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Cross-Cultural adaptation and validation of the Exercise-Induced Leg Pain questionnaire for Spanish speaking patients

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Abstract

Objectives: To cross-culturally adapt and validate a Spanish version of the Exercise-Induced Leg Pain questionnaire.

Design: Clinical measurement study.

Participants: The validity and reliability of the adapted version were assessed in four groups of 40 patients with exercise-induced leg pain, 40 physically active healthy individuals (control group), 40 athletes with other leg conditions and 40 athletes, military personnel and candidates with no history of injury (risk group).

Main measure: Exercise-Induced Leg Pain questionnaire.

Reference measures: Spanish version of the Short-Form 36 and Schepsis postsurgical classification scale.

Results: In patients with exercise-induced leg pain, the mean age was 24.9 (± 6.7) years and the mean score of the questionnaire was 62.8 (± 10.9). The standard error of measurement and minimum detectable change threshold were 1.67 and 4.63 points, respectively. Excellent internal consistency (Cronbach's $\alpha = 0.942$) and test-retest reliability (intraclass correlation coefficient = 0.995) were found. The exploratory and confirmatory factor analyses indicated that a one-factor solution explained 66.84% of the variance. For construct validity, 87.5% of the previously stated hypotheses were fulfilled between the total score of the questionnaire and Short-Form 36 dimensions. Concurrent validity, assessed by the Schepsis scale, was

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almost perfect (r = 0.92, p < 0.001). The predictive validity of the questionnaire was demonstrated using the receiving operating curve (area of 0.992; 95% CI: 0.983–1, p < 0.001).
Conclusion: The Spanish version of the Exercise-Induced Leg Pain questionnaire resulted in a reliable and valid instrument to assess patients with exercise-induced leg pain.

Keywords
Exercise-induced leg pain, patient-reported outcomes measures, psychometrics, reliability, validity, running

Introduction

Exercise-induced leg pain is a term that encompasses painful syndromes of the leg induced by physical activity and exercise, excluding painful syndromes affecting the thigh, knee, foot, and ankle.[1] The main feature of exercise-induced leg pain is the onset of leg pain associated with physical activity, which is pronounced and increases during activity[2] and is relieved by a variable period of rest[3] Despite the wide range of possible diagnoses, medial tibial stress syndrome, chronic compartment syndrome, stress fracture, nerve entrapment, and popliteal entrapment syndrome are the most common forms of exercise-induced leg pain.[1,4,5]

The difficulties associated with the management of these conditions require a comprehensive assessment of the clinical situation of these patients,[3] and patient-reported outcome measures are available for this purpose. For this reason, it was developed the Exercise-Induced Leg Pain questionnaire in German. This specific, self-administered questionnaire intends to determine the severity of symptoms, functional impairment, and ability to perform sports activities in patients with exercise-induced leg pain.[6] This simple and easy-to-use instrument is composed of 10 items scored on a five-point scale ranging from 4 (no difficulty) to 0 (unable to). The individual's total score is divided by the highest potential score and multiplied by 100, giving a percentage value to compare also patients with missing values.

Validation analyses of this patient-reported outcome measure indicated that the questionnaire is valid and reliable.[6–8] However, further study is needed to confirm its general psychometric properties, and cross-cultural adaptation to Spanish has not yet been performed. This study aimed to translate and cross-culturally adapt the German version of the Exercise-Induced Leg Pain questionnaire into Spanish and to study its reliability and validity.

Material and methods

This study followed the COSMIN guidelines to the extent possible[9] and was carried out from September 2020 to February 2021. Before commencing the study, permission was sought from two of the original authors of the Exercise-Induced Leg Pain questionnaire (T.N. and H.L.), and they were invited to participate in the research. To achieve linguistic and cultural equivalence between the original questionnaire and the translated version, we used the guidelines validated by Beaton *et al*. to adapt cross-culturally.[10] The study was approved by the Research Ethics Committee of the University of Malaga (CEUMA Registry No.: 56-2019-H) and the participants provided informed consent, in accordance with the principles established in the Declaration of Helsinki.

