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SECTION II
ORIGINAL ARTICLES

Shoulder Scoring Scales for the Evaluation of Rotator Cuff Repair

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Various assessment tools have been proposed for evaluation of shoulder function. Analyses of comparability, validity, and reliability among shoulder assessment tools are lacking. The purpose of our investigation was to compare the results of three commonly used shoulder assessment tools in the evaluation of a specific shoulder condition. Seventy-two full-thickness rotator cuff tears were treated with an open rotator cuff repair from 1986–1993. The average age of the patients at surgery was 58 years (range, 24–92 years). The median duration of followup at the time of evaluation for this study was 55 months (range, 24–102 months; standard deviation, 22 months). Correlation among the results of the UCLA, Constant-Murley, and the Simple Shoulder Test scales was fair (range, 0.66–0.76). More importantly, the three systems were evaluated for their ability to accurately predict improved motion, strength, and patient satisfaction. The Simple Shoulder Test and the Constant-Murley scales showed the highest positive predictive values. The Simple Shoulder Test is a patient-based self-assessment device that easily can be incorporated into a busy clinical practice, providing outcome data comparable with complex evaluation systems when evaluating the results of rotator cuff repair.

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Assessment of shoulder function is crucial to effective outcomes research for shoulder conditions. Various methods or tools have been proposed for functional assessment of the shoulder.[1,2,4,6,7,17,19,20,22,25] Many of the tools are designed as scoring scales, attempting to represent multiparametric shoulder function in terms of an overall score.[1,4,6,20,25,27] Other assessment tools focus on standardizing data collection without development of a scoring scale.[2,10] Most systems have not been subjected to analysis for validity, reliability, and comparability, and therefore the selection of a shoulder function assessment tool is nonscientific. The use of multiple instruments impairs comparative analysis among investigators, an important method of advanced clinical research.

The purpose of our investigation was to compare the results of three shoulder function assessment tools when evaluating patients with a well-defined shoulder condition. This patient population was evaluated using the UCLA shoulder scoring scale,[1,6] the Constant-Murley shoulder scoring scale,[4] and the Simple Shoulder Test.[17] All patients had an open rotator cuff repair done by one surgeon (BRB) at least 2 years before inclusion in this study. The three shoulder instruments have been used for assessment of rotator cuff conditions. However, the ability to compare results for different scoring scales is unknown.

MATERIALS AND METHODS

Open rotator cuff surgery was done on 109 patients between August 1986 and March 1993. Revision rotator cuff repairs, rotator cuff tears associated with humeral head fracture or shoulder arthroplasty, and rotator cuff tears in patients with rheuma-

toid arthritis were excluded. Ninety-three patients (93 shoulders) satisfied our inclusion criteria, which included a followup of at least 24 months. Four patients were deceased, one patient was unable to return because of medical illness (cardiovascular accident), and two patients declined to return for evaluation because of personal reasons. Three patients were unable to return for clinical evaluation because of geographic constraints. Eleven patients could not be located. The remaining 72 patients were evaluated independently by one examiner (DWH), and independent of the surgeon who did the rotator cuff repairs (BRB). The subjective (patient-based) and objective (examiner-based) information obtained from these 72 patients provided the data for this investigation.

The study group included 44 men and 28 women whose average age was 58 years (range, 24–92 years; standard deviation, 11 years). The dominant arm was affected in 58 patients (79%). Preoperative confirmation of a full-thickness rotator cuff tear was made by double contrast arthrography in more than 90% of the patients, whereas the remaining patients had an abnormal magnetic resonance imaging (MRI) scan showing a full-thickness tear. The average interval from the onset of shoulder pain to surgical treatment was 22 months (range, 3 weeks–244 months; standard deviation, 38 months). The average postoperative followup at the time of our investigation was 54 months (range, 23–102 months; standard deviation, 22 months).

