



**METHODS FOR EVALUATING THE RESULTS OF TREATMENT IN PATHOLOGIES
OF THE ROTARY CUFF OF THE SHOULDER**

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ABSTRACT

Objective examination methods may not always be measurable and it is very difficult to interpret the level during tests in patients with rotator cuff pathologies. It is especially difficult to evaluate objective examination methods in scientific research in many patients. Recently, there has been a tendency to use subjective criteria for evaluating survey results. Also, the lack of standardization of survey methods leads to difficulties in making comparisons between studies and the interpretation of results. Thus, in this study, we evaluated the frequent six common subjective methods for assessing the shoulder joint in rotator cuff pathologies and in surgical treatment of patients in terms of their design, validity, reliability, responsiveness and clinical application. After extensive searches of the google scholar literature over the past 10 years, six typical shoulder scores for rotator cuff pathologies implanted and patient-based have been identified: the University of California, Los Angeles shoulder Rating Scale (UCLA), Constant Score (CMS), American Shoulder and Elbow Surgeons (ASES), Simple Shoulder Test (SST) hand, shoulder and hand disability (DASH). These questionnaires were then discussed for evaluation in terms of their design process, validity, reliability, responsiveness and clinical use. In shoulder surgery cases, and in particular rotator cuff diseases, a number of these indicators have been proposed as a way to measure valid interventional outcomes in patients with rotator cuff pathologies, and some of these indicators are related to shoulder function (ASES, CMS, UCLA, SST, DASH) has been shown to be constructive, test-retest reliable, and responsive to change. However, many of these tools have not been properly tested and have been used instead for purely historical reasons. The results of our study indicate that no single instrument can be absolute in the interpretation of patient functions and satisfaction after surgery for pathologies of the rotator cuff. It is necessary to take into account all examination methods when interpreting the results of surgical treatment. All five of the above methods can be used in research studies to evaluate the results of treating rotator cuff tendon injuries.

KEYWORDS: subjective measurement, shoulder, rotator cuff tear.

Literature review

Shoulder function has traditionally been measured in terms of range of motion, strength, and pain. However, these objective measures may not be practical in some settings because they are time consuming and require personal contact. More recently, there has been an increasing trend towards health-related quality of life measures for both general and specific diseases, often using patient-filled questionnaires (subjective assessment criteria).^[1]

Patient-centered outcome assessment is a feasible and appropriate method for solving patient problems in the context of controlled clinical trials.^[2]

Objective examination methods may not always be measurable and it is very difficult to interpret the level during tests in patients with rotator cuff pathologies. It is especially difficult to evaluate objective examination

methods in scientific research in many patients. Recently, there has been a tendency to use subjective criteria for assessing survey results. Also, the lack of standardization of survey methods leads to difficulties in making comparisons between studies and the interpretation of results. Thus, in this study, we evaluated the five common subjective methods for assessing the shoulder joint in rotator cuff pathologies and in surgical treatment of patients in terms of their design, validity, reliability, responsiveness and clinical application.

Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH)

In DASH, creation of the structure was complex. It was a collaborative project in which the members of the joint upper limb group looked at all possible points about symptoms and functional status of the upper limb. They pre-tested the questionnaire in 20 patients, but did not mention the baseline characteristics and pathologies of

these patients. The authors conducted a survey for a large number of patients in different parts of the world, including a sample of patients with different demographic factors and upper limb pathology.^[1]

The University of California, Los Angeles shoulder Rating Scale (UCLA)

Originally published in 1981 in the journal *Clinical Orthopedics and Related Research*, the UCLA Shoulder Score was originally intended to measure clinical outcomes after total shoulder arthroplasty. Since its inception, it has also been used to assess other shoulder conditions, including rotator cuff pathology and instability.

The UCLA Shoulder Score is a score obtained in collaboration with physician and patient. Its categories include "active forward flexion" (maximum 5 points and completed by the doctor), "force of forward flexion" (maximum 5 points and the doctor performed), "pain" (maximum 10 points and the patient completed), "satisfaction" (maximum 5 points and the patient is complete) and "function" (maximum 10 points and the patient is complete). Scores range from 0 to 35, where 0 indicates poorer shoulder function and 35 indicates best shoulder function.

