

Measures of Adult Shoulder Function

The American Shoulder and Elbow Surgeons Standardized Shoulder Form Patient Self-Report Section (ASES), Disabilities of the Arm, Shoulder, and Hand (DASH), Shoulder Disability Questionnaire, Shoulder Pain and Disability Index (SPADI), and Simple Shoulder Test

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AMERICAN SHOULDER AND ELBOW SURGEONS (ASES) STANDARDIZED SHOULDER FORM: PATIENT SELF-REPORT SECTION

General Description

Purpose. Assessment of patient-rated shoulder pain and function/disability (1).

Content. Pain (1 item) visual analog scale (VAS); function/disability (10 items) 4-point Likert scale of level of difficulty.

Developer/contact information. Research committee of the American Shoulder and Elbow Surgeons Society (ASES). Robin Richards, MD; American Shoulder and Elbow Surgeons, 6300 North River Road, Suite 727, Rosemont, IL 60018-4226.

Versions. English only.

Number of items in scale. 1 pain item and 10 function/disability items, for a total of 11 items.

Subscales. There are 2 subscales: pain (1 item) and function/disability (10 items).

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Populations. *Developmental/target.* Not validated in original article; developed for patients with musculoskeletal shoulder pathologies.

Other uses. Validated in patients with shoulder dysfunctions (n = 63) undergoing physical therapy treatment with diagnoses of impingement syndrome, status-post shoulder surgery, glenohumeral instability/dislocation, rotator cuff syndrome, adhesive capsulitis, hemiarthroplasty, shoulder weakness, humeral fracture. Used, but not validated, in variety of studies which documented outcomes in patients with one or more of the diagnoses stated above.

WHO ICF Components. Impairment, activity limitation, participation restriction.

Administration

Method. Questionnaire.

Training. None.

Time to administer/complete. 4 minutes.

Equipment needed. Only the instrument itself.

Cost/availability. Available through Richards RR, An KN, Bigliani LU, Friedman RJ, Gartsman GM, Gristina AG, et al. A standardized method for the assessment of shoulder function. *J Shoulder Elbow Surg* 1994;347–52 (1). Cost: free. Copy available at the Arthritis Care & Research website at <http://www.interscience.wiley.com/jpages/0004-3591:1/suppmat/index.html>.

Scoring

Responses. *Scale.* Pain: 10 cm VAS; function/disability: 10 items, each rated on 4-point Likert scale for level of difficulty.

Score range. Pain subscale 0–50 ASES points, function/disability subscale 0–50 ASES points. Total score 0–100 ASES points, 0 = worse pain and functional loss/disability.

Interpretation of scores. Lower score means greater pain and disability.

Method of scoring. Pain subscale = (10-pain raw score) \times 5; function/disability subscale = 10 item total \times 5 divided by 3. Total score = pain subscale (50% of total score) + function divided by disability subscale (50% of total score).

Time to score. 2 minutes.

Training to score. None.

Training to interpret. None.

Norms available. None.

Psychometric Information

Reliability. *Internal consistency.* Cronbach's alpha = 0.86.

Test-retest. Intrarater correlation coefficient (ICC) (one-way random effects) 0.84; CI lower limit 0.75.

Validity. *Content.* Face validity demonstrated.

Construct-convergent. Demonstrated with significant correlations with other similar measures, those measuring the same construct of functional loss/disability. Those measures were the Short Form-36 (SF-36) physical function score, the SF-36 role physical score, the SF-36 physical component summary score, and the Penn Shoulder Score (another condition-specific measure for the shoulder).

Construct-divergent. Demonstrated with non-significant correlations with dissimilar measures, those *not* measuring the construct of functional loss/disability. Those measures were the SF-36 mental health score, the SF-36 role emotional score, and the SF-36 mental component summary score.

Known groups validity. The ASES demonstrated 1) the ability to discriminate between patient groups that stated they had “gotten slightly better” versus “gotten somewhat better” after 3–4 weeks of rehabilitation, and 2) the ability to discriminate between patients who were minimally, moderately, and severely functionally limited as indicated by

the external criterion of the therapists' global rating of shoulder function.

