

**Reverse Total Shoulder Arthroplasty:** A two hour surgical procedure to the shoulder utilizing a plastic and metal prosthesis that is performed when all other treatment options have failed to address the complex shoulder problem. This surgery was designed by Paul Grammont in 1985 and was approved by the FDA for use in the United States in 2004. The surgery changes the shoulder's orientation seen by a ball like convex surface that replaces the glenoid, and a glenoid-like concave surface that replaces the humeral head . The difference between Total Shoulder Arthroplasty (TSA) and Reverse TSA is that with the TSA the patient has an intact rotator cuff and with the Reverse TSA they have a torn rotator cuff.

**Complex Shoulder Problems:**

***Glenohumeral Arthritis:*** Shoulder Arthritis. Inflammation of the shoulder, usually accompanied by pain, swelling, and stiffness, and resulting from infection, trauma, degenerative changes, and/or metabolic disturbances.

***Irreparable Rotator Cuff Damage:*** Loss of rotator cuff tendons from the subscapularis, infraspinatus, supraspinatus, and teres minor muscles which aide with the insertion of the humerus making any overhead activities difficult if not impossible.

***Past fracture repair*** and ***conventional shoulder joint replacements*** that have failed

**Goals from the surgery:**

1. To provide stability and strength
2. To improve movement of the arm/shoulder by using the deltoid muscle to power the joint even in the absence of a normal rotator cuff to allow lifting of the arm overhead to improve function.
3. To prevent superior migration of the humeral head
4. To lessen pain and swelling

**Precautions after surgery:**

1. No combined shoulder adduction, internal rotation, and extension for 12 weeks. (no shoulder motion behind back – ex: tucking in shirt, fastening bra, toilet hygiene)
2. No glenohumeral extension beyond neutral for 12 weeks
3. Sling should be worn 3-6 weeks at all times except for bathing, dressing, and exercise to prevent disruption of the implant
4. No lifting of objects with operative extremity
5. No supporting of bodyweight with involved extremity

**Rehabilitation of the shoulder:** Usually a 3-6 month program consisting of 3 phases

1. Phase I: PROM/AAROM
2. Phase II: AAROM/AROM
3. Phase III: AROM/Strengthening

Phase I: Week 2 - 4

- Begin elbow/wrist/hand ROM exercises
- PROM in supine – forward shoulder flexion to 90-120 degrees, external rotation to 20-30 deg. While lying in supine, a pillow/towel should be placed behind elbow for 6-8 weeks to prevent shoulder hyperextension
- Cryotherapy (Ice) 4-5 times/day for 20 minutes

- Deltoid isometric exercises
- Pendulum exercises passively (bend over at waist and move body forward, backward, side to side to generate movement of shoulder without active recruitment of shoulder muscles)

Phase II: Week 4-8

- Restore full PROM
- Strengthening of elbow/wrist/hand
- Removal of sling for normal arm swing with ambulation – only use sling for sleeping
- May begin AAROM pulleys – flexion
- Begin weight shifting on elbows
- Begin AA/AROM forward flexion, ER, IR in supine with gradual progression to sit/stand

Phase III: Week 8 – 12+

- Progress to AROM
- Initiate internal rotation behind back stretch, resisted IR and ER
- Begin light functional activities – dressing, bathing, ....
  - a. Comb hair: 112 deg. Abduction, 54 deg. Horizontal adduction
  - b. Reaching for toilet hygiene: 38 deg. Extension, 86 deg. Horizontal abduction
  - c. Fasten bra: 56 deg. Extension, 69 deg. Horizontal abduction, and IR
- Begin supine active elevation strengthening of anterior deltoid with light weights with progression to sitting/standing
- Resisted flexion and extension with therabands

**Outcome Measures:** for pain and function related to the shoulder

Shoulder Pain and Disability Index (SPADI)

Disabilities of the Arm, Shoulder, and Hand (DASH) or quick DASH

## SHOULDER PAIN AND DISABILITY INDEX (SPADI)

Patient Name \_\_\_\_\_

Date \_\_\_\_\_

Please read carefully:

Instructions: Please circle the number that best describes the question being asked.

Pain scale:

No pain at all	0	1	2	3	4	5	6	7	8	9	10	Worst pain Imaginable
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How severe is your pain?