The Constant–Murley Score (CMS)

The Constant-Merli Scale (CMS) was introduced in 1987. As a tool for assessing overall shoulder function, regardless of diagnosis.^[3]

It was approved and recommended by the Executive Committee of the European Society for Shoulder and Elbow Surgery and has been widely used as an assessment method since then.^[4]

The CMS scale assesses four aspects related to leverage. Pathology; two subjective: pain and daily activity (ADL) and two objective: range of motion (ROM) and strength. Subjective components can score up to 35 points and a target of 65, resulting in a possible maximum overall score of 100 points (best function). Pain and ADL responded by the patient; ROM and strength require physical assessment, and an orthopedic surgeon or physical therapist is in charge.^[5]

American Shoulder and Elbow Surgeons (ASES) Shoulder Score

Originally published in 1994 in the *Journal of Shoulder and Elbow Surgery*, the American Shoulder and Elbow Surgeons Shoulder Score (ASES) was developed to assess the condition of the shoulder, regardless of the pathology of the disease. ASES is a composite instrument requiring both a physician's assessment and a part completed by the patient; however, this is usually a purely patient survey. This includes a section on pain (7 points) and a section on daily activities (10 points). The scores range from 0 to 100, with 0 indicating the worst shoulder condition and 100 the best shoulder condition.^[6]

The Simple Shoulder Test (SST)

The Routine Shoulder Test (SST) was originally published in 1993 in the conference proceedings of the American Association of Orthopedic Surgeons (AAOS) Symposium Series. Shoulder; Balancing mobility and sustainability. SST measures shoulder function from the patient's perspective. These are 12 questions, all of which require simple yes / no answers. The simplicity of the conventional shoulder test is often cited as one of its strengths.^[7]

DASH is the most tested and most commonly used self-assessment tool for the shoulder joint and any other upper limb disease. This is especially useful for polyarticular diseases or when symptom and function measurements of the entire upper limb are required. Since the shoulder function determines the position of the elbow and hand, DASH is also useful for all elbow and hand conditions. Some of the DASH elements also ask questions about hand fine motor skills. The empirical data can be compared with the demographic norms of the United States. The QuickDASH overall score gives values very similar to the DASH values, and the overall scores are highly correlated with each other.^[8-9]

Time to complete is 4 minutes for DASH. All elements are easy to understand and not sensitive to emotions.^[10-11]

Test-retest reliability: intraclass correlation coefficient 0.93–0.98 for DASH.^[12-13] For imprinting syndrome, tendonitis with physiotherapy treatment: ES (volume of effect) 0.81, SRM (standardized response means) 0.72. For surgical treatment of the rotator cuff and total shoulder arthroplasty: ES 0.64, SRM 0.81. For adhesive capsulitis with steroid treatment: ES 0.34, SRM 0.43.^[14-16]

DASH is suitable for research purposes in a variety of upper limb diseases. The specificity and responsiveness in local conditions (affecting only 1 joint) are moderate.^[17]

UCLA - Based on the work of researchers Matthew T Provencher and colleagues, reporting the results of a study with a 22-question online questionnaire provided to members of the American Orthopedic Society of Sports Medicine, the North American Arthroscopy Association and the International Society of Arthroscopy, Knee Surgery and Orthopedic Sports Medicine through voluntary participation e-mail. Further, the following results were obtained. Of the 1,129 (29%) surveys received, 74% of practitioners in the United States, 10% in Europe, 8% in Mexico / South America, and 6% in Asia, respondents believe that the 3 most commonly used indicators of the shoulder joint is the rating of American shoulder surgeons. and elbow joints (ASES), the University of California Los Angeles (UCLA) score and the Constant score for surgical repair of the rotator cuff.^[18]

The UCLA shoulder assessment was first described in 1981, making it one of the earliest indicators of shoulder assessment.^[19]

Originally described for the evaluation of shoulder arthroplasty, it has since been used to evaluate almost all shoulder conditions.^[20] In the literature, there is research aimed at adapting the test to other languages. The UCLA Shoulder Assessment assesses five areas, including pain, function, forward flexion, strength forward flexion, and overall satisfaction. Ten possible scores were assigned to pain and function, with five possible scores for each of the other areas, resulting in a potential score of 35 (best score). The reasons for weighing the scale against these scores are not described. The assessment combines the patient's subjective experience with the results of the physical examination, which is probably not true.