Sensitivity/responsiveness to change. Minimally Clinically Important Difference (MCID): Scores on the ASES reflected change in the external criterion measure of the patients' rating of “better,” “worse,” or the “same” as compared with 3–4 weeks prior at baseline. A receiver operating characteristics (ROC) curve was constructed to determine the amount of change that differentiates those patients who have improved from those who have remained stable or deteriorated. MCID 6.4 ASES points; sensitivity 91% and specificity 75%.

The ASES demonstrated the ability to measure change when it has occurred with an effect size of 1.4, and standardized response mean of 1.5.

Comments and Critique

Limited evidence for use in patients with rheumatologic shoulder conditions.

Reference

1. (Original) Richards RR, An KN, Bigliani LU, Friedman RJ, Gartsman GM, Gristina AG, et al. A standardized method for the assessment of shoulder function. *J Shoulder Elbow Surg* 1994;(November/December): 347–52.

Additional Reference

Michener LA, McClure PW, Sennett BJ. American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form, patient self-report section: reliability, validity, and responsiveness. *J Shoulder Elbow Surg* 2002;11:587–94.

DISABILITIES OF THE ARM, SHOULDER, AND HAND (DASH)

General Description

Purpose. Assess functional disability related to the upper extremity.

Content. There are 30 total questions, 5 related to symptoms, 25 related to functional tasks. Two optional additional modules are work (4 items) and sports (4 items).

Developer/contact information. DASH Outcome Measure is the shared property of the Institute for Work and Health and the American Academy of Orthopedic Surgeons. Scale and information available at: <http://www.dash.iwh.on.ca/>.

Versions. English, French, German, Hebrew, Swedish, and Turkish.

Number of items in scale. 30.

Subscales. Disability/symptoms, 30 questions; Optional sports/performing arts module (4 items) and optional work module (4 items).

Populations. *Developmental/target.* Adults with upper extremity problems both surgical and non-surgical. Intended for use with hand, wrist, elbow and shoulder disorders.

Other uses. Demonstrated reliability and validity in patients with a broad range of shoulder disorders as well as in patients with elbow, wrist, and hand disorders.

WHO ICF Components. Body function, Impairment, Activity limitation, Participation restriction, Environmental factor.

Administration

Method. Self-administered questionnaire.

Training. None.

Time to administer/ complete. 6–10 minutes.

Equipment needed. None.

Cost/availability. None, public domain, web site: <http://www.dash.iwh.on.ca/>.

Scoring

Responses. *Scale.* There are 30 questions on a 5-point ordinal scale (1–5), transformed to percentage.

Score range. Range is 0–100%.

Interpretation of scores. Higher score means greater disability.

Method of scoring. Simple addition then transformation by $[(\text{sum of } n \text{ responses}/n) - 1] \times 25$. Note: must complete at least 27/30 items. Optional modules: $[(\text{sum of } 4 \text{ responses}/4) - 1] \times 25$. Note: must complete all 4 items.

Time to score. 3–5 minutes.

Training to score. Minimal.

Training to interpret. Minimal.

Norms available. Yes, (see reference 2).

Psychometric Information

Reliability. *Test-retest.* ICC 0.92–0.96; Pearson's = 0.96.

Error estimate. SEM = 4.6–7.6 DASH points, Minimal detectable change (90% confidence interval 10.7–12.8 DASH points).

Internal consistency. Cronbach's alpha = 0.95, 0.96. Developed from patients tested 3–5 days apart before treatment who believed their problem had not changed.

Validity. *Content.* Content developed by expert consensus groups.

Construct/convergent. Demonstrated with significant correlations with other similar measures, those measuring the same construct of functional loss/disability. Those measures were the Canadian Occupational Performance Measure, the SPADI (Shoulder Pain and Disability Index), The Western Ontario Shoulder Instability Index (WOSI), the Brigham (carpal tunnel) questionnaire, Medical Outcomes Study SF-36 physical function subscale, the SF-12 physical scale, and self-rated global health. The DASH score was moderately correlated to an upper extremity manual-tracking task in subjects with symptomatic cumulative trauma disorders.

