

# Journal of Hand Surgery (European Volume)

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*Journal of Hand Surgery (European Volume)* 2008; 33; 653

DOI: 10.1177/1753193408093810

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## VALIDATION OF A MODERN ACTIVITY HAND SURVEY WITH RESPECT TO RELIABILITY, CONSTRUCT AND CRITERION VALIDITY

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**This study validates a novel, modern wrist and hand functional assessment: the Modern Activity Subjective Survey of 2007 (MASS07). In total, 326 patients visiting an academic tertiary-care orthopaedic hand clinic (April 2006–April 2007) were recruited to complete the MASS07 questionnaire, Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, and Patient-Rated Wrist Evaluation (PRWE) to assess construct validity, criterion validity and test–retest reliability of the MASS07. MASS07 correlated strongly with both PRWE (0.81) and DASH (0.85) even when adjusted for age, sex and history of hand problems ( $P < 0.001$ ). MASS07 scores compared for 42 patients with repeated visits indicated no statistically significant difference between MASS07 scores at the patients' first and second clinic visit. We conclude that the newly constructed MASS07 instrument is valid and reliable with respect to the out-patient population with a wide spectrum of hand and wrist pathologies for fast and effective assessment of patient-reported hand function during modern daily activities.**

**Keywords:** Wrist survey, Functional outcomes, Hand function

Physicians, and hand surgeons in particular, require the ability to measure and quantify functional disability in the hand and wrist. The most widely used patient-reported questionnaires available for evaluating patients with reduced hand function include the Disabilities of the Arm, Shoulder and Hand (DASH) (Beaton et al., 2001; Hudak et al., 1996), Quick-DASH (Beaton et al., 2005; Gummesson et al., 2006), Patient-Rated Wrist Evaluation (PRWE) (MacDermid, 1996), Short-Form 36 (SF-36) (McHorney et al., 1993), Michigan Hand Outcomes Questionnaire (MHOQ) (Chung et al., 1999, 1998), Musculoskeletal Functional Assessment (MFA) (Engelberg et al., 1996; Martin et al., 1996) and Levine Questionnaire (LQ) (Levine et al., 1993). Each of these instruments has been validated as an appropriate tool for measuring subjective limitations of the hand and wrist, yet each varies with its level of detail, degree of functional assessment, measurement of pain and patient completion time (Dowrick et al., 2005; Kotsis and Chung, 2005; Kotsis et al., 2007; MacDermid et al., 2000; MacDermid and Tottenham, 2004; Martin et al., 1997). However, none of the mentioned instruments provides a way to quantify functional limitations while performing commonplace modern activities such as the

use of computers, cell phones and other advanced technology. In addition, there is a potential need to provide faster and more efficient instruments that can minimise the time necessary to assess patients' hand function. Currently, only Quick-DASH, an 11-question instrument, offers rapid subjective assessment of hand function, but without the inclusion of modern, commonplace activities.

We developed the Modern Activity Subjective Survey of 2007 (MASS07) to aid physicians in quantifying the functional impairment of patients with hand and wrist disorders and provide here the rationale for development and validation of this new tool. Our purpose was to design, develop and validate a short subjective functional assessment of the wrist and hand, giving physicians a way to quantify patients' functional limitations during high-frequency modern activities. Specifically, we wanted the new instrument to capture the use of modern technology such as a cell phone, computer and a handheld device (Blackberry, iPhone or Trio for example).

### METHODS

This study was approved by the IRB (#2006P-000051) and written consent was obtained from all participants.

IRB approval has been obtained by the Beth Israel Deaconess Medical Center IRB Committee. Protocol # 2006P-000051.