Because the UCLA shoulder scale is item-specific, it was not possible to subject it to the same psychometric analysis in the 2000 Toni S Roddey study. The results obtained could neither confirm nor disprove its use by comparisons at the group or individual level. However, when all other factors were equal, multi-element scales gave much more reliable measurements than single-element scales. Therefore, it is doubtful that the UCLA shoulder scale is accurate enough to effectively track individual patient progress in a clinical setting.^[21]

The Constant–Murley Score (CMS)

The CMS has been accepted and widely used, but has not been properly tested.^[22]

Reliability was overall the second best measure of quality, with more frequent and adequate reproducibility reported than internal consistency. Cronbach's alphas were > 0.60, but 0.37 was also seen.

The Constant–Murley Score has been shown to be a reliable (ICC = 0.8–0.87) and sensitive (effect size = 0.59) tool for assessing the impact of shoulder interventions. This test has been shown to detect improvement after shoulder intervention in a variety of shoulder pathologies. This responsiveness or ability to assess changes over time was found to be adequate.^[23–24] Several studies have shown good reproducibility, responsiveness, and constructive validity of the estimates.^[23–25] The Constant – Murley score strongly correlates with the upper limb questionnaires.^[26]

The validity of the Constant – Murley test has been questioned for three reasons.

A single pain scale is considered insufficient to provide a true understanding of a patient's pain. The function report is presented to the patient for interpretation, as it is not specific enough for any particular activity. The method for measuring strength is not standardized.^[27]

The Constant – Murley Shoulder Assessment is not suitable for measuring outcomes in patients with

shoulder instability because it does not contain elements that are directly associated with instability.^[28]

The American Shoulder and Elbow Surgeons (ASES) Shoulder Score had acceptable retest reliability for the American Shoulder and Elbow General Shoulder Scale (intraclass correlation coefficient = 0.94) and ten out of eleven areas. Internal consistency was acceptable for patients with instability (Cronbach's alpha = 0.61), rotator cuff disease (0.64), and arthritis (0.62). Acceptable floor and ceiling effects were observed for patients with instability (0% and 1.3%, respectively), rotator cuff disease (0% for both), and arthritis (0% for both). Acceptable and relevant validity of the test was observed with significant correlations ($p < 0.05$) between the American General Scale of Shoulder and Elbow Joint Surgeons and physical functioning, role-related physical and bodily pain on the Short Form-12 scale, as well as insignificant correlations ($p > 0, 05$) with role-playing areas of emotional, mental health, vitality and social functions. There was acceptable construct validity, with all twenty-three hypotheses showing significance ($p < 0.05$) and acceptable response to change for patients with instability (standardized mean response, 0.93), rotator cuff disease, and arthritis. It is important to use performance assessment tools with well-studied psychometric characteristics. The American Shoulder and Elbow Subjective Shoulder Scale has shown generally acceptable psychometric characteristics for assessing outcomes in patients with shoulder instability, rotator cuff disease, and shoulder arthritis.^[29]

Overall, a study by Keith M. et al. D in 2021. There was an excellent correlation between ASES and SST for all patients undergoing rotator cuff arthroscopic repair and total shoulder arthroplasty. Because there is an excellent correlation between the two scores, it seems redundant and therefore unnecessary to include the two scores at the same time in tracking patient-defined outcomes. Since the ASES score is higher compared to SST, the authors recommend using ASES over SST in patients undergoing rotator cuff repair and total shoulder arthroplasty.^[30]

The Simple Shoulder Test (SST) The constructive validity of the SST was acceptable, with all 8 hypotheses demonstrating significance ($P < 0.05$). The SST responded to changes (effect size 0.81; standardized mean 0.81). However, after stratification, differences were found by age group and type of injury. SST demonstrated generally acceptable psychometric characteristics; however, differences were found when stratification of data by age and type of injury.^[31]

It was found that SST fills quickly, is valid compared to other shoulder scales, reliably and quickly responds after rotator cuff repair.^[32]

CONCLUSION

Most of the estimates do not appear to have been constructed in a systematic manner using the recommended methodology. There is a trend towards increased use of validated patient-based scoring, but many of the shoulder scoring systems used have not been adequately tested for validity, repeatability, and sensitivity to change. Scores are invalid when used in modified form, and unverified use of modified scoring systems should not be encouraged. One further area of research is comparing two or more rating scales to determine if they fall into the same category of shoulder function. In addition, it is necessary to formally confirm the cross-cultural adaptation of different rating systems.

In conclusion, although many scoring systems have been used to evaluate patients with rotator cuff abnormalities, we are still far from a single outcome scoring system that is reliable, valid, and sensitive to clinically significant changes that takes into account the point of view of both patients and clinicians, short and practical to use.

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