The formula used to calculate the sample size was $n = 16p\ (1 - p)\ /w,^2$ where p is the expected intraclass correlation coefficient (0.9) and w is the maximum width (0.20) of the 95% confidence interval.[11] The calculated minimum sample size for each group was 36 subjects. Four additional participants were included in each group to cover possible drop-outs. A total of 160 participants were recruited, divided into four groups of equal size: patients with exercise-induced leg pain; physically active healthy individuals (control group);

athletes, military personnel, and candidates with no history of leg pain (risk group); and athletes with other leg conditions. To be eligible for inclusion into the risk group, the subjects had to confirm that they run at least 30 km per week.[6] The participants in the exercise-induced leg pain group were initially included based on the criteria previously described: history of lower leg pain that increases during specific sports activities, lower leg pain that limits the ability to run, persistent symptoms for more than 3 months, symptoms that disappear after a few minutes of rest, and diffuse pain in one or both legs.[6] When the diagnosis of exercise-induced leg pain was inconclusive, additional tests such as treadmill running to reproduce familiar symptoms, imaging with radiography, magnetic resonance, or Doppler ultrasound were performed.[12–15] General exclusion criteria were pregnancy, low back pain, and previous surgery of the lower extremities or spine. For the healthy and risk groups, additional exclusion criteria were exercise-induced leg pain and functional deficits while participating in sports. All participants had to be at least 18 years of age and involved in sports. The individuals in the other leg conditions group had injuries such as ankle sprains, tendinopathies, knee osteoarthritis, or muscle tears that were diagnosed on clinical examination by a sports physician.

The reliability of the Spanish version of the Exercise-Induced Leg Pain questionnaire was assessed by internal consistency and test-retest reliability.[16] The questionnaire was administered to 120 participants twice at an interval of 7 to 10 days (excluding the participants in the other leg conditions group, whose condition were more likely to improve). During this period, the participants with exercise-induced leg pain were instructed to continue their regular physical activity, with participants who identified their condition as unchanged being included in the second administration, thus ensuring the stability of the condition.

Convergent and divergent validity were measured as indicators of the construct validity of the Spanish version of the Exercise-Induced Leg Pain questionnaire using the Spanish version of the SF-36 questionnaire. For the assessment of convergent validity, the authors hypothesized that the subscales with similar constructs (physical function, physical role, bodily pain, and physical component) would be strongly correlated with the Exercise-Induced Leg Pain questionnaire score. Regarding divergent validity, the authors expected to find weak correlations between the Exercise-Induced Leg Pain questionnaire score and the subscales with different SF-36 constructs (mental health, emotional role, social function, vitality, and mental component). This requirement was considered fulfilled when at least 75% of the hypotheses were confirmed.[16]

Concurrent validity was assessed using the established postsurgical classification system for chronic compartment syndrome.[16] The clinicians who performed the initial assessment of the participants indicated the score in the classification system before administering the Spanish version of the Exercise-Induced Leg Pain questionnaire and interpreted only the items that assessed the presence of symptoms and functional capacity.

Descriptive statistics were used to determine the characteristics of the participants, and to calculate the ceiling/floor effects and discriminatory power. The reliability of the questionnaire was evaluated by Cronbach's alpha coefficient of internal consistency and the intraclass correlation coefficient.[17] The corrected homogeneity indices were also calculated for each of the items. Exploratory factor analysis and confirmatory factor analysis were used to study construct validity and factorial validity. Spearman correlations between the Exercise-Induced Leg Pain questionnaire score and the dimensions of the SF-36 were used to determine convergent and divergent validity, as indicators of construct validity. Concurrent validity was assessed using Spearman correlations between the Exercise-Induced Leg Pain questionnaire scores and the Schepsis et al.[16] classification. The receiver operating curve procedure was used to assess discriminant validity. In all these inferential statistical tests, significance was considered when $p < 0.05$ (usual 5% confidence level) and high significance when $p < 0.01$ (1% confidence level). Statistical analysis was performed using IBM-SPSS Statistics version 25 (Armonk, NY, USA).

Results

The characteristics of the participants and patient-reported outcome measures are shown in Table 1. The translation and back-translation of the questionnaire presented no difficulty either in language or in comprehension of the items. The Spanish version of the Exercise-Induced Leg Pain questionnaire can be found in Appendix 1.