An extensive patient-administered questionnaire was completed without assistance by the 72 patients who comprised the study group. The questionnaire included the self-assessment contents of UCLA shoulder scoring scale,[1] the Constant-Murley shoulder scoring scale,[4] and the Simple Shoulder Test.[17,19] All three instruments include questions regarding pain, motion, and function (Table 1). The Constant-Murley and Simple Shoulder Test also include questions regarding the evaluation of strength. The Neer shoulder assessment scale was used to additionally assess patient satisfaction.[23] Although the scale is divided into four categories (excellent, satisfactory, unsatisfactory, limited goals), results were separated into two categories, satisfactory and unsatisfactory.

The UCLA scale was described initially as a method to assess the outcome of shoulder arthroplasty.[1] However, the UCLA shoulder scoring scale has been used to describe the outcome of intervention for many shoulder conditions, including rotator cuff tears.[7] The UCLA scale has been modified to include an additional five points for patient satisfaction.[5] Parameters include: pain (10 points), motion (10 points), function (10 points), and patient satisfaction (five points). Subjective criteria are responsible for 15 points of a total of 35 points, and examination findings are responsible for the remaining 20 points. The UCLA score was converted to a 100-point scale for comparison with the other shoulder assessment systems.

The Constant-Murley shoulder scoring system may be the most commonly used international shoulder scoring scale.[4] This system is attractive because it has been the subject of extensive psychometric validation.[11] The Constant-Murley scale is based on a 100-point scale. Subjective characteristics are responsible for 35 points. An absence of pain is worth 15 points, whereas functional characteristics such as the ability to work can be awarded as many as 25 points. Objective measurements are awarded a maximum of 65 points, with 40 points possible for range of motion (ROM) and 25 points possible for strength.

When the scoring scale was proposed, strength was measured by a spring balance mounted around the wrist of the patient.[4] Other published methods have included the use of weights held in 90° abduction with the arm in the plane of the scapula.[11] One point is awarded for each pound, with a maximum of 25 points. An exact method to measure strength has not been described, including position of the hand, elbow, and shoulder, and attachment of a weight or resistance device, all of which may affect the consistency and validity of strength testing. For our investigation, we asked patients to lift a handheld weight to 90° abduction with the arm held in the plane of the scapula. The examiner observed and assisted the patients in maintaining an approximate plane of the scapula. One point was awarded for each pound lifted. Patients could start at any weight level, and increase or decrease the amount of weight until they achieved the maximum weight they could lift within the lifting parameters. To correct for variations in strength related to the patient's physique, the opposite, nonaffected shoulder initially was tested, and an abduction strength ratio was calculated.

The Simple Shoulder Test is proposed as a practical, patient-based, shoulder function assessment tool.[17] It is comprised of 12 questions that allow the patient to answer yes or no (Table 2). The questions were derived from the most frequent complaints of patients presenting to a referral shoulder practice. Unanswered questions are accepted as a no answer. No attempt is made by the physician to assist the patient in answering questions because this test is focused on the patient's personal assessment of his or her shoulder function, which may be the most important viewpoint for determination of effective medical and surgical intervention.[8,9] The Simple Shoulder Test has been studied in healthy populations and in patients with osteoarthritis.[18] Factors such as age and gender also have been evaluated. Initial testing showed that patients with no prior or current history of shoulder problems between the ages of 60 and 70 years, appropriate for our study population, were able to physically accomplish the questioned tasks and answered yes to greater than 95% of all questions.[17]

To compare results of the UCLA, Constant-Murley, and Simple Shoulder Test, we converted the Simple Shoulder Test responses to a scoring scale. The 12 questions were weighted equally on a 100-point percentage scale, with 100 points representing the best result or 12 positive answers. Seventeen points (two questions) are related to the effect that pain has on the patient's shoulder function. The functional ROM achieved by the shoulder can be awarded a maximum of 33 points (four questions). Strength characteristics account for 25 points (three questions), and complex functional activities for the shoulder account for the final 25 points (three questions). Converting the Simple Shoulder Test to a scoring scale reveals a remarkable similarity to the characteristics of the Contant-Murley scoring scale, with slightly less similarity to the UCLA scoring scale (Table 1).