1. At its worst?  
0      1      2      3      4      5      6      7      8      9      10

2. When lying on the involved side?  
0      1      2      3      4      5      6      7      8      9      10

3. Reaching for something on a high shelf?  
0      1      2      3      4      5      6      7      8      9      10

4. Touching the back of your neck?  
0      1      2      3      4      5      6      7      8      9      10

5. Pushing with the involved arm?  
0      1      2      3      4      5      6      7      8      9      10

Disability scale:

No difficulty	0	1	2	3	4	5	6	7	8	9	10	So difficult it requires help
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How much difficulty do you have?

1. Washing your hair?  
0      1      2      3      4      5      6      7      8      9      10

2. Washing your back?  
0      1      2      3      4      5      6      7      8      9      10

3. Putting on an undershirt or pullover sweater?  
0      1      2      3      4      5      6      7      8      9      10

4. Putting on a shirt that buttons down the front?  
0      1      2      3      4      5      6      7      8      9      10

5. Putting on your pants?  
0      1      2      3      4      5      6      7      8      9      10

6. Placing an object on a high shelf?  
0      1      2      3      4      5      6      7      8      9      10

7. Carrying a heavy object of 10 pounds?  
0      1      2      3      4      5      6      7      8      9      10

8. Removing something from your back pocket?  
0      1      2      3      4      5      6      7      8      9      10

Scoring: (sum scores pain scale) + (sum scores disability scale x .625) / 100

Total score \_\_\_\_\_ Examiner Signature \_\_\_\_\_

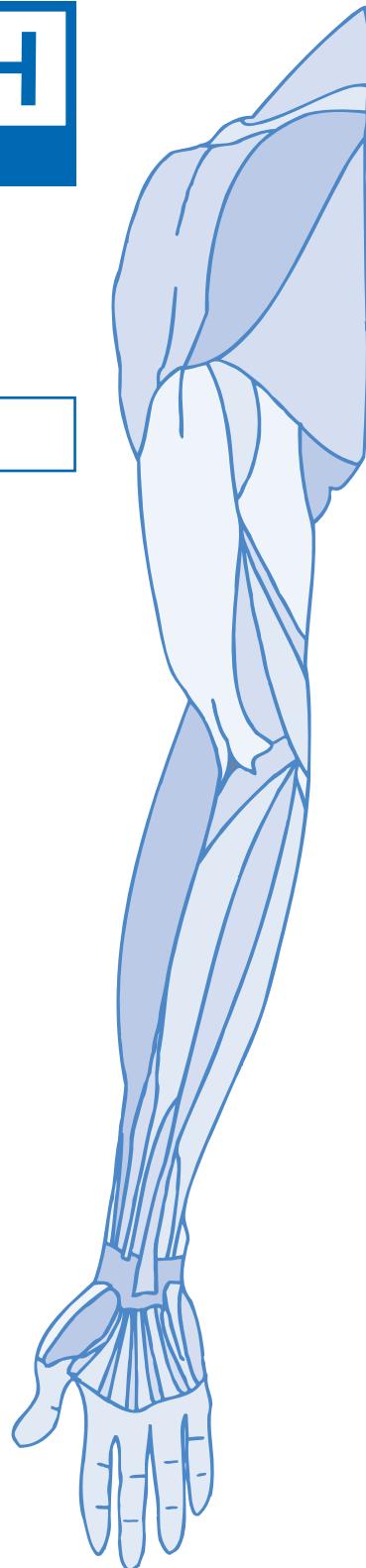
THE

# QuickDASH

OUTCOME MEASURE

...a faster way to measure  
upper-extremity disability  
& symptoms

Information for Users



## About the QuickDASH

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The DASH Outcome Measure has been increasing in popularity since its release in 1996. Today the tool is being used around the world in both clinical and research settings and has proven to be a useful self-report outcome measure for people with musculoskeletal upper-limb disorders.

The QuickDASH is a shortened version of the DASH Outcome Measure. Instead of 30 items, the QuickDASH uses 11

items to measure physical function and symptoms in persons with any or multiple musculoskeletal disorders of the upper limb. Like the DASH, the QuickDASH also has two four-item optional modules that are scored separately.

This shortened version of the tool provides clinicians with an option that enables faster measurement of disability and symptoms; however, there are some

advantages to using the full DASH outcome measure. (See *Psychometric Properties*)

The QuickDASH Outcome Measure is available free of charge (for non-commercial purposes) and may be downloaded from the DASH web site at [www.dash.iwh.on.ca](http://www.dash.iwh.on.ca). Information on scoring is also available on-line.