### Instrument development and administration

A preliminary version of the MASS07 was developed after considering the variety of activities frequently performed by patients but not assessed by current functional questionnaires. In addition, we aimed to measure hand function involved in tasks that are performed routinely, often multiple times a day. Importantly, tasks not included in the instrument were personal hygiene activities, which are included in a variety of the instruments previously mentioned. Rather, our interest was in quantifying declines in function that may seem small in isolation but may have large effects on patients' quality of life and daily activities due to repeated and routine use. For example, a small decline in speed, accuracy or comfort while using a cell phone may cause increasing amounts of frustration throughout the day. These activities included the use of newer technologies such as the use of cellular phones, personal digital assistant (PDA) devices, manoeuvring a mouse or typing on a keyboard, and common activities that may occur frequently throughout the day such as writing, taking a dollar bill from a wallet or manipulating clothes. We modelled the format and response schema after the PRWE, a validated and reliable measure of wrist function with respect to a patient population including a wide spectrum of hand pathologies, which most closely resembled our intended result. An initial list of 15 questions was developed and a preliminary questionnaire was administered to over 50 patients presenting at an academic orthopaedic hand clinic. After evaluating the results and feedback from the initial pilot, we condensed the instrument to 10 questions each graded from 0 to 10 with a sum score ranging from 0 to 100 to reflect scales used by both the PRWE and DASH (see Appendix A for the complete MASS07 survey). The final MASS07 score calculation was restricted to instruments with at least eight out of ten questions answered. For instruments that missed answers to one or two questions, an average on questions answered is imputed in place of the missing answers, according to a method that is expected to minimise bias due to missing data and is also followed in the scoring of the PRWE (MacDermid, 1996).

### Criterion validity

*Definition:* To evaluate criterion validity, we assessed how well patients' MASS07 scores correlated with the gold standard in the literature. For our purposes, the gold standard that most closely and commonly measures functional outcomes includes the DASH and the PRWE.

*Subjects:* To evaluate criterion validity, all patients visiting an academic tertiary-care orthopaedic hand clinic between April 2006 and April 2007 were recruited to participate in the study. Patients were asked to

complete the MASS07 questionnaire, the DASH questionnaire and the PRWE questionnaire. Our study sample consisted of 326 patients who completed all three instruments at a total of 425 clinic visits, and had complete scores for the MASS07, PRWE and DASH at each visit. The subjects were purposefully recruited without consideration of their diagnosis or treatment, therefore reflecting the full spectrum of hand and wrist pathologies.

*Statistics:* The Spearman rank correlation was used to evaluate criterion validity of MASS07. Additionally, we used scatter plots to illustrate the correlation between MASS07 scores and the two gold standards (PRWE and DASH).

### Internal consistency

*Definition:* To assess internal consistency we evaluated how well 10 different items on the MASS07 survey measure a single construct, i.e., hand function.

*Subjects:* The same subject population of 326 patients used above was used to evaluate internal consistency.

*Statistics:* Cronbach's  $\alpha$  was used to evaluate internal consistency of the instrument. To have high internal consistency, an instrument should have a Cronbach's  $\alpha$  greater than 0.70 and a score of 0.90 is considered excellent in the literature, but at the same time a value that is too high could indicate the presence of redundant questions in the instrument (Nunnally, 1978; Streiner and Norman, 1995).

### Test-retest reliability

*Definition:* To assess test-retest reliability, we evaluated whether patients' scores at two consecutive visits correlate, specifically when patients do not receive surgical treatment.

*Subjects:* A subsample of patients who returned for a consequent clinic visit and had non-missing survey data was used to evaluate test-retest reliability of the MASS07 survey, defined as stability of the results of a survey instrument over time when no change in function is expected. We identified 70 patients, and to ensure minimal change in function (a condition necessary to prove test-retest reliability), we excluded from this group any patients who had surgery or received a steroid injection either between the visits or at their first visit. The final sample used for test-retest validation consisted of 42 patients.

*Statistics:* We calculated the mean, standard deviation and the range of time between the patients' two consecutive visits. The Spearman coefficient was estimated to determine how well MASS07 scores at Visit 1 correlated with MASS07 scores at Visit 2. In addition, the Wilcoxon signed-rank test for matched pairs was used to evaluate whether there was a statistically significant difference between the distribution of

**Table 1—Analysis of MASS07 criterion validity**

|        | Mean ± SD   | Median, IQR | Correlation with MASS07 | P-value |
|--------|-------------|-------------|-------------------------|---------|
| MASS07 | 30.0 ± 30.9 | 29.0, 4–51  | –                       | –       |
| PRWE   | 42.3 ± 30.3 | 40.0, 14–68 | 0.81                    | <0.001  |
| DASH   | 29.0 ± 27.0 | 31.9, 14–54 | 0.85                    | <0.001  |
| N      | 445         | 445         | 445                     |         |

Summary statistics and results of correlation analysis for MASS07, PRWE and DASH surveys. IQR = interquartile range.