All patients were examined independently at followup by one examiner (DWH). Range of motion (forward flexion, abduction, external rotation, internal rotation) measurements were obtained

TABLE 1. Comparison of Scoring Scales

Parameter Measured	UCLA Scale	Constant-Murley Scale	Simple Shoulder Test
Pain	28.5/100 points 10—no pain 8—occasional and slight 5—with heavy activity/above shoulder activities frequent 4—none/little at rest; + light act; above shoulder activities frequent 2—constant, bearable; ± strong medium 1—constant, unbearable; + strong medium	15/100 points 15—no pain 10—minimal pain 5—moderate pain 0—severe pain	17/100 points Pain at rest Pain during sleep
Motion	28.5/100 points 10—normal muscle power/near normal motion 8—good or normal; forward elevation 140°; external rotation 20° 5—fair to good; forward elevation 140°; external rotation 90° 4—poor to fair; forward elevation <60°; internal rotation <45° 2—ankylosis, good position 1—ankylosis, with deformity	40/100 points Active range of flexion, no pain 0 to 10 points Active range of abduction, no pain 0 to 10 points Flexion and abduction: 150° 10 points 150–121° 8 points 120–91° 6 points 90–61° 4 points 60–31° 2 points Combined active external rotation Hand behind head, elbow forward Hand behind head, elbow back Hand on top of head, elbow forward 0 to 10 points 2 points Hand on top of head, elbow back 2 points Full elevation from top of head 2 points Combined active internal rotation 0 to 10 points Hand to interscapular region 10 points Hand to T12 8 points Hand to dorsum of wrist 6 points Hand to lumbosacral junction 4 points Dorsum of hand to buttocks 2 points Hand to lateral thigh 0 points	33/100 points Reach small of back to tuck in shirt Place hand behind head, elbow out to side Place coin on shelf, level of shoulder, elbow straight Wash back of opposite shoulder
Strength	0 points	25/100 points Strength of abduction in the scapular plane 1 patient per pound	25/100 points Lift 1 lb to level of shoulder, elbow straight Lift 8 lb to level of shoulder, elbow straight Carry 20 lb at side
Stability	0 points	0 points	0 points
Function	28.5/100 points 10—normal activities 8—slight restriction; able to work above shoulder 5—most housework; wash hair; bra, shop, driving 4—light housework; most activities of daily living 2—very light activities only 1—unable to use arm	20/100 points Ability to work—0 to 4 points Recreational activities—0 to 4 points Ability to sleep—0 to 4 points Ability to work at the level: Of the wait 2 points Of the xiphoid 4 points Of the neck 6 points Of the head 8 points Above the head 10 points	25/100 points Toss a softball underhand 10 yards Toss a softball overhand 20 yards Work full time at regular job
Patient satisfaction	14.5/100 points		

TABLE 2. Simple Shoulder Test

Questions from the Simple Shoulder Test	Percentage of Patients Answering Yes
1) Is your shoulder comfortable with your arm at rest by your side?	97%
2) Does your shoulder allow you to sleep comfortably?	86%
3) Can you reach the small of your back to tuck in your shirt with your hand?	94%
4) Can you place your hand behind your head with the elbow straight out to the side?	90%
5) Can you place a coin on a shelf at the level of your shoulder without bending your elbow?	93%
6) Can you lift 1 lb (a full pint container) to the level of your shoulder without bending your elbow?	90%
7) Can you lift 8 lb (a full gallon container) to the level of your shoulder without bending your elbow?	68%
8) Can you carry 20 lb at your side with the affected extremity?	85%
9) Do you think you can toss a softball underhand 20 yards with the affected extremity?	74%
10) Do you think you can toss a softball overhand 20 yards with the affected extremity?	90%
11) Can you wash the back of your opposite shoulder with the affected extremity?	89%
12) Would your shoulder allow you to work full time at your regular job?	89%

with a goniometer with the patient in the supine and standing positions. The abduction strength was measured in the scapular plane with the arm abducted 90º, the elbow extended, while holding onto a weight. Both shoulders were tested. Internal rotation strength and external rotation strength were measured with the elbow at the side of the body and graded according to the British Medical Research Commission scale.[28] The characteristics of the examination were used to complete the objective measurements required for the UCLA and Constant-Murley scoring scales.

