Editorial

Outcomes Assessment in Wrist Surgery

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A crucial part of any manuscript that is submitted to the Journal of Wrist Surgery is the outcomes assessment. The results of treatment have no meaning unless they are considered in light of the functional outcome. In order to report the result of an intervention, however, one must define the outcome that is being examined. For example, if the outcome assessed is the development of radiocarpal osteoarthritis, the results may be different if the assessed outcome is changed to wrist pain or grip strength. Furthermore, these outcomes may not take into account the patient's level of pain, their ability to carry out activities of daily living, or the ability to return to previous occupations.

Jaeschke and colleagues first described the concept of the minimal clinically important difference (MCID) in 1989.¹ The MCID was defined as the smallest difference in score in the domain of interest that patients perceive as beneficial, which would thus mandate a change in the patient's management. Their argument was that although statistically significant changes often occurred during the use of instruments that measured change after intervention, in some cases the significant change had little clinical significance. The measure of change must be reflective of a self-reported measure from a patient versus a clinical finding or statistical change. As Cook² opined, some of the difficulties with using the MCID include how to determine how much patient-reported change is beneficial, what is the best way to glean this query, and how one decides if the patient-reported change is sufficient. Unfortunately, MCIDs can vary widely depending on the method used, and there is currently no standard on how to calculate the MCID, which has led to a number of methodological or interpretation problems. As a consequence, the MCID is not commonly used in clinical studies on wrist surgery.

Scoring systems that evaluate subjective and objective factors together are frequently used to quantify wrist function after treatment from a physician's point of view. A number of validated outcomes evaluation measures have been developed, but it can be quite confusing as to which ones to use. One must first decide if they are measuring the whole or the parts and which region of the body to evaluate. In addition, there are physician-based scoring systems and patient-completed health status questionnaires.

Physician-Based Scoring Systems

The Modified Mayo Wrist Score (MMWS)³ is a modification of the Geen and O'Brien score.⁴ There is a total of 100 points which are divided among the evaluator's assessment of pain (25 points), active flexion/extension arc as a percentage of the opposite side (25 points), grip strength as a percentage of the opposite side (25 points), and the ability to return to regular employment or activities (25 points). Pain is rated as none (25 points), mild (20 points), moderate (10 points), or severe (0 points) by the evaluator, based on the patient's subjective description. The total score ranges from 0 to 100 points with higher scores indicating a better result. An excellent result is defined as 90–100 points, good is 80–89, fair is 65–79 points, and poor is less than 65 points. The Sarmiento modification of the Gartland and Werley Score⁵ is a demerit scoring system that combines subjective and objective factors, all of which are rated by the evaluator and not the patients. The evaluator rates pain, stiffness, and disability on a scale from 0 (best) to 6 (worst). The evaluator also rates deformity on a 6-point demerit scale. Objective evaluations of range of motion, distal radioulnar joint pain, and grip strength account for 17 points. Complications such as arthritis, painful arthritis, and nerve dysfunction account for 23 points. The total score ranges from 0–52 points, with lower scores indicating a better function. An excellent score is 0–2 points, good is 3–8 points, fair is 9–29 points, and a score that is more than 21 points is considered poor.

Patient-Reported Outcome Measures

The choice of a patient-reported outcome measure is determined by the clinical condition one wishes to assess. Most of the outcome questionnaires are self-administered by the patient. The popular patient-reported outcome instruments for evaluating wrist and hand function include the disability of shoulder, arm, and hand questionnaire (DASH), the Brigham and Women's Hospital carpal tunnel questionnaire (CTQ), and the patient-rated wrist evaluation questionnaire (PRWE). The Michigan Hand Outcomes Questionnaire (MHQ), the hospital for special surgery wrist scoring system (HSS), and the Wrightington Wrist function score are additional

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questionnaires. Pain scales are another group of patient-reported outcome measures that have been widely used.

