

High patient satisfaction after arthroscopic subacromial decompression for shoulder impingement

A prospective study of 50 patients

Marie Bengtsson¹, Karl Lunsjö², Ylva Hermodsson¹, Anders Nordqvist³ and Fikri M Abu-Zidan²

Departments of ¹Physiotherapy, Helsingborg Hospital, Sweden, ²Surgery, Faculty of Medicine and Health Sciences, UAE University, Al Ain, United Arab Emirates, ³Orthopedics, Ängelholm Hospital, Sweden

Correspondence KL: k.lunsjo@uaeu.ac.ae

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Background Arthroscopic subacromial decompression (ASD) for shoulder impingement has gained popularity. We evaluated the result of this common procedure prospectively, from a patient perspective.

Method We used the Disability of the Arm, Shoulder and Hand questionnaire (DASH) and the Visual Analogue Scale (VAS) to evaluate 50 patients with a mean age of 49 (27–72) years. All patients had undergone 6 months of failed nonoperative treatment prior to surgery. Exclusion criteria were total rotator cuff rupture, shoulder instability, clinically verified acromioclavicular joint osteoarthritis, calcifying tendonitis or neurological symptoms. All the decompressions were done by experienced shoulder arthroscopists.

Results A significant improvement in both the median DASH score and the VAS had occurred 6 months after surgery.

Interpretation ASD for impingement in properly selected patients performed by experienced surgeons gives a high degree of patient satisfaction 6 months after surgery.

has questions that measure daily activities (ADL) and others that measure the strength and range of motion (Constant and Murley 1987). The value of this score is questionable, because it uses objective values that are useful to surgeons but does not take account of the patient's satisfaction regarding health and function. Several authors have emphasized the importance of measuring the patient's own experience of disability using self-reported questionnaires. These consist of different scales that measure specific health considerations such as physical function and pain (Atroshi et al. 2000, Michener et al. 2000). The DASH questionnaire is a region-specific instrument that is reliable and valid in patients with elbow and shoulder disorders (Hudak et al. 1996, Turchin et al. 1998, McConnel et al. 1999).

Using the Swedish version of the DASH questionnaire, we have prospectively measured the satisfaction of subacromial impingement patients who were treated with ASD.

The most common alternatives for surgical treatment of shoulder impingement are open decompression and ASD. No difference in long-term outcome has been found between the two methods (Lindh and Norlin 1993, Husby et al. 2003).

The Constant-Murley score is often used to measure the outcome of shoulder surgery (Anderson et al. 1999, Patel et al. 1999, Dom et al. 2003). It

Patients and methods

67 consecutive patients who had undergone ASD for clinically verified impingement syndrome (Neer grade II) (Neer and Welsh 1977) at Ängelholm Hospital, Sweden, in 2002 and 2003 were studied prospectively. ASD was chosen as a routine instead of open surgery because of its diagnostic advantages and shorter rehabilitation period (Lindh

and Norlin 1993). To be included in the study, the patients had to have had subacromial pain for more than 6 months which did not improve by nonoperative treatment. This comprised a training program supervised by an experienced physiotherapist. Most patients received at least one subacromial injection of corticosteroid as part of this regime. Exclusion criteria included: total rotator cuff rupture, instability, clinically verified acromioclavicular joint osteoarthritis, calcifying tendonitis, neurological symptoms, or not being able to read and understand Swedish. As part of the preoperative evaluation, all patients received a subacromial injection of local anesthesia to assess whether the pain emanated from the subacromial structures. Radiographs of the humeroscapular and acromioclavicular joints were taken in all patients. Co-planing, or removal of osteophytes under the lateral end of the clavicle and medial acromion, was done as part of the ASD in patients with asymptomatic acromioclavicular joints. 5 patients who were included preoperatively were excluded at surgery because of instability in the glenohumeral joint, repair of the rotator cuff, or resection of the lateral end of clavicle.

The research leader (MB) was informed as soon as any patient was scheduled for ASD due to impingement syndrome. The patients were then asked by telephone if they wanted to participate in the study. All patients were given the information that it was optional to participate in the study, and that every statement and result would be anonymous. To prevent bias, the research leader never met the patients. 1 week before and 6 months after surgery, the patients received an envelope with two self-assessment questionnaires (the Swedish version of the DASH questionnaire and the VAS) and a return envelope (Hudak et al. 1996, Atroshi et al. 2000). If any questionnaire was not returned, the patient was reminded twice. 10 patients who did not respond at all, and 2 patients who left more than 4 of the 30 questions unanswered were excluded from the study. 50 patients completed the questionnaire (31 men). Mean age was 49 (27–72) years.