Discriminant. DASH scores discriminated between patients who were working and those who were not, as well as those stating they were able to do all they wanted versus those who were not able to do so. The DASH has also shown the ability to discriminate among conditions known to differ in severity.

Sensitivity/responsiveness to change. Standardized Response Mean (SRM) = 0.70–1.13; (mean change/SD of change scores). The responsiveness of the DASH (to self-rated change) was slightly better than the SPADI and the Brigham (carpal tunnel) questionnaire. Responsiveness was similar in patients with shoulder disorders compared to those with wrist disorders. The majority of data available are from patients with wrist and hand disorders that have also shown good responsiveness.

Comments and Critique

The reliability and validity studies have used patients with a broad spectrum of upper extremity disorders, no studies were found that were specific to shoulder disorders. Reliability has been

demonstrated for Swedish, Spanish, and Dutch translations.

The DASH is a comprehensive upper extremity disability scale and therefore may be preferable to other shoulder-specific scales in patients with multiple regions involved or if measurement of total upper-extremity function is the desired goal.

References

1. (Original) Hudak P, Amadio PC, Bombardier C, and the Upper Extremity Collaborative Group. Development of an upper extremity outcome measure: The DASH (Disabilities of the Arm, Shoulder, and Hand). *Am J Ind Med* 1996;29:602–8.
2. Hunsaker FG, Cioffi DA, Amadio PC, Wright JG, Caughlin B. The American Academy of Orthopedic Surgeons Outcomes Instruments: normative values from the general population. *J Bone Joint Surg Am* 2002;84:208–15.

Additional References

- Atroshi I, Gummesson C, Andersson B, Dahlgren E, Johansson A. The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire: reliability and validity of the Swedish version evaluated in 176 patients. *Acta Orthop Scand* 2000; 71:613–8.
- Beaton DE, Davis AM, Hudak P, McConnell S. The DASH (Disabilities of the Arm, Shoulder and Hand) outcome measure: what do we know about it now? *Br J Hand Ther* 2001;6:109–18
- Beaton DE, Katz JN, Fossel AH, Wright JG, Tarasuk V, Bombardier C. Measuring the whole or the parts? Validity, reliability and responsiveness of the Disabilities of the Arm, Shoulder, and Hand outcome measure in different regions of the upper extremity. *J Hand Ther* 2001;14:128–46.
- Griggs SM, Ahn A, Green A. Idiopathic adhesive capsulitis: a prospective functional outcome study of nonoperative treatment. *J Bone Joint Surg Am* 2000;82:1398–407.
- Kirkley A, Griffin S, McLintock H, Ng L. The development and evaluation of a disease-specific quality of life measurement tool for shoulder instability: The Western Ontario Shoulder Instability Index (WOSI). *Am J Sports Med* 1998;26: 764–72.
- Navsarikar A, Gladmann DD, Husted JA, Cook RJ. Validity assessment of the disabilities of arm, shoulder and hand questionnaire (DASH) for patients with psoriatic arthritis. *J Rheumatol* 1999; 26:2191–4.
- Skutek M, Fremerey RW, Zeichen J, Bosch U. Outcome analysis following open rotator cuff repair: early effectiveness validated using four different shoulder assessment scales. *Arch Orthop Trauma Surg* 2000; 120:432–6.

- Solway S, Beaton DE, McConnell S, Bombardier C. The DASH Outcome Measure User's Manual, Second Edition. Toronto: Institute for Work & Health; 2002.
- Upper Extremity Collaborative Group. Measuring disability and symptoms of the upper limb: A validation study of the DASH Questionnaire [abstract]. *Arthritis Rheum* 1996;39 Suppl 9:S112.

SHOULDER DISABILITY QUESTIONNAIRE

General Description

Purpose. Assess functional disability related to the shoulder.

Content. There are 16 pain-related disability questions.

