Background: The Oxford Shoulder Score (OSS) is an English-language questionnaire specifically designed to evaluate patients affected by shoulder pain. Although this scoring system has been translated into other languages, an Italian version of it is still not available. The aim of the present study was to translate, culturally adapt, and validate the Italian version of the OSS.

Materials and methods: We recruited 140 patients with shoulder pain caused by degenerative or inflammatory state or disorder of the shoulder. Patients completed the following questionnaires: Italian OSS, University of California, Los Angeles (UCLA) Shoulder Rating Scale, Constant-Murley shoulder assessment, and the Medical Outcome Study Short-Form 36 Health Survey (MOS SF-36). Internal consistency was tested using Cronbach coefficient $\alpha$. Reproducibility was assessed by asking 110 patients to complete another OSS 48 hours after the first. Correlation between the total results of both tests was determined by the Pearson correlation coefficient. Validity was assessed by calculating the Pearson correlation coefficient between the OSS and the UCLA, Constant-Murley, and SF-36 assessments.

Results: Cronbach $\alpha$ was 0.95. The Pearson correlation coefficient was $r = 0.97$. With respect to validity, there was a significant correlation between the Italian OSS and the individual scores of UCLA, Constant-Murley, and SF-36.

Discussion: Psychometric properties of the Italian OSS compared well with those reported for the English OSS. As demonstrated by the high values of Cronbach $\alpha$ and Pearson correlation coefficients, in accordance with the English version of the OSS, the Italian version proved to be a reliable, valid, and reproducible measure of shoulder pain perception in Italian-speaking patients.

Level of evidence: Level 1, Test of previously developed criteria, diagnostic test study.

Keywords: Oxford shoulder score; shoulder; validation; quality of life; Italian translation
than the Oxford Shoulder Score (OSS). The literature, however, reports no Italian version of it.

The need for validated translations has become more essential with the growing number of multicenter and multinational studies, which provide more statistical power of randomized controlled trials. Given the prevalence and socioeconomic consequences of shoulder pain, we believe an Italian cultural adaptation and validation of the OSS would be extremely beneficial for Italian-speaking surgeons and patients. The objective of the present study was to translate and culturally adapt the OSS into Italian and to test its validity in Italian mother-tongue patients with shoulder pain.

Materials and methods

Medical Ethics Committee approval was obtained for the present study.

Translation and adaptation process

Translation and cross-cultural adaptation of the OSS was done according to the guidelines reported in the literature. Three bilingual native Italian speakers translated the questionnaire into Italian, independently from one another. During a conference, a consensus was reached on a first preliminary Italian version based on the 3 translations. Then, 2 bilingual native English speakers retranslated the reconciled version into English. Any inconsistency between the original English version and the retranslated English version was resolved in the second draft of the questionnaire. Afterwards, 3 doctors, a nurse, a medical student, and a physiotherapist evaluated all versions. Consensus on the final version was obtained. After the final questionnaire was approved (Appendix; the Italian version of the OSS), it was pretested on 10 patients with shoulder pain and 10 patients without shoulder pain to test for comprehensibility.

Patients

Between September 2008 and March 2009, 140 consecutive patients with shoulder pain caused by degenerative or inflammatory state disorder of the shoulder were recruited. All patients were seen at the orthopedic outpatient clinic of our university hospital.

The inclusion criteria were age 18 years or older, ability to complete questionnaires, and being a native Italian speaker. The study excluded patients with shoulder instability. Patient sex, age, operated/nonoperated status and diagnosis, including impingement with rotator cuff tear, without tear, calcified deposits in rotator cuff, and force in abduction as measured by a spring scale (maximum 25 points) were recorded (Table I). All patients gave their informed consent, upon receiving complete information on the study.

The patients received and personally completed the following questionnaires: Italian version of the OSS, the University of California Los Angeles (UCLA) Shoulder Rating Scale, the Constant-Murley shoulder assessment, and the Medical Outcome Study Short-Form 36 Health Survey (MOS SF-36).

All patients were presented the OSS before the SF-36 and were asked to make note on the questionnaire of the time required to answer the questions. Comprehensibility and acceptance of the questionnaire were evaluated by the number of items completed, number of items left blank, and time required to complete the questionnaire. Time needed to evaluate the questionnaires was also recorded to test the ease with which the OSS is assessed by the surgeons.