The DASH self-assessment questionnaire (Table 1) is designed to assess symptoms and functional status in patients with musculoskeletal conditions of the upper extremity, the main emphasis being physical function (Turchin et al. 1998, McConnel et al. 1999, Atroshi et al. 2000). Each item has 5

Table 1. The items in the Disabilities of the Arm, Shoulder and Hand (DASH) symptom scale

1. Opening a tight or new jar.
2. Writing.
3. Turning a key.
4. Preparing a meal.
5. Pushing open a heavy door.
6. Placing an object on a shelf above the head.
7. Doing heavy household tasks such as washing the floor or windows.
8. Gardening or doing yard work.
9. Making a bed.
10. Carrying a shopping bag or briefcase.
11. Carrying a heavy object (over 5 kg).
12. Changing a light bulb over head.
13. Washing or blowing hair dry.
14. Washing the back.
15. Putting on a pullover/sweater.
16. Using a knife to cut food.
17. Recreational activities that require little effort such as playing cards, knitting.
18. Recreational activities that require taking some force or impact through the arm, shoulder or hand such as playing golf, using a hammer.
19. Recreational activities that require moving the arm freely, such as badminton or swimming.
20. Managing transportation needs.
21. Sexual activity.
22. Social activities.
23. Work and other daily activities.
24. Pain.
25. Pain when performing activities.
26. Tingling.
27. Weakness.
28. Stiffness.
29. Difficulty in sleeping.
30. Effect on self-image.

choices of response, ranging from “no difficulty or no symptom” to “unable to perform activity or very severe symptom”, and is scored on a 1- to 5-point rating scale. The DASH questionnaire also includes 2 optional 4-item scales about occupational function and additional questions about leisure activities (e.g. the ability to perform sports and/or to play a musical instrument) (Table 2). The DASH score was used to evaluate whether gender and/or sick leave were prognostic factors for the result of the operation. Pain was measured using the visual analogue scale (VAS).

The ASD was performed with the arthroscope in the posterior port. The coracoacromial ligament was released (Ellman 1988). All 4 surgeons were experienced shoulder arthroscopists to eliminate the learning curve. Patients had met a physiotherapist on the day of surgery, and were given a standard

Table 2. The items in the DASH symptom scale regarding work and leisure activity

Work:
1. Using your own technique to work.
2. Doing your usual work because of pain in the arm, shoulder and hand.
3. Doing your work as well as you would wish.
4. Using the same time as usual to do your work.
Leisure activity:
1. Using your own technique to play an instrument or perform sports.
2. Playing an instrument or performing sports because of pain in the arm, shoulder or hand.
3. Playing an instrument or performing sports as well as you would wish.
4. Using the same time as usual to play an instrument or perform sports.

rehabilitation protocol starting with active assisted range of motion at day 1. As the pain decreased, this progressed with strengthening exercises of the rotator cuff and shoulder muscles.

Statistics

We used non-parametric statistical methods because of the small number of samples. The Wilcoxon signed-rank test was used to compare the results of related groups. The Mann-Whitney U test was then used to compare unrelated groups. Probabilities of less than 0.05 were considered significant.

Results

The median DASH overall score improved by 24 points after surgery (median 42 (9–87) before surgery and 18 (0–78) after surgery; $p < 0.001$, Wilcoxon signed-rank test) (Figure 1). A mean improvement in DASH score of 19 points has been suggested to be “much better” (Gummeson et al. 2003). A 10-point difference in DASH score may be considered to be the minimal amount of change of any importance, and this improvement was observed in 38 patients. 2/19 women and 6/31 men showed no improvement after surgery.

The DASH work score was studied in 25 patients and improved after surgery (median 44 (0–100) before surgery compared with 0 (0–75) after surgery; $p < 0.001$, Wilcoxon signed-rank test). The

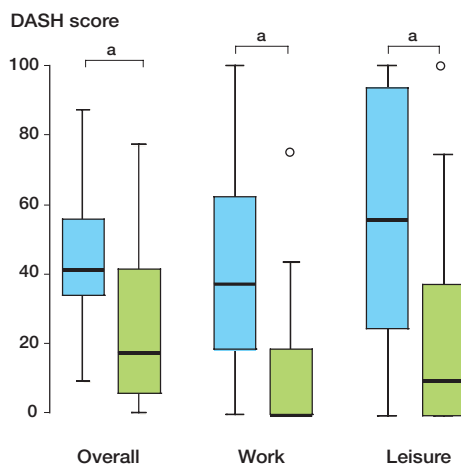


Figure 1. Box plots of overall DASH score, work score and leisure (sport/music) score before surgery (blue box) and after surgery (green box). * $p < 0.001$.