Developer/contact information. See original reference (1).

Versions. Only 1.

Number of items in scale. There are 16 items.

Subscales. None.

Populations. *Developmental/target.* To date, the psychometric studies have included only patients with soft-tissue disorders of the shoulder as would be seen in general practice. Patients with rheumatoid arthritis and other systemic disorders have been excluded. Post-surgical shoulder disorders have not been included.

Other uses. None.

WHO ICF Components. Impairment, Activity limitation, Participation restriction.

Administration

Method. Questionnaire.

Training. None.

Time to administer/complete. Three minutes.

Equipment needed. None.

Cost/availability. Copy available at the *Arthritis Care & Research* Web site at <http://www.interscience.wiley.com/jpages/0004-3591:1/suppmat/index.html>.

Scoring

Responses. *Scale.* 16 yes or no questions. Yes = 1, no = 0. Thirteen questions relate to pain with

upper extremity functional tasks “My shoulder hurts when I . . .” Other questions relate to sleeping, the need to rub the shoulder, and mood irritability due to shoulder pain. Ratings are for tasks performed in the last 24 hours. There is an option to rate questions as “NA” if the task was not performed in the last 24 hours.

Score range. Range is 0–100%.

Interpretation of scores. Higher score means greater disability.

Method of scoring. (Number of “yes” responses divided by number of items answered) \times 100.

Time to score. One minute.

Training to score. None.

Training to interpret. None.

Norms available. Not applicable.

Psychometric Information

Reliability. Not specifically tested. Inferred from stable scores of patients who were judged to be clinically stable over 6 weeks based on a self-rating using an 8 point Likert scale. The mean and median change in stable patients was less than 5 points, SD 18 points.

Validity. *Content.* The 16 items were drawn from a 60-item list sent to practitioners and researchers asked to select the items most frequently mentioned by patients and estimate their sensitivity to change on a Likert scale. These ratings were used to construct the 16-item scale.

Construct. Not specifically compared with other existing measures. Demonstrated stability in patients who rated themselves as clinically unchanged and able to detect changes in patients who rated themselves as clinically changed.

Sensitivity/responsiveness to change. *Guyatt Responsiveness Index (RI).* The $RI = 1.89\text{--}2.22$ $RI = \text{mean change in “improved” patients} / \text{SD of the change score in “stable” patients}$. The authors suggest scores > 1 are responsive in proportion to the magnitude of the score. Smallest clinically relevant change estimated to be 3 items (18.7%).

Calibrated Responsiveness Ratio (CRR). The $CRR = (\text{median change in “Improved” patients} - \text{median change in “stable” patients}) / (\text{interquartile range in “stable” patients})$ which was 1.14. The

authors suggest scores < 1 are unresponsive. They suggest that the scale discriminates well between improved and stable patients when between 10% and 60% of items change.

Comments and Critique

The reliability and validity of the scale still have yet to be determined by traditional standards. The scale is simple and easy to complete and score however it has only been tested on patients with soft-tissue disorders in a general practice. One limitation is that virtually all items relate to pain and therefore would not be useful in patients who have minimal or no pain yet might have serious limitations due to weakness or lack of motion.

Reference

1. (Original) Van der Windt DA, van der Heijden GJ, de Winter AF, Koes BW, Deville W, Bouter LM. The responsiveness of the Shoulder Disability Questionnaire. *Ann Rheum Dis* 1998;57:82–7.

Additional Reference

- Van der Heijden GJ, Leffers P, Bouter LM. Shoulder disability questionnaire design and responsiveness of a functional status measure. *J Clin Epidemiol* 2000;53:29–38.

SHOULDER PAIN AND DISABILITY INDEX (SPADI)

General Description

Purpose. Developed to measure pain and disability associated with shoulder pathology (1).

Content. Pain: 5 items; VAS, function/disability: 8 items; VAS.

Developer/contact information. Physical therapists and physicians. Kathryn Roach, PhD, PT; University of Miami, School of Medicine, Division of Physical Therapy, 5915 Ponce de Leon Blvd, 5th floor, Coral Gables, FL 33146.

