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# Italian Version of University of California at Los Angeles (UCLA) Activity Score: Cross-Cultural Adaptation

Alessandro Calistri, MD [a,b], Luca Di Martino, MD [a], Michele D. Gurzì, MD [a], Marco Bove, MD [a], Koen De Smet, MD [b], Ciro Villani, MD [a]

[a] Department of Anatomical, Histological, Forensic Medicine and Orthopedic Science, University of Rome "Sapienza," Rome, Italy
[b] ANCA Medical Centre, Ghent, Belgium

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ABSTRACT

Over the last 10 years, patient-oriented evaluations using questionnaires have become an important aspect of clinical outcome studies. Any questionnaire must be translated and culturally adapted in order to be used with different language groups, and the translated version must then be evaluated for reliability, validity and responsiveness which are fundamental attributes of any measurement tool. The aim of this study is the validation, translation and cross-cultural adaptation of the Italian version of UCLA activity Score, following the Guillemin criteria. The results show that our Italian version of the UCLA score has the following: reproducibility expressed as ICC = 0.994, an internal consistency calculated as Spearman–Brown coefficient = 0.754 and finally the construct validity has demonstrated a significant Pearson's correlation coefficient with other validated hip questionnaires.



Orthopedic outcome measurements have usually focused on objective parameters such as radiographic measures or other technical aspects. However, these parameters are weakly correlated with the outcomes that are most relevant to patients, such as functional status and symptoms.

The most common instruments used to assess the patient's perspective are self-administered questionnaires, which must be subjected to a validation process to evaluate reliability and validity, which are fundamental attributes for any instrumental measure.

Hip arthroplasty is well recognized as an effective surgical procedure for relieving pain and improving physical function in patients with end-stage degenerative joint disease. Harris Hip score and WOMAC index have been extensively used over the last 20 years in the evaluation of hip osteoarthritis and to assess the patient-reported outcome after surgery. Both measures are reliable, valid and responsive to change. Each one contains questions about joint pain and function. Higher scores represent better health-related quality of life.

However, the UCLA activity score represents a reliable tool for assessing the level of physical activity and the return to sport high functional demand after hip arthroplasty. Hip resurfacing arthroplasty is a procedure commonly performed in young adults. Theoretical advantages are less bone destruction, less bone resection, normal femoral loading, avoidance of stress shielding, maximum proprioceptive feedback, and restoration of normal anatomy. Patients who undergo these procedures, must return to heavy manual work and to high-impact activities, which include recreational sports.

The purpose of this study is to evaluate if the Italian cross-cultural adapted version of University of California at Los Angeles (UCLA) activity score is a statistically valid representation of the English version. Also, this analysis was made within a sample composed of patients that were subjected to hip resurfacing and with high functional demand.

## Materials and Methods

We performed a cross-cultural adaptation and translation, as recommend by the World Health Organization and also by Guillemin and Beaton [1–4]; continuing with forward translation, back-translation, and expert committees [5].

In order to validate the questionnaire, two professional translators (mother-tongue Italian and fluent in English) have made two independent translations of the UCLA activity score. Then, a synthesis of these two translations into one version was made in order to resolve any discrepancy. Thereafter a native English speaker, fluent in Italian, and naive to the investigated topic has performed independent back translation.

Finally a consensus meeting of all involved subjects (expert committees: the authors, the two initial translators, one linguist, one methodologist and one patient expert in orthopedics) was made to resolve any problems and discrepancies (Fig. 1).

The study was carried out on 65 patients (all male; mean age 55.86, range: 34–72; mean BMI 31.06, range: 22.21–39.71) suffering from hip arthritis, as assessed by clinical examination and imaging

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Reprint requests: Michele Gurzì, MD, University of Rome "Sapienza," Piazzale Aldo Moro 5, 00136 Rome, Italy.

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(radiographic analysis, computed tomography and/or magnetic resonance imaging), all of whom underwent hip resurfacing (Table 1).

Each patient filled in the following:

1. Our Italian version of the UCLA
2. The SF-12
3. A visual analogue scale (VAS)
4. The Harris Hip Score
5. The Oxford Hip Score
6. WOMAC

We have used WOMAC also to assess responsiveness of our Italian version of UCLA [6].

Statistical analysis was performed to assess reliability and validity. The Spearman–Brown split-half reliability coefficient for internal consistency was used. Reproducibility was tested with the ICC coefficient and the questionnaire was administered twice to a sample of 40 patients (test–retest).