Reliability

A comparison of the measurement properties of the Spanish, French,[8] Greek[7] and German[6] questionnaires are presented in Table 2. Cronbach's alpha coefficient was very high: 0.942. The study of the homogeneity indices indicated that item number 3 (low-impact activities) had a lower contribution to the reliability of the questionnaire. However, Table 3 shows that its removal did not improve the overall reliability by more than a few thousandths (0.949 versus 0.942). Temporal stability by test-retest (n = 120) obtained a very high intraclass correlation coefficient: 0.998, indicating that the reliability over time of the questionnaire is very high. A Bland-Altman plot showed that the differences between the two assessments were plotted around the zero line and indicated no systematic bias (Figure 1).

Construct validity

The prerequisites that must be verified for the correct use of an exploratory factor analysis (Table 4) were satisfactorily met by a high Kaiser-Meyer-Olkin coefficient value (0.88) and a high significance ($p < 0.001$) on Bartlett's test of sphericity

Table 1. Descriptive analysis of the groups of participants (N = 160).

	EILP (n = 40)	OLEC (n = 40)	RISK (n = 40)	CONTROL (n = 40)
Sex *Female*	23	23	18	16
Age *Mean (SD)*	24.9 (±6.7)	29.9 (±7.8)	28.9 (±9.9)	30.4 (±6.0)
Height *Mean (SD)*	170.3 (±8.6)	171.6 (±8.0)	171.8 (±6.1)	174.1 (±8.4)
Weight *Mean (SD)*	65.2 (±9.8)	65.2 (±7.7)	66.9 (±10.1)	70.1 (±11.0)
BMI *Mean (SD)*	22.4 (±2.5)	22.2 (±1.6)	22.6 (±2.3)	23.0 (±2.4)
Practising running	36	14	40	12
Kilometers per week *Mean (SD)*	28.1 (±13.6)	34.3 (±24.9)	41.9 (±4.2)	24.2 (±12.2)
SF-36 Score				
Physical Component *Mean (SD)*	51.4 (±4.6)	50.9 (±4.2)	55.8 (±4.8)	55.6 (±4.4)
Mental Component *Mean (SD)*	48.2 (±6.9)	44.4 (±5.6)	52.6 (±7.3)	52.4 (±8.4)
EILP-Sp Score* *Mean (SD)*	62.8 (±10.9)	64.3 (±18)	96.6 (±5,4)	98.7 (±2.6)
Schepsis et al. score *Mean (SD)*	2.3 (±0.5)	2.4 (±0.7)	3.8 (±0.4)	3.9 (±0.3)
Type of injury				
Medial Tibial Stress Syndrome	27			
Chronic Exertional Compartment Syndrome	7			
Nerve Entrapment	2			
Stress Injury	4			
Knee Osteoarthritis		8		
Tendinopathy/Fasciopathy		16		
Ankle Sprain		10		
Muscle Injury		6		

Abbreviations: BMI = body mass index; EILP-Sp = Exercise-Induced Leg Pain Questionnaire in Spanish; EILP = exercise-induced leg pain group; OLEC = other leg conditions group.
*The individual's total score is divided by the highest potential score (40) and multiplied by 100 to get a percentage value and compare patients with missing values.

Table 2. Summary of measurement properties of the spanish version of the Exercise-Induced Leg Pain Questionnaire and its cross-cultural adaptations.

Measurement Property	EILP-SP	EILP-F	EILP-GR	EILP-G
Concurrent validity *				
Total sample	0.920 (n = 160)	NR	0.947 (n = 160)	−0.743 (n = 160)
Factorial validity				
Factor structure	1-factor solution	NR	1-factor solution	1-factor solution
Variance explained (%)	66.8	NR	83.8	71.4
Communalities	0.238-0.823	NR	0.703-0.948	0.590-0.942
Internal consistency				
Cronbach alpha (EILP group)	0.942	0.930	0.942	0.924
Test-retest reliability, ICC				
All (n = 120)	0.998	0.980	0.997	NR
Healthy group	0.975	0.910	0.872	0.859
At-risk group	0.987	0.940	0.955	0.861
EILP group	0.995	0.970	0.995	0.987
Agreement, SEM				
Healthy group	0.16	NR	1.25	1.59
At-risk group	0.84	NR	0.64	0.88
EILP group	1.67	NR	1.83	1.50
Minimal detectable change				
Healthy group	0.44	NR	3.46	4.41
At-risk group	2.33	NR	1.77	2.43
EILP group	4.63	NR	3.82	4.16