## Development of the QuickDASH

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Statistical analysis of the 30-item DASH indicated that it could be reduced to 11 items while still maintaining an acceptable rating of internal consistency for individual patient evaluation (i.e. Cronbach's alpha ~ 0.90). Shortening the DASH was felt to be an attractive and sensible option provided that psychometric properties could be maintained.

Three techniques were used for item reduction using field-testing data for the full DASH. Three different scales (i.e. QuickDASH versions) were produced.

### Conceptual Method

The first scale was created by selecting items that represented each of the key domains identified in the theoretical framework of the full DASH. The 16 original domains were reduced to 11 based on similarity across domains. Items in the full DASH were sorted according to the domain they represented and were then ranked according to two criteria: first, the importance and difficulty according to patients, and second, correlation with total DASH score. The highest-ranking items in each of the 11 specified

domains were chosen to comprise the concept-based version of the QuickDASH.

### Equidiscriminative Item-Total Correlation (EITC)

The second scale was created by selecting items that had the highest correlation with overall scores across subgroups (those with high, moderate and low levels of disability). The four items with the highest correlation in each grouping were selected to compose the EITC-based version of the QuickDASH (the item with the smallest correlation of the twelve was eliminated).

### Item Response Theory (Rasch Analysis)

The third scale was created using Rasch analysis. DASH items were calibrated based on their relative difficulty; misfitting items were eliminated, and an 11-item scale was produced with items theoretically equally spaced and calibrated along the scale length.

### Evaluation and Comparison

Three distinct QuickDASH versions were produced using the item-reduction techniques described. These scales were evaluated and compared using data from the original 30-item DASH prospective cohort (i.e., 200 individuals with various upper-limb disorders). The final decision of the accepted version of the QuickDASH was made based on the following criteria:

- number of items with > 40% in one response category
- Cronbach's alpha > 0.90
- highest correlation with the 30-item DASH and with other markers of physical function and severity of problem.

The three versions were similar, though differing in content. The concept version ranked slightly better than the others, and was chosen and unanimously supported by the Upper Extremity Collaborative Group (the DASH development group) and named the QuickDASH Outcome Measure.

## Psychometric Properties

Establishing the psychometric properties of any instrument is an ongoing process and is context specific. In other words, with each new population, clinical setting or treatment type, pilot testing of performance in

that particular context is recommended. Initial testing has shown the QuickDASH to work well in groups of patients (research studies, program evaluation); however, clinicians should be aware that there are advantages to using the full DASH in individual patient monitoring. The precision of

measurement is slightly better with the DASH, resulting in greater confidence of the accuracy of scores. Until further data is available on the QuickDASH, clinicians should consider this advantage when choosing which measure to use.

	<b>QuickDASH</b>	<b>DASH</b>
<b>Reliability</b>		
Internal Consistency	Cronbach's alpha = 0.94	Cronbach's alpha = 0.97
Test-Retest	ICC = 0.94	ICC = 0.96
<b>Validity</b>		
<b>Convergent Construct</b>		
• VAS of overall problem	r = 0.70	r = 0.70
• VAS of overall pain	r = 0.73	r = 0.72
• VAS of ability to function	r = 0.80	r = 0.79
• VAS of ability to work	r = 0.76	r = 0.77
<b>Known-Groups</b>		
• able to do all need to versus limited	<u>M</u> = 25.4 vs. 48.6	<u>M</u> = 23.6 vs. 47.1
• able to work versus unable to work due to upper-limb problem	<u>M</u> = 27.5 vs. 52.6	<u>M</u> = 26.8 vs. 47.1
<b>Responsiveness</b>		
• Change in group of patients undergoing treatment; expected to improve	SRM = 0.79	SRM = 0.78
• Change in those rating their problem as better	SRM = 1.03	SRM = 1.05

ICC – intra-class correlation coefficient (2,1)

M – average score; r – Pearson product moment correlation

SRM - standardized response mean; VAS - visual analogue scale

All Pearson product moment correlations and known-group differences statistically significant at p≤0.05.

## Scoring the QuickDASH

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The QuickDASH is scored in two components: the disability/symptom section (11 items, scored 1-5) and the optional high performance sport/music or work modules (4 items, scored 1-5).

