



ELSEVIER

ORIGINAL ARTICLE

Radial notch labralization for proximal radioulnar joint dysplasia

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Background: Chronic posterior subluxation or dislocation of the radial head is uncommon and difficult to treat. To restore radiocapitellar alignment, procedures such as deepening of the notch using a high-speed burr have been described, but they can result in cartilage damage. We hypothesized that a radial notch labralization using soft tissue could improve radiocapitellar tracking without violating the joint surface.

Methods: A radial notch labralization was performed in 3 patients with chronic posterior subluxation of the radial head and developmental dysplasia of the radial notch in the setting of complex recurrent instability of the elbow. A soft tissue graft (typically a portion of an allograft hamstring tendon) was used to create a meniscus-like bumper posteriorly, thereby deepening the radial notch and reducing its radius of curvature. A corrective anterior opening wedge ulnar osteotomy was also performed to realign the radial head with the capitellum.

Results: At a mean follow-up of 32 months, all 3 patients were pain free and had maintained a stable joint, with a functional range of motion. Each patient gave a rating of either "Greatly Improved" or "Almost Normal" on the Summary Outcome Determination scale. Radiographs performed during the last follow-up showed improved radiocapitellar alignment.

Conclusion: Chronic posterior subluxation or dislocation of the radial head can occur subsequent to developmental joint changes. The radial notch labralization using a soft tissue graft associated with a corrective ulnar osteotomy was successful in restoring radial head stability and avoiding cartilage damage.

Level of evidence: Level IV; Case Series; Treatment Study

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Chronic instability of the proximal radioulnar joint (PRUJ) is uncommon. The typical patterns reported include anterior dislocation of the radial head and posterior subluxation or dislocation.^{11,15,18,28,33} These can result from Monteggia

fractures,^{9,20,27} although chronic posterior dislocation is rarely described.¹⁵ Chronic posterior dislocation of the radial head not associated with Monteggia injuries is even less common.¹

Developmental joint changes are reported in response to chronic dislocations or subluxations, such as with hip dysplasia. In chronic radial head subluxations or dislocations, attention has usually been focused on dysplastic changes affecting the proximal ulnar shaft and the radial head.^{11,15,18,28,33} Only 1 paper has recently dealt with morphologic changes of the radial notch of the ulna associated with chronic anterior dislocation.²⁶

The Mayo Clinic Institutional Review Board that convened on October 10, 2011, approved the project, entitled "General Radiologic Patterns of Elbow Injury" (protocol number 11-002988).

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The radial head is an important stabilizer of the elbow joint, acting as a secondary constraint resisting posterolateral rotatory instability (PLRI).^{19,24,29} To contribute to ulnohumeral stability, the radial head must be stable in its articulation at the PRUJ. The senior author (S.O.D.) has been aware that PRUJ dysplasia affecting the radial notch of the ulna may be present in patients with complex forms of PLRI that began in childhood. They present with a shallow widened radial notch and posterior PRUJ subluxation. Such dysplasia and PRUJ instability compromise overall elbow stability because of loss of the stabilizing effect of the radial head against the capitellum.

The aim of this paper was to describe the senior author's surgical technique for "radial notch labralization" and to detail the presentation, treatment, and outcome of 3 patients with complex elbow instability accompanied by developmental dysplasia of the radial notch.

Surgical technique

The surgical technique was similar in the 3 patients, with only minor variations. The elbow was exposed laterally through the Kaplan interval and the annular ligament divided at the

midpoint of the radial head. The radial head was subluxated anteriorly by placing a Hohmann retractor under the radial neck (Fig. 1, A). Interosseous membrane lesion and associated longitudinal forearm instability were ruled out by pushing and pulling the radius along its longitudinal axis. These 3 patients all required lateral collateral ligament (LCL) reconstruction for chronic PLRI, so a portion of the allograft hamstring tendon being used to reconstruct the LCL was used to create a meniscus-like "bumper" at the posterior margin of the radial notch (Fig. 1, B). The graft was folded over 3 times and sewn to itself with a running No. 2-0 absorbable suture. We aimed to obtain a structure that is approximately 5 to 8 mm thick and 12 to 15 mm long. It was then sutured to the inner side of the annular ligament at its posterior insertion on the ulna (Fig. 1, C and D). In 1 case, it was also fixed to the posterior margin of the radial notch with suture anchors (Fig. 1, E). We do not know if one method is better than the other but prefer the use of suture anchors, which permit a reconstruction that somewhat mimics a labral repair in the shoulder. Imbrication and closure of the annular ligament and capsule caused the tendon graft to push the radial head anteriorly into better position in the radial notch (Fig. 1, F). The aim of the arthroplasty is to reduce the radius of curvature of the radial notch by creating a structure that deepens

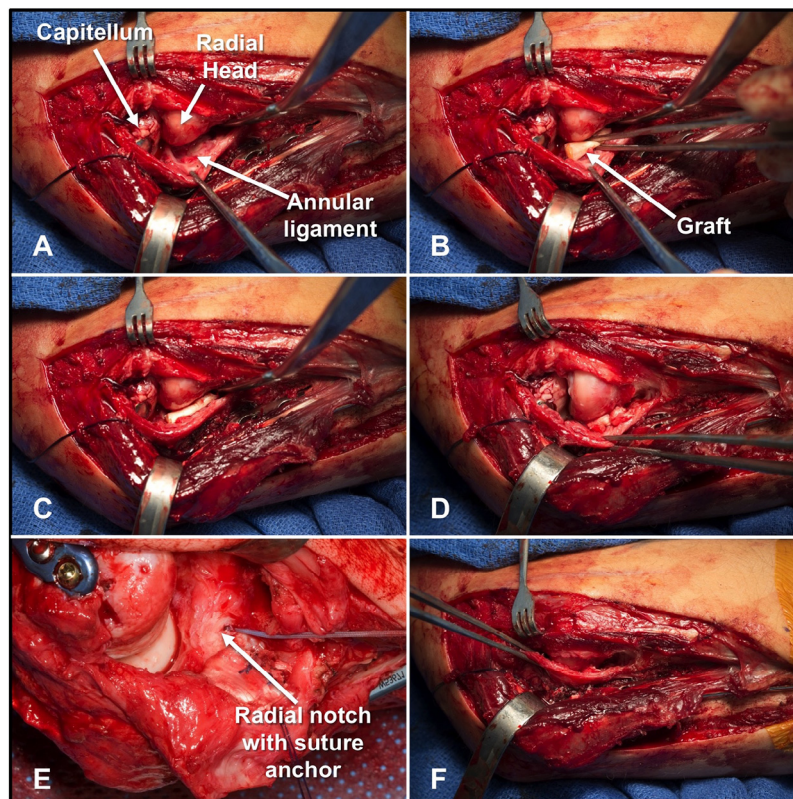


Figure 1 Surgical steps for radial notch labralization. The proximal part of the patient is on the left, the distal on the right. (A) The radial head is subluxated anteriorly and the annular ligament exposed. (B) A soft tissue graft is placed between the radial head and annular ligament. (C and D) The graft is folded, sewn to itself, and then fixed down to the inner side of the annular ligament. (E) As an alternative, graft fixation can be done with a suture anchor into the radial notch. (F) The annular ligament and lateral capsule are closed, and the tendon graft pushes the radial head anteriorly. (By permission of Mayo Foundation for Medical Education and Research. All rights reserved.)

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