


Original Research

Cross-Culturally Adapted Versions of Patient Reported Outcome Measures for the Lower Extremity

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Background

A large number of patient reported outcome measures (PROMs) have been developed in the English language for various lower extremity orthopaedic pathologies. Twenty different PROMs were recommended for 15 specific musculoskeletal lower extremity pathologies or surgeries. However, the availability of cross-culturally adapted versions of these recommended PROMs is unknown.

Purpose

The purpose of this study was to identify the cross-culturally adapted versions of recommended PROMs for individuals experiencing orthopedic lower extremity pathologies or undergoing surgeries, and to identify the psychometric evidence that supports their utilization.

Study design

Literature Review

Methods

PubMed, Embase, Medline, Cochrane, CINAHL, SPORTDiscus and Scopus were searched for cross-culturally adapted translated studies through May 2022. The search strategy included the names of the 20 recommended PROMs from previous umbrella review along with the following terms: reliability, validity, responsiveness, psychometric properties and cross-cultural adaptation. Studies that presented a non-English language version of the PROM with evidence in at least one psychometric property to support its use were included. Two authors independently evaluated the studies for inclusion and independently extracted data.

Results

Nineteen PROMS had cross-culturally adapted and translated language versions. The KOOS, WOMAC, ACL-RSL, FAAM, ATRS, HOOS, OHS, MOXFQ and OKS were available in over 10 different language versions. Turkish, Dutch, German, Chinese and French were the most common languages, with each language having more than 10 PROMs with psychometric properties supporting their use. The WOMAC and KOOS were both available in 10 languages and had all three psychometric properties of reliability, validity, and responsiveness supporting their use.

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Conclusion

Nineteen of the 20 recommended instruments were available in multiple languages. The PROM most frequently cross-culturally adapted and translated were the KOOS and WOMAC. PROMs were most frequently cross-culturally adapted and translated into Turkish. International researchers and clinicians may use this information to more consistently implement PROMs with the most appropriate psychometric evidence available to support their use.

Level of evidence

3a

INTRODUCTION

Patient reported outcome measures (PROMs) are widely used in orthopaedic settings.¹⁻⁵ The decision regarding which PROM to use should be based on the available psychometric evidence. Although a large number of PROMs have been developed in the English language for various lower extremity orthopaedic pathologies, the psychometric evidence supporting their use is highly variable.⁶⁻¹⁰ An umbrella review by Zhang et al.¹¹ assessed 19 systematic reviews and found that 20 different PROMs were recommended for 15 specific musculoskeletal lower extremity pathologies or surgeries. However, the availability of cross-culturally adapted versions of these recommended PROMs is unknown.

The usefulness of a PROM can be defined by the instrument's psychometric properties, including evidence for reliability, validity, and responsiveness. Test-retest reliability defines the stability of a score over time for patients who have not changed.^{1,2,12} A useful value for clinicians related to test-retest reliability is minimal detectable change (MDC) which is the change in score outside of measurement error. This reflects a true change in the patient.^{1,2,12} Validity refers to the degree to which the instrument measures the construct it was intended to measure.^{2,12} PROMs commonly offer evidence for concurrent validity which is the degree to which the scores of a PROM relate to scores on other instruments that measure the same or similar construct.^{1,2,12} Responsiveness is the ability of an instrument to detect a meaningful change in patient status over time. It can be defined with a value for minimal clinically important difference (MCID).^{1,2,12,13} A PROM may be more useful to clinicians and researchers when there is evidence for the three psychometric properties of reliability, validity, and responsiveness.

Cross-cultural adaptation studies are needed to translate PROMs into a variety of languages that will allow for more international implementation.¹⁴ Cross-cultural adaptation studies ensure that the items and responses for the translated PROMs have the same meaning as the original language version.¹⁵ Clinicians and researchers need to not only be aware of recommended PROMs for specific lower extremity pathologies, but also be aware of which versions are cross-culturally adapted. The purpose of this study was to identify the cross-culturally adapted versions of recommended PROMs for individuals experiencing orthopedic lower extremity pathologies or undergoing surgeries, and

to identify the psychometric evidence that supports their utilization.

METHOD

The current study utilized the results of a previous umbrella review to identify which of the 20 recommended PROMs have been translated and cross-culturally adapted.¹¹ (Table 1) A literature review was conducted on PubMed, Embase, Medline, Cochrane, CINAHL, SPORTDiscus and Scopus Search from database inception to May 2022. The search strategy and terms are listed in Table 2. Studies were included if a non-English language version of one of the 20 recommended PROMs was cross-culturally adapted into another language while providing evidence of one psychometric property (reliability, validity and responsiveness) to support its use. Studies on individuals less than age 18 were excluded. Two authors independently evaluated the studies for inclusion and independently completed data extraction. Any conflicts were resolved by a third author. Cross-culturally adapted language versions for each of the 20 recommended PROMs were identified and recorded. The supporting psychometric properties for reliability, validity, and responsiveness for each version were extracted and recorded on a data collection spreadsheet for tabulation.

RESULTS

The search identified 9064 articles. 312 met the inclusion criteria. (Figure 1) Of the 20 recommended PROMs, 19 were cross-culturally adapted into languages other than English (Table 3 and Figure 1). The Knee Injury and Osteoarthritis Outcome Score (KOOS), The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), ACL-Return to Sport after Injury Scale (ACL-RSL), Functional Ankle Ability Measure (FAAM), Achilles tendon Total Rupture Score (ATRS), Hip dysfunction and Osteoarthritis Outcome Score (HOOS), Oxford hip score (OHS), The Manchester-Oxford Foot Questionnaire (MOXFQ) and Oxford hip score (OKS) were available in over 10 different language versions. (Figure 2) A breakdown of the PROMs available in languages other than English are presented in Figure 3. Turkish, Dutch, German, Chinese, and French were the most common languages. Each of these versions had more than 10 PROMs with psychometric properties supporting their use.

Table 1. Recommended Patient Reported Outcome Measures

Systematic review recommended PROMs	Pathology/ Surgical Procedure
ACL-RSI	Anterior cruciate ligament injury
A-FORM	Recovery after Ankle Fractures
ATRS	Achilles' tendon rupture
AKPS	Patellofemoral pain syndrome
FAAM	Chronic Ankle instability
FADI	Chronic Ankle instability
HAGOS	Groin pain
	Hip Arthroscopy for labral pathology
	Non-arthritic hip joint pain, femoroacetabular impingement, Hip labral pathology
HOS	Hip Arthroscopy for labral pathology
	Non-arthritic hip joint pain, femoroacetabular impingement, Hip labral pathology
HOS combined with NAHS	Hip Arthroscopy
HOOS	Hip osteoarthritis
	Total Hip Arthroplasty for osteoarthritis
iHOT-12	Hip Arthroscopy for labral pathology
	Non-arthritic hip joint pain, femoroacetabular impingement, hip labral pathology
iHOT-33	Hip Arthroscopy for labral pathology
	Non-arthritic hip joint pain, femoroacetabular impingement, Hip labral pathology
KOOS	Total Knee Arthroplasty for osteoarthritis
KOS-ADLS	Patellofemoral pain syndrome
MOXFQ	Foot or ankle diseases
	Surgery for hallux valgus
OHS	Total Hip Arthroplasty for osteoarthritis
OKS	Total Knee Arthroplasty for osteoarthritis
SEFAS	Surgery for hallux valgus
	Rheumatoid arthritis in the foot and ankle
WOMAC	Knee osteoarthritis
	Total Hip Arthroplasty for osteoarthritis
	Total Knee Arthroplasty for osteoarthritis
WORQ	Total Knee Arthroplasty for osteoarthritis

Abbreviations: ACL-RSI, ACL-Return to Sport after Injury Scale; A-FORM, Ankle-fracture outcome of rehabilitation measure; AKPS, Anterior Knee Pain Scale; ATRS, Achilles tendon Total Rupture Score; FAAM, Functional Ankle Ability Measure; FADI, Foot and Ankle Disability Index; HAGOS, The Copenhagen Hip and Groin Outcome Score; HOS, Hip Outcome Score; HOOS, Hip dysfunction and Osteoarthritis Outcome Score; iHOT, International Hip Outcome Tool; KOOS, Knee Injury and Osteoarthritis Outcome Score; KOS-ADLS, Knee Outcome Survey of Daily Living Scale; MOXFQ, The Manchester-Oxford Foot Questionnaire; NAHS, Non-Arthritic Hip Score; OHS, Oxford hip score; OKS, Oxford Knee Score; SEFAS, Self-Reported Foot and Ankle Score; WOMAC, The Western Ontario and McMaster Universities Osteoarthritis Index; WORQ, The Work Osteoarthritis or joint replacement questionnaire

The cross-culturally adapted translated PROMs with all three psychometric properties for reliability, validity and responsiveness are listed in Tables 4, 5, and 6. They corresponded to the hip, knee, and foot and ankle, respectively. Cross-culturally adapted PROMs that do not have all three psychometric properties are listed in the [Appendix](#). In addition, the number of research studies supporting each of the psychometric properties of reliability, validity, and responsiveness for the hip, knee, and foot and ankle are also shown in Tables 4, 5, and 6, respectively.

