VIDEOS IN CLINICAL MEDICINE
SUMMARY POINTS

# Reduction of Pulled Elbow

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*The following text summarizes information provided in the video.*

## OVERVIEW

Pulled elbow, also known as annular ligament displacement or radial-head subluxation, is a common orthopedic injury in children.[1] In the United States, the incidence of emergency department visits for pulled elbow is estimated at 2.7 per 1000 persons younger than 18 years of age.[2] The median age at presentation is 2 years.[3,4] The injury is unique to infants and young children because the radial head is less bulbous than it is in older persons and may easily become displaced. Reduction of a pulled elbow is a safe procedure that can be performed in the outpatient setting.

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## ANATOMY

The annular ligament encircles the neck of the radius and holds it tightly in place against the ulna (Fig. 1), thereby maintaining the position of the proximal radius in relation to the ulna and the capitellum of the distal humerus while allowing 180-degree rotation. When there is forceful longitudinal traction, such as when a child is pulled or lifted by the arm, the radial head is pulled underneath the annular ligament. The ligament then becomes entrapped proximal to the radial head at the level of the radiocapitellar joint (Fig. 2).

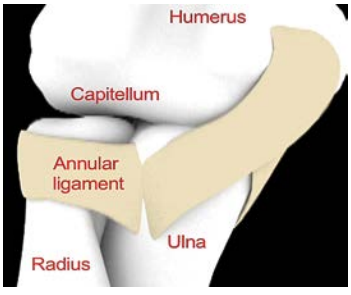


**Figure 1. The Annular Ligament.**
The neck of the radius is encircled by the annular ligament, which holds the radius tightly in place against the ulna.

**Figure 2. Entrapment of the Annular Ligament.**
With forceful longitudinal traction, the radial head is pulled underneath the annular ligament, entrapping the ligament.

## INDICATIONS

First, make sure that the child's history and findings on physical examination are consistent with the diagnosis. The child's history may include a witnessed event of forceful traction; however, other mechanisms of injury have also been described.[4] Physical examination should reveal pseudoparalysis, with the child voluntarily keeping the limb still to minimize discomfort. There will also be pain with movement, most often related to supination and pronation rather than to flexion and extension. In most cases there will be tenderness to palpation on the lateral side of the elbow; however, absence of this tenderness does not rule out the diagnosis. An affected child holds the elbow in a slightly flexed position, with the hand pronated. Further examination should also reveal a normal-looking elbow without effusion, bruising, or obvious deformity. Radiographs are almost always normal in cases of pulled elbow, so radiography should be reserved for cases in which the diagnosis is not clear. However, positioning the elbow in preparation for radiography is often therapeutic in reducing the displacement.

## CONTRAINDICATIONS

The contraindications to performing a reduction are few and are usually easily recognized. If a child has a history and physical examination that are consistent with fracture, such as deformity, swelling, or bruising of the elbow or a history of a fall onto the arm from a substantial height, then a radiograph should be obtained to evaluate for fracture. If the radiograph does not reveal fracture or effusion, then reduction may be considered. However, if any other abnormalities are present, such

Figure 3. Positioning for the Supination Technique.

Figure 4. Flexion and Supination of the Hand and Arm in the Supination Technique.

Figure 5. Clasping of the Patient's Hand in the Hyperpronation Technique.

Figure 6. Hyperpronation of the Patient's Wrist during Reduction of a Pulled Elbow.

as evidence of infection, reduction should not be attempted and immediate evaluation of the cause and appropriate treatment should be initiated.

### PREPARATION

No equipment is required for the reduction of a pulled elbow. The clinician's hands should be washed thoroughly as part of standard precautions.

### PROCEDURE

To prepare the parent or caregiver, explain that some discomfort may be associated with the procedure. The child may cry or scream for several minutes after the radial head has been relocated to its proper position.

Two techniques can be used to correct a pulled elbow. The supination technique has typically been used for reduction of pulled elbow; however, some studies comparing the supination with the hyperpronation technique have shown that hyperpronation is more successful.[5-7] In one study, reduction was achieved on the first attempt in 95% of patients who underwent randomization to hyperpronation as compared with 77% of patients who underwent randomization to supination.[6]

#### *Supination Technique*

To perform the supination technique, seat the child on the parent or caregiver's lap, with the child facing you. Clasp both the hand and elbow of the affected arm (Fig. 3). Your fingers or thumb should overlie the radial head. Neither the positioning of your fingers or thumb nor the starting position of the affected arm is critical to the success of the procedure. Supinate and flex the forearm until you feel the ligament move back into position (Fig. 4). You may feel or hear a click as the ligament is reduced. If the reduction is successful, the child should be pain free and able to move the arm normally in 5 to 30 minutes, including being able to reach for an object above the head.

#### *Hyperpronation Technique*

Hyperpronation can be the primary method used to reduce a pulled elbow, or it can be used if the supination technique has failed. Seat the child on the parent's or caregiver's lap, with the child facing you. Clasp the hand of the affected arm as you would in a handshake (Fig. 5). Use your free hand to support the patient's elbow. Hyperpronate the patient's wrist (Fig. 6). You may feel or hear a click as the ligament is reduced. If the reduction is successful, the child should be pain free and able to move the arm normally in 5 to 30 minutes, including being able to lift the affected arm above the head.

### TROUBLESHOOTING

Most reductions of a pulled elbow will be successful after a single attempt. If an initial attempt fails, the procedure may be repeated or the alternate technique may be used. If the elbow has not been reduced after three or four attempts, reexamine the arm carefully from shoulder to fingertips and obtain a radiograph to rule out fracture. However, when the cause of the injury or displacement is a fall, when the circumstances of the injury are unclear, or when it is difficult to perform a thorough examination because the child is uncooperative, it is prudent to obtain a radiograph before the third or fourth attempt at reduction. After obtaining a radiograph, splint the elbow at an angle of approximately 90 degrees (even if the child presents with the arm more fully extended) and refer the child to an orthopedic surgeon. In the majority of such cases, the affected elbow will reduce spontaneously during the period of immobilization.

## AFTERCARE

When a pulled elbow has been successfully reduced, aftercare is minimal. Children may resume normal activity as soon as they wish. However, parents and caregivers should be advised that the condition may recur, and the clinician should explain how the risk of recurrent subluxation can be minimized. For example, advise caregivers to avoid pulling on the arms and lifting or swinging the child by the arms. Clinicians may also consider providing family members with instructions on how to reduce a pulled elbow at home, particularly if this is not the first time the child has had pulled elbow.[8]

## SUMMARY

Pulled elbow is a common injury in young children. Reduction of a pulled elbow is a simple and benign intervention that can be performed in an outpatient setting with rapid results. Some studies have shown that the hyperpronation method is more effective than supination and may be less painful.[5,6] Clinicians should be competent in treating this common pediatric injury.

## REFERENCES


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