

# SPECIFIC QUESTIONNAIRE FOR KNEE SYMPTOMS - THE "LYSHOLM KNEE SCORING SCALE" – TRANSLATION AND VALIDATION INTO PORTUGUESE

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## SUMMARY

Knee diseases present variable consequences for an individual's function and quality of life. For the purposes of translating, validating and checking the measurement properties of the specific questionnaire for knee symptoms - the "Lysholm Knee Scoring Scale" - into Portuguese, we selected, for convenience, 50 patients (29 males and 21 females, mean age = 38.7 years) with knee injuries (meniscal injury, anterior cruciate ligament injury, chondromalacia or arthrosis). Reproducibility and ordinal consistency inter- and intra-interviewer were excellent ( $\alpha = 0.9$ ). The nominal consistency inter-interviewers was good (Kappa = 0.7) and intra-interviewer was excellent (Kappa = 0.8). During validation process, we correlated the Lysholm questionnaire with

the pain numerical scale ( $r = -0.6$ ;  $p = 0.001$ ) and with the Lequesne index ( $r = -0.8$ ;  $p = 0.001$ ). Correlations between Lysholm questionnaire and the global health evaluation by patient and by therapist were poor and not significant. The correlations between Lysholm questionnaire and SF-36 were significant for physical aspects ( $r = 0.4$ ;  $p = 0.04$ ), pain ( $r = 0.5$ ;  $p = 0.001$ ) and function ( $r = 0.7$ ;  $p = 0.0001$ ). We concluded that the translation and cultural adaptation of the "Lysholm knee scoring scale" into our language have proven to be reproducible and valid in patients with meniscal injury, anterior cruciate ligament injury, chondromalacia or knee arthrosis.

**Keywords:** Questionnaires; Translations; Knee injuries.

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## INTRODUCTION

Knee joint internal disturbances are uncountable, presenting variable consequences for an individual's function and quality of life. The increasing search for physical activities associated to a complex and so vulnerable anatomy of knee joint led to an increase of the number of ligament injuries on this joint, especially on anterior cruciate ligament.

Joint instability is reported by patients complaining about missing steps and lack of confidence upon certain movements. Chronic anterior instability evolves with a large incidence of X-ray degenerative changes, as well as meniscal and chondral injuries. Current trend for patients intending to resume sports practice is the indication of knee ligament reconstruction.

Knee surgery advancement has been assessed by means of the development of new surgical techniques, new instruments, as well as of surgeons' specialization. Previously, empirical assessments were made for checking the effectiveness of an established treatment. Many times, those assessments provided wrong conclusions regarding the evolution and quality of the employed techniques.

The complexity of knee joint and the number of criteria for

evaluating its function and symptoms make measurements and quantification of employed treatments difficult.

In 1955, O'Donoghue<sup>(1)</sup> was the first to develop a system for assessing outcomes. An objective examination and a questionnaire totaling 100 score points was used for assessing outcomes on knee ligament repairs. The answers to each question were "yes" (10 points) or "no" (0 point) kind. Assessment was supplemented by adding subjective criteria, such as stroke, disability, and functional evaluation.

Slocum and Larson<sup>(2)</sup> recognized the need to assess rotational instability and comparative values pre- and postoperatively.

Larson<sup>(3)</sup> developed a scale of 100 score points based on subjective, objective and functional criteria. At functional aspect, it was concerned to assess an individual's conditions to walk, run, jump, and squat.

Marshall et al.<sup>(4)</sup>, emphasized that the adequate method of assessment should allow a surgeon to determine anatomical injuries and correspondent functional damages. On this ground, they developed, in 1977, the scale "Hospital for Special Surgery Knee Score (HSSKS)"<sup>(5)</sup>, the first specific method used for assessing knee ligament injuries. The HSSKS includes subjective symptoms, subjective function, and

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objective functional tests, as well as a clinical examination. Lysholm and Gillquist<sup>(6)</sup> developed a scale for assessing symptoms. The Lysholm scale includes basic aspects of the Larson scale, but introducing the instability symptom and correlating it to activity. This scale was later modified by Tegner and Lysholm<sup>(7)</sup>. They recognized the difficulty in achieving a score for ligament injury, and decided, in that issue, to research clinical findings, and assess only symptoms and function. The Lysholm scale or questionnaire is constituted of eight questions, with closed answers alternatives, of which final score is expressed nominally and ordinally, with a score ranging from 95 to 100 points regarded as "excellent"; 84 to 94 points, "good", from 65 to 83 points, "fair", and "poor" when values were equal or below 64 points.