The WOMAC and the KOOS were both available in 10 languages and had all three psychometric properties of reliability, validity, and responsiveness supporting their use.

The HOOS and OHS were both available in seven languages having all three psychometric elements of reliability, validity and responsiveness supporting their use. The most well studied PROMs were the German-WOMAC, Spanish-WOMAC, Swedish-KOOS and Swedish-SEFAS. ([Tables 4-6](#)) There were 124 cross-culturally adapted PROMs that had only studies providing evidence for reliability and/or validity. ([Appendix](#))

DISCUSSION

Of the 20 PROMs with appropriate psychometric properties that were previously identified by Zhang et al.,¹¹ 19 have

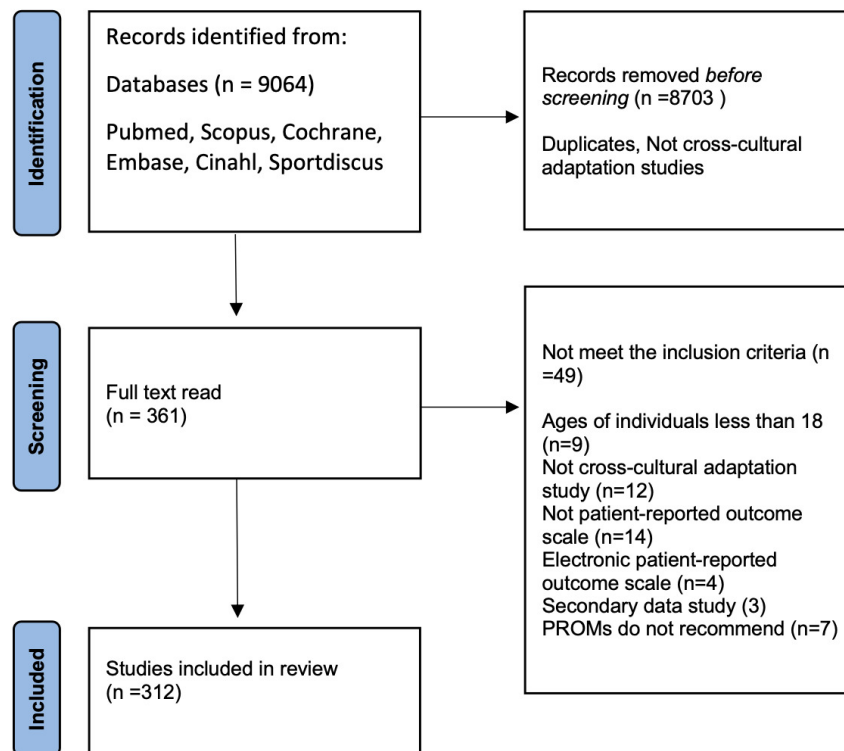


Figure 1. PRISMA Search Diagram

been cross-culturally adapted into language versions other than English. The KOOS and WOMAC were found to be available in 24 and 23 different languages, respectively. The most commonly culturally adapted language was Turkish, with 14 PROMs. There were 64 cross-culturally adapted translated PROMs with all three psychometric properties for reliability, validity, and responsiveness. To the authors' knowledge, this is the first review that summarizes the availability of cross-culturally adapted PROMs for either lower or upper extremity pathologies. The result of this study can be a useful resource for international clinicians and researchers when choosing a PROM to use based on the evidence available in their languages of interest.

While there are a variety of reasons PROMs may be cross-culturally adapted, pathology prevalence and length of time the PROM has been in use may be important factors. The authors' identified nine PROMs that were cross-culturally adapted into 10 different languages, while 11 PROMs were cross-culturally adapted into less than 10. The most common cross-culturally adapted PROMs, the KOOS and WOMAC, were developed for use in knee osteoarthritis. Similarly, the HOOS and OHS, available in 13 different languages, were originally developed for use in hip osteoarthritis. Osteoarthritis is a prevalent pathology worldwide,³⁰⁷ which may explain the high frequency in which these PROMs were cross-culturally adapted into a language other than English.

The KOOS and the WOMAC, were developed in 1988 and 1998, respectively.^{308,309} These instruments may be cross-

culturally adapted at a higher frequency because of the length of time these instruments have been available. However, PROMs developed more recently, such as the ACL-RSL, FAAM, and ATRS, have also been cross-culturally adapted into 14, 13, and 13 different languages, respectively. (Figure 2) Anterior cruciate ligament tears, Achilles tendon ruptures, and ankle instability are common pathologies. This may help to explain why a larger number of language versions for these instruments exist, despite being developed more recently.

In addition to the pathology prevalence and length of time the PROM has been in use, the frequency at which PROMs are cited in published research studies may also influence whether the instrument has been cross-culturally adapted into languages other than English. The umbrella review by Zhang et al.¹¹ found the WOMAC, HOOS, KOOS, ATRS, and FAAM were the most commonly cited instruments. These PROMs were also found to be the most frequently cross-culturally adapted. When specifically looking at these PROMs, the WOMAC consists of 24 items divided into three subscales: pain (5 items), stiffness (2 items) and physical function (17 items).³¹⁰ The HOOS consists of 40 items³¹¹ while the KOOS consists of 42 items, with each PROM being divided into five subscales: 1) pain, 2) symptoms, 3) activities of daily living, 4) sport and recreation function, and 5) knee-related quality of life.³¹² ATRS consists of 10 items³¹³ and the FAAM consists of a 29-item questionnaire divided into two subscales: activities of daily living (21 item) and sports (8 items).³¹⁴

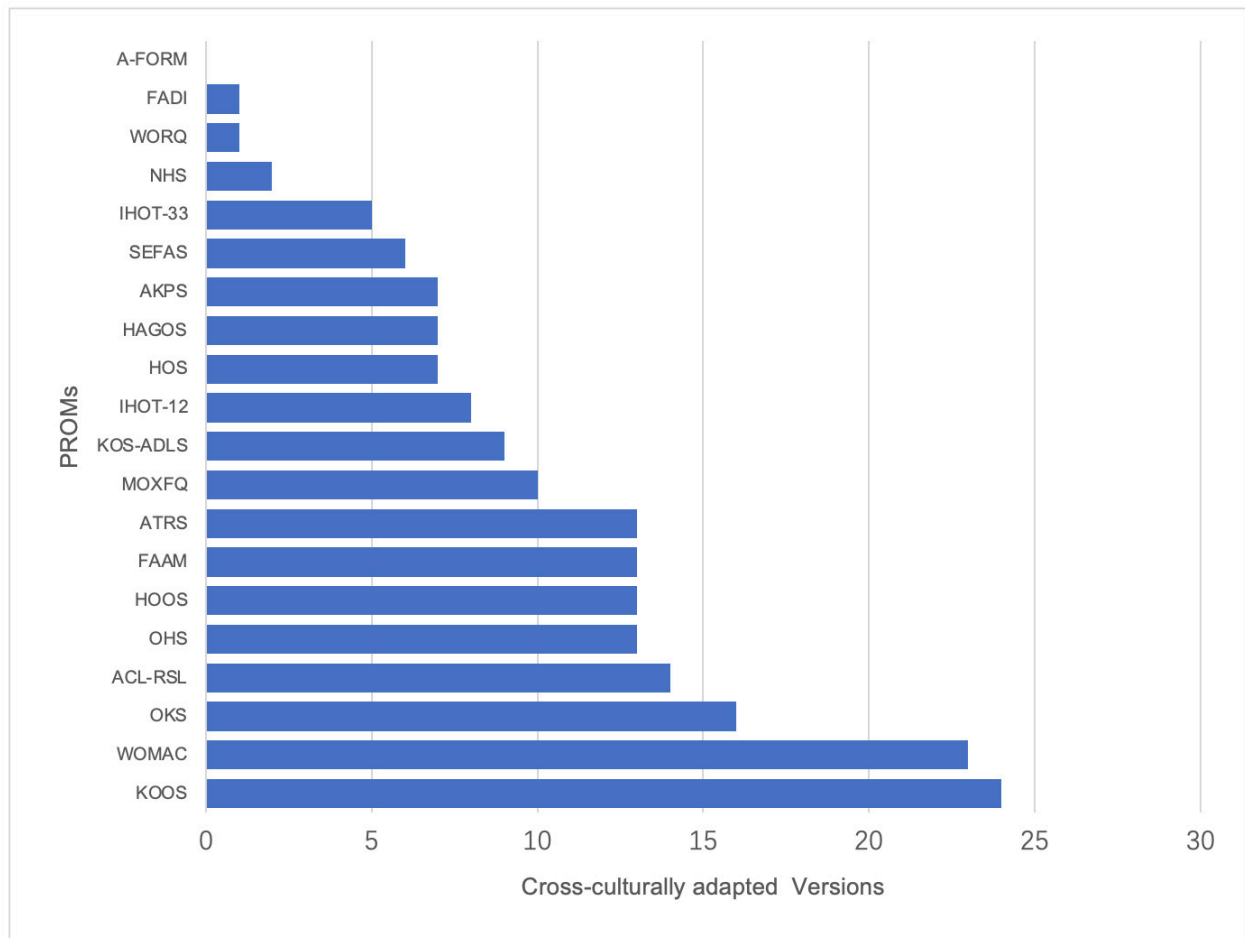


Figure 2. Number of Language Versions Available for Recommended Patient Reported Outcome Measures