The OSS

The OSS is a 12-item questionnaire for completion by patients with a degenerative or inflammatory state of the shoulder. It is not suitable for patients with instability of the shoulder. Each question has 5 categories of response, corresponding to a score ranging from 1 to 5. Overall score ranges from 12 (best) to 60 (worst). The questions investigate both pain and influence on the quality of life. The OSS is short, practical, reliable, valid, and sensitive to clinically important changes.

UCLA Shoulder Rating Scale

The supplemented version of the UCLA score was used. Two questions deal with pain and function of the affected shoulder. There are 6 possible answers and a score between 1 and 10. Two questions deal with active flexion and force exerted thereby, with 6 possible answers and a score between 0 and 5. The final question concerns patient satisfaction with the shoulder, with a score of 0 or 5. The best possible final score is 35.

The Constant-Murley shoulder assessment

This scoring system is based on an 8-item questionnaire. Five questions evaluate the shoulder objectively, and 3 items evaluate it subjectively, with a maximum score of 100. One question concerns the degree of pain and 2 concern the degree of activity in daily life, each with a maximum score of 15 or 20. Four questions investigate range of motion (maximum 40 points), and 1 evaluates force in abduction as measured by a spring scale (maximum 25 points).

The MOS SF-36

This 36-item questionnaire assesses general health. It evaluates physical function, social function, limitations caused by physical symptoms, limitations caused by emotional problems, general mental health, vitality, pain, and perception of general health. Scores for each dimension range from 0 (poor) to 100 (good health).
Psychometric testing and analysis

Reliability is divided into internal consistency and reproducibility.

Internal consistency was tested using the Cronbach coefficient \( \alpha \), which summarizes the internal correlations of all items in a scale. The higher the coefficient (range, 0 to 1) the more consistent is the scale and the greater the likelihood that it is tapping an underlying single variable on the questionnaire. The coefficient was also calculated for elimination of 1 item in all 12 questions. All items were examined for correlation with the overall score. \(^{10}\)

Reproducibility, or test-retest reliability, was assessed by asking 110 patients to complete another take-home blank OSS 48 hours after the first and to return it by e-mail, fax, or standard mail to our department for evaluation. All patients were told about the importance of completing the take-home test 48 hours after the first, and were asked to refuse to do so if they had any doubt that they would be able to complete this instruction.

Correlation between the total results of both tests was determined by the Pearson correlation coefficient. \(^{10}\) The difference between the 2 tests was also calculated. To detect systematic trends, confidence intervals for the mean difference were calculated, and paired \( t \) tests were performed. \(^{18}\)

Validity was assessed by calculating the Pearson correlation coefficient between the OSS and the UCLA, Constant-Murley and SF-36.

Statistical analyses were performed using SPSS 11.0 software (SPSS Inc, Chicago, IL). Values of \( P < .05 \) were considered significant.

Results

No major language problem was experienced in the forward- and back-translations of the OSS. The only minor problem encountered was the use of different synonyms by different translators. For instance: “Ha avuto difficolta` nel vestirsi da solo a causa della Sua spalla?” vs “Ha avuto problemi nel vestirsi da solo a causa della Sua spalla?” The first question translates to “Have you had any difficulty dressing yourself because of your shoulder?” The second sentence translates to “Have you had any problem dressing yourself because of your shoulder?” This difference did not determine an alteration of the meaning and connotation of the question being translated. However, a consensus was obtained on the choice of the term to be included in the final version of the Italian OSS.

In terms of cross-cultural adaptation, given the tradition of Italian families to eat in the kitchen and rare habit of using trays on a daily basis, item 6 of the OSS was modified accordingly: “E` stato in grado di portare per una stanza/cucina un piatto pieno di cibo?,” meaning “Could you carry a plate full of food across a room/kitchen?,” whereas the same item on the original OSS said “Could you carry a tray containing a plate of food across a room?” Despite the