Abbreviations: EILP = Exercise-Induced Leg Pain; EILP-Sp = Spanish version of the Exercise-Induced Leg Pain Questionnaire; EILP-F = French version of the Exercise-Induced Leg Pain Questionnaire; EILP-GR = Greek version of the Exercise-Induced Leg Pain Questionnaire; EILP-G = German version of the Exercise-Induced Leg Pain Questionnaire; ICC = intraclass correlation coefficient; NR = not reported; SEM = standard error of measurement.
*All Spearman rho values are significant at p <0.001.

($Chi^2 = 1575.16$; $p = 0.000$), which indicated that there were multiple correlations between the items that ensure the extraction of factors. Figure 2 shows the scatter plot that indicates the existence of a single factor underlying all items, in which a clear inflexion point can be observed from the first factor, with an eigenvalue of 6.68 as opposed to < 1 for the rest and explaining 66.84% of the total variance.

The confirmatory factor analysis of the unidimensional structure was performed using the results of the retest The degree of fit of the empirical data with the model tested was verified. A Root Means Square Error of Approximation Index with a good fit (0.027) was found. However, the rest of the values (Normed Fit Index, Incremental Fit Index, Tucker Lewis Index and Comparative Fit Index) did not reach a goodness-of-fit index greater than 0.800. Although this could lead us to distrust the fit, the Chi^2/gl ratio was nevertheless much higher than the necessary cut-off (> 3), allowing us to use the confirmatory factor analysis to assess the proposed model and trust its result (Table 4).

Strong and moderate, but significant convergent and divergent validity for the exercise induced leg pain group were found between the Spanish version of the Exercise-Induced Leg Pain questionnaire score and the following SF-36 dimensions: physical function, standardized physical component, bodily pain, physical role, mental health, social function and vitality. No correlation was found between the Spanish version of the Exercise-Induced Leg Pain questionnaire score and the dimensions emotional role and the

Table 3. Reliability analysis.

Item Number	Variance	HI corrected	Cronbach α if item deleted
1. When beginning to run	0.62	0.72	0.939
2. Running after about 10 min	0.96	0.82	0.934
3. Running after about 15 min	1.03	0.88	0.931
4. Running after 30 min or longer	1.40	0.84	0.933
5. Jumping	0.89	0.85	0.933
6. Landing	1.13	0.79	0.935
7. Starting and stopping quickly	1.15	0.85	0.932
8. Sideward cutting movements	1.12	0.70	0.940
9. Low-impact activities	0.27	0.42	0.949
10. Ability to participate in your desired sport as long as you like	1.58	0.79	0.936

Abbreviations: HI = Homogeneity indices.

standardized mental component. Despite what was expected a priori, the general health dimension had a weak correlation in relation to the adapted questionnaire score (Table 5).

Concurrent validity

The total score on the Spanish version of the Exercise-Induced Leg Pain questionnaire maintained a high and direct correlation with the Schepsis *et al.*[17] disability scale (Table 5), such that lower values of both indicate a poorer patient condition.

Discriminatory power

The mean total score on the questionnaire was 80.5 points (CI: 78.9–82.1; with a standard deviation of ± 20.4). The mean value of this score was contrasted among the four study groups, resulting in highly significant differences, $p < 0.001$ (Kruskal-Wallis: H = 121.09; $p = 0.000$), explained on the basis of the lower mean values ± standard deviations of the group of patients with exercise-induced leg pain (62.8 ± 10.9) and the individuals in the other leg conditions group (64.3 ± 18) compared to the risk (96.6 ± 5.4) and control (98.7 ± 2.6) groups. The result of the receiving operating curve indicated that a good cut-off value for maximizing sensitivity and specificity is 81.2 points, where sensitivity = 87.5% and specificity = 98.8%, with positive predictive values of 98.6% and negative predictive values of 88.8% (Figure 3).

Ceiling and floor effect

No ceiling and floor effects were observed as none of the patients with exercise-induced leg pain presented the minimum or maximum score of the possible range of values.

