# Surgical vs Conservative Treatments for Adolescent Shoulder Instability

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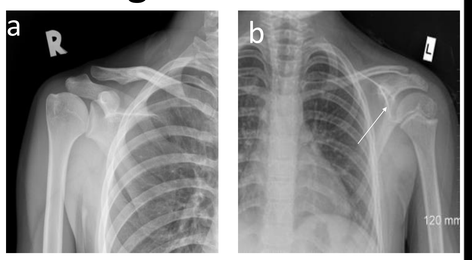
## Abstract

Shoulder instability following an anterior shoulder dislocation is common in active adolescent populations and can have negative long-term impacts on activities of daily living and competitive physical activities. Historically, shoulder instability following anterior shoulder dislocation is treated surgically with arthroscopic repair. Surgical repair has shown to have the greatest impact on decreasing the risk of recurrent instability. However, conservative treatments may be appropriate in certain adolescent populations due to skeletal immaturity. The hypothesis of greater elasticity within the capsular structures, along with the fact of secondary ossification centers contributing to the shape and formation of the subcoracoid glenohumeral joint are crucial for understanding skeletal maturity, which occurs around 16-17 years of age. This review of the literature investigates the effectiveness of conservative therapy compared to surgical repair in the adolescent population with shoulder instability following anterior shoulder dislocation.

## Images

Figure 1 (a) normal adult shoulder, no rotation, no ossification centers present.[6] (b) normal 7 y/o shoulder, external rotation, with an arow pointing at the unfused ossification center.[9]



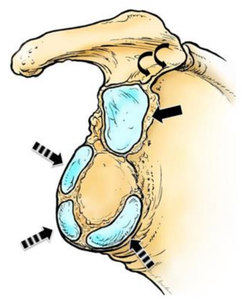



Figure 2 Illustration depicting normal secondary ossification centers including: subcoracoid ossification center (solid arrow), inferior ossification centers (dotted arrows), and bipolar growth plate (curved arrows).[18]

## Treatment Approaches

**Surgical:** The current standards of repair are by use of arthroscopic stabilization.[1-5] The goal with any form of treatment is to prevent future instability. Surgical intervention is currently the preferred method of treatment for anterior shoulder instability due to low occurrence of future instability. The benefits of surgical intervention in both adults[1,4] and skeletally mature (Figure 1a) adolescents,[2,3,5] generally have high success in preventing future instability.[7] Though the surgical approach has been shown to prevent future dislocations and instability in some populations, it is not true of all populations. Most skeletally mature adolescents ages fifteen and older have higher rates of recurrent dislocations than their adult counterparts.[8] However, primary dislocation at age fourteen or less (Figure 1b) will have lower recurrence rates even without surgical intervention.[8, 10,11] This gives rise to the question of how to treat a skeletally immature adolescent with anterior shoulder dislocation.

**Conservative:** Alternatives to surgical intervention are conservative treatments including resistance bands,[12] electrical muscle stimulation techniques,[13] neuromuscular exercises,[14] and self-reduction with therapy.[15] Treatment with nonoperative measures are hypothesized to be more effective in skeletally immature, as opposed to skeletally mature, adolescents due to the higher capsular elasticity in this population.[10,11] This gives reason to avoid the invasive nature of arthroscopic intervention. Conservative therapy has shown excellent results as well as low recurrence rates of instability.[8,10,11] However, structuring treatment on skeletal maturity is not a firm line that can be drawn since the timeline for maturation of secondary ossification centers and decreasing elasticity depends on the individual adolescent.[16-18]

## Comparison

Many authors do not consider ossification patterns or elasticity of the skeletally immature adolescent's shoulder and combine skeletally mature and immature groups.[3,5] To assess skeletal maturity, the physis, epiphysis, and apophysis of the shoulder should be examined. The physis (growth plate) is a more fragile cartilaginous plate that allows the epiphysis to expand in articulation with a joint while the apophysis (tubercle or tuberosity) allows lateral bony growth for skeletal muscle attachment. Fusion and development of these centers is what classifies an individual as skeletally mature.[16-18] Adolescent treatment should be divided based on the fusion of secondary ossification centers (Figure 2).[16-19] In consideration of treatment approaches: surgical is indicated in skeletally mature adolescents while conservative should be favored in skeletally immature adolescents.[8,10,11]

## Conclusion

Surgical intervention should be approached with hesitancy in the skeletally immature age group. Extrapolating data onto a skeletally immature adolescent from research on skeletally mature adolescents or adults should be approached with discretion. A nonoperative treatment should be the initial approach in the skeletally immature adolescent due to the resilience and the changing nature that accompanies this stage of development. Future research specifically directed towards conservative treatment methods in this population would be beneficial.

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