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean score ± SD</th>
<th>Item-total correlation</th>
<th>Alpha if item removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.70 ± 1.19</td>
<td>0.67</td>
<td>0.93</td>
</tr>
<tr>
<td>2</td>
<td>2.55 ± 1.01</td>
<td>0.79</td>
<td>0.94</td>
</tr>
<tr>
<td>3</td>
<td>2.10 ± 0.96</td>
<td>0.64</td>
<td>0.94</td>
</tr>
<tr>
<td>4</td>
<td>1.70 ± 0.97</td>
<td>0.57</td>
<td>0.93</td>
</tr>
<tr>
<td>5</td>
<td>2.96 ± 1.08</td>
<td>0.70</td>
<td>0.95</td>
</tr>
<tr>
<td>6</td>
<td>2.41 ± 0.96</td>
<td>0.69</td>
<td>0.94</td>
</tr>
<tr>
<td>7</td>
<td>3.12 ± 1.02</td>
<td>0.82</td>
<td>0.94</td>
</tr>
<tr>
<td>8</td>
<td>3.71 ± 1.45</td>
<td>0.76</td>
<td>0.96</td>
</tr>
<tr>
<td>9</td>
<td>3.25 ± 1.20</td>
<td>0.77</td>
<td>0.94</td>
</tr>
<tr>
<td>10</td>
<td>2.89 ± 1.05</td>
<td>0.80</td>
<td>0.94</td>
</tr>
<tr>
<td>11</td>
<td>3.76 ± 0.95</td>
<td>0.81</td>
<td>0.93</td>
</tr>
<tr>
<td>12</td>
<td>3.90 ± 1.11</td>
<td>0.69</td>
<td>0.95</td>
</tr>
</tbody>
</table>

SD, standard deviation.

### Table II Absolute values of all scores

<table>
<thead>
<tr>
<th>Scores</th>
<th>Mean ± SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>64.36 ± 22.7</td>
<td>15-100</td>
</tr>
<tr>
<td>UCLA</td>
<td>21.12 ± 5.94</td>
<td>10-35</td>
</tr>
<tr>
<td>Oxford Shoulder Score</td>
<td>36.05 ± 13.95</td>
<td>13-57</td>
</tr>
<tr>
<td>SF-36</td>
<td>37.74 ± 13.95</td>
<td>13-57</td>
</tr>
</tbody>
</table>

### Table IV Correlation between OSS and Constant-Murley, UCLA, and SF-36

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Correlation with OSS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant-Murley</td>
<td>0.73</td>
</tr>
<tr>
<td>UCLA</td>
<td>0.67</td>
</tr>
<tr>
<td>SF-36</td>
<td>0.57</td>
</tr>
</tbody>
</table>

\(^{*}\) All correlations \( P < .0001 \).
modifications, pretesting of the Italian OSS demonstrated full comprehension of all items.

A total of 140 patients personally completed the questionnaires. No item was left blank. Table II reports absolute values of all scores. The mean time (minutes:seconds) for completion of the OSS was 3:10 (range, 1:11-6:53), and the mean time required for evaluation of the questionnaire was 0:38 (range, 0:28-1:02). Internal consistency was high (Cronbach α = 0.95). Elimination of one item in all 12 questions did not result in a value <0.93. All items correlated, with the total score >0.57 (Table III).

A total of 110 patients completed the OSS twice to test for reproducibility. The Pearson correlation coefficient was \( r = 0.97 \). The mean difference between the 2 questionnaires was \(-0.47 \) (standard deviation, 1.94; 95% confidence interval, \(-1.41 \) to 0.34), which was not significantly different.

With respect to validity, there was a significant correlation between the OSS and the individual scores of the UCLA, Constant-Murley, and SF-36. Physical subscales exhibited higher values than emotional components (Table IV).

**Discussion**

Shoulder pain is a common orthopedic problem, accounting for more than 6 million outpatient visits to orthopedic surgeons each year. Multiple pathologies may be responsible for the pain, but impingement syndromes seem to be among the most important triggers.

Despite several questionnaires that assess patients with shoulder pain, like the Disabilities of the Arm, Shoulder and Hand (DASH), Constant-Murley, and UCLA assessment, only the OSS is specifically designed to evaluate quality of life and pain perception in patients affected by symptomatic pathologies limited to the shoulder. The DASH is a valuable patient-reported measure, but its use for evaluating the whole upper limb limits shoulder pain. The DASH is a valuable patient-reported measure of shoulder pain.