MASS07 scores at Visit 1 and the distribution of MASS07 scores at Visit 2. Additionally, we estimated the Interclass Correlation Coefficient (ICC) using one-way ANOVA in order to assess the degree of test–retest reliability.

**Construct validity**

*Definition:* To assess construct validity, we examined whether changes in MASS07 scores reflect changes in objective range of motion (ROM) measures. By controlling the degree for ROM, we were then able to examine whether subjective MASS07 scores (1) reflect this change in function and (2) correlate with objective ROM measures. As such, this approach corresponded to the “known group validation” method (Hulley et al., 2001; De Vellis, 2003).

*Subjects:* Measurements from a separate sample of 42 volunteers treated by splinting were used to assess construct validity, defined as the ability of the MASS07 to correlate decreasing function with increasing scores. The volunteers were fitted with two custom-made splints (Alimed – Dedham, MA) with different degrees of restriction: partial restriction and high restriction. After wearing each splint for 24 hours each the DASH, PRWE and MASS07 surveys were completed and changes in function were correlated with changes in the MASS07 score.

*Statistics:* Spearman correlation was used to evaluate the correlation between MASS07 scores and functional ability. We used the Friedman test to determine whether the change in splinting conditions corresponded with a downward trend in MASS07 scores as the function decreased. We calculated the effect size for each of the three surveys by calculating the difference in means between fully restricted treatment and the baseline treatment, and dividing the difference by the standard deviation of the fully restricted scores (Husted et al., 2000).

**RESULTS**

In total, 326 recruited patients with a total of 425 visits had complete MASS07, PRWE and DASH responses.

Mean age among study patients at their first visit to the clinic was 44.5 (range: 18.0–89.7), 55% were female and 33% had a prior history of hand problems. Table 1 reports mean scores for each instrument, as well as the correlation between the MASS07 and the gold standards (DASH and PRWE). The correlation between the MASS07 and DASH was 0.85 ( $P < 0.001$ ,  $N = 326$  patients,  $N = 425$  visits), and between the MASS07 and PRWE scores was 0.81 ( $P < 0.001$ ). Fig 1 graphically displays these correlations, indicating that the points cluster closely on the identity line (at 45°). The DASH had a better fit than the PRWE (Fig 2).

Because the PRWE consists of both the Pain subscale and the Function subscale, we further analysed correlation of the MASS07 survey with these subscales separately. MASS07 correlated by a coefficient of 0.85 ( $P < 0.001$ ) with the PRWE Function subscale and by 0.67 ( $P < 0.001$ ) with the PRWE Pain subscale. The MASS07 correlated strongly with both the PRWE and DASH ( $P < 0.001$ ) even when adjusted for age, sex and prior history of hand problems. It should be noted that age, sex and prior history are likely to affect both measures to the same degree, and as such should not be considered serious sources of potential confounding in this case.

Using the standard Cronbach’s  $\alpha$ , our analysis of internal consistency consisted of computing inter-item correlations for all pairs of 10 questions, and obtaining the final Cronbach’s  $\alpha$  statistic for the scale formed from these 10 individual items. We obtained Cronbach’s  $\alpha$  of 0.97 for the composite MASS07 scale. The result provided evidence that the 10 different questions succeeded in capturing or measuring a single quantity of interest (i.e., hand function), which was the main criterion for demonstrating internal consistency.

Forty-two patients with a total of 126 visits met the inclusion criteria outlined above for evaluating the test–retest reliability of the MASS07. The average time between the patients’ two consecutive visits was 68.3 days (range: 0–275 days; SD: 57.3 days). There was no statistically significant difference between MASS07 scores at the patients’ first and second clinic visit ( $P = 0.07$ ,  $N = 42$  patients,  $N = 126$  visits). Therefore, we found no evidence that MASS07 scores at Visit 1 and Visit 2 were statistically different. Correlation between