Versions. English only. Two versions for answer options: VAS, numeric scale.

Number of items in scale. There are 5 pain items and 8 function/disability items; total: 13 items.

Subscales. There are 2 subscales: pain (5 items) and function/disability (8 items).

Populations. *Developmental/target.* Original article presented validation of scale in patients undergoing physical therapy treatment for shoulder

pain of musculoskeletal, neurogenic, or undetermined origin (1).

Other uses. Validated in patients with shoulder dysfunctions undergoing physical therapy or general medical treatment with diagnoses of impingement syndrome, degenerative joint disease, non-specific shoulder pain, osteoarthritis, total shoulder arthroplasty, rotator cuff surgery, glenohumeral instability/dislocation, rotator cuff syndrome, adhesive capsulitis, status-post fracture, and shoulder weakness.

WHO ICF Components. Impairment, Activity limitation, Participation restriction.

Administration

Method. Questionnaire.

Training. None.

Time to administer/complete. 7 minutes.

Equipment needed. Only the instrument itself.

Cost/availability. Copy available at the Arthritis Care & Research website at <http://www.interscience.wiley.com/jpages/0004-3591:1/suppmat/index.html>.

Scoring

Responses. *Scale.* Pain 5 items, 10-cm VAS for each. Function/disability 8 items, 10-cm VAS for each.

Score range. Pain 0–50 SPADI points, function/disability 0–50 SPADI points, total score 0–100 (100 = worse pain and function/disability).

Interpretation of scores. Higher scores reflect greater pain and disability.

Method of scoring. Pain subscale = (sum of 5 items scores) \times 5. Function/disability subscale = (sum of 8 items scores) \times 5/8. Total score = pain subscale (50% of total score) + function/disability subscale (50% of total score).

Time to score. 8 minutes.

Training to score. No.

Training to interpret. No.

Norms available. No.

Psychometric Information

Reliability. *Internal consistency.* Cronbach's alpha = 0.95, 0.96.

Test-retest. ICC 0.66 and 0.91.

Content. Initially 20 items developed from a panel of 3 Rheumatologists and 1 Physical Therapist and refined to 13 items based on preliminary reliability testing and correlation of items to range of motion.

Construct-convergent. Demonstrated with significant correlations with other similar measures, those measuring the same construct of functional loss/disability. Those measures were the arthritis specific Health Assessment Questionnaire (HAQ, numeric scale version only), Short Form-20 (SF-20, numeric scale version only), Short Form-36 (SF-36), Sickness Impact Profile (SIP), other shoulder specific measures (Simple Shoulder Test, Modified American Shoulder and Elbow Surgeons Standardized Form, Patient Self-report Section, Subjective Shoulder Rating Scale, Shoulder Severity Index).

Construct/divergent. Demonstrated with non-significant weak correlations with dissimilar measures, those *not* measuring the construct of functional loss. Those measures were the SIP subscale scores of eating, mobility, alertness behavior, and emotional health.

Validity. *Known groups.* The SPADI demonstrated the ability to discriminate between patient groups that stated they were "cured/improved" versus "the same" versus "worse" after 2, 4, and 12 weeks.

Sensitivity/responsiveness to change. *Sensitivity/Minimally Clinically Important Difference (MCID).* Scores on the SPADI reflected change in the external criterion measure of the patient's rating of themselves as "cured/improved," "the same," or "worse" after 12 weeks. An ROC curve was constructed to determine the amount of change that differentiates those patients who have improved from those who have remained stable or deteriorated. A change of greater than 10 SPADI points is highly specific. An increase of 10 SPADI points is highly specific for improvement (likelihood ratio 34), and a decrease of 10 SPADI points is highly specific for deterioration (likelihood ratio 12.9) (numeric scale version only).

Responsiveness. The SPADI demonstrated the ability to measure change when it has occurred

with a standardized response mean of 1.23 and 1.38.