SPSS for Windows (Version 7) (SPSS Inc, Chicago, IL) was used for data management and statistical analysis. The raw scores obtained from subjective and objective measurements were converted to a 100-point scale, where 100 points equaled the best possible result. Statistical analysis was done after data conversion. The results of the three scales were compared and then additionally evaluated for their relationship to other parameters essential for outcome assessment of rotator cuff treatment, including shoulder motion, strength, and patient satisfaction. Shoulder motion was represented by the examiner-measured maximal active forward elevation. Shoulder strength was defined as the abduction ratio. The numerator was the amount of weight abducted by the operative side (maximum, 25 lb), and the denominator was the amount of weight abducted by the nonoperative shoulder (maximum, 25 lb). The ratios ranged from 0–1.25. Patient satisfaction (with patients rated simply as satisfied or unsatisfied) was determined using the Neer scale.[23]

Because the shoulder assessment tool scores, the maximal active forward elevation, and the abduction ratio had distributions that statistically were not normal, nonparametric methods were used to analyze the data. Spearman correlation coefficients and scatterplots were obtained to investigate association between the shoulder assessment tool scores and between each of these scores and the maximal active forward elevation and abduction ratio. The Friedman test and the paired-samples sign test were used to compare the three shoulder assessment tool scores to determine whether any of the tools tended to produce higher or lower scores than any of the other tools. To investigate whether any of the tools was more accurate for predicting patient satisfaction, bivariate logistic regression was done with each shoulder assessment tool as the only independent variable for predicting patient satisfaction.

A 0.05 significance level was used for all statistical tests. No one-sided statistical tests were done. Use of a smaller significance level would have reduced the statistical power of the study, thereby decreasing the chance of finding differences between the shoulder assessment tool scores. However, because exact p values are reported, the results still can be evaluated against a smaller significance level.

RESULTS

Seventy-two patients completed the questionnaire and examination. The results based on the three shoulder assessment tools used in this investigation were similar but not equivalent.

The UCLA scoring scale average raw score was 32 (range, 7–35; standard deviation, 5). Conversion to a 100-point scale resulted in an average score of 91 (standard deviation, 15). The Constant-Murley scoring scale is based on a 100-point scale and there was a raw score of 78 (standard deviation, 15). Age and gender normalization were not used to adjust any of the scoring scales. Results from the Simple Shoulder Test showed an average of 10 of 12 questions answered positively (range, 0 – 12; standard deviation, 3). The responses then were converted to a 100-point scale, which had an average score of 87 (standard deviation, 22).

Overall, the Spearman correlations between the three systems were fair (range, 0.66–0.76). The highest Spearman correlation coefficient for two scales was obtained for the UCLA scale and the Simple Shoulder Test (Table 3).

These results indicate that the Constant-Murley score tends to be lower than the Simple Shoulder Test and UCLA scores. When compared with the UCLA scores, the Constant-Murley scores were lower (often substantially) for all but two patients (Fig 1). When compared with the

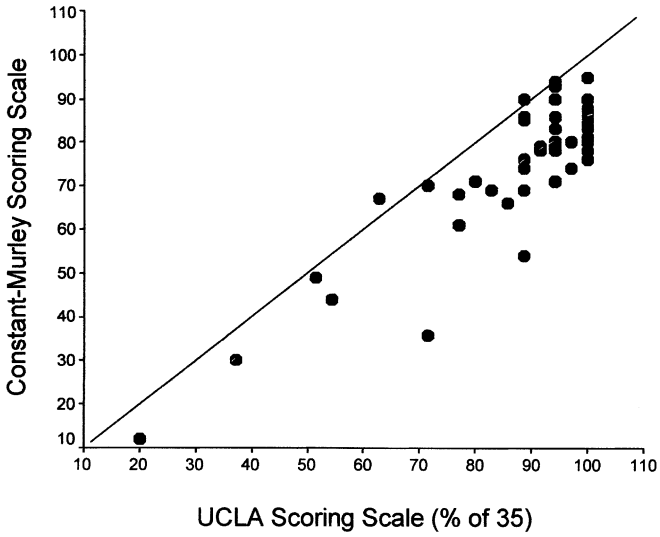

Fig 1. The results of the Constant-Murley and UCLA scoring scales in the same patient are shown. The UCLA scores were higher for all but two patients.