Abbreviations: ACL-RSI, ACL-Return to Sport after Injury Scale; ADLS, Activities of Daily Living Scale; A-FORM, Ankle-fracture outcome of rehabilitation measure; AKPS, Anterior Knee Pain Scale; ATRS, Achilles tendon Total Rupture Score; FAAM, Functional Ankle Ability Measure; FADI, Foot and Ankle Disability Index; HAGOS, The Copenhagen Hip and Groin Outcome Score; HOS, Hip Outcome Score; HOOS, Hip dysfunction and Osteoarthritis Outcome Score; IHOT, International Hip Outcome Tool; KOOS, Knee Injury and Osteoarthritis Outcome Score; MOXFQ, The Manchester-Oxford Foot Questionnaire; NAHS, Non-Arthritic Hip Score; OHS, Oxford hip score; OKS, Oxford Knee Score; SEFAS, Self-Reported Foot and Ankle Score; WOMAC, The Western Ontario and McMaster Universities Osteoarthritis Index; WORQ, The Work Osteoarthritis or joint replacement questionnaire

According to the results of this study, there are 64 cross-culturally adapted language PROMs supported by all three properties of reliability, validity, and responsiveness. (Tables 4-6) Studies that cross-culturally adapt PROMs commonly offer evidence for reliability and validity with evidence for responsiveness being infrequently studied. (Appendix) This may be due to the fact that responsiveness studies require a more challenging longitudinal study design.

LIMITATIONS

A limitation of this study is that this review does not include a comprehensive search of all PROMs. Only cross-culturally adapted PROMs that were recommended in other systematic reviews were included in this review. Additionally, this review focused solely on musculoskeletal lower extremity pathologies. Regional and global PROMs, as well as those that pertain to the spine and upper extremity were not included in this current review. The study did not present the details regarding specific values that define reliability, validity and responsiveness for each PROM.

CONCLUSION

Of the 20 recommended PROMs identified in a previous review by Zhang et al.,¹¹ 19 were cross-culturally adapted into languages other than English. The PROMs most frequently cross-culturally adapted were the KOOS and WOMAC with 23 and 24 languages available, respectively. PROMs were most frequently cross-culturally adapted into Turkish. International researchers and clinicians may use this information to more consistently implement PROMs with the most appropriate psychometric evidence available to support their use.

CONFLICTS OF INTEREST

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 article

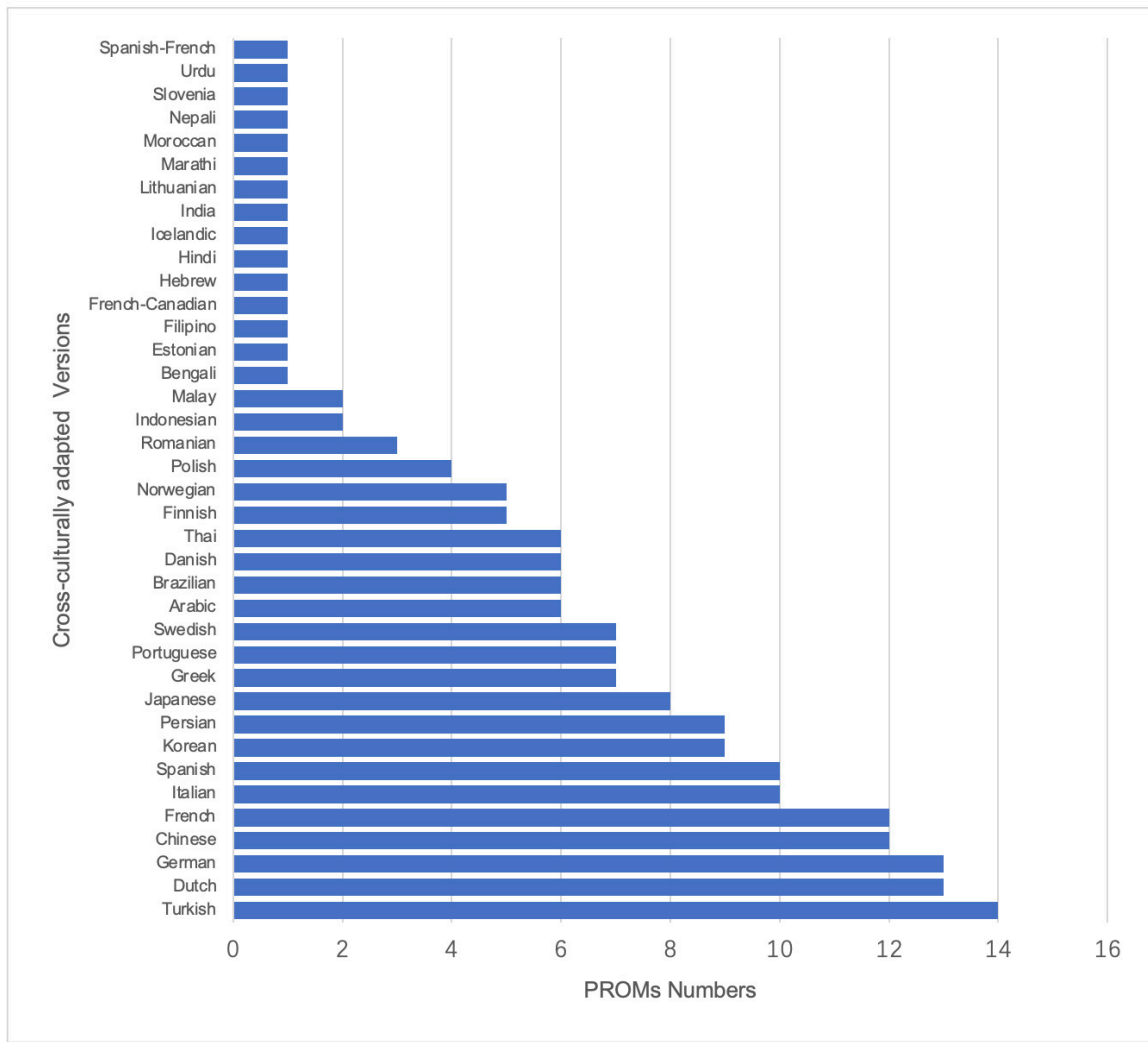


Figure 3. Number of Language Versions Available for Recommended Cross-culturally Adapted Patient Reported Outcome Measures

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Table 2. Search Strategy

(Reliability) OR (validity) OR (responsiveness) OR ("psychometric properties") OR ("cross-cultural adaptation")	AND	<p>ACL-Return to Sport after Injury Scale (ACL-RSI)</p> <p>Ankle-fracture outcome of Rehabilitation Measure (A-FORM)</p> <p>Anterior Knee Pain Scale (AKPS)</p> <p>Achilles tendon Total Rupture Score (ATRS)</p> <p>Functional Ankle Ability Measure (FAAM)</p> <p>Foot and Ankle Disability Index (FADI)</p> <p>The Copenhagen Hip and Groin Outcome Score (HAGOS)</p> <p>Hip Outcome Score (HOS)</p> <p>Hip dysfunction and Osteoarthritis Outcome Score (HOOS)</p> <p>International Hip Outcome Tool (IHOT)</p> <p>Knee Injury and Osteoarthritis Outcome Score (KOOS)</p> <p>Knee Outcome Survey-Activities of Daily Living Scale (KOS-ADLS)</p> <p>The Manchester-Oxford Foot Questionnaire (MOXFQ)</p> <p>Non-Arthritic Hip Score (NAHS)</p> <p>Oxford Hip Score (OHS)</p> <p>Oxford Knee Score (OKS)</p> <p>Self-Reported Foot and Ankle Score (SEFAS)</p> <p>The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)</p> <p>The Work Osteoarthritis or Joint Replacement Questionnaire (WORQ)</p>
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Table 3. Available Language Versions for Recommended Patient Reported Outcome Measures