The construct validity of our version of UCLA activity score and of the validated versions WOMAC, Harris HIP Score and SF12 was determined assessing the whole sample results by means of Pearson's coefficient, for all follow-up time. Finally responsiveness was calculated as the effect size (ES) and as receiver operating characteristic (ROC) curves of our version of UCLA activity score and WOMAC achieved pre-operatively and at 3 months post-operatively (Table 2). All data were analyzed through SPSS Statistics 20 [6,7].

**UCLA Activity Score**

**Paziente ID:**

**Lato :** ␣ Sinistro ␣ Destro
**Data Esame (GG/MM/AA):** / /
**Iniziali Paziente :** I____I____I____I
**Numero di Registrazione Pz:**
**FOLLOW-UP:** _____!

**Contrassegnare la casella che meglio descrive il livello di attività attuale.**

1 Totalmente inattivo, dipendente dagli altri, e non può lasciare la propria abitazione

2 Per lo più inattivo o limitato alle attività minime della vita quotidiana.

3 A volte partecipo alle attività fisiche modeste, come camminare, lavori domestici limitati e fare shopping limitato.

4 Regolarmente partecipa ad attività fisica modesta.

5 A volte partecipa ad attività fisiche moderate come il nuoto o fare i lavori domestici o fare shopping senza limiti.

6 Regolarmente partecipa ad attività fisiche moderate

7 Partecipa regolarmente ad attività come andare in bicicletta.

8 Partecipa regolarmente ad attività, come il golf o il bowling.

9 A volte partecipa a sport di impatto, come jogging, tennis, sci, acrobazie, danza, lavori pesanti o zaino in spalla.

10 Regolarmente partecipa a sport di contatto.

**Fig. 1.** Appendix A: Italia version of UCLA activity score.

**Table 1**
Descriptive Statistics of the Whole Sample.

| | *n* of Observation | Range | Mean | S.D. |
|---|---|---|---|---|
| Age | 65 | 34.13–72.94 | 55.86 | 8.43 |
| weight | 65 | 58–120 | 84.25 | 14.21 |
| height | 65 | 1.57–1.91 | 1.76 | 0.07 |
| bmi | 65 | 22.21–39.71 | 31.06 | 4.07 |
| follow-up (month) | 65 | 0–24 | 3.76 | 4.75 |

## Results

Our version of UCLA activity score has showed an excellent reproducibility (ICC = 0.994; C.I. = 989–997) and a good internal consistency (Spearman–Brown coefficient = 0.754). There was a good correlation between the test and retest results and the questionnaire proved good homogeneity in split-half test.

The construct validity was assessed with Pearson's correlation test which shows a moderate–high correlation coefficient between our version of UCLA score and total WOMAC (Rho = −674; *P*-value < 0.001), with Harris hip score (Rho = 689; *P*-value < 0.001), with SF12 physical component (Rho = 675; *P*-value < 0.001), with Oxford hip score (Rho = 675; *P*-value < 0.001) and with VAS (Rho = −572; *P*-value < 0.001). At last, the correlation between UCLA and SF12 mental component summary did not show statistical significance (Rho = 378; *P*-value < 0.001) (Table 3).

The value of effect size for our version of UCLA activity score was 0.705. The ROC curve analysis has shown a value of AUC of 0.899 (95% CI: 0.83, 0.92) for our version of UCLA activity score and a value of 0.983 (95% CI: 0.99, 0.1) for WOMAC score. The standard error values were 0.032 for UCLA activity score and 0.014 for WOMAC (Fig. 2).

## Discussion

Questionnaires are needed in order to address patients' perception of a single disease entity and are maximally sensitive to the outcomes. We found out that the UCLA score is a simple, valid and reproducible tool for the assessment of the regain of sport activity levels in patients who undergo total hip arthroplasty. For this purpose we elaborated an Italian adaptation of this questionnaire that has the same validity as the English version.

In any case, patients must be thoroughly assessed by the surgeon by clinical and radiographic assessments [8].