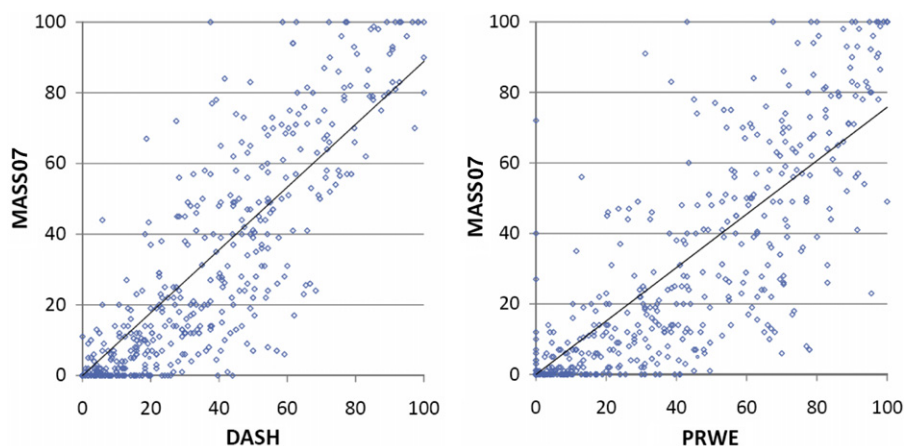


Fig 1 Illustration of construct validity. MASS07 scores are graphed against DASH scores (left panel) and PRWE scores (right panel), plotting the best fit linear prediction.

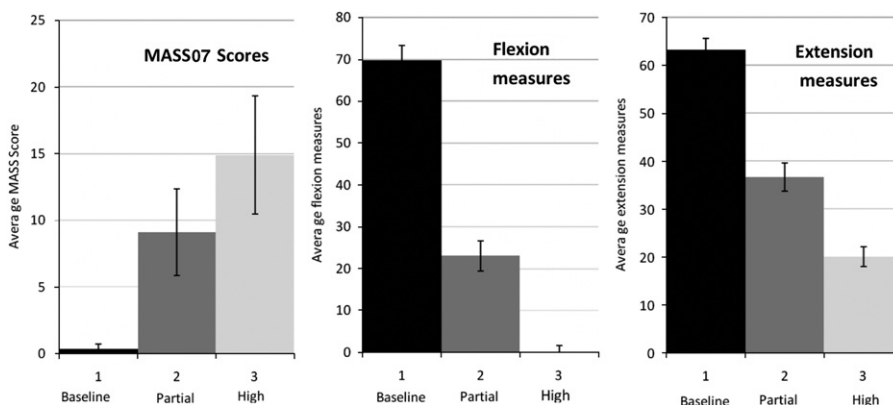


Fig 2 Illustration of construct validity. Average MASS07 scores, flexion and extension measurements are compared for 42 patients at baseline, after partial restriction and at high restriction. Error bars denote standard errors. Higher MASS07 scores correspond to lower flexion and extension measures.

MASS07 scores at Visit 1 and Visit 2 was  $\rho = 0.68$  ( $P < 0.0001$ ). Power analysis revealed that our sample size of 42 subjects provided 90% statistical power to detect a 20% difference in MASS07 scores between partial and full splinting and control conditions and between the visits using a two-tailed significance level of 0.05 and a paired analysis (version 6.0, nQuery Advisor, Statistical Solutions, Boston, MA). In addition, we obtained the ICC of 0.91 (SE: 0.061) using a one-way ANOVA ( $R$ -squared = 0.91,  $P < 0.0001$ ).

Forty-two volunteers treated with two different restrictive splints formed a sample for evaluating construct validity of MASS07. The subjects demonstrated significantly lower MASS07 scores between splinting and normal conditions ( $P < 0.001$ ), as well as between the partial and the full splinting condition compared to each other ( $P < 0.001$ ). The results also indicate a clear trend of increasing MASS07 scores as patients' function, measured as flexion and extension,

**Table 2—The inverse Spearman  $\rho$  coefficient of correlation between the MASS07 score and the different range of motion (ROM) measures in the study population of 42 splinting volunteers**

|                  | <i>Corr. coefficient</i> | <i>P-value</i> | <i>N (patients, measurements)</i> |
|------------------|--------------------------|----------------|-----------------------------------|
| Circumduction    | -0.61                    | <0.0001        | 42, 126                           |
| Extension        | -0.66                    | <0.0001        | 42, 126                           |
| Ulnar deviation  | -0.61                    | <0.0001        | 42, 126                           |
| Radial deviation | -0.56                    | <0.0001        | 42, 126                           |
| Supination       | -0.22                    | 0.02           | 42, 126                           |
| Pronation        | -0.10                    | NS             | 42, 126                           |