Discussion

This study developed a valid and reliable Spanish version of the Exercise-Induced Leg Pain questionnaire. This instrument has good discriminatory power and adequate construct and concurrent validity, in addition to excellent test-retest reliability and high internal consistency.

The study sample had an even distribution of men (n = 80) and women (n = 80) from different cities in Spain, minimizing the risk of bias associated with cultural, semantic, or demographic factors. In terms of age and anthropometric data, the subjects involved in this study were relatively similar to the participants involved in the psychometric validation of the German,[6] Greek,[7] and French versions.[8] However, in our study, there was a significant difference ($p < 0.01$) in age, with exercise-induced leg pain patients being approximately 5 years younger than the other participants.

The test-retest procedure confirmed the reliability through the high temporal stability of the Spanish version of the Exercise-Induced Leg

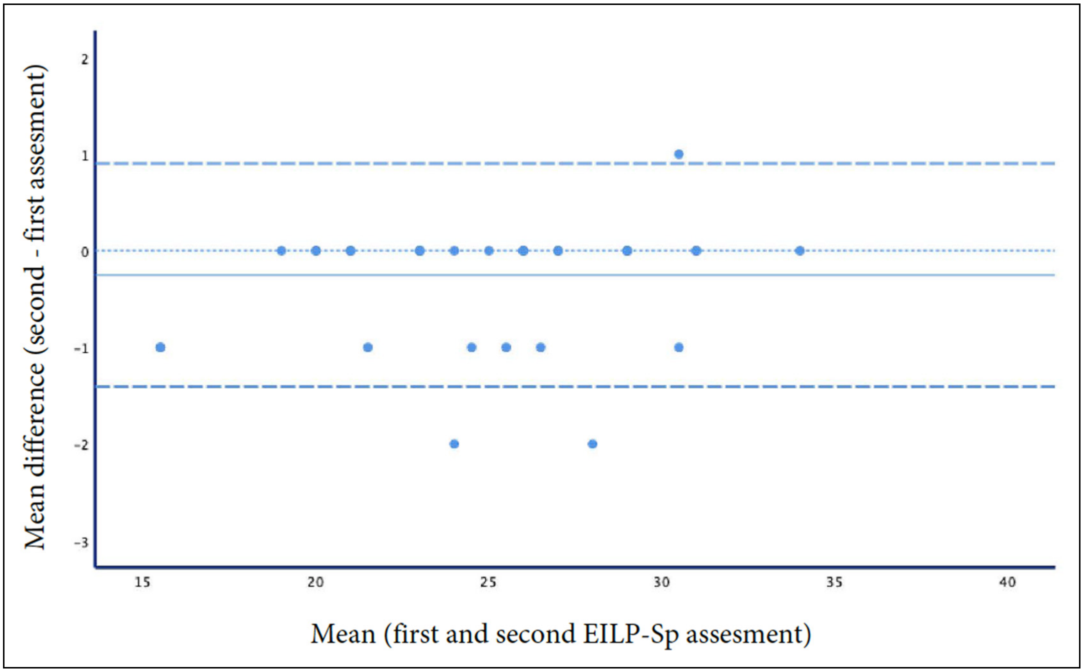

Figure 1. Bland-Altman plot visualizing the agreement for test-retest for the group with exercise-induced leg pain (n = 40), with the limits marked as mean ± SD difference. Means and differences were calculated using total original scores of the scale (0-40).

Table 4. Factorial validity: exploratory factor analysis and confirmatory factor analysis (goodness-of-fit indexes).

Factor analysis with varimax rotation suggesting the 1-factor solution.*						
Item Number.					Communalities	Factorial loading
1. *When beginning to run*					0.609	0.780
2. *Running after about 10 min*					0.744	0.862
3. *Running after about 15 min*					0.823	0.907
4. *Running after 30 min or longer*					0.773	0.879
5. *Jumping*					0.777	0.881
6. *Landing*					0.691	0.831
7. *Starting and stopping quickly*					0.768	0.876
8. *Sideward cutting movements*					0.566	0.752
9. *Low-impact activities*					0.238	0.487
10. *Ability to participate in your desired sport as long as you like*					0.696	0.834
Confirmatory Factor Analysis.						
	RMSEA (IC 95%)	**NFI**	**IFI**	**TLI**	**CFI**	**Cmin/DF**
Model: *Unidimensional 10-item*	0.027 (0.025–0.029)	0.747	0.769	0.763	0.769	9.71

Abbreviations: RMSEA = Root Mean Square Error of Approximation; NFI = Normed Fit Index; IFI = Incremental Fit Index; TLI = Tucker–Lewis Index; CFI = Comparative Fit Index and Cmin/DF = Chi-square fit statistics/Degree of Freedom.
*Total variance explained, 66.84%.