The development of tools to measure patients' symptoms has been mainly carried out by the English mother-tongue scientific community. Therefore, most of the questionnaires are written in English and tailored for the Anglo-Saxon culture. The need to include the patient's perspective in scientific papers puts an onus on the European scientific community to adopt such types of analysis. The process of spreading such evaluation systems throughout Europe requires either the elaboration of new questionnaires or the adaptation of those that

**Table 2**
The Results of WOMAC and UCLA Activity Score at Pre-Operation Time and at 3 Months of Follow-Up.

| | *n* of Observation | Range | Mean | S.D. |
|---|---|---|---|---|
| WOMAC pain pre-op | 65 | 2–18 | 8.5 | 3.72 |
| WOMAC stiffness pre-op | 65 | 2–8 | 4.54 | 1.61 |
| WOMAC function pre-op | 65 | 8.97–56.98 | 34.55 | 11.67 |
| WOMAC TOT PREOP | 65 | 14.01–74 | 47.42 | 15.42 |
| UCLA pre-op | 65 | 2–7 | 3.49 | 1.516 |
| WOMAC pain 3°Month | 65 | 0–5 | 0.59 | 0.9 |
| WOMAC stiffness 3° Month | 65 | 0–2 | 1.21 | 0.8 |
| WOMAC function 3°Month | 65 | 0–25.02 | 10.3 | 3.91 |
| WOMAC TOT3°Month | 65 | 0–29.95 | 7.85 | 4.73 |
| UCLA TOT3°Month | 65 | 3–9 | 6.45 | 1.48 |

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**Table 3**
Pearson's Correlation Between UCLA and Other Validated Questionnaires.

| | | WP | WOMAC Stiff | WOMAC Func | WOMAC Tot | HHS | Oxford | VAS | PCS 12 | MCS12 |
|---|---|---|---|---|---|---|---|---|---|---|
| UCLA tot | Pearson's *r* coefficent | −.603 | −.595 | −.678 | −.674 | .689 | .675 | −.572 | .604 | .378 |
| | *P*-value | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| | *n* of total observation | 242 | 242 | 242 | 242 | 242 | 242 | 242 | 242 | 242 |

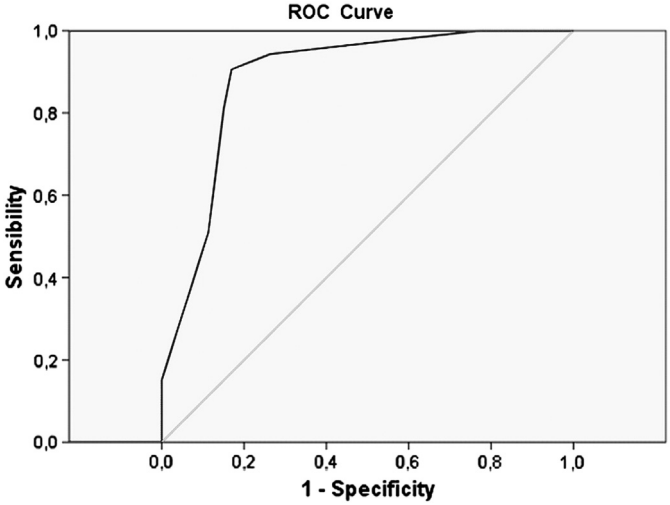


**Fig. 2.** ROC curve of UCLA activity score pre-operatively and 3 months post-operatively.

already exist in countries with a different language and culture [9–12]. The former solution implies a complex procedure, whereas the latter demands a linguistic and cultural adaptation process and a statistical validation of the new version. The trans-cultural adaptation procedure, which was described by Guillemin et al [9] in 1993 with regard to non-specific questionnaires, is without doubt more challenging than a mere linguistic translation. However, the development of disease-specific questionnaires is slightly simpler. Whereas the trans-cultural adaptation of generic health status questionnaires requires a complex analysis of psychological and cultural aspects, the analysis of symptoms shared in specific pathologies is simpler. In the latter case, the subjective complaints are investigated through specific questions, without fundamental interference of cultural influences. A further element, favoring the translation of existing questionnaires over the development of new ones, is that the diffusion of a single questionnaire into the International scientific community will allow the performance of meta-analysis studies and the standardization of outcome measurement.

Assessment of activity levels in patients undergoing hip arthroplasty is important to respect patients' concerns and expectations and to estimate possible risks derived from increased physical activity and sports such as implant failure and wear production. Compared to patients undergoing THA, though with similar expectations pre-operatively in terms of regain of pre-pathologic activity levels, a higher proportion of hip resurfacing patients were able to return to running and to other sports, likewise a larger number of patients were more frequently able to perform heavy manual work.

The limitation of our study is the lack of women representation, but the rigorous procedure followed, the good sample size and its homogeneity in age and treatment reduce possibility of bias.

Our study was designed to assess the reliability of UCLA score in patients treated with hip resurfacing arthroplasty and the ability to assess and understand the return to sports and performance.

The Italian version of University of California at Los Angeles (UCLA) activity score showed levels of reliability and validity comparable to the English version [6].

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