PROMs Language versions	
ACL-RSL	Arabic ¹⁶ ; Brazilian ¹⁷ ; Chinese ^{18,19} ; Dutch ^{20,21} ; French ²² ; German ²³ ; Italian ²⁴⁻²⁶ ; Japanese ²⁷ ; Korean ²⁸ ; Lithuanian ²⁹ ; Norwegian ³⁰ ; Spanish ³¹ ; Swedish ³² ; Turkish ³³
ATRS	Chinese ³⁴ ; Danish ³⁵ ; Dutch ^{36,37} ; French ³⁸ ; Greek ³⁹ ; Italian ⁴⁰ ; Korean ⁴¹ ; Norwegian ⁴² ; Persian ⁴³ ; Portuguese ⁴⁴ ; Polish ⁴⁵ ; Swedish ⁴⁶ ; Turkish ⁴⁷
AKPS	Arabic ⁴⁸ ; Brazilian ⁴⁹ ; Dutch ^{50,51} ; French ⁵² ; Greek ⁵³ ; Norwegian ⁵⁴ ; Spanish ⁵⁵
A-FORM	N/A
FAAM	Brazilian ⁵⁶ ; Chinese ⁵⁷ ; Danish ⁵⁸ ; Dutch ⁵⁹ ; Finnish ⁶⁰ ; French ⁶¹ ; German ⁶² ; Italian ⁶³ ; Japanese ⁶⁴ ; Persian ⁶⁵ ; Spanish ^{66,67} ; Thai ⁶⁸ ; Turkish ⁶⁹⁻⁷¹
FADI	Italian ⁷²
HAGOS	Brazilian ⁷³ ; Chinese ⁷⁴ ; Danish ^{75,76} ; Dutch ⁷⁷⁻⁷⁹ ; Italian ⁸⁰ ; Norwegian ⁷⁶ ; Swedish ⁸¹
HOOS	Chinese ⁸² ; Dutch ⁸³ ; French ⁸⁴ ; German ^{85,86} ; Italian ⁸⁷ ; Japanese ⁸⁸ ; Korean ⁸⁹ ; Persian ⁹⁰ ; Polish ^{91,92} ; Portuguese ^{93,94} ; Romanian ⁹⁵ ; Thai ⁹⁶ ; Turkish ⁹⁷
HOS	Brazilian ⁹⁸ ; German ^{99,100} ; Korean ¹⁰¹ ; Portuguese ¹⁰² ; Romanian ¹⁰³ ; Spanish ¹⁰⁴ ; Turkish ¹⁰⁵
IHOT-12	Dutch ¹⁰⁶ ; French ¹⁰⁷ ; German ¹⁰⁸ ; Greek ¹⁰⁹ ; Japanese ¹¹⁰ ; Swedish ¹¹¹ ; Turkish ¹¹²
IHOT-33	Chinese ¹¹³ ; Dutch ¹¹⁴ ; French ¹¹⁵ ; German ¹¹⁶ ; Spanish ¹¹⁷ ; Thai ¹¹⁸
KOOS	Arabic ¹¹⁹⁻¹²² ; Chinese ¹²³⁻¹²⁷ ; Danish ¹²⁸ ; Dutch ¹²⁹⁻¹³¹ ; Finnish ¹³² ; French ^{133,134} ; Filipino ¹³⁵ ; German ¹³⁶ ; Greek ¹³⁷ ; Hindi ¹³⁸ ; Icelandic ¹³⁹ ; India ¹⁴⁰ ; Indonesian ¹⁴¹ ; Italian ^{142,143} ; Japanese ¹⁴⁴⁻¹⁴⁷ ; Malay ¹⁴⁸ ; Norwegian ¹²⁸ ; Persian ¹⁴⁹⁻¹⁵⁴ ; Polish ^{155,156} ; Portuguese ¹⁵⁷⁻¹⁵⁹ ; Spanish ¹⁶⁰⁻¹⁶² ; Swedish ¹⁷¹⁻¹⁷³ ; Turkish ^{163,164} ; Urdu ¹⁶⁵
KOS-ADLS	Arabic ^{166,167} ; Chinese ¹⁶⁸ ; French ¹⁶⁹ ; German ¹⁷⁰ ; Greek ¹⁷¹ ; Persian ¹⁵² ; Polish ¹⁷² ; Portuguese ¹⁷³ ; Turkish ¹⁷⁴
MOXFQ	Chinese ¹⁷⁵ ; Dutch ¹⁷⁶ ; Finnish ¹⁷⁷ ; French ¹⁷⁸ ; German ^{179,180} ; Italian ¹⁸¹ ; Korean ¹⁸² ; Persian ¹⁸³ ; Spanish ^{184,185} ; Turkish ^{186,187}
NHS	Portuguese ¹⁸⁸ ; Turkish ¹⁸⁹
OHS	Chinese ¹⁹⁰ ; Danish ^{191,192} ; Dutch ¹⁹³ ; French ¹⁹⁴ ; German ¹⁹⁵⁻¹⁹⁷ ; Indonesian ¹⁹⁸ ; Italian ¹⁹⁹ ; Japanese ²⁰⁰ ; Korean ²⁰¹ ; Persian ^{202,203} ; Romanian ¹⁰³ ; Spanish ^{204,205} ; Turkish ²⁰⁶
OKS	Arabic ²⁰⁷⁻²⁰⁹ ; Chinese ²¹⁰⁻²¹⁸ ; Dutch ²¹⁹ ; Estonian ²²⁰ ; Finish ²²¹ ; French ^{222,223} ; German ^{224,225} ; Greek ²²⁶ ; Japanese ^{146,227} ; Korean ²²⁸ ; Persian ²²⁹ ; Portuguese ²³⁰ ; Slovenia ²³¹ ; Spanish ^{205,232} ; Thai ²³³ ; Turkish ²³⁴
SEFAS	Danish ²³⁵ ; German ²³⁶ ; Spanish- French ²³⁷ ; Swedish ²³⁸⁻²⁴² ; Thai ²⁴³ ; Turkish ²⁴⁴
WORQ	Korean ²⁴⁵
WOMAC	Arabic ^{246,247} ; Bengali ²⁴⁸ ; Brazilian ²⁴⁹⁻²⁵¹ ; Chinese ²⁵²⁻²⁵⁶ ; Dutch ^{131,257-259} ; Finnish ²⁶⁰⁻²⁶² ; French ²⁶³ ; French-Canadian ^{264,265} ; German ²⁶⁶⁻²⁷² ; Greek ^{273,274} ; Hebrew ²⁷⁵ ; Italian ^{276,277} ; Japanese ^{278,279} ; Korean ^{280,281} ; Malay ²⁸² ; Marathi ²⁸³ ; Moroccan ²⁸⁴ ; Nepali ²⁸⁵ ; Persian ^{286,287} ; Spanish ²⁸⁸⁻²⁹⁵ ; Swedish ²⁹⁶⁻²⁹⁸ ; Thai ^{299,300} ; Turkish ³⁰¹⁻³⁰³

Abbreviations: ACL-RSI, ACL-Return to Sport after Injury Scale; A-FORM, Ankle-fracture outcome of rehabilitation measure; AKPS, Anterior Knee Pain Scale; ATRS, Achilles tendon Total Rupture Score; FAAM, Functional Ankle Ability Measure; FADI, Foot and Ankle Disability Index; HAGOS, The Copenhagen Hip and Groin Outcome Score; HOS, Hip Outcome Score; HOOS, Hip dysfunction and Osteoarthritis Outcome Score; IHOT, International Hip Outcome Tool; KOOS, Knee Injury and Osteoarthritis Outcome Score; KOS-ADLS, Knee Outcome Survey of Daily Living Scale; MOXFQ, The Manchester-Oxford Foot Questionnaire; NAHS, Non-Arthritic Hip Score; OHS, Oxford hip score; OKS, Oxford Knee Score; SEFAS, Self-Reported Foot and Ankle Score; WOMAC, The Western Ontario and McMaster Universities Osteoarthritis Index; WORQ, The Work Osteoarthritis or joint replacement questionnaire

Table 4. The Cross-culturally Adapted Translated Hip Patient Reported Outcome Measures with all three Psychometric Properties

Hip PROM (Number of Language Versions)	Language Version	Reliability	Validity	Responsiveness
HAGOS	Chinese	174	174	174
HOOS	French	184	184	184
	German	186	285,86	186
	Italian	187	187	187
	Japanese	188	188	188
	Korean	189	189	189
	Polish	291,92	291,92	192
	Chinese	182	182	182
HOS	German	299	299,100	1100
	Korean	1101	1101	1101
	Turkish	1105	1105	1105
IHOT-12	French	1107	1107	1107
	German	1108	1108	1108
	Greek	1109	1109	1109
	Japanese	1110	1110	1110
	Swedish	1111	1111	1111
IHOT-33	Chinese	1113	1113	1113
	German	1116	1116	1116
OHS	Chinese	1190	1190	1190
	German	1195	3195-197	2196,197
	Indonesian	1198	1198	1198
	Italian	1199	1199	1199
	Japanese	1200	1200	1200
	Korean	1201	1201	1201
	Spanish	2204,205	2204,205	1204
WOMAC	Chinese	3252-254	5252-256	2254,256
	Dutch	4131,257-259	4131,257-259	1259
	Finnish	2260,261	3260-262	1260
	German	3266,267,272	4266,267,269,270,272	3268,269,271
	Italian	1276	1276	1277
	Korean	1280	2280,281	1280
	Spanish	4289,292,295	5288,289,292-294	4290-293
	Swedish	3296-298	3296-298	1297
	Thai	2299,300	2299,300	1299
	Turkish	3301-303	3301-303	1301