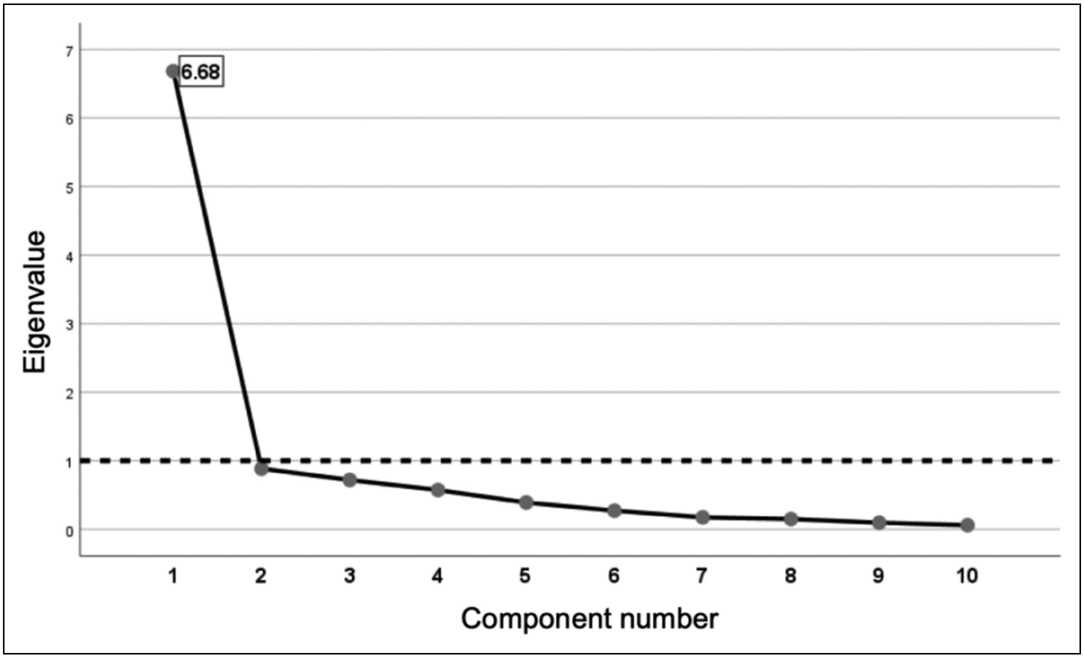

Figure 2. Scree plot for the exploratory factor analysis of the spanish version of the Exercise-Induced Leg Pain Questionnaire.

Table 5. Spearman correlations between the spanish version of the Exercise-Induced Leg Pain Questionnaire score, SF-36 dimensions and the Schepsis et al. disability scale.

		Correlation coefficient	*p* value	Shared variance
Convergent validity				
SF-36	**Physical Function**	0.85 ***	0.000	72.2%
	Physical Role	0.38 **	0.002	14.4%
	Bodily Pain	0.43 ***	0.000	18.5%
	General Health	0.23 *	0.044	5.3%
	Physical Component	0.55 ***	0.000	30.2%
Divergent validity				
SF-36	**Vitality**	0.33 **	0.007	10.9%
	Social Function	0.30 *	0.011	9.0%
	Emotional Role	0.20	0.070	4.0%
	Mental Health	0.30 **	0.010	9.6%
	Mental Component	0.22	0.054	4.8%
Concurrent Validity				
Schepsis *et al* Scale		0.92 **	0.000	84.3%

* = p less than or equal to 0.05.
** = p less than or equal to 0.01.
*** = p less than or equal to 0.001.