Comments and Critique

SPADI in the original form is cumbersome to use especially by clinicians, as it requires measurement of 13 VAS. One study converted the VAS to numerical scales, and demonstrated construct convergent validity and sensitivity/minimally clinically important difference (2). However, it is noted that in this same study the original version of the SPADI was compared to the numeric version, demonstrating a strong relationship but not explaining all of the relationship between these two measures with an ICC of 0.86. The numeric scale yielded scores on average 2.5 points greater than the VAS original version.

References

1. (Original) Roach KE, Budiman-Mak E, Sangsiridej N, Lertrantanakul Y. Development of a shoulder pain and disability index. *Arthritis Care Res* 1991;4:143–9.
2. Williams JW, Holleman DR, Simel DL. Measuring shoulder function with the Shoulder Pain and Disability Index. *J Rheumatol* 1995;22:727–32.

Additional References

- Beaton DE, Richards RR. Assessing the reliability and responsiveness of 5 shoulder questionnaires. *J Shoulder Elbow Surg* 1998;7:565–72, 1998.
- Beaton DE, Richards RR. Measuring function of the shoulder: a cross-sectional comparison of five questionnaires. *J Bone Joint Surg Am* 1996;78:882–90.
- Heald SL, Riddle DL, Lamb RL. The shoulder pain and disability index: the construct validity and responsiveness of a region-specific disability measure. *Phys Ther* 1997;77:1079–89.
- Roddey TS, Olson SL, Cook KF, Gartsman GM, Hanten W. Comparison of the University of California–Los Angeles Shoulder Scale and the Simple Shoulder Test with the Shoulder Pain and Disability Index: single administration reliability and validity. *Phys Ther* 2000;80:759–68.

SIMPLE SHOULDER TEST

General Description

Purpose. Assess functional disability of the shoulder.

Content. Twelve questions answered yes or no; 2 questions relate to pain, 7 relate to function, and 3 relate to range of motion.

Developer/contact information. University of Washington, Shoulder Service, Department of Orthopedic Surgery (Lippitt SB, Matsen FA).

Versions. One.

Number of items in scale. 12.

Subscales. None.

Populations. *Developmental/Target.* Patients with shoulder dysfunction, has been used with multiple diagnoses both surgical and non-surgical (arthritis, arthroplasty, instability, rotator cuff repair, tendonitis, adhesive capsulitis).

Other uses. None.

WHO ICF Components. Activity limitation, Participation restriction.

Administration

Method. Self-administered questionnaire.

Training. None.

Time to administer/complete. 3 minutes.

Equipment needed. None.

Cost/availability. No cost/public domain (1). Copy available at http://www.orthop.washington.edu/shoulder_elbow/technical/shouldertest/01.

Scoring

Responses. *Scale.* Twelve functional task questions answered yes or no (yes = 1, no = 0).

Score range. Range is 0–12, (transformed to percentage).

Interpretation of scores. Best score is 12/12, representing no disability.

Method of scoring. (Number of yes responses/number of items answered) × 100.

Time to score. 1 minute.

Training to score. None.

Training to interpret. None.

Norms available. Not applicable.

Psychometric Information

Reliability. *Internal consistency.* Cronbach's alpha = 0.85; SEM 11.65.

Test-retest. ICC 0.99.

Validity. *Content.* Content developed by expert consensus group.

Construct. Convergent demonstrated with significant correlations with other similar measures, those measuring the same construct of functional loss/disability. Those measures were the SPADI $r = 0.74$, the modified American Shoulder and Elbow Surgeons form $r = 0.73$, Acute SF-36 $r = 0.60$. The scale has shown the ability to discriminate between levels of self-rated severity among shoulder patients.

Sensitivity/responsiveness to change. SRM 0.8 (mean change score/SD change score). From 33 subjects who underwent rotator cuff surgery or total shoulder arthroplasty and who believed that they had improved between testing.

Comments and Critique

The scale is simple and easy to complete and score and has been used in a variety of patient groups. It is perhaps less sensitive than some other scales in capturing changes in an individual patient with treatment.