NS = not significant.

decreases (see Table 2). Furthermore, MASS07 scores showed substantial and statistically significant correlation with circumduction, flexion, extension and both ulnar and radial deviation (correlation coefficients

ranging from  $\rho = -0.56$  to  $-0.66$ ,  $P < 0.0001$ ), but weak correlation with supination ( $\rho = -0.22$ ,  $P = 0.015$ ) and no correlation with pronation ( $\rho = -0.10$ ,  $P = 0.2724$ ). Effect size comparing full restriction and baseline was calculated. For the MASS07, the effect size was 0.98. For PRWE, the effect size was 1.22 and for DASH it was 1.52.

**DISCUSSION**

Statistical analysis and evaluation of the MASS07 demonstrate that the survey meets the standards for construct and criterion validity, test-retest reliability and internal consistency. In assessing construct validity, MASS07 also meet the threshold set by previous validation studies in the literature and MASS07 scores were correlated with most relevant ROM measures, yielding inverse coefficients ranging from  $\rho = -0.56$  to  $-0.66$  (higher MASS07 scores correlated with lower ROMs; see Table 3). Although there is no single criterion for establishment of construct validity, a correlation coefficient of greater than 0.40 has been suggested as the minimal value (Dowrick et al., 2005; Stewart and Ware, 1992). In comparison to MASS07, values for other similar surveys are listed in Table 3. It should be noted, however, that the comparison of DASH and SF-36 should not necessarily be expected to yield a strong correlation since SF-36 is a generic health status measure rather than a disease-specific instrument. Weak correlation of MASS07 scores with supination and pronation measures were not surprising considering that types of modern daily functions assessed by MASS07 depend less on these two particular forms of movement.

In assessing criterion validity, the MASS07 scores well exceeded the standard of greater than 0.40 suggested as necessary (Stewart and Ware, 1992). The correlation of the MASS07 with the two other popular upper-extremity surveys, DASH and PRWE, exceeded 0.80. We found that this level of correlation either meets or exceeds criterion validity results in the literature. In comparison to MASS07, the correlation of the MHQ with SF-12 questionnaire components ranged from 0.54 to 0.79 (Chung et al., 1998), the correlation of the MFA with physicians' ratings ranged from 0.53 to 0.71 (Martin et al., 1997). The correlation with DASH was stronger than with the composite PRWE score most likely because the PRWE consists of both pain and function subscales. The MASS07 score correlated better with the PRWE Function subscale than with the Pain subscale, which was to be expected given that the main purpose of the MASS07 survey was to assess function and not pain.

In assessing the test-retest reliability of MASS07, our analysis uncovered no statistically significant difference in patients' scores at Visit 1 and Visit 2, and we obtained a correlation coefficient of 0.68 between the two subsequent visits. While there is no single established standard for test-retest reliability, since such tests depend on the time period and the patient population, our correlation coefficient was lower than those reported by DASH and PRWE. In comparison, test-retest reliability of the DASH in patients with shoulder pain yielded a correlation coefficient of 0.90 ( $P < 0.01$ ) (MacDermid and Tottenham, 2004). We expect the lower than expected correlation to be due to a great deal of heterogeneity in our population of 42 patients whose scores at Visit 1 and Visit 2 were compared. A larger study using a population of patients with comparable diagnoses, followed for an identical length of time, would be a necessary next step in further evaluating the test-retest reliability of MASS07. In the meantime, our results do indicate that absent significant intervention such as surgery or steroid injection between visits, the patients' MASS07 score at their first visit correlated with their MASS07 score at their subsequent visit. Because our study was not confined to any particular condition, our results apply to a wide set of conditions usually encountered in an academic tertiary-care hand clinic.