### Disability/Symptom Score

At least 10 of the 11 items must be completed for a score to be calculated. The assigned values for all completed responses are simply summed and averaged, producing a score out of five. This value is then transformed to a score out of 100 by subtracting one and multiplying by 25. This transformation is done to make the score easier to compare to other measures scaled on a 0-100 scale. A higher score indicates greater disability.

$$= \left( \left[ \frac{\text{sum of n responses}}{n} \right] - 1 \right) \times 25,$$

where n is equal to the number of completed responses.

### Optional Modules (Sport/Music or Work)

There are two optional modules, each consisting of four items. The optional modules are intended for athletes, performing artists and other groups of workers whose jobs require high levels of physical performance. These individuals may be having difficulties only at these high performance levels, which are beyond the scope of the 11-item QuickDASH.

The same procedure described for the disability/symptom score is followed to calculate the optional four-item module score. All four questions must be answered in order to calculate the score. For each module, simply add up the assigned values for each response and divide by four (number of items); subtract one and multiply by 25 to obtain a score out of 100.

### Missing Items

If more than 10 per cent of the items (that is, more than one item) are left blank by the respondent, you will not be able to calculate a QuickDASH disability/symptom score. By this same rule (that is no more than 10 per cent of the items can be left blank), no missing values can be tolerated in the optional modules because each module consists of only four items.

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THE

# QuickDASH

OUTCOME MEASURE

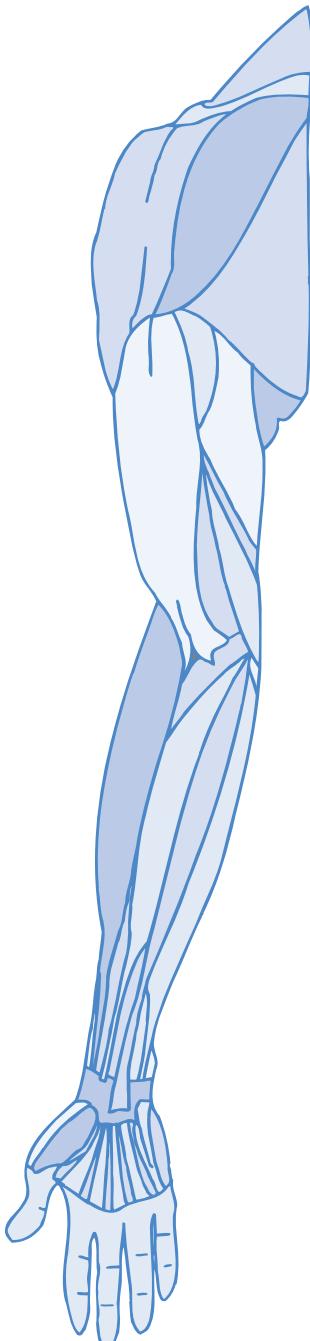
## INSTRUCTIONS

This questionnaire asks about your symptoms as well as your ability to perform certain activities.

Please answer *every question*, based on your condition in the last week, by circling the appropriate number.

If you did not have the opportunity to perform an activity in the past week, please make your *best estimate* of which response would be the most accurate.

It doesn't matter which hand or arm you use to perform the activity; please answer based on your ability regardless of how you perform the task.



# QuickDASH

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar.	1	2	3	4	5
2. Do heavy household chores (e.g., wash walls, floors).	1	2	3	4	5
3. Carry a shopping bag or briefcase.	1	2	3	4	5
4. Wash your back.	1	2	3	4	5
5. Use a knife to cut food.	1	2	3	4	5
6. Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g., golf, hammering, tennis, etc.).	1	2	3	4	5

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
7. During the past week, <i>to what extent</i> has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups?	1	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
8. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem?	1	2	3	4	5

	NONE	MILD	MODERATE	SEVERE	EXTREME
9. Arm, shoulder or hand pain.	1	2	3	4	5
10. Tingling (pins and needles) in your arm, shoulder or hand.	1	2	3	4	5

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
11. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? ( <i>circle number</i> )	1	2	3	4	5

QuickDASH DISABILITY/SYMPTOM SCORE =  $\left( \frac{(\text{sum of } n \text{ responses})}{n} - 1 \right) \times 25$ , where n is equal to the number of completed responses.

A QuickDASH score may not be calculated if there is greater than 1 missing item.

## WORK MODULE (OPTIONAL)

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including homemaking if that is your main work role).

Please indicate what your job/work is: \_\_\_\_\_

I do not work. (You may skip this section.)