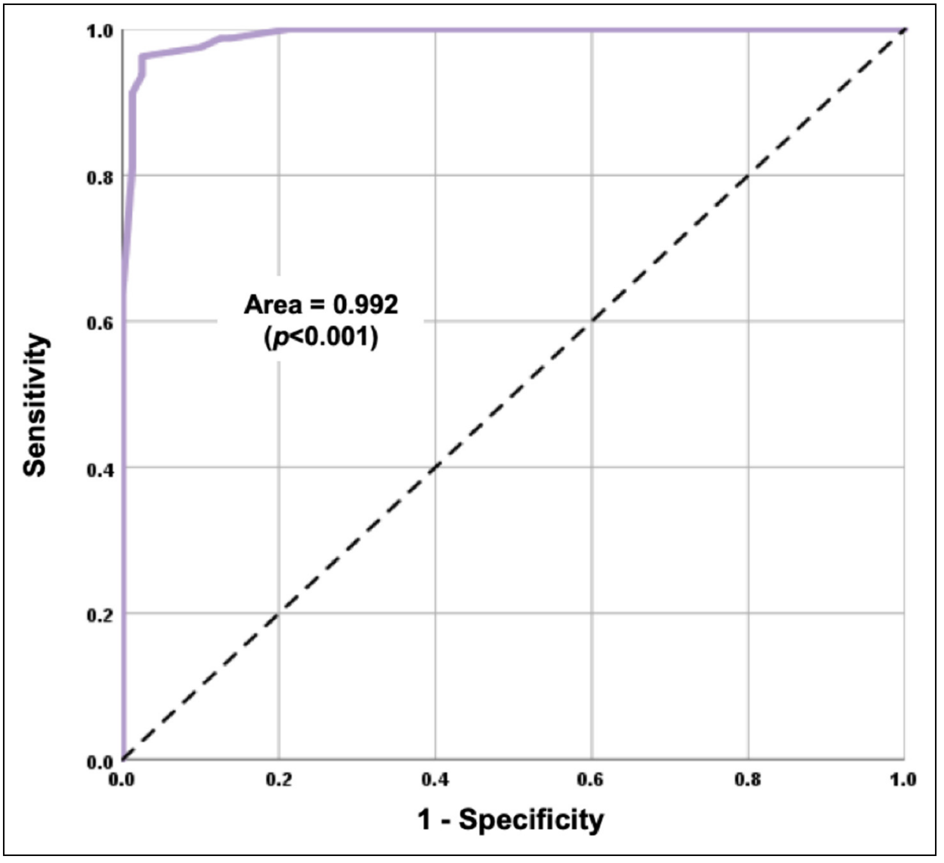

Figure 3. Receiving operating curve. Discriminatory power of the Spanish version of the Exercise-Induced Leg Pain questionnaire score to differentiate between injured and healthy participants.

Pain questionnaire. The reliability of the set of items, from the perspective of internal consistency using Cronbach's alpha, had a value of 0.94 (95% CI: 0.92–0.96), which is within the range of the proposed criterion (0.70–0.95) for an adequate measure of internal consistency.[16] This value is usually higher for specific instruments that measure more concrete concepts, as in this case, and lower when measuring more generic or broad constructs. Therefore, the study of this property suggested that all items were necessary to generate a homogeneous, but not redundant, questionnaire.[16] These internal consistency results using Cronbach's alpha were very close to those obtained in the original German (0.924), Greek (0.942), and French versions (0.930). The standard error measures calculated in the study are quite small and clinically acceptable, being very similar to the original[6] and Greek[7] version of the questionnaire (Table 2).

The exploratory and confirmatory factor analysis confirmed the initial hypothesis of unidimensionality of the Spanish version of the Exercise-Induced Leg Pain questionnaire, proving the unidimensionality of this set of items together with the high loadings of all items on a single factor that explained 66.8% of the variance. This result coincides with those obtained in the Greek[7] and German[6] version, which obtained a higher variance explained by a single factor of 83.8% and 71.4%, respectively (Table 4).

For the analysis of convergent and divergent validity, we established hypotheses of correlations between the Spanish version of the Exercise-Induced Leg Pain questionnaire score and the similar dimensions of the SF-36 (physical function, physical role, bodily pain, physical component, and general health) and the absence of correlation with the other SF-36 constructs (mental health, emotional role, social function, vitality, and mental component), with 80% of the hypotheses previously established being fulfilled. These results confirmed both the convergent and divergent validity of the Spanish version. During the validation of the French version,[8] the SF-36 instrument was also used to determine construct validity, obtaining similar results with 87.5% of the hypotheses confirmed.