The absence of a specific instrument for assessing knee symptoms in Portuguese called our attention to translate the "Lysholm Knee Scoring Scale", one of the most used questionnaires for assessing knee symptoms in traumatology area. Our objectives in this study were: to translate and adjust the "Lysholm Knee Scoring Scale" into Portuguese, as well as to check its measurement properties (reproducibility and validity).

## MATERIAL

Fifty patients (42% females and 58% males) have been selected from Centro de Traumatologia do Esporte (CETE), UNIFESP-EPM and from Instituto Cohen de Ortopedia, presenting with knee joint diseases, with diagnosis determined by the same orthopaedic doctor.

The average age of the sample was 38.7 years old (16-72). From the 50 studied patients, 32% had a high school degree, and 68% had university degree. The patients selected for this study were those fulfilling the following inclusion criteria established for this research: Brazilian citizens, with arthrosis diagnosis (6), meniscal injury (15), anterior cruciate ligament injury (12), isolated or combined knee (5) chondral injury (12), with diagnostic complementation provided by means of imaging tests. The patients did not present medication switch or any other procedure during study period (15 days).

## METHODS

Methodology employed followed the recommendations by Guillemin et al.<sup>(8)</sup>, for translation and cultural adaptation. The specific questionnaire for knee symptoms "Lysholm Knee Scoring Scale" was translated.

Reproducibility of Lysholm scale was assessed by means of three interviews made with 50 patients presenting with meniscal injury, ligament injury, or isolated and combined chondral injuries diagnosis. The assessments were performed by two independent interviewers (interviewer 1 and 2), on the same day (inter-observer reproducibility), and within a time interval of 45 min. between both interviews. Subsequently, a new assessment, with maximum time interval of 15 days (average: 7 days) was performed by interviewer nr. 1 (intra-observer reproducibility). The first and third interviews were performed by a non-medical professional (interviewer 1) and the second one was performed by an expert doctor (interviewer 2).

The Lysholm questionnaire validity was assessed by checking its correlation with established diagnosis and other clinical parameters, all of them performed by the same interviewer, at the moment of the first interview, which are described below:

Pain numeric scale from zero to 10 (0 = no pain and 10 = extreme pain);

Overall health evaluation made by patients (AVGP), with a scale ranging from zero to 10 (0 = bad health and 10 = perfect health);

Overall health evaluation made by a healthcare professional (AGSPS) with a scale ranging from zero to 10 (0 = bad health and 10 = perfect health);

Lequesne's index<sup>(9)</sup>, where global final score of a patient enables to classify a disease's severity as mild (1 to 4 points), moderate (5 to 7 points), severe (8 to 10 points), very severe (11 to 13 points), and extremely severe (above 14 points);

Generic questionnaire for quality of life SF-36<sup>(10)</sup>, which is a multidisciplinary questionnaire constituted of 36 items comprised in eight scales, measuring eight domains (0-100).

## Statistical analysis

The following statistical tests have been performed:

- Mann-Whitney's test, variance analysis by Kruskal-Wallis' posts, Spearman's correlation coefficient, Cronbach's alpha coefficient, Kappa's reliability coefficient. For all statistical tests, the significance level adopted was alpha <0.05 or 5%.

## RESULTS

Twenty patients with knee joint disease took part of the cultural equivalence evaluation phase.

Only question number 3 (restraining) was regarded as difficult to understand by more than 10% of studied population (n=10).

A new version was again administered in other 10 patients intending to check its understanding and cultural equivalence. After those modifications, the question was regarded as equivalent by more than 95% of the patients.

Concerning the Lysholm questionnaire, three patients (6%) presented a scoring corresponding to "excellent" level, 10 patients (20%), to "good" level, 18 patients (36%) "fair", and 19 patients (38%) presented scores corresponding to "poor" level.

Regarding Lequesne's index, our sample presented the following distribution: 21 patients (42%) were at "mild" level; eight patients (16%) at moderate level; 10 patients (20%) at "severe" level; four patients (8%) at "very severe" level, and; seven patients (14%) at "extremely severe" level.

Having in mind that SF-36 questionnaire does not have a numeric scale corresponding to a nominal scale, we report that, on items such as functional capacity, physical aspect, and pain, the lowest values were achieved, in a scale ranging from zero to 100 points.

The average time for Lysholm questionnaire application was five minutes (minimum four minutes and maximum eight minutes).

