7.1
The Shoulder and Arm

In children, the clavicle (collarbone) is one of the bones that is most susceptible to fracture. In most cases, immobilization is the preferred choice of treatment; only in exceptional cases does surgery prove necessary, and this is confined to cases where there is a simple fracture with exposure of the bone. Fractures in neonates may be caused by natural delivery, especially in macrosomic children weighing more than 4 kg, or by compression trauma of the shoulders in the course of dystocic delivery. In older children, the trauma most commonly responsible for fracture is a fall on the shoulder with direct trauma, or with an outstretched arm.

Most fractures involve the middle third of the clavicular diaphysis, making A-P X-ray projections sufficient for diagnosis. However, in neonates and very small children, incomplete lesions with a thin fracture rima and normal bone alignment are common, and are sometimes mistaken during X-ray diagnosis due to their small size or to their position, which is not tangential to the radiographic beam. In these cases, where the symptoms (tumefaction, immobility, pain on mobilization) do not correspond to the negative findings from X-ray, ultrasound may identify small breaks without the need to resort to additional X-ray projections (Fig. 7.1a, b). In these cases, the fracture can then be visualized by X-ray through further check-ups that can identify the presence of a reparative callus (Fig. 7.1c, d).

In neonates, discovery of a fracture of the acromial extremity of the clavicle raises suspicions of non-accidental lesions caused by abuse. In older children and adolescents, fractures are more frequently simple fractures, with lowering of the shoulder on the affected side, loco-regional tumefaction, and pain; treatment is based on immobilization through “figure-of-eight” bandage.
Dislocation of the clavicle is rare in pediatric age. Fractures of the lateral portion of the clavicle are more frequently observed in connection with the acromioclavicular articulation, while fractures at the level of the sternoclavicular articulation are extremely rare and involve the physis (type I or II Salter–Harris fractures). Avulsion of the middle physis with posterior dislocation of the fragment may cause compression of the trachea, the subclavian vessels, or the brachial plexus. Assessment of this type of lesion can be made by computed tomography (CT) blurring, which makes it possible to record the position of the dislocated fragment from behind and to identify further complications that provide useful indications for surgery.

Scapular fractures are rare and generally caused by high-energy traumas; they are often associated with traumatic lesions of adjoining skeletal structures (clavicle, ribs, dorsal vertebrae, humerus) or with pulmonary lesions (lacerations/contusions, aero-pleura). Traumatic lesions most frequently involve the coracoid (Fig. 7.2), the acromion, and the glenoid, and may be associated with lesions of the acromioclavicular articulation and glenohumeral articulation. The numerous nuclei of ossification of the scapula may resemble fracture lesions. Fractures of the neck and body of the scapula are rarer in pediatric age compared to adults and are generally caused by a direct trauma of significant extent (Fig. 7.3). A-P and L-L X-ray projections of the scapula are generally diagnostic; CT can provide further information, especially for fractures of the neck of the scapula, highlighting the extension of the rim fracture to the glenoid.

Traumatic lesions of the proximal extremity of the humerus are more frequently represented by epiphyseal separation and by fractures of the proximal metaphysis of