The DASH score was first described in 1996 by Hudak, Amadio, and Bombardier.⁶ It is self-administered by patients and aims to capture the patient's own perception of their upper extremity function as a single functional unit. The questionnaire contains thirty items: twenty-one evaluate difficulty with specific tasks, five evaluate symptoms (two pain, one numbness, one stiffness, and one weakness), and one each evaluate social function, work function, sleep, and confidence. The score is scaled between 0 and 100, with higher scores indicating worse upper-extremity function.

The Brigham and Women's Hospital carpal tunnel questionnaire (CTQ) is a self-administered questionnaire first described by Levine et al in 1993.⁷ It was developed to assess the severity of symptoms and functional status and response to treatment in patients with carpal tunnel syndrome (CTS) and includes six critical domains for the evaluation of CTS: pain, test-retest reliability of paresthesia, numbness, weakness, nocturnal symptoms, and overall functional status. A symptom-severity scale was developed comprising eleven questions incorporating these six domains and eight questions regarding functional activities that are commonly affected in CTS, such as writing and holding a cup. The answer to each multiple-choice question ranges from mild (1 point) to most severe (5 points). The overall score is calculated as the sum of the mean of scores for all items on the symptom-severity scale and functional-status scale.

The PRWE score was originally described by MacDermid et al in 1998.⁸ It is a self-administered questionnaire that is intended to provide a reliable and valid tool for quantifying patient-rated wrist pain and disability in order to assess the outcome in patients with distal radius fractures. The score consists of two domains—pain and function—both of which carry equal weight. There are five items in the pain domain and ten items in the function domain. The response to each item is scored on a scale of 0–10. The pain score is the sum of five items, a worse score of 50; the disability (function) score is the sum of ten items, divided by two. Thus, the total function on the PRWE scale ranges from 0 (normal wrist) to 150 (worst possible score).

Souer et al⁹ found that pain is the dominant predictor of both the DASH and the Gartland and Werley scores during recovery from an operatively treated fracture of the distal radius. In the latter case, this may be in part because one-third of the points (12 of 36) are related to pain. Grip strength is the dominant predictor of the MMWS, perhaps because grip strength is responsible for a larger percentage of the total score (25%). They believed that it was not clear that these scoring systems provided any advantage over isolated measures of motion, deformity, grip, and pain. Others have shown that grip strength is also an important predictor of the PRWE score.¹⁰ Changulani et al¹¹ concluded that the PRWE score is the most responsive instrument for evaluating the outcome in patients with distal radius fractures, while the DASH score is the best instrument for evaluating patients with disorders involving multiple joints of the upper limb. The Brigham and Women's CTQ score showed good responsiveness and reli-

ability in evaluating the outcome in patients following a carpal tunnel release. McPhail and coauthors¹² analyzed the patient-reported outcome measures used in clinical trials of patients with osteoarthritis of the wrist and found that the DASH and the MHQ had the most favorable and comprehensive supporting empirical evidence.

It is clear that the outcomes assessment instrument is an integral part of any scientific manuscript and will directly affect the impact of the study. As a part of the validation process, a number of items are chosen by a panel of experts, which are then refined and reduced after preliminary testing is done on the patients to determine the statistical significance as well as the test-retest reliability, validity, and internal consistency of these items. The questionnaire is then administered before and after an intervention, and the change in the score is used to assess the responsiveness and sensitivity to clinical change. Despite widespread use, the Gartland and Werley score still has not been validated. Only guarded conclusions can be drawn from patient assessments when uncertainty exists regarding the reliability or validity of an assessment instrument. It is also important that patient-reported outcomes be responsive to change. An instrument that is not responsive to change is likely to increase the chance of a false negative finding during a clinical trial. Such a finding would not only confound the results of the clinical trial at hand, but also makes it difficult to compare different studies. For this reason, nonvalidated, author-generated outcome scores should generally be avoided. When submitting a paper to the *Journal of Wrist Surgery*, the author(s) should strive to use the most responsive, validated, and specific outcome instrument(s) that is(are) pertinent to their study, which will, in turn, improve the overall quality of the research.

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