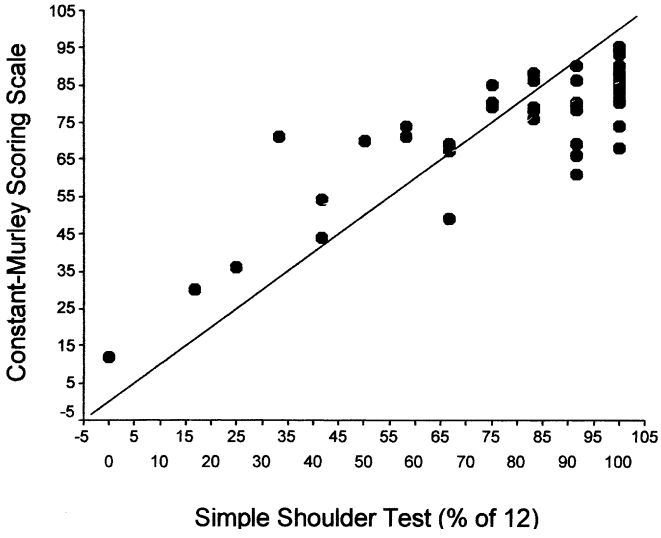

Fig 2. The results of the Constant-Murley scoring scale and the Simple Shoulder Test in the same patient are shown. Constant-Murley scores tended to be higher when both scores were less than 55, but Constant-Murley scores were lower with higher values.

Simple Shoulder Test scores, the Constant-Murley scores were all higher when the Simple Shoulder Test score was low to moderate ($\leq \rho 55$), but tended to be lower when the Simple Shoulder Test scores were high (> 80) (Fig 2).

The three scoring systems then were compared using the Friedman test to determine whether any assessment tool tended to have higher or lower scores than another tool. Because this test was highly statistically significant ($p < 0.000001$), paired-samples sign tests were used to compare the scoring systems two at a time. The Simple Shoulder Test score was higher than the Constant-Murley score for 56 patients, and lower for 16 patients ($p < 0.00005$). The UCLA score was higher than the Constant-Murley score for 70 patients, and lower for only two patients ($p < 0.0005$). There was no statistically significant difference between the Simple Shoulder Test scores and the UCLA scores ($p = 0.54$), with the Simple Shoulder Test score higher than the UCLA score for 19 patients, lower for 24 patients, and the same for 29 patients.

The discrepancies among these scoring systems led to the question of which system is most accurate. We attempted to assess this by examining the relationships among the three scoring systems and two objective measures (maximal active forward elevation and abduction ratio) and one subjective measure, patient satisfaction determined by the Neer scale (with patients rated simply as satisfied or unsatisfied). Table 3 shows that none of the three assessment systems is substantially correlated with forward elevation or the abduction ratio, although all of the correlations are statistically significant. The Constant-Murley scale has the highest correlation with forward elevation (rho = 0.45), and the Simple Shoulder Test scale has the highest correlation with the abduction ration (rho = 0.55).

TABLE 3. Spearman Correlations for Three Shoulder Assessment Tools and Other Measurements*

Parameter Measured	Assessment Tool		
	Simple Shoulder Test	*Constant-Murley Scale*	*UCLA Scale*
Constant-Murley scale	0.70	—	—
UCLA scale	0.76	0.66	—
Forward motion	0.40	0.45	0.37
Abduction ratio	0.55	0.52	0.48

*All p values $\leq$ 0.001

Logistic regression was done to compare the accuracy of the three scoring systems for predicting whether patients are satisfied. Fifty-five patients (76%) were satisfied according to the Neer scale. Each of the three scoring systems was statistically significant ($p < 0.00005$) when used as the only independent variable in a logistic regression equation. Table 4 summarizes the accuracy of the three scoring systems for predicting whether patients are satisfied. For example, the Simple Shoulder Test correctly classified 98% of the satisfied patients as satisfied, and correctly classified 65% of the unsatisfied patients as unsatisfied. When the Simple Shoulder Test predicted that a patient was satisfied, the prediction was correct 90% of the time. When this scale predicted that a patient was unsatisfied, the prediction was correct 92% of the time. The Constant-Murley scale was the most accurate for correctly classifying unsatisfied patients as unsatisfied (76%). No other substantial differences among the three scoring systems with respect to their accuracy for predicting patient satisfaction were evident.