Abbreviations: HAGOS, The Copenhagen Hip and Groin Outcome Score; HOS, Hip Outcome Score; HOOS, Hip dysfunction and Osteoarthritis Outcome Score; IHOT, International Hip Outcome Tool; OHS, Oxford hip score; WOMAC, The Western Ontario and McMaster Universities Osteoarthritis Index

Table 5. The Cross-culturally Adapted Translated Knee Patient Reported Outcome Measures with all three Psychometric Properties

Knee (Number of Language Versions)	Language Version	Reliability	Validity	Responsiveness
ACL-RSL	Dutch	1 ²⁰	1 ²⁰	1 ²¹
AKPS	Brazilian	1 ⁴⁹	1 ⁴⁹	1 ⁴⁹
KOOS	Chinese	5 ¹²³⁻¹²⁷	5 ¹²³⁻¹²⁷	2 ^{125,127}
	French	2 ^{133,134}	2 ^{133,134}	2 ^{133,134}
	Hindi	1 ¹³⁸	1 ¹³⁸	1 ¹³⁸
	Japanese	1 ¹⁴⁴	3 ^{144,145,147}	1 ¹⁴⁶
	Persian	4 ¹⁴⁹⁻¹⁵²	2 ¹⁴⁹⁻¹⁵²	1 ¹⁵⁴
	Portuguese	3 ¹⁵⁷⁻¹⁵⁹	3 ¹⁵⁷⁻¹⁵⁹	2 ¹⁵⁷⁻¹⁵⁹
	Spanish	2 ^{160,162}	3 ¹⁶⁰⁻¹⁶²	3 ¹⁶⁰⁻¹⁶²
	Swedish	3 ³⁰⁴⁻³⁰⁶	3 ³⁰⁴⁻³⁰⁶	3 ³⁰⁴⁻³⁰⁶
	Turkish	1 ¹⁶³	1 ¹⁶³	1 ¹⁶⁴
	Dutch	2 ^{129,130}	2 ^{129,130}	1 ¹³⁰
	Arabic	2 ^{166,167}	2 ^{166,167}	1 ¹⁶⁷
KOS-ADLS	Chinese	1 ¹⁶⁸	1 ¹⁶⁸	1 ¹⁶⁸
	Persian	1 ¹⁵²	1 ¹⁵²	1 ¹⁵²
	Polish	1 ¹⁷²	1 ¹⁷²	1 ¹⁷²
	Portuguese	1 ¹⁷³	1 ¹⁷³	1 ¹⁷³
	Arabic	3 ²⁰⁷⁻²⁰⁹	3 ²⁰⁷⁻²⁰⁹	1 ²⁰⁹
OKS	Finish	1 ²²¹	1 ²²¹	1 ²²¹
	German	2 ^{224,225}	2 ^{224,225}	1 ²²⁵
	Japanese	1 ²²⁷	1 ²²⁷	1 ¹⁴⁶

Abbreviations: ACL-RSL, ACL-Return to Sport after Injury Scale; AKPS, Anterior Knee Pain Scale; KOOS, Knee Injury and Osteoarthritis Outcome Score; KOS-ADLS, Knee Outcome Survey of Daily Living Scale OKS, Oxford Knee Score

Table 6. The Cross-culturally Adapted Translated Foot and Ankle Patient Reported Outcome Measures with all three Psychometric Properties

Foot and Ankle (Number of Language Versions)	Language Version	Reliability	Validity	Responsiveness
ATRS	Chinese	1 ³⁴	1 ³⁴	1 ³⁴
	Dutch	1 ³⁷	1 ³⁷	1 ³⁶
MOXFQ	German	2 ^{179,180}	2 ^{179,180}	2 ^{179,180}
	Italian	1 ¹⁸¹	1 ¹⁸¹	1 ¹⁸¹
	Spanish	2 ^{184,185}	2 ^{184,185}	2 ^{184,185}
SEFAS	Danish	1 ²³⁵	1 ²³⁵	1 ²³⁵
	German	1 ²³⁶	1 ²³⁶	1 ²³⁶
	Swedish	3 ²³⁸⁻²⁴⁰	4 ^{238-240,242}	4 ²³⁸⁻²⁴¹

Abbreviations: ATRS, Achilles tendon Total Rupture Score; MOXFQ, The Manchester-Oxford Foot Questionnaire; SEFAS, Self-Reported Foot and Ankle Score



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REFERENCES

1. Ueland TE, Disantis A, Carreira DS, Martin RL. Patient-reported outcome measures and clinically important outcome values in hip arthroscopy: a systematic review. *JBJS Rev.* 2021;9(1):e20.00084. doi:[10.2106/jbjs.rvw.20.00084](https://doi.org/10.2106/jbjs.rvw.20.00084)
2. Martin RL, Irrgang JJ. A survey of self-reported outcome instruments for the foot and ankle. *J Orthop Sports Phys Ther.* 2007;37(2):72-84. doi:[10.2519/jospt.2007.2403](https://doi.org/10.2519/jospt.2007.2403)
3. Thorborg K, Tjissen M, Habets B, et al. Patient-reported outcome (PRO) questionnaires for young to middle-aged adults with hip and groin disability: a systematic review of the clinimetric evidence. *Br J Sports Med.* 2015;49(12):812. doi:[10.1136/bjsports-2014-094224](https://doi.org/10.1136/bjsports-2014-094224)
4. Harris K, Dawson J, Gibbons E, et al. Systematic review of measurement properties of patient-reported outcome measures used in patients undergoing hip and knee arthroplasty. *Patient Relat Outcome Meas.* 2016;7:101-108. doi:[10.2147/prom.s97774](https://doi.org/10.2147/prom.s97774)
5. Gagnier JJ, Shen Y, Huang H. Psychometric Properties of patient-reported outcome measures for use in patients with anterior cruciate ligament injuries: a systematic review. *JBJS Rev.* 2018;6(4):e5. doi:[10.2106/jbjs.rvw.17.00114](https://doi.org/10.2106/jbjs.rvw.17.00114)
6. Hijji FY, Schneider AD, Pyper M, Laughlin RT. The popularity of outcome measures used in the foot and ankle literature. *Foot Ankle Spec.* 2020;13(1):58-68. doi:[10.1177/1938640019826680](https://doi.org/10.1177/1938640019826680)
7. Haywood KL, Brett J, Tutton E, Staniszevska S. Patient-reported outcome measures in older people with hip fracture: a systematic review of quality and acceptability. *Qual Life Res.* 2017;26(4):799-812. doi:[10.1007/s11136-016-1424-1](https://doi.org/10.1007/s11136-016-1424-1)
8. Ramkumar PN, Harris JD, Noble PC. Patient-reported outcome measures after total knee arthroplasty: a systematic review. *Bone Joint Res.* 2015;4(7):120-127. doi:[10.1302/2046-3758.47.2000380](https://doi.org/10.1302/2046-3758.47.2000380)
9. Kearney RS, Achten J, Lamb SE, Plant C, Costa ML. A systematic review of patient-reported outcome measures used to assess Achilles tendon rupture management: what's being used and should we be using it? *Br J Sports Med.* 2012;46(16):1102-1109. doi:[10.1136/bjsports-2011-090497](https://doi.org/10.1136/bjsports-2011-090497)
10. Hunt KJ, Hurwit D. Use of patient-reported outcome measures in foot and ankle research. *J Bone Joint Surg Am.* 2013;95(16):e118. doi:[10.2106/jbjs.l.01476](https://doi.org/10.2106/jbjs.l.01476)
11. Zhang Y, Yang Y, Ren J, et al. Use of Patient-Reported Outcome Measures in Lower Extremity Research. *International Journal of Sports Physical Therapy.* Published online 2022.
12. Prinsen CAC, Mokkink LB, Bouter LM, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. *Qual Life Res.* 2018;27(5):1147-1157. doi:[10.1007/s11136-018-1798-3](https://doi.org/10.1007/s11136-018-1798-3)
13. Cepeda NA, Polascik BA, Ling DI. A primer on clinically important outcome values: going beyond relying on P values alone. *J Bone Joint Surg Am.* 2020;102(3):262-268. doi:[10.2106/jbjs.19.00817](https://doi.org/10.2106/jbjs.19.00817)
14. Epstein J, Santo RM, Guillemin F. A review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus. *J Clin Epidemiol.* 2015;68(4):435-441. doi:[10.1016/j.jclinepi.2014.11.021](https://doi.org/10.1016/j.jclinepi.2014.11.021)
15. Mokkink LB, Terwee CB, Patrick DL, et al. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *J Clin Epidemiol.* 2010;63(7):737-745. doi:[10.1016/j.jclinepi.2010.02.006](https://doi.org/10.1016/j.jclinepi.2010.02.006)
16. Alzhrani M, Alzahrani H, Alshehri YS. Arabic Version of the short Anterior Cruciate Ligament-Return to Sport After Injury Scale: translation, cross-cultural adaptation, and validation. *Orthop J Sports Med.* 2022;10(1):232596712110665. doi:[10.1177/23259671211066509](https://doi.org/10.1177/23259671211066509)
17. Silva LO, Mendes LMR, Lima POP, Almeida GPL. Translation, cross-adaptation and measurement properties of the Brazilian version of the ACL-RSI Scale and ACL-QoL Questionnaire in patients with anterior cruciate ligament reconstruction. *Braz J Phys Ther.* 2018;22(2):127-134. doi:[10.1016/j.bjpt.2017.09.006](https://doi.org/10.1016/j.bjpt.2017.09.006)
18. Chen T, Zhang P, Li Y, et al. Translation, cultural adaptation and validation of simplified Chinese version of the anterior cruciate ligament return to sport after injury (ACL-RSI) scale. *PLoS ONE.* 2017;12(8):e0183095. doi:[10.1371/journal.pone.0183095](https://doi.org/10.1371/journal.pone.0183095)

