ORIGINAL ARTICLE

# Minimal clinically important differences in Rowe and Western Ontario Shoulder Instability Index scores after arthroscopic repair of anterior shoulder instability

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**Background:** The minimal clinically important difference (MCID) is the threshold value for a change that would be considered meaningful by the patient. The purpose of this study was to determine the MCIDs for the Rowe score and the Western Ontario Shoulder Instability Index (WOSI) score after arthroscopic repair of anterior shoulder instability.

**Methods:** The study enrolled 198 patients who underwent an arthroscopic stabilization procedure for anterior shoulder instability. Patients were assigned to no change and minimal change groups by a 15-item questionnaire at the 1-year postoperative visit. The Rowe and WOSI scores were assessed preoperatively and at a 1-year postoperative follow-up. The MCID was calculated using an anchor-based method and a distribution-based method.

**Results:** There were 9 patients in the no change group and 26 patients in the minimal change group. The MCID for the Rowe score was 9.7 according to the anchor-based method. By the anchor-based method, the authors could not calculate MCID for the WOSI score because of insignificant difference of the mean score changes between the no change and minimal change groups. By the distribution-based method, MCIDs for the Rowe and the WOSI scores were 5.6 and 151.9 with the standard deviation–based estimate and 2.2 and 60.7 with the effect size–based estimate, respectively.

**Conclusions:** To assess the effectiveness of an arthroscopic stabilization procedure for anterior shoulder instability using the Rowe score, a difference of at least 9.7 in the score is clinically relevant. To compare clinical outcomes between different modalities, we should consider not only statistically significant differences but also the MCID.

**Level of evidence:** Basic Science Study; Validation of Outcome Instruments

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**Keywords:** Rowe score; WOSI score; minimal clinically important difference; shoulder; instability; Bankart lesion

Numerous operative techniques for anterior shoulder instability have been introduced, and many studies have evaluated the effectiveness of these techniques and reported clinical outcomes.[1,14,25] To determine the effectiveness of a treatment, clinicians generally design randomized controlled trials. When a statistically significant difference in outcomes between treatment modalities is confirmed, clinicians consider the superior one a more effective treatment. However, statistical significance sometimes does not imply clinical importance, that is, patients may not feel any difference just because a result is statistically significant.[3,9,15] Despite a statistically significant difference between treatment modalities, it may not be clear whether the difference is really meaningful to patients. Furthermore, it is well known that statistical significance is influenced by sample size.[5,6] The effectiveness of a treatment that produces a clinically important difference might be underestimated because of a lack of statistical significance if the sample size of a study is too small.

To overcome the shortcomings of the use of statistically significant differences, the concept of the minimal clinically important difference (MCID) has been introduced. The MCID is defined as "the smallest difference in score in the domain of interest which patients perceive as beneficial."[7] In other words, the MCID is a threshold value for a change that would be considered meaningful and worthwhile by the patient. Even if there is a statistically significant difference between different treatment modalities, a difference less than the MCID would not be perceived by patients; therefore, this degree of change would not be considered worthwhile for patients.

There are 3 methods to determine the MCID: consensus, anchor based, and distribution based.[3,10] Consensus-based methods rely on the opinion of a panel of experts regarding the best estimate of the MCID. Anchor-based methods use an external, independent criterion, called an anchor, which is usually a questionnaire, to assess patients' subjective reports of their level of improvement. Distribution-based methods use a statistical measurement such as the standard deviation (SD) or the effect size. Among these methods, anchor-based and distribution-based methods are the most commonly used in orthopedic research.[3,24]

Although the MCID of currently used clinical evaluation methods has been reported for various shoulder diseases, to the best of our knowledge, there has been no published literature concerning the MCID for recurrent shoulder instability. The purpose of this study was to determine the MCIDs for the Rowe score and the Western Ontario Shoulder Instability Index (WOSI) score after arthroscopic surgery for recurrent shoulder instability using anchor-based and distribution-based methods.

## Materials and methods

This was a retrospective study to evaluate the MCIDs for the Rowe score and the WOSI score in patients with anterior shoulder instability. From April 2010 to March 2015, there were 217 consecutive patients who underwent arthroscopic Bankart repair for recurrent anterior shoulder instability at 1 institution. The indications for operative treatment were a history of frank anterior traumatic shoulder dislocation with magnetic resonance imaging findings of an anteroinferior labral tear and a positive result of an anterior apprehension test. Only patients who had completed at least a 1-year follow-up visit were included. The exclusion criteria were Bankart lesion combined with rotator cuff tears or bicep tendon-related disease, multidirectional shoulder instability, and patients older than 50 years.

### Patient assessment

Preoperatively, all patients were evaluated using the Rowe score and the WOSI score. The Rowe score is a 100-point scoring system consisting of 3 domains: instability, range of motion, and function.[18] The WOSI score is a 2100-point scoring system consisting of 21 items with 4 domains: physical symptom, sport/recreation/work function, lifestyle function, and emotional function.[11,17] All patients also completed questionnaires about the history of symptoms, including age at the time of the first dislocation, number of dislocations, and detailed demographic data such as age and gender. Patients underwent routine physical examinations including active and passive range of motion.

All operations were performed by a single orthopedic surgeon. The operations were performed arthroscopically while patients were in the lateral decubitus position under general anesthesia. After adequate bone bed preparation, Bankart lesions were repaired using >4 suture anchors. An additional remplissage procedure was performed when an engaged Hill-Sachs lesion was observed even after Bankart repair. Postoperatively, shoulder joint immobilization was maintained for 4 weeks with a standard protective sling. Passive range of motion exercises were begun after the brace was removed, and muscle strengthening exercises were initiated at postoperative weeks 8-12.

At the 1-year postoperative visit, all patients were re-evaluated using the Rowe score, the WOSI score, and physical examinations by a physician assistant who was not involved in this study.

### Distribution-based methods

Among several distribution-based methods used to calculate the MCID, an SD-based estimate and an effect size–based estimate were used in this study. The SD is the variation among a group of scores, and Norman et al found that 0.5 SD is equivalent to the MCID.[16] The effect size is a standardized measure of change, and by convention, an effect size of 0.2 is considered small, 0.5 moderate, and 0.8 large.[2,3] According to Samsa et al, the MCID can be calculated by multiplying the SD of the baseline scores by 0.2.[21] In this study, the MCID was calculated as 0.5 SD of the baseline Rowe score using the SD-based method and as 0.2 SD of the baseline Rowe score using the effect size–based method.

### Anchor-based methods

At the 1-year postoperative visit, patients were given this anchor question: Compared with your preoperative state, has there been any change in the overall function of your shoulder? They were asked to score their perceived degree of change on a 15-item anchor questionnaire designed by Juniper et al[8] (Table I). Patients who responded "no change," "almost the same, hardly any worse at all," and "almost