The concurrent validity determined from the high correlation ($r = 0.92$) of the Spanish version of the Exercise-Induced Leg Pain questionnaire score with the non-validated classification tool of Schepsis et al.[17] was similar to that obtained in the Greek validation study ($r = 0.947$). In contrast, the German version[6] negatively correlated with their total sample ($n = 73$). This difference could be attributed to the Schepsis grading scale used between these studies (the German version[6] graded poor as 4, whereas the Greek version[7] and the present study graded poor as 1).

The results obtained concerning the discriminatory power by the receiving operating curve indicated that a good cut-off value that maximizes sensitivity and specificity is 81.2 points, considering as positive tests ≤ 81 points, which would indicate a pathological degree of pain and disability associated with exercise-induced leg pain. The absence of ceiling and floor effects in the Spanish version of the Exercise-Induced Leg Pain questionnaire scores suggest that this tool is applicable to patients within the full range of exercise-induced leg pain severity.[16]

This study has several limitations that must be considered in analysing the results. Although sample size required for the study was based on the intraclass correlation coefficient and the maximum width of the 95% confidence intervals obtained in the development study for the original[6] and Greek questionnaire,[7] the sample size with exercise-induced leg pain was smaller than recommended for psychometric validation.[16] Mainly, this limitation should be considered in interpreting the factor analyses performed. Our study indicates that a difference score of at least 5 points for the Spanish version of the Exercise-Induced Leg Pain questionnaire is needed to declare a detectable change between repeated measures. Nevertheless, this is a statistical threshold because the minimally important difference is more appropriate than the minimal detectable change to decision-making in a clinical context.[18] Sensitivity to change was not measured to determine clinically relevant changes due to the study's cross-sectional design. This property assesses the ability of the questionnaire to identify clinical changes over time, allowing the assessor to become aware of changes (improvement or worsening) in relation to exercise-induced leg pain during or after rehabilitation or treatment, and to assess whether these changes are clinically relevant. Therefore, future research to investigate the minimal important difference is required, using a larger sample and a longer follow-up period. Regarding concurrent validity, a patient-reported outcome measure such as the Medial Tibial Stress Syndrome Score,[19] designed to assess the severity of tibial periostitis, could have been used for the present study instead of using the unvalidated classification of Schepsis *et al*.[17] Nevertheless, to date, none of these questionnaires has been translated and validated in Spanish. Furthermore, due to the cultural difference with the Spanish-speaking population in Spain, future studies should confirm these results in other South American Spanish-speaking participants, as there may be contradictory linguistic information.

The complexity of managing exercise-induced leg pain conditions requires a thorough clinical evaluation to objectively quantify the severity of symptoms and loss of function associated with exercise-induced leg pain.[3] The Spanish version of the Exercise-Induced Leg Pain questionnaire has been shown to be a valid and reliable tool that may help clinicians and researchers to evaluate this impact and can be considered alongside other patient-reported outcome measures used in sports medicine for the assessment of chronic exercise-induced leg pain in the Spanish population.[20] In the future, the study of its responsiveness could respond to which change in the score would indicate a clinically significant change in the patient and be used as a further element in making decisions about return to sport in athletes suffering from chronic lower leg injuries.

Clinical message

- The psychometric properties of the Spanish version of the Exercise-Induced Leg Pain questionnaire confirm that the questionnaire is a reliable and valid patient-reported outcome measure for the assessment of chronic exercise-induced leg pain in Spanish speaking patients.

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Author contributions

Conceptualization, J.R.A.-C. and J.C.G.-R.; Methodology, T.N and H.L.; Formal analysis, A.C.-D. and J.P.-M; Investigation, A.C.-D., V.S. and J.R.A.-C.; Data curation, A.C.-D. and J.P.-M; Writing—original draft preparation, A.C.-D. and J.P.-M.; Writing—review and editing, H.L., J.R.A.-C. and J.C.G.-R; Supervision, T.N and V.S.

Declaration of conflicting interests

The authors certify that they have no affiliations with or financial involvement in any organization or entity with a direct financial interest in the subject matter or materials discussed in the manuscript.

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