19. Jia ZY, Cui J, Wang W, et al. Translation and validation of the simplified Chinese version of the anterior cruciate ligament-return to sport after injury (ACL-RSI). *Knee Surg Sports Traumatol Arthrosc.* 2018;26(10):2997-3003. [doi:10.1007/s00167-018-4850-5](https://doi.org/10.1007/s00167-018-4850-5)
20. Slagters AJ, Reininga IHF, van den Akker-Scheek I. The Dutch language anterior cruciate ligament return to sport after injury scale (ACL-RSI) – validity and reliability. *J Sports Sci.* 2017;35(4):393-401. [doi:10.1080/02640414.2016.1167230](https://doi.org/10.1080/02640414.2016.1167230)
21. Slagters AJ, van den Akker-Scheek I, Geertzen JHB, Zwerver J, Reininga IHF. Responsiveness of the anterior cruciate ligament – Return to Sports after Injury (ACL-RSI) and Injury – Psychological Readiness to Return to Sport (I-PRRS) scales. *J Sports Sci.* 2019;37(21):2499-2505. [doi:10.1080/02640414.2019.1646023](https://doi.org/10.1080/02640414.2019.1646023)
22. Sadeqi M, Klouche S, Bohu Y, Herman S, Lefevre N, Gerometta A. Progression of the psychological ACL-RSI Score and return to sport after anterior cruciate ligament reconstruction: A prospective 2-year follow-up study from the French prospective anterior cruciate ligament reconstruction cohort Study (FAST). *Orthop J Sports Med.* 2018;6(12):232596711881281. [doi:10.1177/232596711881281](https://doi.org/10.1177/232596711881281)
23. Müller U, Schmidt M, Krüger-Franke M, Rosemeyer B. ACL-return to sport after injury scale as an important predictor for return to sport level I and II after ACL reconstruction (German version). *Sport-Orthopädie - Sport-Traumatologie.* 2014;30(2):135-144. [doi:10.1016/j.orthtr.2014.01.009](https://doi.org/10.1016/j.orthtr.2014.01.009)
24. Tortoli E, Francini L, Giovannico G, Ramponi C. Translation, cross-cultural adaptation and validation of the Italian version of the anterior cruciate ligament-return to sport after injury (ACL-RSI) scale. *Knee Surg Sports Traumatol Arthrosc.* 2020;30(4):1180-1186. [doi:10.1007/s00167-020-06169-0](https://doi.org/10.1007/s00167-020-06169-0)
25. Thiebat G, Cucchi D, Spreafico A, et al. Italian version of the anterior cruciate ligament-return to sport after injury scale (IT ACL-RSI): translation, cross-cultural adaptation, validation and ability to predict the return to sport at medium-term follow-up in a population of sport patients. *Knee Surg Sports Traumatol Arthrosc.* 2021;30(1):270-279. [doi:10.1007/s00167-021-06498-8](https://doi.org/10.1007/s00167-021-06498-8)
26. Monaco E, Pisanu G, Carrozzo A, et al. Translation, cross-cultural adaptation, and validation of the Italian version of the anterior cruciate ligament-return to sport after injury (ACL-RSI) scale and its integration into the K-STARTS test. *J Orthop Traumatol.* 2022;23(1):1-8. [doi:10.1186/s10195-021-00622-7](https://doi.org/10.1186/s10195-021-00622-7)
27. Hirohata K, Aizawa J, Furuya H, et al. The Japanese version of the anterior cruciate ligament-return to sport after injury (ACL-RSI) scale has acceptable validity and reliability. *Knee Surg Sports Traumatol Arthrosc.* 2020;28(8):2519-2525. [doi:10.1007/s00167-020-05849-1](https://doi.org/10.1007/s00167-020-05849-1)
28. Ha JK, Kim JG, Yoon KH, et al. Korean version of the Anterior Cruciate Ligament-Return to Sport after Injury Scale: translation and cross-cultural adaptation. *Clin Orthop Surg.* 2019;11(2):164-169. [doi:10.4055/cios.2019.11.2.164](https://doi.org/10.4055/cios.2019.11.2.164)
29. Salatkaitė S, Šiupšinskas L, Gudas R. Translation and cultural adaptation of Lithuanian version of the anterior cruciate ligament return to sport after injury (ACL-RSI) scale. *PLoS ONE.* 2019;14(7):e0219593. [doi:10.1371/journal.pone.0219593](https://doi.org/10.1371/journal.pone.0219593)
30. Faleide AGH, Inderhaug E, Vervaat W, et al. Anterior cruciate ligament—return to sport after injury scale: validation of the Norwegian language version. *Knee Surg Sports Traumatol Arthrosc.* 2020;28(8):2634-2643. [doi:10.1007/s00167-020-05901-0](https://doi.org/10.1007/s00167-020-05901-0)
31. Sala-Barat E, Álvarez-Díaz P, Alentorn-Geli E, Webster KE, Cugat R, Tomás-Sabado J. Translation, cross-cultural adaptation, validation, and measurement properties of the Spanish version of the anterior cruciate ligament-return to sport after injury (ACL-RSI-Sp) scale. *Knee Surg Sports Traumatol Arthrosc.* 2020;28(3):833-839. [doi:10.1007/s00167-019-05517-z](https://doi.org/10.1007/s00167-019-05517-z)
32. Kvist J, Österberg A, Gauffin H, Tagesson S, Webster K, Arderin C. Translation and measurement properties of the Swedish version of ACL-Return to Sports after Injury questionnaire. *Scand J Med Sci Sports.* 2013;23(5):568-575. [doi:10.1111/j.1600-0838.2011.01438.x](https://doi.org/10.1111/j.1600-0838.2011.01438.x)
33. Harput G, Tok D, Ulusoy B, et al. Translation and cross-cultural adaptation of the anterior cruciate ligament-return to sport after injury (ACL-RSI) scale into Turkish. *Knee Surg Sports Traumatol Arthrosc.* 2017;25(1):159-164. [doi:10.1007/s00167-016-4288-6](https://doi.org/10.1007/s00167-016-4288-6)
34. Cui J, Jia Z, Zhi X, et al. The chinese version of achilles tendon total rupture score: cross-cultural adaptation, reliability and validity. *Health Qual Life Outcomes.* 2017;15(1):2. [doi:10.1186/s12955-016-0574-8](https://doi.org/10.1186/s12955-016-0574-8)
35. Ganestam A, Barfod K, Klit J, Troelsen A. Validity and reliability of the Achilles tendon total rupture score. *J Foot Ankle Surg.* 2013;52(6):736-739. [doi:10.1053/j.jfas.2013.07.004](https://doi.org/10.1053/j.jfas.2013.07.004)