Reference

1. (Original) Lippitt SB, Harryman DT, Matsen FA. A practical tool for evaluation of function: the simple shoulder test. In: Matsen FA, Fu FH, Hawkins RJ (eds). *The Shoulder: a balance of mobility and Stability*. Rosemont (IL): American Academy of Orthopedic Surgery; 1993.

Additional References

- Beaton DE, Richards RR. Measuring function of the shoulder: a cross-sectional comparison of five questionnaires. *J Bone Joint Surg Am* 1996;78:882–90.
- Soldatis JJ, Moseley JB, Etminan M. Shoulder symptoms in healthy athletes: a comparison of outcome scoring systems. *J Shoulder Elbow Surg* 1997;6:265–71.
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- Cook KF, Gartsman GM, Roddey TS, Olson SL. The measurement level and trait-specific reliability of 4 scales of shoulder functioning: an empiric investigation. *Arch Phys Med Rehabil* 2001;82:1558–65.
- Matsen FA III, Smith KL, DeBartolo SE, Von Oesen G. A comparison of patients with late-stage rheumatoid arthritis and osteoarthritis of the shoulder using self-assessed shoulder function and health status. *Arthritis Care Res* 1997;10:43–7.
- Matsen FA III, Ziegler DW, DeBartolo SE. Patient self-assessment of health status and function in glenohumeral degenerative joint disease. *J Shoulder Elbow Surg* 1995;4:345–51.
- Roddey TS, Olson SL, Cook KF, Gartsman GM, Hanten W. Comparison of the University of California-Los Angeles Shoulder Scale and the Simple Shoulder Test with the shoulder pain and disability index: single-administration reliability and validity. *Phys Ther* 2000;80:759–68.
- Rozencwaig R, van Noort A, Moskal MJ, Smith KL, Sidles JA, Matsen FA III. The correlation of comorbidity with function of the shoulder and health status of patients who have glenohumeral degenerative joint disease. *J Bone Joint Surg Am* 1998;80:1146–53.
- Viola RW, Boatright KC, Smith KL, Sidles JA, Matsen FA III. Do shoulder patients insured by workers' compensation present with worse self-assessed function and health status? *J Shoulder Elbow Surg* 2000;9:368–72.

Summary Table for Measures of Adult Shoulder Function *

Measure/scale	Content	Measure outputs	No. of items	Response format	Method of administration	Time for administration	Validated populations	Psychometric properties		
								Reliability	Validity	Responsiveness
American Shoulder and Elbow Surgeons Shoulder Form: Patient Self-Report section (ASES)	Pain and function related to shoulder	100-point scale (50% pain, 50% function)	1 Pain item, 10 function items	10-cm VAS for pain 4-point Likert scale for function	Self-administered	3-5 minutes	General shoulder disorders including operative and non-operative conditions	Good	Good	Good
Disabilities of the Arm, Shoulder, and Hand (DASH)	Pain and functional disability related to upper extremity function Optional Sports Module and Work Module	100-point scale	30 items for sports module, 4 items for work module	5-point Likert scale	Self-administered	5-7 minutes	General shoulder and wrist/hand populations including operative and non-operative conditions	Excellent	Good	Good
Shoulder Disability Questionnaire	Pain-related shoulder function	100-point scale	16 items	Dichotomous questions (Yes or no)	Self-administered	3-5 minutes	Shoulder conditions in general, surgical or systemic disease conditions excluded.	Not formally assessed	Not formally assessed	Good
Shoulder Pain and Disability Index (SPADI)	Pain and function related to shoulder	100-point scale (50% pain, 50% function)	5 Pain items, 8 function items	Originally each item scored on a VAS. One study converted items to a numeric scale	Self-administered	5-7 minutes	General shoulder disorders including operative and non-operative conditions	Good	Good	Good
Simple Shoulder test	Pain and function related to shoulder	100-point scale	12 items	Dichotomous questions (Yes or no)	Self-administered	3-5 minutes	General shoulder disorders including operative and non-operative conditions	Excellent	Good	Good

*VAS = Visual Analog Scale.