Henkus HE, de Witte PB, et al. Bursectomy compared with acromioplasty in the management of subacromial impingement syndrome. JBJS Br 2009;91(4):504-510.

Design: Randomized clinical trial

Study question: In the setting of nontraumatic impingement syndrome, does acromioplasty, when done in addition to bursectomy, improve the outcomes over bursectomy alone?

Population/sample size/setting:

- 57 patients (26 men, 31 women, mean age 47) treated for symptomatic subacromial impingement syndrome at a department of orthopedics in the Netherlands
- Patients were referred by primary care physicians on the basis of nontraumatic deltoid region pain with an inability to lie on the affected side
    - All patients had full passive ROM, a positive Neer or Hawkins sign, and a positive lidocaine impingement test
    - The diagnosis of subacromial impingement was based on history, clinical exam, radiographs of the shoulder and cervical spine, and an MR arthrogram
- Exclusion criteria were clinical signs of glenohumeral instability, impairment of movement of the glenohumeral joint such as with adhesive capsulitis, arthritis diagnosed by imaging, rheumatoid disease, history of trauma to the shoulder, any tear of the rotator cuff, calcifying tendinitis, and biceps tendinitis

Main outcome measures:

- Before surgery was considered, all patients had three lidocaine and hydrocortisone injections into the subacromial space at 4 week intervals, combined with NSAIDs and at least 6 weeks of exercise therapy
- 56 patients were randomized to either debridement of the subacromial bursa alone (Group A, n=26) or to debridement followed by arthroscopic acromioplasty (Group B, n=30)
    - One of the original 57 patients was lost to followup because of lung cancer diagnosed before followup could be done
- Debridement of the bursa was done with a motorized shaver and an electrocautery probe
- Acromioplasty was done by preparing a flat undersurface of the acromion with a motorized burr introduced through the lateral portal
- All patients had the same postoperative exercise program for rehabilitation
- After one year of followup, 2 patients in Group A and 3 in Group B had a second surgical procedure because of symptomatic deterioration

- The Constant scores, the pain VAS, the function VAS, and the simple shoulder tests improved in both groups from baseline to followup
    - Group A improved the Constant score by 13.9 points, Group B by 18.5 points; the mean difference was 4.6 points in favor of Group B, but the 95% confidence interval was (-14.1, 4.9) which includes the null value of 0 difference, and was declared not statistically significant
    - Improvements in other outcome scores (simple shoulder test and pain/function VAS) similarly improved in both groups but had no significant difference between groups
- Because of differences at baseline in the distribution of acromion types, age, and gender, the results were analyzed with multiple regression to adjust for possible confounding in spite of the randomization
    - For the Constant scores, male gender had a positive effect in the regression analysis, and on average added 12 points to the Constant score
    - Compared to a Type I acromion, a Type III acromion lowered the Constant score by an average of 12.6 points
        - However, there was no statistical interaction between acromion type and treatment assignment: the effect of treatment did not depend on the type of acromion
    - Similar effects were seen for simple shoulder and VAS scores; a Type III acromion had a less favorable score than a Type I acromion, but there was no evidence that the type of acromion changed the effect of treatment group

Authors' conclusions:

- Both bursectomy and bursectomy with added acromioplasty led to improved clinical scores; group differences were small and clinically unimportant
- A Type III acromion had an effect on the final clinical outcome, but did not have an effect on the response to treatment
- The extrinsic theory of impingement is challenged by these results; other studies also conflict with the extrinsic theory of impingement
    - Most rotator cuff tears are not on the bursal side but are on the articular side or are intra-tendinous
    - Type III acromion appears to be more common with advancing age; changes in the acromion may be the result of and not the cause of rotator cuff pathology
- A number of potentially eligible patients had to be excluded because of specific shoulder pathology which was not detected by Neer's test or the lidocaine injection test (4 patients were excluded at the time of diagnostic arthroscopy because of SLAP lesions, 3 because of glenohumeral synovitis, and 3 with glenohumeral arthritis);

Neer's test has a low specificity and does not differentiate adequately between impingement syndrome and other shoulder pathology

- The size of the study was fairly small and underpowered
- A subgroup of patients with subacromial pain may benefit from acromioplasty but this study was not able to identify such a group

Comments:

- The confidence intervals for improvement of the Constant score are fairly wide and include a value of 14.1 points in favor of acromioplasty; a clinically important advantage of acromioplasty cannot be excluded, but neither can a disadvantage of acromioplasty of 4.9 points on the Constant score
- While the authors did not find that the acromion type affected the response to treatment, detection of this difference would depend on a statistical interaction between acromion type and treatment
    - In multiple regression, the standard errors of interaction terms (acromion x treatment) are larger than for main effects (acromion type or treatment assigned); the study was even more underpowered for interaction than for the main effects

Assessment: adequate for some evidence that in the setting of nontraumatic subacromial impingement syndrome, both bursectomy alone and bursectomy accompanied by acromioplasty can improve shoulder pain and function, and that adding acromioplasty is not likely to significantly enhance the outcome of surgery