36. Dams OC, Reininga IHF, Zwerver J, Diercks RL, van den Akker-Scheek I. The Achilles tendon Total Rupture Score is a responsive primary outcome measure: an evaluation of the Dutch version including minimally important change. *Knee Surg Sports Traumatol Arthrosc.* 2020;28(10):3330-3338. [doi:10.1007/s00167-020-05924-7](https://doi.org/10.1007/s00167-020-05924-7)
37. Opdam KTM, Zwiers R, Wiegerinck JI, et al. Reliability and validation of the Dutch Achilles tendon Total Rupture Score. *Knee Surg Sports Traumatol Arthrosc.* 2018;26(3):862-868. [doi:10.1007/s00167-016-4242-7](https://doi.org/10.1007/s00167-016-4242-7)
38. Buckinx F, Lecoq G, Bornheim S, et al. French translation and validation of the Achilles Tendon Total Rupture Score "ATRS." *Foot Ankle Surg.* 2020;26(6):662-668. [doi:10.1016/j.fas.2019.08.010](https://doi.org/10.1016/j.fas.2019.08.010)
39. Touzopoulos P, Verweridis A, Giakas G, Drosos GI. Validation and cross-cultural adaptation of Greek version of Achilles tendon Total Rupture Score. *Foot Ankle Surg.* 2019;25(1):8-12. [doi:10.1016/j.fas.2017.07.560](https://doi.org/10.1016/j.fas.2017.07.560)
40. Vascellari A, Spennacchio P, Combi A, et al. Cross-cultural adaptation and multi-centric validation of the Italian version of the Achilles tendon Total Rupture Score (ATRS). *Knee Surg Sports Traumatol Arthrosc.* 2018;26(3):854-861. [doi:10.1007/s00167-016-4152-8](https://doi.org/10.1007/s00167-016-4152-8)
41. Park YH, Cho HW, Choi JW, Kim HJ. Validation and cross-cultural adaptation of the Korean translation of the Achilles tendon Total Rupture Score. *BMC Musculoskelet Disord.* 2021;22(1):876. [doi:10.1186/s12891-021-04765-w](https://doi.org/10.1186/s12891-021-04765-w)
42. Myhrvold SB, Sandnes Ø, Hoelsbrekken SE. Validity and reliability of the Norwegian translation of the Achilles tendon Total Rupture Score. *Knee Surg Sports Traumatol Arthrosc.* 2018;26(7):2045-2050. [doi:10.1007/s00167-017-4689-1](https://doi.org/10.1007/s00167-017-4689-1)
43. Ansari NN, Naghdi S, Hasanvand S, Fakhari Z, Kordi R, Nilsson-Helander K. Cross-cultural adaptation and validation of Persian Achilles tendon Total Rupture Score. *Knee Surg Sports Traumatol Arthrosc.* 2016;24(4):1372-1380. [doi:10.1007/s00167-015-3977-x](https://doi.org/10.1007/s00167-015-3977-x)
44. Zambelli R, Pinto RZ, Magalhães JMB, et al. Development of the Brazilian Portuguese version of the Achilles Tendon Total Rupture Score (ATRS BrP): a cross-cultural adaptation with reliability and construct validity evaluation. *BMC Sports Sci Med Rehabil.* 2016;8(1):11. [doi:10.1186/s13102-016-0034-0](https://doi.org/10.1186/s13102-016-0034-0)
45. Bąkowski P, Rubczak S, Wolff-Stefaniak M, Grygorowicz M, Piontek T. Reliability and validity of the Polish version of the Achilles tendon Total Rupture Score. *Knee Surg Sports Traumatol Arthrosc.* 2018;26(7):2074-2079. [doi:10.1007/s00167-017-4764-7](https://doi.org/10.1007/s00167-017-4764-7)
46. Nilsson-Helander K, Thomeé R, Grävare-Silbernagel K, et al. The Achilles tendon Total Rupture Score (ATRS): development and validation. *Am J Sports Med.* 2007;35(3):421-426. [doi:10.1177/0363546506294856](https://doi.org/10.1177/0363546506294856)
47. Kaya Mutlu E, Celik D, Kiliçoglu Ö, Ozdinler AR, Nilsson-Helander K. The Turkish version of the Achilles tendon Total Rupture Score: cross-cultural adaptation, reliability and validity. *Knee Surg Sports Traumatol Arthrosc.* 2015;23(8):2427-2432. [doi:10.1007/s00167-014-3042-1](https://doi.org/10.1007/s00167-014-3042-1)
48. Alshehri A, Lohman E, Daher NS, et al. Cross-cultural adaptation and psychometric properties testing of the Arabic Anterior Knee Pain Scale. *Med Sci Monit.* 2017;23:1559-1582. [doi:10.12659/msm.901264](https://doi.org/10.12659/msm.901264)
49. da Cunha RA, Costa LOP, Hespanhol LC Jr, Pires RS, Kujala UM, Lopes AD. Translation, cross-cultural adaptation, and clinimetric testing of instruments used to assess patients with patellofemoral pain syndrome in the Brazilian population. *J Orthop Sports Phys Ther.* 2013;43(5):332-339. [doi:10.2519/jospt.2013.4228](https://doi.org/10.2519/jospt.2013.4228)
50. Kievit AJ, Breugem SJM, Siersevelt IN, et al. Dutch translation of the Kujala Anterior Knee Pain Scale and validation in patients after knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc.* 2013;21(11):2647-2653. [doi:10.1007/s00167-013-2635-4](https://doi.org/10.1007/s00167-013-2635-4)
51. Ummels PEJ, Lenssen AF, Barendrecht M, Beurskens AJHM. Reliability of the Dutch translation of the Kujala Patellofemoral Score Questionnaire. *Physiother Res Int.* 2017;22(1):e1649. [doi:10.1002/pr.i.1649](https://doi.org/10.1002/pr.i.1649)
52. Buckinx F, Bornheim S, Remy G, et al. French translation and validation of the "Anterior Knee Pain Scale" (AKPS). *Disabil Rehabil.* 2019;41(9):1089-1094. [doi:10.1080/09638288.2017.1419288](https://doi.org/10.1080/09638288.2017.1419288)
53. Papadopoulos C, Constantinou A, Cheimonidou AZ, Stasinopoulos D. Greek cultural adaption and validation of the Kujala anterior knee pain scale in patients with patellofemoral pain syndrome. *Disabil Rehabil.* 2017;39(7):704-708. [doi:10.3109/09638288.2016.1161834](https://doi.org/10.3109/09638288.2016.1161834)