The psychometric properties of the Italian OSS compared well with those reported for the English OSS. As demonstrated by the internal consistency (Cronbach α = 0.95), test-retest reliability (Pearson correlation coefficient was \( r = 0.97 \)) and the nonsignificant difference between the 2 tests (−0.47), in accordance with the English version of the OSS, the high values of the Cronbach α and Pearson correlation coefficients demonstrated that the Italian version is a reliable, valid, and reproducible measure of shoulder pain perception.

With respect to the test-retest reliability, the 48-hour interval was chosen because it is one after which it is unlikely that the patients remember the content of the questionnaire, and during which no change in disease state is expected.

As for the English version of the OSS, correlation between the Italian OSS and Constant Murley, UCLA, and SF-36 questionnaires was high, which confirmed construct validity. These data were also observed in the German version of the OSS.

Scores on the Italian OSS were slightly higher than those on the English and German versions. This difference should not be related to demographic and clinical differences between the study populations, which were comparable among these studies. Interestingly, Lingard et al. have shown that geographic, cultural, and health care system differences seem to affect perception of quality of life. Therefore, such differences should be taken into account when questionnaire scores across clinical studies in different countries are compared.

In conclusion, the present study demonstrated that the Italian version of the OSS, translated according to international standardized guidelines, is a reliable, valid, and
adapted questionnaire for Italian-speaking patients with degenerative and inflammatory disorders of the shoulder.

**Disclaimer**

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

**References**


## Domanda Punteggio

### Nelle ultime 4 settimane:

1. **Come descriverebbe il peggiore dolore che ha provato alla spalla?**
   - Nessun dolore
   - Dolore lieve
   - Dolore moderato
   - Dolore forte
   - Dolore insopportabile
2. **Ha avuto difficoltà nel vestirsi da solo a causa della Sua spalla?**
   - Nessun problema
   - Lieve difficoltà
   - Difficoltà moderata
   - Difficoltà estrema
   - Impossibile vestirsi da solo
3. **A seconda del mezzo di trasporto che utilizza più di frequente, ha avuto difficoltà nel salire e scendere dall’auto o nel prendere un mezzo pubblico a causa dei Suoi problemi alla spalla?**
   - Nessuna difficoltà
   - Lieve difficoltà
   - Difficoltà moderata
   - Difficoltà estrema
   - Impossibile farlo
4. **E’ stato in grado di utilizzare coltello e forchetta allo stesso tempo?**
   - Si, facilmente
   - Con lieve difficoltà
   - Con moderata difficoltà
   - Con estrema difficoltà
   - No, impossibile
5. **E’ stato in grado di fare la spesa da solo?**
   - Si, facilmente
   - Con lieve difficoltà
   - Con moderata difficoltà
   - Con estrema difficoltà
   - No, impossibile
6. **E’ stato in grado di portare per una stanza/cucina un piatto pieno di cibo?**
   - Si, facilmente
   - Con lieve difficoltà
   - Con moderata difficoltà
   - Con estrema difficoltà
   - No, impossibile
7. **E’ stato in grado di pettinarsi/spazzolarsi i capelli con il braccio malato?**
   - Si, facilmente
   - Con lieve difficoltà
   - Con moderata difficoltà
   - Con estrema difficoltà
   - No
8. **Come descriverebbe il dolore che solitamente ha provato alla spalla?**
   - Nessun dolore
   - Molto lieve
   - Lieve
   - Moderato
   - Severo
9. **E’ stato in grado di appendere i vestiti nell’armadio con il braccio affetto?**
   - Si, facilmente
   - Con lieve difficoltà
   - Con moderata difficoltà
   - Con grande difficoltà
   - No, impossibile
10. **E’ stato in grado di lavarsi/asciugarsi entrambe le ascelle?**
    - Si, facilmente
    - Con lieve difficoltà
    - Con moderata difficoltà
    - Con grande difficoltà
    - No, impossibile

### Domanda Punteggio

11. **Quanto ha influito il dolore alla spalla nell’esecuzione delle Sue abituali attività lavorative? (incluse quelle domestiche)**
   - Per niente
   - Un po’
   - Moderatamente
   - Molto
   - Totalmente
12. **Il dolore alla spalla Le ha recato disturbo a letto durante la notte?**
   - No
   - Solo 1 o 2 notti
   - Alcune notti
   - La maggior parte delle notti
   - Tutte le notti

(continued on next page)