



Which measure should be used to assess the patient's functional outcome after distal radius fracture ?

Sanjay GUPTA, Mansur HALAI, Mohammed AL-MAIYAH, Scott MULLER

From the Department of Trauma & Orthopaedics Wansbeck General Hospital Woodhorn Lane Ashington UK

The Disability of the Arm, Shoulder and Hand (DASH) and the Patient-Rated Wrist Evaluation (PRWE) scores appear most frequently in the literature when assessing functional outcome after distal radius fracture. We aimed to evaluate if the two questionnaires correlate. We reviewed 258 cases of adults who sustained a distal radius fracture over a one year period. At mean follow-up of 17 months the disability of the arm, shoulder and hand (DASH) and the patient-rated wrist evaluation (PRWE) scores were recorded. The outcome scores for each group were not statistically different (DASH $p = 0.86$, PRWE $p = 0.80$). The results of both questionnaires correlated strongly (Spearman's coefficient = 0.90). As the DASH score is potentially influenced by concomitant upper limb problems we suggest that the specific patient rated wrist evaluation (PRWE) be the sole instrument for assessing the functional outcome of distal radius fractures. This will reduce questionnaire fatigue and standardise the literature.

INTRODUCTION

Patient outcome should be the most important marker of the success of an intervention. However, it is difficult to make valid comparisons as there are many different outcome measures utilised in the literature on the subject of distal radius fractures. New measures include the Modern Activity Subjective Score (MASS), developed by Harvard Medical School, which includes tasks such as typing on a mobile telephone and navigating on the internet (1). Nevertheless, our experience in reviewing the liter-

ature revealed that the Disability of the Arm, Shoulder and Hand (DASH) and the Patient-Rated Wrist Evaluation (PRWE) scores appear most frequently in the literature when assessing functional outcomes (2).

The DASH instrument was developed in 1994 by the institute for work and health in Ontario and the American Academy of Orthopaedic Surgeons (3). It is a 30-item questionnaire that evaluates symptoms and physical function with five responses per item. If a particular response for an item (up to 10%) is missing, a mean value is chosen before the overall score is calculated. The DASH score is on a 100-point scale. 0 indicates a normal wrist and 100 is equivalent to maximum disability.

The PRWE is a 15-item instrument that scores wrist-related pain and disability with respect to function (4). It concentrates primarily on the wrist. Five items concern pain. The functional items include specific tasks and also include patients' ratings of their performances to do tasks.

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- Sanjay Gupta, MD.
 - Mansur Halai, MD.
 - Mohammed Al-Maiyah, MD.
 - Scott Muller, MD.

Department of Trauma & Orthopaedics Wansbeck General Hospital Woodhorn Lane, Ashington UK.

Correspondence : Mansur Halai, 51 North Grange Road, G61 3AG Scotland

E-mail : mansurhalai@hotmail.com

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These patient-rated scoring instruments were chosen due to their reported good levels of reliability, validity and standardised response means (5).

We aim to evaluate if the two questionnaires correlate. A universal, single questionnaire for fractures of the distal radius would help to standardise the literature, adding power to the validity of any conclusions reached by statistical analysis.

METHODS

This retrospective cross-sectional study was undertaken at a district general hospital after receiving local research ethics committee approval. All adults (over 16 years of age) sustaining a distal radius fracture, regardless of pattern, over a one year period were included. All fractures were closed and the groups were not matched for age. This was an attempt to keep this study pragmatic. All adults sustained a single wrist fracture and patients who sustained multiple fractures were excluded. There were a total of 258 cases.

The method of treatment for each fracture was recorded. Five patients had bilateral fractures in the study period, leaving a total of 253 patients. All of the patients were posted a copy of the DASH and PRWE with a covering letter from a named researcher not involved in their clinical management. After three rounds of mailing, 183 patients answered with 186 questionnaires (3 patients with bilateral fractures), giving a response rate of 72%.

A standard formula was used to calculate the DASH scores (6) (0 – best score, 100 – worst). All published work pertaining to the PRWE references a score out of 150 (0 – normal wrist, 150 – worst possible).

Statistical analysis

This was performed using the Statistical Package for the Social Sciences (SPSS, version 13.0). Spearman's rank correlation coefficient was calculated to assess if both questionnaire results correlated. Advice was taken from the hospital trust statistician for analysis.

