



POSNA

The Core Curriculum

Acromioclavicular dislocations and distal clavicle fractures

Objectives

1. Describe the anatomy of the acromioclavicular joint and distal clavicle in children
2. Describe a classification system (Rockwood) for distal clavicle and acromioclavicular joint in children
3. Describe treatment of distal clavicle and acromioclavicular dislocation in children

Discussion point

1. When does the lateral clavicular epiphysis ossify? When does it fuse?

Discussion

Distal clavicle and acromioclavicular injuries are unusual in children; distal clavicle fractures only account for about 10% of all clavicle fractures. The acromioclavicular ligament is anatomically similar to the adult's, this ligament is not very strong and its primary role is stabilization in the anteroposterior plane. The distal clavicle is surrounded by a thick periosteal tube to which are attached the coracoclavicular ligaments. These ligaments protect against superior displacement of the clavicle. The coracoclavicular ligaments and periosteal tube are not disrupted when the distal clavicle is fractured in children; the fractured clavicle breaks through the superior periosteum and displaces dorsally. The periosteal tube and coracoclavicular ligaments are intact, thus remodeling provides an excellent restoration of stability. The distal clavicular epiphysis forms and fuses in a remarkably short time, about age 19; it is thus only radiographically evident for a very short time. The distal coracoid also has a secondary center of ossification which can be fractured with the ligaments, but has a much more favorable outcome than ligamentous rupture. The injury usually results from a fall on the shoulder.

Rockwood has outlined 6 types of distal clavicle and acromioclavicular injuries in children. Type I and II are mild sprains with no or partial superior displacement of the distal clavicle. Type III injuries have definite dorsal displacement of the distal clavicle, with the coracoclavicular interval 25% to 100% greater than normal. In Type IV injuries, the distal clavicle is also displaced posteriorly and penetrates into or through the overlying trapezius. In Type V injuries the coracoclavicular distance is > 100% more than normal. In Type VI injuries, which are very rare, the distal clavicle is displaced inferiorly. A radiograph with a 20-degree cephalad tilt is very helpful in diagnosis. The Stryker notch view is essentially an AP radiograph with the patient's hand resting on the head, and is valuable for detection of coracoid fractures.

Treatment for Types I and II is symptomatic for any age patient. Analysis of studies of Type III injuries in adults lends little justification to operative treatment, and there is clearly no need for

operation in a child with this category of injury. Operative treatment is justified for Types IV, V, and VI; although the frequency of these injuries in a child appears to be minimal. At about age 16 (13 for Eidman), treatment recommendations seem to become those of the adult distal clavicle, even though there is still an unossified and unfused distal clavicular epiphysis. Replacement of the clavicle into the periosteal tube and resuture of the tube around the clavicle is recommended by some for markedly displaced fractures, but criteria for the amount of displacement and/or age of patient for which this procedure is advisable is elusive.

References

1. Bannister GC, Wallace WA, Stableforth PG, Hutson MA. The management of acute acromioclavicular dislocation. A randomised prospective controlled trial. *Journal of Bone & Joint Surgery - British Volume* 1989;71(5):848-50.
2. Black GB, McPherson JA, Reed MH. Traumatic pseudodislocation of the acromioclavicular joint in children. A fifteen year review. *American Journal of Sports Medicine* 1991;19(6):644-6.
3. Clarke HD, McCann PD. Acromioclavicular joint injuries. *Orthopedic Clinics of North America* 2000;31(2):177-87.
4. Eidman DK, Siff SJ, Tullos HS. Acromioclavicular lesions in children. *American Journal of Sports Medicine* 1981;9(3):150-4.
5. Havranek P. Injuries of distal clavicular physis in children. *Journal of Pediatric Orthopedics* 1989;9(2):213-5.
6. Holst AK, Christiansen JV. Epiphyseal separation of the coracoid process without acromioclavicular dislocation. *Skeletal Radiology* 1998;27(8):461-2.
7. Ogden JA. Distal clavicular physeal injury. *Clin Orthop* 1984;188:68-73.
8. Phillips AM, Smart C, Groom AF. Acromioclavicular dislocation. Conservative or surgical therapy. *Clinical Orthopaedics & Related Research* 1998(353):10-7.
9. Sanders JO, Rockwood CA, Jr., Curtis RJ. Fractures and dislocations of the humeral shaft and shoulder. In: Rockwood CA, Jr., Wilkins KE, Beatty JH, editors. *Fractures in children*. Philadelphia: Lippincott-Raven; 1996. p. 905-1019.
10. Taga I, Yoneda M, Ono K. Epiphyseal separation of the coracoid process associated with acromioclavicular sprain. A case report and review of the literature. *Clinical Orthopaedics & Related Research* 1986(207):138-41.
11. Tibone J, Sellers R, Tonino P. Strength testing after third-degree acromioclavicular dislocations. *American Journal of Sports Medicine* 1992;20(3):328-31.