In assessing internal consistency, we found that the MASS07 Cronbach's  $\alpha$  of 0.97 meets the established criteria and closely matches the standards set by previous surveys. The established criteria for internal consistency indicated that Cronbach's  $\alpha$  is required to be greater than 0.70 and that a value of 0.90 is considered excellent (Feinstein, 1987). In addition, it is suggested that Cronbach's  $\alpha$  greater than 0.95 may indicate that there are too many items assessing the same construct (Cronbach, 1951; Michener and Leggin, 2001). However, in the case of MASS07, which consists of only 10 questions, at least eight of which must be answered to

**Table 3—Comparison of MASS07 validation results with available selected validation studies of similar subjective survey instruments**

| <i>Instrument</i>      | <i>Construct (Spearman correlation)</i> | <i>Criterion (Spearman coefficient)</i> | <i>Test-retest (Spearman coefficient)</i> | <i>Consistency (Cronbach's <math>\alpha</math>)</i> |
|------------------------|---|---|---|---|
| MASS07                 | -0.56 to -0.66                          | 0.81-0.85                               | 0.68                                      | 0.97  |
| MFA <sup>1</sup>       | 0.34-0.51                               | 0.52-0.71                               |   | 0.85  |
| DASH <sup>2</sup>      | -0.36 to -0.62                          |   | 0.90                                      | 0.96  |
| QuickDASH <sup>3</sup> | 0.73-0.80                               |   |   | 0.92  |
| PRWE <sup>4</sup>      |   |   | 0.90                                      |   |
| MHQ <sup>5</sup>       |   | 0.54-0.79                               |   | 0.85  |
| Levine <sup>6</sup>    | 0.42-0.60                               |   |   |   |

See text for complete description of each survey.  
<sup>1</sup>Engelberg et al., 1996; Martin et al., 1996, 1997.  
<sup>2</sup>Offenbaecher et al., 2002; SooHoo et al., 2002.  
<sup>3</sup>Beaton et al., 2005; Gummesson et al., 2006.  
<sup>4</sup>MacDermid and Tottenham, 2004.  
<sup>5</sup>Chung et al., 1998.  
<sup>6</sup>Levine et al., 1993.

obtain a full score, the length of the survey and the breadth of questions were not an impediment to its administration. In addition, MASS07 contains questions regarding the use of both new technologies and more routine tasks such as handling a wallet. A broader coverage of different activities is useful for increasing the chances of obtaining a valid MASS07 score even if a patient lacks experience using some new technology. The validation of previous surveys (i.e., DASH) reported Cronbach's  $\alpha$  scores comparable to those obtained with MASS07 (Table 3).

Despite the many self-evaluated subjective surveys available to surgeons, there was a need to develop and validate a survey capable of accurately quantifying the functional ability involved in modern daily activities such as the use of computers, PDAs and cell phones. The existing surveys that measure hand and wrist function contain a plethora of questions assessing personal hygiene, dressing, carrying large items and participating in recreational activities. One of their limitations is that they do not accurately quantify the functional limitations of performing modern daily tasks that involve the use of new technology, both at work and at home. In contrast, the MASS07 is designed for the many patients who work at desks, with computers or constantly use cellular phones and other handheld devices. Our literature search identified the four most widely used upper-extremity instruments as the DASH, PRWE, MHOQ and LQ – none of which asked about the use of cellular phones, a computer mouse, typing on a keyboard or using handheld device (i.e., Blackberry). Some surveys, such as the MFA attempt to quantify the musculoskeletal function of the entire body (Martin et al., 1996), while others, such as the DASH (Hudak et al., 1996) and MHOQ (Chung et al., 1998), focus on the upper extremity. Others are more focused to quantify functional status with a specific condition, such as the LQ for carpal tunnel syndrome (Levine et al., 1993), or the PRWE originally developed for distal radius fractures but then applied more broadly (MacDermid, 1996). Rather than designing a survey for a particular type of condition such as those listed above, we designed a survey to measure functional abilities associated with particular types of activities.