**Please circle the number that best describes your physical ability in the past week.**

Did you have any difficulty:	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for your work?	1	2	3	4	5
2. doing your usual work because of arm, shoulder or hand pain?	1	2	3	4	5
3. doing your work as well as you would like?	1	2	3	4	5
4. spending your usual amount of time doing your work?	1	2	3	4	5

## SPORTS/PERFORMING ARTS MODULE (OPTIONAL)

The following questions relate to the impact of your arm, shoulder or hand problem on playing *your musical instrument or sport or both*. If you play more than one sport or instrument (or play both), please answer with respect to that activity which is most important to you.

Please indicate the sport or instrument which is most important to you: \_\_\_\_\_

I do not play a sport or an instrument. (You may skip this section.)

**Please circle the number that best describes your physical ability in the past week.**

Did you have any difficulty:	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for playing your instrument or sport?	1	2	3	4	5
2. playing your musical instrument or sport because of arm, shoulder or hand pain?	1	2	3	4	5
3. playing your musical instrument or sport as well as you would like?	1	2	3	4	5
4. spending your usual amount of time practising or playing your instrument or sport?	1	2	3	4	5

**SCORING THE OPTIONAL MODULES:** Add up assigned values for each response; divide by 4 (number of items); subtract 1; multiply by 25.

An optional module score may not be calculated if there are any missing items.



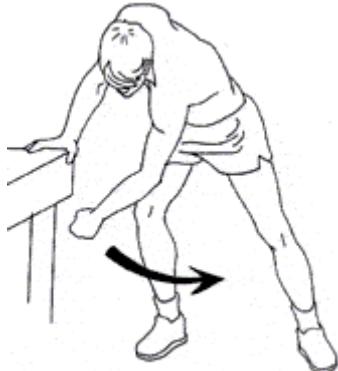
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## Codman's Pendulum Exercises

**Exercise:**

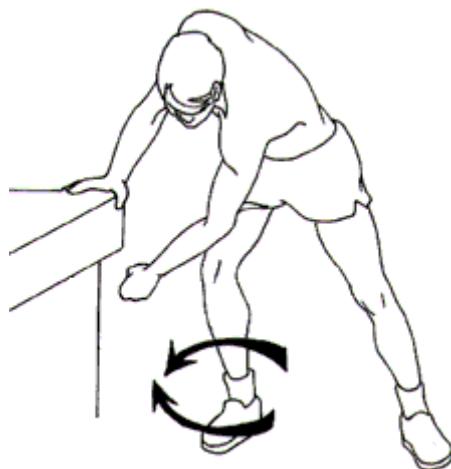
Pendulum Side-to-Side



BEND OVER AT THE WAIST AND LET YOUR ARM RELAX COMPLETELY. SLOWLY SWING YOUR ARM FROM SIDE-TO-SIDE AS ILLUSTRATED.

**Repeat:** 20 times**Sessions:** 4 /day**Exercise:**

Pendulum Side-to-Side



BEND OVER AT THE WAIST AND LET YOUR ARM RELAX COMPLETELY. SLOWLY SWING YOUR ARM FROM SIDE-TO-SIDE AS ILLUSTRATED.

**Repeat:** 20 times**Sessions:** 4 /day

*Necessary Shoulder ROM for functional tasks*

<b>Activity</b>	<b>Necessary ROM in degrees</b>
Eating	70-100 horizontal adduction 45-60 abduction
Combing hair	30-70 horizontal adduction 105-120 abduction 90 external rotation
Reach perineum	75-90 horizontal abduction 30-45 abduction 90 internal rotation
Tuck in shirt	50-60 horizontal abduction 55-65 abduction 90 internal rotation
Position hand behind head	10-15 horizontal adduction 110-125 forward flexion 90 external rotation
Put an item on a shelf	70-80 horizontal adduction 70-80 forward flexion 45 external rotation
Wash opposite shoulder	60-90 forward flexion 60-120 horizontal adduction

*Adapted from Matsen FH, III, Lippitt SB, Sidles JA, et al.: Practical Evaluation of Management of the Shoulder. Philadelphia, PA; WB Saunders, 1994; 19-150; Majee DJ: Shoulder, Orthopedic Physical Assessment, Philadelphia, PA: WB Saunders, 1992:90-142; Orthopaedic examination, evaluation, and intervention Mark Dutton section IIA: The upper extremities p.542*