DASH sport/music score was studied in 18 patients and improved after surgery (median 56 (0–100) before surgery compared with 10 (0–75) after surgery; $p < 0.001$, Wilcoxon signed-rank test) (Figure 1).

There was no sex-related difference in the absolute change in DASH (women: median 22 (–8 to 43); men: 21 (–27 to 49); $p = 0.4$, Mann Whitney U test). There was no difference in the absolute change in DASH between those who had sick leave before surgery (median 19 (–28 to 49) and those who had not (median 23 (–16 to 48); $p = 0.5$, Mann-Whitney U test). There was a significant improvement in the VAS score after surgery (median 1 (0–9) compared with median 7 (0–10) before surgery; $p < 0.001$, Wilcoxon signed-rank test) (Figure 2).

Discussion

Shoulder impingement is a common disorder and when nonoperative treatment has failed, ASD has proven useful. We have evaluated this common procedure from the point of view of the patient. The region-specific self-assessment instrument DASH, which is applicable to a large variety of disorders of the upper extremity, has shown effectiveness of treatment and has even detected mild disability. A review of disease-specific instruments that evaluate disorders of the arm has shown that only the

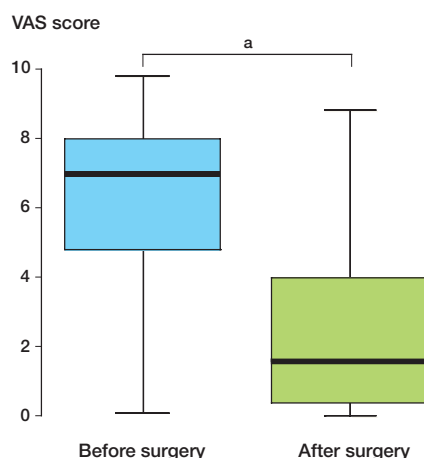


Figure 2. Box plots of VAS score before surgery and after. ^a $p < 0.001$.

Carpal Tunnel Instrument had higher sensitivity than the DASH questionnaire (Gummeson et al. 2003). Most of the questions were useful in detecting the symptoms of shoulder impingement in the current study (Table 1). The DASH questionnaire is of good quality in comparison with other shoulder assessment scales, such as the American Shoulder and Elbow Surgeons' (ASES) Shoulder Index, the Simple Shoulder Test (SST), and the DASH in combination with more function-orientated scales such as the Constant-Murley score (Skutek et al. 2000). The interpretation of DASH can be influenced by patient age: a recent study has shown that scores are higher in older patients (Hunsaker et al. 2002). The mean age in our study appears to be similar to those in other rotator cuff disease studies (Ellman 1988, Dom et al. 2003).

To our knowledge, the result of ASD for shoulder impingement has only been evaluated prospectively once before using a DASH questionnaire; the score increased by (median) 11 points (Gummeson et al. 2003). This is less than half of the improvement seen in our patients. The reason for this may be that we applied a stricter patient selection and excluded patients who were found to have other causes of shoulder pain or who had concomitant surgery other than ASD. Furthermore, the number of our patients was double that in Gummeson et al. (2003), and with less selection bias. Gummeson et al. (2003) had a mean follow-up period of 12 (6–21) months. Even so, there was

no further improvement after 6 months in their study. We are well aware that the patient's progress may continue until 1 year after surgery; however, we found improvement in both DASH and VAS with 6 months of follow-up. A longer follow-up period would probably not have changed the conclusion of our study and, to our knowledge, there is no evidence in the literature of inferior results with a longer follow-up period. Gummeson et al. (2003) used only DASH questions about ADL. We included parts of the DASH questionnaire that evaluate work and leisure activities, and found significant improvement in these scores. Pain is the main complaint in shoulder impingement patients and it reduces the patient's quality of life. We have found a remarkable improvement in the VAS score after ASD.

Female sex and work absence have been reported to be prognostic factors. Women have been reported to be more troubled by the musculoskeletal symptoms (especially in the neck and shoulder regions) than men (Henriksson et al. 1996). We did not find any difference between men and women regarding change in DASH score. One of the best independent prognostic factors in patients with rotator tendinosis was restricted prescription of sick leave (Brox et al. 1996, 1999). We found no significant change between those who were on sick leave compared and those who were not.

We conclude that ASD for impingement, performed by experienced shoulder surgeons after appropriate patient selection, gives high patient satisfaction 6 months after surgery.

Author contributions

MB participated in the design and conduction of the study, data collection and drafted the manuscript. KL participated in the design of the study, analysis of the result and in editing the manuscript. YH participated in the design and editing of the manuscript. AN participated in the design and conduction of the study and editing of the manuscript. FA-Z was actively involved in the analysis of the results and the editing of the manuscript.

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