Correlations between three patient-assessed shoulder instability scales

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ABSTRACT

Purpose. To evaluate the correlations between three patient-assessed shoulder instability scales before and after Latarjet stabilisation for traumatic antero-inferior glenohumeral instability. Methods. Records of 30 men and 2 women (mean age, 26.7 years) who had not undergone surgery for antero-inferior shoulder instability and records of 31 men and one woman (mean age, 27 years) who had undergone Latarjet stabilisation for antero-inferior shoulder instability and had been followed up for a mean period of 21.3 months were reviewed. Correlations between the Western Ontario Shoulder Instability Index (WOSI), the Melbourne Instability Shoulder Score (MISS), and the L’Insalata Shoulder Questionnaire (L’Insalata) were assessed.

Results. The mean score of each scale was significantly greater in the postoperative than preoperative group (p<0.001). Within each group, the mean scores of the 3 scales differed significantly (ANOVA, p=0.001). The mean L’Insalata score was significantly higher than the mean WOSI and MISS scores (p<0.01, post-hoc analysis), but the latter 2 scores did not differ significantly (p>0.01, post-hoc analysis). Correlations of all scale pairs were significant (p<0.001). The WOSI-MISS correlations in the pre- and post-operative groups were moderate. The L’Insalata-WOSI correlations in the pre- and post-operative groups were moderate and high, respectively. The L’Insalata-MISS correlations in the pre- and post-operative groups were high and moderate, respectively.

Conclusion. The MISS and WOSI scales are moderately correlated. Correlation of the L’Insalata scale with other scales depends on the operative status of the patient. The use of the L’Insalata scale alone is not recommended.

Key words: patient outcome assessment; shoulder dislocation; questionnaires

INTRODUCTION

Antero-inferior glenohumeral instability is common following traumatic shoulder dislocation,¹-³ and can
be treated with various reconstructive surgeries. In clinical assessment, episodes of instability (dislocation or subluxation) can be documented accurately, but assessing function and impairment are less straightforward.

There are several validated, patient-assessed, shoulder joint–specific scales and shoulder condition (instability)–specific scales. The latter includes the Western Ontario Shoulder Instability Index (WOSI), and the Melbourne Instability Shoulder Score (MISS). In addition, the L’Insalata Shoulder Questionnaire can be used to measure general shoulder function. This study aimed to evaluate the correlations between WOSI, MISS, and L’Insalata scales before and after Latarjet stabilisation for traumatic antero-inferior glenohumeral instability.

MATERIALS AND METHODS

This study was approved by the ethics committees of 2 private hospitals in Melbourne, Australia. The sample size was based on a perceived clinically significant difference of 20 scores between the 2 groups. If the mean±standard deviation (SD) scores of the pre- and post-operative groups were 60±20 and 80±20, respectively, at least 26 patients were required in each group (2-sided, power=0.85, p=0.01).

Between January 2010 and March 2013, records of 30 men and 2 women (mean±SD age, 26.7±7.7 years) who had not undergone surgery for antero-inferior shoulder instability, and records of 31 men and one woman (mean±SD age, 27.0±5.0 years) who had undergone Latarjet stabilisation for antero-inferior shoulder instability and had been followed up for a mean±SD period of 21.3±12.4 months were reviewed. The cohorts were not subdivided according to pathologies, although any of the labral, capsular, and bony damage may lead to antero-inferior instability.

The 3 scales were administered by 2 investigators during single outpatient clinic visits. The WOSI comprises 21 items in 4 domains: physical symptoms, sports/recreation/work, lifestyle, and emotions, with maximum scores of 1000, 400, 400, and 300, respectively. This absolute WOSI score was converted to a percentage of normal function (0%–100%). The MISS comprises 2 questions and 24 items in 4 domains: pain, instability, function, and occupation/sporting demands, with maximum scores of 15, 33, 32, and 20, respectively. The L’Insalata scale comprises 2 questions and 21 items in 5 domains: pain, daily activities, recreational activities, work, and satisfaction/areas for improvement, with maximum scores of 40, 20, 15, 10, and 15, respectively. For the 3 scales, higher scores indicate better perceived shoulder function.