DISCUSSION

Evaluation of effective treatment for specific shoulder conditions requires numerous factors, including a precise definition of the study group, prospective characterization of functional deficits, longitudinal followup, and thorough data analysis.[16] Although data provide the most accurate assessment of the study results, an improved understanding of the overall functional status of the shoulder and the ability to compare previous investigations may be achieved with shoulder assessment systems. Various tools have been proposed for evaluation of shoulder conditions with some proposing scoring scales, whereas others use data acquisition forms.[1,2,4,6,7,11,17,19,20,23,25] A shoulder assessment tool may be developed for a specific shoulder condition, but it often is used to assess other conditions related only by anatomic location.[1,6,7] Because analysis of testing validity and comparability is lacking, selection of an outcome assessment tool is based on nonscientific parameters. The inability to accurately compare the results of various investigations inhibits the determination of effective treatment. Although disorders of the rotator cuff are the most common shoulder problem, there is a substantial variation in treatment.[14,15]

The purpose of our investigation was to compare the results of three commonly used shoulder assessment tools when used to evaluate surgical treatment of rotator cuff tears. All patients had preoperative clinical and radiographic confirmation of a full-thickness rotator cuff tear. Intraoperative findings supported the diagnosis. One surgeon did all the surgeries using a consistent technique. An independent examination and an extensive patient-administered questionnaire were completed at an average of 54 months after the surgical intervention.

To improve our ability to compare the three shoulder assessment systems, all systems were evaluated on a 100-point scale after calculation of the raw scores. The Simple Shoulder Test was proposed by its authors as a practical shoulder function assessment form, not a scoring scale.[17] However, analysis of its component questions reveals similarities to the other two scoring scales, in content and in the weighted value of the various questions (Table 1). Therefore, the 12 questions of the Simple Shoulder Test were evenly weighted on a scale of 100 points for comparative analysis.

Shoulder scoring systems attempt to simplify multiparametric data. Most commonly, the final score is proposed as a reflection of overall shoulder function. A higher score implies better shoulder function. An ideal scoring system would be practical, simple, easily incorporated into clinical practice, and lend itself to uncomplicated data analysis so that all physicians interested in evaluating the outcome of treatment for their patients' shoulder conditions could participate in the outcome research. To propose only multicenter, complex, expensive outcome studies as methods of evaluating disease treatment fails to recognize that the majority of patients with these conditions are treated by physicians outside academic centers.[16] Results from medical centers are likely to be biased toward treatment of the most severe rotator cuff conditions. Finally, the scoring scale should be related to other outcome measurements of shoulder function, such as motion, strength, and patient satisfaction.

The UCLA system initially was described as an assessment tool for shoulder arthroplasty.[1] Its reproducibility has

TABLE 4. Accuracy of Three Shoulder Assessment Tools for Predicting Patient Satisfaction (Neer)

Tool	% Satisfied Patients Correctly Classified as Satisfied	% Unsatisfied Patients Correctly Classified as Satisfied	% Patients Classified as Satisfied Actually Satisfied	% Patients Classified as Unsatisfied Actually Unsatisfied
Simple Shoulder Test	98	65	90	92
Constant-Murley scale	96	76	93	87
UCLA scale	98	59	89	91

not been tested, and its authors have not proposed adjustments for age or gender. The scale is comprised of four areas: pain, motion, function, and patient satisfaction.[5,7] We found that the UCLA score was greater than the Constant-Murley score for all but two patients. Previous investigations showed improved comfort and shoulder motion after an acromioplasty and repair of the rotator cuff tear.[6,12,13,15,21] With relief of pain, many patients are satisfied with treatment of their rotator cuff tear. More than 50% of the UCLA scale is based on pain relief, passive motion, and patient satisfaction because it was designed for patients who had shoulder arthroplasty. When used for other diagnoses, such as shoulder instability, the UCLA score also shows more favorable results when compared with other scales.[3] Although the scale is relatively easy to complete, it requires objective measurements that may affect interobserver reliability. Furthermore, subjective satisfaction questions cannot be used for preoperative evaluation, inhibiting longitudinal followup from the preintervention stage through all phases of treatment.