A secondary objective in creating the MASS07 was to develop an assessment tool that was quickly completed by all patients, as well as easily scored by physicians. For this reason we elected to use a simple 0 through 10 grading scale for only 10 highly specific questions. Given the short length of our survey, we established a requirement that at least eight questions be answered in order for the MASS07 final score to be calculated, and normalised all scores to a scale of 0 to 100. Of the other surveys previously mentioned, published completion times range from 3 to 15 minutes (Dowrick et al., 2005). For example, the DASH, which is a 30-item survey, takes on average 6 minutes to complete, but with many patients taking longer in our experience. The

shortest survey available was the Quick-DASH, which consisted of 11 questions plus an optional component, taking approximately 3 minutes and without questions pertaining to the use of modern, commonplace activities. The completion time of lengthy surveys may be a significant barrier to its regular use in a busy clinical practice. We intended for the MASS07 to be a quick assessment of a specific group of tasks, and for this reason, we limited it to a length of only 10 questions. In addition, scoring mechanisms for the surveys listed above are variable and often require specific algorithms or equations for final score evaluation. Because this may be an obstacle to their common usage, we designed the MASS07 so that the score can be easily calculated as ten times the average of individual question scores. Obtaining the MASS07 score requires the most basic math skills and can usually be computed mentally, simplifying the scoring process.

Our study has some potential limitations. The cohort of patients asked to complete the survey were all presenting to an academic institution and may not accurately reflect the responses of patients in the community setting. A second limitation of our study, and our survey, is the limited and narrowly focused question set we elected to include. As discussed above, our intention was to develop a brief, simple survey to assess functional abilities while using modern technology, an outcome measure that is not appropriate for all patients. However, we believe that this survey and these questions will expose other researchers and clinicians to a new genre of functional assessment questions that play a critical role in the lives of patients, but have been neglected until now. Also note that we have chosen to trade off having some possible redundancy in our instrument or the ability to maximise the likelihood that the patients would answer at least eight questions given that not every patient will use the devices included in the instrument.

Finally, we recognise the potential for bias when drawing conclusions about validity from a cohort of 326 patients and 445 visits. We also recognise that, as with any patient-reported outcomes survey research, missing data and patient self-selection may influence the validity of the final results. Although every patient seen at the clinic during the study period was asked to complete a survey, not all patients did so. We processed a total of 989 individual surveys collected during this period, and a total of 425 of those surveys met the study inclusion criteria of having complete MASS07, DASH and PRWE scores. Overall, the subjects included in the study formed a very diverse population of patients, with varying severity of functional impairment (as can be seen from the distributions of the scores), approximately equal proportion of males and females, and an age profile representative of a typical academic tertiary-care hand clinic patient population. Patients were more likely to fail to meet the inclusion criteria because they had missing data on the DASH (much longer, consisting of

30 questions) than on the MASS07 (10 questions) or the PRWE (15 questions).

The results of this study demonstrate that with respect to an out-patient population with a wide spectrum of hand and wrist pathologies, the MASS07 is a valid and

reliable instrument for assessing patient-reported hand function. It will provide surgeons with a new tool for fast and efficient assessment of hand function during daily activities, including the increasing use in modern technology.

**APPENDIX A. MODERNIZED ACTIVITY SUBJECTIVE SURVEY (MASS07)**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

For each of the following tasks, please rate your experience while performing them over the past day by circling the number that describes your difficulty on a scale of 1 to 10. A **Zero** (0) means you did not experience any difficulty and **ten** (10) means it was so difficult you were unable to do it at all. If you cannot comment on your ability to perform a task, or if you do not know how to perform any of these tasks, please circle N/A.

| Functional task |  | No difficulty |   |   |   |   |   |   |   |   |   | Unable to do |    |     |   |   |   |   |   |   |   |   |   |   |    |
|-----------------|--|---------------|---|---|---|---|---|---|---|---|---|--------------|----|-----|---|---|---|---|---|---|---|---|---|---|----|
| 1.              | Type on a keyboard                     | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2.              | Use a computer mouse                   | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3.              | Dial a cell phone/telephone            | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4.              | Taking a photograph with a camera      | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5.              | Pulling an item from a pocket or purse | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6.              | Write a check                          | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7.              | Take a dollar bill out of a wallet     | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8.              | Plug a cord into a power outlet        | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9.              | Do laundry/fold clothes                | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 10.             | Typing on a handheld device            | N/A           | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | N/A | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

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Received: 14 January 2008

Accepted after revision: 27 April 2008

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doi:10.1177/1753193408093810 available online at <http://jhs.sagepub.com>