All score data were normally distributed based on the Kolmogorov-Smirnov one-sample test. Scores of any 2 scales were compared using differences in means/proportions with 95% confidence intervals fitted around point estimates. Within each group, the mean scores of the 3 scales were compared.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Preoperative group (n=32)</th>
<th>Postoperative group (n=32)</th>
<th>Difference (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD WOSI score</td>
<td>47.8±22.0</td>
<td>78.0±19.7</td>
<td>30.2 (19.8–40.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean±SD MISS score</td>
<td>50.8±14.5</td>
<td>75.7±11.5</td>
<td>24.9 (18.4–31.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean±SD L’Insalata score</td>
<td>66.9±15.8</td>
<td>89.2±9.9</td>
<td>22.3 (15.7–28.9)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale pair</th>
<th>Preoperative group (n=32)</th>
<th>Postoperative group (n=32)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation coefficient</td>
<td>p Value</td>
</tr>
<tr>
<td>WOSI-MISS</td>
<td>0.66</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>L’Insalata-WOSI</td>
<td>0.58</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>L’Insalata-MISS</td>
<td>0.77</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
using the analysis of variance. Student’s paired t-test was used for post-hoc comparison of means. Pearson correlation test (2-tailed) was used to assess correlation coefficients between scores of scale pairs. The level of significance was set at p=0.01.

RESULTS

The mean score of each scale was significantly greater in the postoperative than preoperative group (p<0.001, Table 1). Within each group, the mean scores of the 3 scales differed significantly (ANOVA, p=0.001). The mean L’Insalata score was significantly higher than the mean WOSI and MISS scores (p<0.01, post-hoc analysis), but the latter 2 scores did not differ significantly (p>0.01, post-hoc analysis).

Correlations of all scale pairs were significant (p<0.001, Table 2). The WOSI-MISS correlations in the pre- and post-operative groups were moderate. The L’Insalata-WOSI correlations in the pre- and post-operative groups were moderate and high, respectively. The L’Insalata-MISS correlations in the pre- and post-operative groups were high and moderate, respectively (Fig.).

DISCUSSION

There are various scales for evaluation of shoulder function; some are condition- or disease-specific and others are more general and applicable to a spectrum of shoulder conditions. Head-to-head comparisons of the scales can determine the optimal usage of each scale.

In this study, the mean WOSI and MISS scores in the pre- and post-operative groups were similar, as these 2 scales comprised similar questions and were designed to assess shoulder instability. Although the MISS has a greater spread of questions relating to functional tasks and instability than the WOSI, both scales are useful in evaluating shoulder instability. The mean L’Insalata scores were significantly higher than the WOSI and MISS scores, particularly in the postoperative group. The L’Insalata scale was designed for a different purpose; it may be less sensitive to variations within patients over time and in identifying differences between treatments. Compared with the L’Insalata scale, the MISS scale has increased responsiveness and hence a greater ability to show change. The poor agreement in absolute MISS and L’Insalata scores was attributed to

![Figure](image_url)  Correlations between pairs of the Western Ontario Shoulder Instability Index (WOSI), the Melbourne Instability Shoulder Score (MISS), and the L’Insalata Shoulder Questionnaire (L’Insalata) scores in the (a) preoperative and (b) postoperative groups.
the difficulty in obtaining high scores on the MISS. Correlation between the WOSI and MISS scores in the pre- and post-operative groups was moderate. Correlation between the L’Insalata and the WOSI or MISS scores showed greater variability, as the L’Insalata score is affected by the patient’s operative status. Direct comparisons between the L’Insalata score and the WOSI or MISS score may be misleading and should be avoided. Both the MISS and the L’Insalata scales contain questions that do not contribute to the score.

One limitation of this study was the use of 2 separate patient cohorts for analysis. The pathologies leading to antero-inferior shoulder instability were not evaluated. There may be a bias towards bony pathology in the post-treatment cohort, given the specific nature of the reconstructive surgery. The subjectivity of each scale may have introduced measurement bias.

CONCLUSION

The MISS and WOSI scales are moderately correlated. Correlation of the L’Insalata scale with other scales depends on the operative status of the patient. The use of the L’Insalata scale alone is not recommended.

DISCLOSURE

No conflicts of interest were declared by the authors.

REFERENCES