The Constant-Murley rating system is composed of subjective (35%) and objective (65%) parameters.[4] Its reproducibility has been tested and normative values for age and gender are available. The scale is comprised of four areas: pain, motion, strength, and function. The scale frequently has been criticized because of a lack of consensus on a reproducible measurement of strength.[11] In our investigation, the measurement of strength was done using free weights held in the patient's hand.[11] Comparing abduction strength with the nonaffected shoulder may be a better assessment method for strength measurement rather than an isolated single maximum lift. The high percentage of objective data for the Constant-Murley scale increases the possibility of significant interobserver variability, which again is complicated by the strength measurements. The lack of consensus on the correct acquisition of data for this scoring scale inhibits its use for comparing study results. In our investigation, the Constant-Murley scoring scale showed the lowest average score of 78 points, which is a good to excellent overall result for an age-matched population.

The Simple Shoulder Test is a practical tool for assessment of shoulder function.[17,19] The 12 questions that form the Simple Shoulder Test can be separated into four categories (pain, motion, strength, and function) with characteristics similar to those of the other more complex scales. On a 100-point scale with the questions weighted equally, the weights of the various categories are similar to those of the other scales. The Simple Shoulder Test questions are answered easily by the patient without assistance. The test allows for a prospective description of the patient's shoulder function before intervention. The test can be completed by the patient without additional examinations or personal followup, the primary source of lost longitudinal data from outcome investigations. The Simple Shoulder Test has been evaluated in populations without complaints of a shoulder disorder and in patients with various well-defined shoulder disorders.[17–19] This patient-based self-assessment encourages multicenter use and comparative analysis.[8,9] These characteristics of the Simple Shoulder Test satisfy the American Shoulder and Elbow Surgeons recommended attributes for a shoulder function assessment form: (1) ease of use; (2) method of assessing activities of daily living; and (3) inclusion of patient self-evaluation.[25]

The primary criticism of the Simple Shoulder Test has been that it is too simple, with limited ability to advance understanding and treatment of various shoulder conditions. However, the Simple Shoulder Test and the scoring scale modification of this test allows for multiparametic description of shoulder function into terminology that can be understood by physicians, patients, administrators, and other individuals who make decisions regarding the efficacy of treatment of shoulder conditions.

The Simple Shoulder Test was compared with four other shoulder function questionnaires.[3] Correlation coefficients among the scales suggested good convergent validity, ranging from 0.74 to 0.80 for the Shoulder Pain and Disability Index,[26] the modified American Shoulder and Elbow Surgeons form,[25] and the Shoulder Severity Index.[24] All of these questionnaires are proposed patient-based assessment tools. The population evaluated varied substantially regarding presenting shoulder diagnosis. The only objective, examiner-based datum was ROM. Correlations between active elevation of the shoulder and the questionnaires were low. Strength correlations were not assessed. In our analysis, the three scales showed low correlations with objective measurements of motion and strength. However, all three scales had good relationships with patient satisfaction.

The ability to determine the outcome of intervention for various shoulder conditions is crucial to advancing patient care. A critical component of outcome studies related to shoulder conditions is the use of assessment tools that will characterize the function of the shoulder and allow longitudinal followup investigations. These tools are not intended to replace the raw data from these investigations, but rather to provide a simplified description of multiparametric shoulder function. When the assessment tools were converted to 100-point scales, fair correlation among the UCLA, Constant-Murley, and Simple Shoulder Test scales was seen. In addition, these scales are related to patient satisfaction. Additional investigations may determine whether these systems can be used for assessment of other shoulder disorders. Because none of the three systems is superior for describing shoulder function after ro-

tator cuff repair, the simplest and most practical assessment tool should be used. The data for completion of the Simple Shoulder Test are easily acquired and converted to a scoring scale, facilitating outcome assessment in any clinician's office, and in larger, multicenter outcome studies.

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