary to advanced arthropathy. It should therefore be performed first and is sufficient to reach the diagnosis in these situations. Ultrasound offers better spatial resolution than MRI, with the advantage of dynamic information regarding tendon movements and probe pressure

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**Figure 1.** Digital tumor on ultrasound (a). Radiographs show bone disease, which was not visible on ultrasound (b). The combination of radiographs with ultrasound is essential in this case.

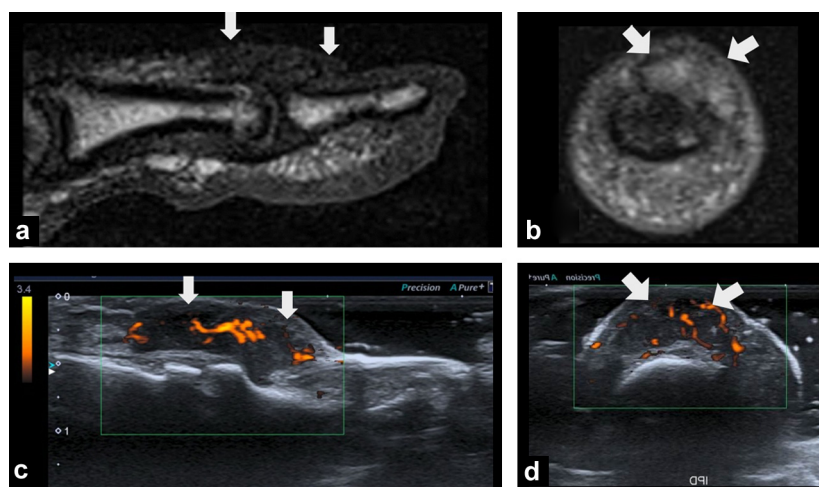
to diagnose adhesions and analyze relationships with adjacent structures. Ultrasound is often criticized for being operator-dependent, but for the hand, wrist and particularly fingers, MRI is at least as operator-dependent: the need for powerful gradients and high resolution coils which are unfortunately not available on all machines and not easy to master (Fig. 2).

This article does not aim to provide an extensive description of hand and wrist tumors, from the most common to rarest one, but rather “putting them into perspective” to show how ultrasound can answer the three questions which arise for a surgeon faced with a hand mass.

### A mass is palpable: is it a cyst?

Cysts account for 60% of hand masses [3,4] and are the most common and often the easiest ultrasound diagnosis. On ultrasound, cysts presents as a mass with a typically anechoic echostructure and posterior echo enhancement,

occasionally containing fine partitions and tiny echoes because of their frequent thick content (Fig. 3). There is no Doppler flow within these cysts except occasionally around their pseudocapsule, particularly if an inflammatory component or fissuring in the soft tissue makes them painful. Their most common location is the dorsal aspect of the roof or the radial artery groove although they may develop around most wrist and finger joints and also in the tendons or in the pulleys. Ninety-five per cent of cysts are typical in appearance on ultrasound [5,6] whereas 5% are atypical, occasionally more echogenic because of their hemorrhagic content (Fig. 4). It is then more difficult to confirm the diagnosis by ultrasound. In particular it is worth mentioning the lack of Doppler flow in a clearly delineated lesion or in avascular clots seen in a cyst, which is otherwise typical in appearance (Fig. 5). For cysts with atypical appearances, MRI with intravenous administration of a gadolinium chelate is needed to characterize these hemorrhagic masses, particularly using T1 and T2\* weighted images which do not enhance with contrast. In answer to the question: “is it



**Figure 2.** Giant cell tenosynovial tumor of the extensor tendon sheath of the finger (arrows): MRI (a and b) was obtained at 1.5T with a dedicated machine although the coil used, gradient, power and technical settings were not sufficient in the preoperative assessment supplemented by a higher quality ultrasound (c and d).

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