The results achieved with the Lysholm questionnaire for the

first time by interviewer 1 were used as a parameter for inter-interviewer reproducibility analysis, once, in a second application by interviewer 1, inter-interviewer reproducibility was excellent, thus, those results were used as reference values (Figure 1). When we assess the consistency of the first application of Lysholm questionnaire by one interviewer with subsequent applications by two interviewers in two different moments with the same patient, we could observe that the median was very similar between those conditions, as well as scoring variability, resulting in an excellent reproducibility level. The consistency level between both questionnaire application moments performed by the same interviewer was excellent (Kappa = 0.8), and, between two interviewers, this level was regarded as good (Kappa=0.7).

Absolute values for intradisciplinary coefficient obtained for each of Lysholm's questionnaire questions, comparing inter- and intra-interviewer reproducibility are described on Table 1.

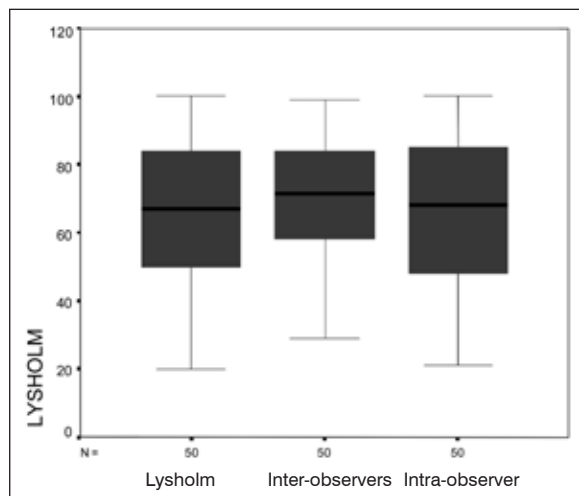
By analyzing Lysholm total scores correlation to the eight isolated questions, we found that the questions best correlating with the total were: limping, instability, pain, swelling, climbing steps, and squatting. Although questions about restraining and support presented an excellent reproducibility, they presented poor correlation to the total score, being significant for restraining question and not significant for support question.

Regarding validity, we could see a higher score, which means a lower level of symptoms presented by patients with chondromalacia and meniscal injury (Table 2). The values shown between parentheses represent scores corresponding to nominal classification.

By analyzing the scores, we could notice that the patients presenting fewer symptoms, which determines a higher score, were those presenting with chondromalacia and meniscal injury (Figure 2).

When we proceed to Spearman's correlation analysis, an inversely proportional coefficient

**Figure 1** – Inter/ Intra-observer/ interviewer consistency observed.



Lysholm = Observer/ interviewer 1  
 Inter-observers = interviewers  $\alpha = 0.89$  ;  $p < 0.0001$   
 Intra-observer = interviewer  $\alpha = 0.95$  ;  $p < 0.0001$

**Table 1** – Intradisciplinary coefficient values and their corresponding p values for the different questions assessed on Lysholm questionnaire.

Questions	Inter-interviewer	Intra-interviewer
Limping	0.8 <sup>†</sup>	0.9 <sup>‡</sup>
Support	1.0 <sup>†</sup>	1.0 <sup>‡</sup>
Restraining	0.9 <sup>†</sup>	0.9 <sup>‡</sup>
Instability	0.8 <sup>†</sup>	0.9 <sup>‡</sup>
Pain	0.9 <sup>†</sup>	0.9 <sup>‡</sup>
Swelling	0.8 <sup>†</sup>	0.9 <sup>‡</sup>
Climbing stairs	0.9 <sup>†</sup>	0.9 <sup>‡</sup>
Squatting	0.9 <sup>†</sup>	0.9 <sup>‡</sup>

<sup>†</sup>  $p < 0.0001$ ; <sup>‡</sup>  $p < 0.001$

was obtained between Lysholm questionnaire and pain numeric scale ( $r = -0.6$ ;  $p = 0.001$ ) and between Lysholm questionnaire and Lequesne's index ( $r = -0.8$ ;  $p = 0.001$ ); correlations between Lysholm questionnaire and overall health assessment by patients and overall health assessment by healthcare professional were shown to be poor and insignificant ( $r = 0.04$ ;  $p = 0.7$  /  $r = 0.12$ ;  $p = 0.38$  respectively).

We could notice that the correlations between Lysholm and SF-36 questionnaires achieved a statistical significance level when functional capacity ( $r = 0.7$ ;  $p = 0.0001$ ), physical aspects ( $r = 0.4$ ;  $p = 0.04$ ) and pain ( $r = 0.5$ ;  $p = 0.001$ ) were assessed.