RESULTS

In total there were 253 patients with 258 distal radius fractures in the study. Of these (n = 253), 205 (81%) were female and 48 (19%) male. The mean age at time of injury was 63 years (44 to 82).

The mean length of follow-up since the original injury was 17 months (13 to 21).

The relationship between the DASH and PRWE scores

Spearman's correlation coefficient was 0.90 ($p < 0.01$). The scatter plot provides a graphical representation of the data (Fig. 1), revealing an almost linear relationship between the two scores.

DISCUSSION

Patient reported outcome measures are increasingly recognised as important instruments for evaluating orthopaedic interventions. The ideal instrument should be specific, sensitive and simple for patients to complete. In terms of distal radius fractures, the PRWE is more wrist-specific whereas the DASH is a generic upper limb tool. Therefore, a higher prevalence of concomitant upper limb pathology may impact on the DASH scores.

MacDermid et al showed that the PRWE was easier for patients to complete, was quicker to administer and easier to score than the DASH (6). Our study has further shown that the responsiveness between the two scores is equivalent. As the PRWE system has fewer domains it should require less time to complete.

The financial burden of these fractures is large. It is essential to have a specific, reproducible and patient friendly functional outcome instrument to inform health economic decisions. A uniform measure in the literature would make financial comparisons more valid. A recent study revealed that Medicare made \$170 million in distal radius fracture-attributable payments (7). This cost will grow as our population ages, fracture prevalence increases and the current trend towards more aggressive surgical intervention continues.

DASH and PRWE patient-rated scoring instruments were used in this study for their recognised reliability, validity and standardised response means. We found the results of the questionnaires to have an excellent correlation (0.90, $p < 0.01$). Therefore, both tools may not be necessary for the functional assessment of distal radius fractures. A

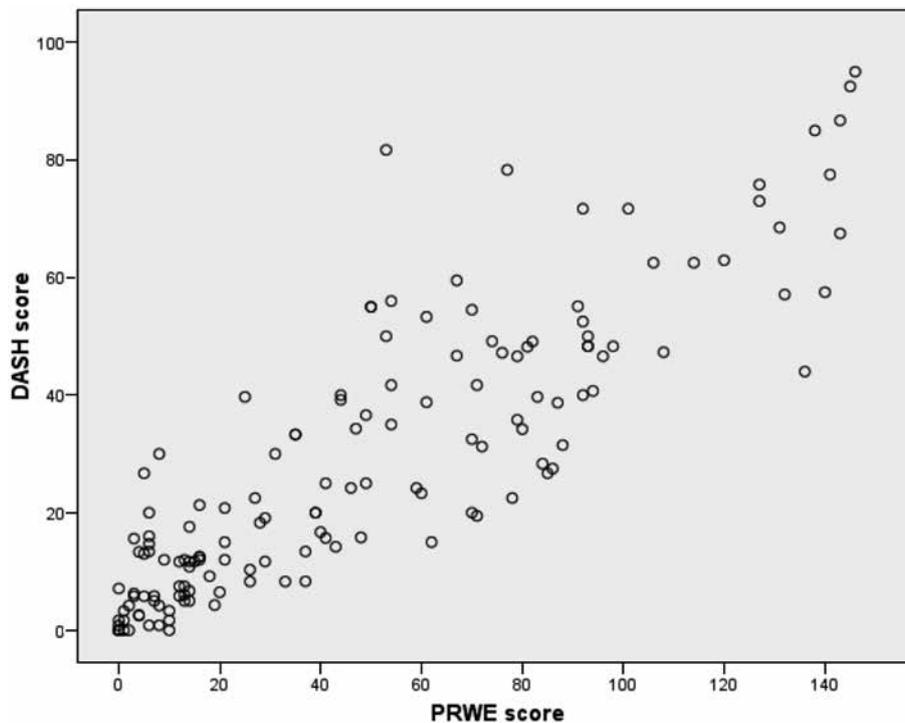


Fig. 1. – The correlation of DASH to PRWE.

single universal scoring system would certainly help to standardise the literature, adding power to the validity of any conclusions reached by statistical analysis. We recommend the PRWE due to its specificity to the wrist and its simplicity to complete.

We propose that the specific patient rated wrist evaluation (PRWE) be the sole instrument for assessing the functional outcome of distal radius fractures, to reduce questionnaire fatigue and to standardise the literature.

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