Regarding social and mental health aspects, correlations were poor, with a statistically insignificant p value ( $r = 0.2$  and  $p = 0.09$ ;  $r = 0.3$  and  $p = 0.07$ , respectively). For emotional aspect, correlation was also shown to be poor, although having a significant p value.

## DISCUSSION

Scientific community is very concerned about developing questionnaires assessing health status, as well as validating instruments available

in other languages and cultures. New instruments or those being validated must be assessed and reassessed by different researchers, in different societies and situations (11). In our study, we initially assessed the applicability of the questionnaire in a sample with good cultural level, which, in a certain manner, limits its use for this population. Due to the current importance given to this topic, a subsequent step would be the applicability of Lysholm questionnaire in different socioeconomic levels.

In our study, in order to standardize the methods for applying questionnaires, we decided to perform them as interviews (12,13), even with those people having a good intellectual level.

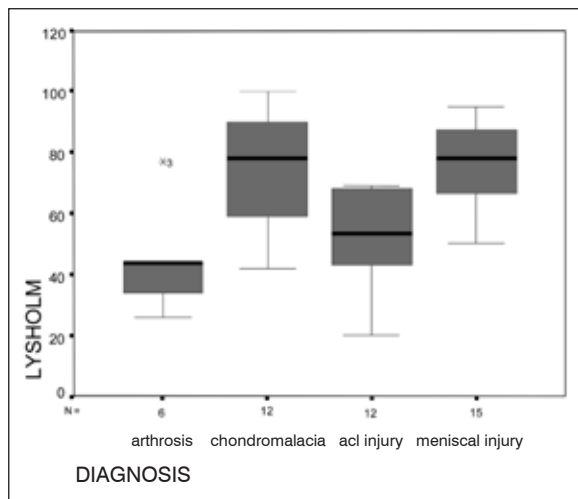
Evaluation instruments must be reproducible along the time, that is, they should produce equal or very similar results in two or more administrations in a same patient, considering that his/her overall clinical status is not

**Table 2** – Average, median, and standard deviation values obtained from Lysholm questionnaire for different clinical diagnostics.

Diagnosis	Lysholm	Average	Median	Standard deviation
Arthrosis (n=6)	Poor (<64)	44.7	43.5	17.4
Chondromalacia (n=12)	Fair (65-83)	74.6	78.0	18.9
ACL injury (n=12)	Poor (<64)	53.1	53.5	15.8
Meniscal injury (n=15)	Fair (65-83)	76.0	78.0	14.8

Patients presenting combined injuries (n=5) were excluded from this analysis.

changed<sup>(14)</sup>. All patients in our sample had a medical diagnosis of knee joint disease and were at the chronic phase of the disease. This could justify the excellent intra-interviewer consistency, once important picture changes were not seen in such a short time. We found a lower score at Lysholm questionnaire for arthrosis and anterior cruciate ligament injury cases than for meniscal injury and chondromalacia. This could be explained by the fact that the most common symptoms of arthrosis and anterior cruciate ligament injury are instability and pain, which are frequent at chronic phases of these diseases<sup>(15,16)</sup>. Both symptoms account for half of the total Lysholm questionnaire score, and the higher the instability and pain, the lower the score shown by patients in our sample. A similar result was reported in a study conducted by Lysholm et al.<sup>(6)</sup> with patients with acute knee injuries. The subjective classification of results obtained from Lysholm questionnaire had a high correlation with ligament lassitude among patients with anteromedial and/or anterolateral rotational instability, which demonstrates sensitivity of Lysholm questionnaire in this aspect. On the assessment of ordinal inter- and intra-interviewer consistency, we had an excellent consistency among all questions, since this is an objective numeric assessment,



**Figure 2** – Comparison of Lysholm questionnaire score among different clinical diagnosis reported by patients.

leaving no room for variations. Furthermore, the Lysholm questionnaire is easy to understand, was applied on individuals with good education level and presents questions and terms that are part of the daily lives of patients having knee conditions. We assessed the internal consistency of Lysholm questionnaire version to Portuguese by correlation among its various questions and total scores. Questions that were most related to the total score were limping, instability, pain, swelling, climbing stairs, and squatting. Questions addressing restraining and support were poorly correlated with the total score. Such observation is important,

since restraining was the question submitted to changes after the first translation into Portuguese, which may have generated a low agreement rate between this component (modified) and the others, however its reproducibility was excellent. We emphasize that restraining and support questions had a lower bias on the final results of our study. Those findings are also seen in postoperative periods and in knee ligament injuries, situations that originated the initial interest on this questionnaire<sup>(6,7)</sup>. Due to the fact that the Lysholm questionnaire, in its original language, has been frequently used in many studies<sup>(17-20)</sup> for specific assessment of knee ligament injuries, and because it was built in such a careful manner, assessing clearness

**Chart 1** - Lysholm Questionnaire (Scale).

<p><b>Limping (5 points)</b> Never = 5 Mild or periodically = 3 Strong and continuous = 0</p> <p><b>Support (5 points)</b> No support = 5 Walking stick or crutches = 2 Impossible = 0</p> <p><b>Restraining (15 points)</b> No restraining or restraining feeling = 15 Has the feeling, but no restraining = 10 Occasional restraining = 6 Frequent = 2 Joint restrained at examination = 0</p> <p><b>Instability (25 points)</b> Never miss a step = 25 Seldom, during athletic activities or other strong-effort exercises = 20 Frequently during athletic activities or other strong-effort exercises (or unable to participate) = 15 Occasionally in daily activities = 10 Frequently in daily activities = 5 At each step = 0</p>	<p><b>Pain (25 points)</b> No pain = 25 Intermittent or mild during strong-effort exercises = 20 Marked during strong-effort exercises = 15 Marked during or after walking more than 2 Km = 10 Marked during or after walking less than 2 Km = 5 Continuous = 0</p> <p><b>Swelling (10 points)</b> No swelling = 10 Upon strong-effort exercises = 6 Upon usual exercises = 2 Continuous = 0</p> <p><b>Climbing stairs (10 points)</b> No problem = 10 Slightly damaged = 6 One step at a time = 2 Impossible = 0</p> <p><b>Squatting (5 points)</b> No problem = 5 Slightly damaged = 4 Not exceeding 90 degrees = 2 Impossible = 0</p> <p><b>Total score:</b> _____</p>
<p><b>Score table:</b> Excellent: 95 – 100; Good: 84 – 94; Fair: 65 – 83; Poor: &lt; 64</p>	

and criteria for questions selection, we can believe that it presents apparent and content validity. As no structural changes occurred on the translation of Lysholm questionnaire into Portuguese, we can think that its appearance and content validity has also been maintained. However, at validation phase, for enabling a better analysis, we compared the Lysholm questionnaire to other mediators or quality of life.

The best results in this analysis were the correlations of Lysholm questionnaire with pain numeric scale, with Lequesne's index, and with SF-36, probably because Lysholm questionnaire is a specific instrument of which questions refer most to physical/ functional status of individuals and these other instruments also emphasize these situations. When we correlate the Lysholm questionnaire to the overall health assessment both by the patient and by the healthcare professional, other non-specific factors of the basic disease could have been influencing final results, such as emotional, financial, cultural and other problems, which could justify the low correlation rate.

When we assess diseases and correlate them to Lysholm questionnaire score, we observe a lower score for arthrosis and anterior cruciate ligament, probably because those diseases present a higher number of symptoms, such as pain, instability, swelling, and limping, which have stronger correlations on Lysholm questionnaire final score result when its questions were particularly analyzed.

It is important to notice that the correlations existing between Lysholm and SF-36 questionnaires were statistically significant for physical aspects, pain, and functional capacity, with these items being assessed both on generic SF-36

questionnaire and on specific Lysholm questionnaire, a situation also observed in another study published in 1996<sup>(20)</sup>. However, regarding social aspects, mental and emotional health, correlations were poor, probably because there is no specific question for assessing non-physical/ functional status on Lysholm questionnaire. Therefore, we corroborate literature findings showing us the importance of assessing an individual from all his/her biopsychosocial aspects and the importance of, when using specific questionnaires for assessing any disease, concurrently administrating a generic questionnaire in order to obtain a more reliable profile of the overall health status of an individual.

Specific assessment measurements available are clinically sensitive, as seen in our study, showing a better ability to detect specific aspects of the disease, limited to relevance domains to be assessed<sup>(6,7)</sup>.

The translation of Lysholm questionnaire (Chart 1) into Portuguese and its adjustment to cultural conditions of our population, as well as the demonstration of its reproducibility and validity enabled this specific instrument to be used for assessing individuals with knee joint disease, both for research and for healthcare purposes.

## CONCLUSIONS

1. The translation and cultural adjustment of the Portuguese version of Lysholm questionnaire was proven to have measurement, reproducibility and validity properties.
2. The Portuguese version of Lysholm questionnaire is a useful instrument for specific assessment of knee symptoms in Brazilian patients.

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