54. Hott A, Liavaag S, Juel NG, Brox JI, Ekeberg OM. The reliability, validity, interpretability, and responsiveness of the Norwegian version of the Anterior Knee Pain Scale in patellofemoral pain. *Disabil Rehabil.* 2021;43(11):1605-1614. doi:10.1080/09638288.2019.1671499
55. Gil-Gómez J, Pecos-Martín D, Kujala UM, et al. Validation and cultural adaptation of “Kujala Score” in Spanish. *Knee Surg Sports Traumatol Arthrosc.* 2016;24(9):2845-2853. doi:10.1007/s00167-015-3521-z
56. Moreira TS, Magalhães L de C, Silva RD, Martin RL, Resende MA. Translation, cross-cultural adaptation and validity of the Brazilian version of the Foot and Ankle Ability Measure questionnaire. *Disabil Rehabil.* 2016;38(25):2479-2490. doi:10.3109/09638288.2015.1137979
57. González-Sánchez M, Li GZ, Ruiz Muñoz M, Cuesta-Vargas AI. Foot and ankle ability measure to measure functional limitations in patients with foot and ankle disorders: a Chinese cross-cultural adaptation and validation. *Disabil Rehabil.* 2017;39(21):2182-2189. doi:10.1080/09638288.2016.1219772
58. Obionu KC, Krogsgaard MR, Hansen CF, Comins JD. Dual-panel translation to Danish and Rasch validation of the Foot and Ankle Ability Measure (FAAM-DK). *Foot Ankle Surg.* 2021;28(5):588-594. doi:10.1016/j.fas.2021.06.007
59. Weel H, Zwiers R, Azim D, et al. Validity and reliability of a Dutch version of the Foot and Ankle Ability Measure. *Knee Surg Sports Traumatol Arthrosc.* 2016;24(4):1348-1354. doi:10.1007/s00167-014-3480-9
60. Saarinen AJ, Uimonen MM, Suominen EN, Sandelin H, Repo JP. Structural and construct validity of the Foot and Ankle Ability Measure (FAAM) with an emphasis on pain and functionality after foot surgery: a multicenter study. *J Foot Ankle Surg.* 2021;61(4):872-878. doi:10.1053/j.jfas.2021.12.011
61. Borloz S, Crevoisier X, Deriaz O, Ballabeni P, Martin RL, Luthi F. Evidence for validity and reliability of a French version of the FAAM. *BMC Musculoskelet Disord.* 2011;12(1):40. doi:10.1186/1471-2474-12-40
62. Nauck T, Lohrer H. Translation, cross-cultural adaptation and validation of the German version of the Foot and Ankle Ability Measure for patients with chronic ankle instability. *Br J Sports Med.* 2011;45(10):785-790. doi:10.1136/bjism.2009.067637
63. Sartorio F, Vercelli S, Bravini E, et al. [Foot and ankle ability measure: cross-cultural translation and validation of the Italian version of the ADL module (FAAM-I/ADL)]. *Med Lav.* 2014;105(5):357-365.
64. Uematsu D, Suzuki H, Sasaki S, et al. Evidence of validity for the Japanese version of the foot and ankle ability measure. *J Athl Train.* 2015;50(1):65-70. doi:10.4085/1062-6050-49.3.42
65. Mazaheri M, Salavati M, Negahban H, et al. Reliability and validity of the Persian version of Foot and Ankle Ability Measure (FAAM) to measure functional limitations in patients with foot and ankle disorders. *Osteoarthritis Cartilage.* 2010;18(6):755-759. doi:10.1016/j.joca.2010.03.006
66. Cervera-Garvi P, Ortega-Avila AB, Morales-Asencio JM, Cervera-Marin JA, Martin RR, Gijon-Nogueron G. Cross-cultural adaptation and validation of Spanish version of The Foot and Ankle Ability Measures (FAAM-Sp). *J Foot Ankle Res.* 2017;10(1):39. doi:10.1186/s13047-017-0221-6
67. Membrilla-Mesa MD, Aranda-Villalobos P, Pozuelo-Calvo R, Cuesta-Vargas AI, Arroyo-Morales M. Foot and ankle ability measure: validación de la versión española de 29 ítems en el área de rehabilitación. *Rehabilitación.* 2022;56(4):312-319. doi:10.1016/j.rh.2021.09.007
68. Arunakul M, Arunakul P, Suesiritumrong C, Angthong C, Chernchujit B. Validity and reliability of Thai version of the Foot and Ankle Ability Measure (FAAM) subjective form. *J Med Assoc Thai.* 2015;98(6):561-567.
69. Anafiroglu Kulunkoglu B, Celik D. Reliability and validity of the Turkish version of Foot and Ankle Ability Measure for patients with chronic ankle disability. *J Foot Ankle Surg.* 2019;58(1):38-41. doi:10.1053/j.jfas.2018.07.007
70. Çelik D, Malkoç M, Martin R. Evidence for reliability, validity and responsiveness of Turkish Foot and Ankle Ability Measure (FAAM). *Rheumatol Int.* 2016;36(10):1469-1476. doi:10.1007/s00296-016-3485-4
71. Usgu S, Usgu G, Uygur F, Yakut Y. Validity and reliability of the Foot and Ankle Ability Measure Turkish version for athletes. *Int J Athletic Ther Train.* 2019;24(6):263-269. doi:10.1123/ijatt.2017-0095
72. Leigheb M, Rava E, Vaiuso D, et al. Translation, cross-cultural adaptation, reliability, and validation of the Italian version of the Foot and Ankle Disability Index (FADI). *Acta Biomed.* 2020;91(4-S):150-166. doi:10.23750/abm.v91i4-S.9544

73. Mendonça LDM, Camelo PRP, Trevisan GCC, Bryk FF, Thorborg K, Oliveira RR. The Brazilian hip and groin outcome score (HAGOS-Br): cross-cultural adaptation and measurement properties. *Braz J Phys Ther.* 2021;25(6):874-882. [doi:10.1016/j.bjpt.2021.10.004](https://doi.org/10.1016/j.bjpt.2021.10.004)
74. Cao S, Cao J, Li S, Wang W, Qian Q, Ding Y. Cross-cultural adaptation and validation of the Simplified Chinese version of Copenhagen Hip and Groin Outcome Score (HAGOS) for total hip arthroplasty. *J Orthop Surg Res.* 2018;13(1):278. [doi:10.1186/s13018-018-0971-2](https://doi.org/10.1186/s13018-018-0971-2)
75. Thomeé R, Jonasson P, Thorborg K, et al. Validation of the copenhagen hip groin outcome score (HAGOS) for pain, symptoms and physical function in patients with hip/groin disability. *Physiotherapy.* 2015;101:e1514-e1515. [doi:10.1016/j.physio.2015.03.1498](https://doi.org/10.1016/j.physio.2015.03.1498)
76. Christensen KB, Clausen MB, King E, et al. Validation of the Copenhagen Hip and Groin Outcome Score (HAGOS) using modern test theory across different cultures and languages: a cross-sectional study of 452 male athletes with groin pain. *Br J Sports Med.* 2021;56(6):333-339. [doi:10.1136/bjsports-2021-104412](https://doi.org/10.1136/bjsports-2021-104412)
77. Brans E, de Graaf JS, Munzebrock AVE, Bessem B, Reininga IHF. Cross-cultural adaptation and validation of the Dutch version of the Hip and Groin Outcome Score (HAGOS-NL). *PLoS ONE.* 2016;11(1):e0148119. [doi:10.1371/journal.pone.0148119](https://doi.org/10.1371/journal.pone.0148119)
78. Giezen H, Stevens M, van den Akker-Scheek I, Reininga IHF. Validity and reliability of the Dutch version of the Copenhagen Hip And Groin Outcome Score (HAGOS-NL) in patients with hip pathology. *PLoS ONE.* 2017;12(10):e0186064. [doi:10.1371/journal.pone.0186064](https://doi.org/10.1371/journal.pone.0186064)
79. Tak I, Tijssen M, Schamp T, et al. The Dutch Hip and Groin Outcome Score: Cross-cultural adaptation and validation according to the COSMIN Checklist. *J Orthop Sports Phys Ther.* 2018;48(4):299-306. [doi:10.2519/jospt.2018.7883](https://doi.org/10.2519/jospt.2018.7883)
80. Negrau AE, Roccia L, Romanini E, et al. Cross-cultural adaptation and validation of the italian version of the Copenhagen hip and groin outcome score. *Minerva Ortopedica e Traumatologica.* 2020;71(3):98-103. [doi:10.23736/s0394-3410.20.03973-9](https://doi.org/10.23736/s0394-3410.20.03973-9)
81. Thomeé R, Jónasson P, Thorborg K, et al. Cross-cultural adaptation to Swedish and validation of the Copenhagen Hip and Groin Outcome Score (HAGOS) for pain, symptoms and physical function in patients with hip and groin disability due to femoro-acetabular impingement. *Knee Surg Sports Traumatol Arthrosc.* 2014;22(4):835-842. [doi:10.1007/s00167-013-2721-7](https://doi.org/10.1007/s00167-013-2721-7)
82. Wei X, Wang Z, Yang C, et al. Development of a simplified Chinese version of the hip disability and osteoarthritis outcome score (HOOS): Cross-cultural adaptation and psychometric evaluation. *Osteoarthritis and Cartilage.* 2012;20(12):1563-1567. [doi:10.1016/j.joca.2012.08.018](https://doi.org/10.1016/j.joca.2012.08.018)
83. de Groot IB, Reijman M, Terwee CB, et al. Validation of the Dutch version of the Hip disability and Osteoarthritis Outcome Score. *Osteoarthritis Cartilage.* 2007;15(1):104-109. [doi:10.1016/j.joca.2006.06.014](https://doi.org/10.1016/j.joca.2006.06.014)
84. Ornetti P, Parratte S, Gossec L, et al. Cross-cultural adaptation and validation of the French version of the Hip disability and Osteoarthritis Outcome Score (HOOS) in hip osteoarthritis patients. *Osteoarthritis Cartilage.* 2010;18(4):522-529. [doi:10.1016/j.joca.2009.12.007](https://doi.org/10.1016/j.joca.2009.12.007)
85. Blasimann A, Dauphinee SW, Staal JB. Translation, cross-cultural adaptation, and psychometric properties of the German version of the hip disability and osteoarthritis outcome score. *J Orthop Sports Phys Ther.* 2014;44(12):989-997. [doi:10.2519/jospt.2014.4994](https://doi.org/10.2519/jospt.2014.4994)
86. Arbab D, van Ochten JHM, Schnurr C, Bouillon B, König D. Assessment of reliability, validity, responsiveness and minimally important change of the German Hip dysfunction and osteoarthritis outcome score (HOOS) in patients with osteoarthritis of the hip. *Rheumatol Int.* 2017;37(12):2005-2011. [doi:10.1007/s00296-017-3834-y](https://doi.org/10.1007/s00296-017-3834-y)
87. Torre M, Luzi I, Mirabella F, et al. Cross-cultural adaptation and validation of the Italian version of the Hip disability and Osteoarthritis Outcome Score (HOOS). *Health Qual Life Outcomes.* 2018;16(1):115. [doi:10.1186/s12955-018-0935-6](https://doi.org/10.1186/s12955-018-0935-6)
88. Satoh M, Masuhara K, Goldhahn S, Kawaguchi T. Cross-cultural adaptation and validation reliability, validity of the Japanese version of the Hip disability and Osteoarthritis Outcome Score (HOOS) in patients with hip osteoarthritis. *Osteoarthritis Cartilage.* 2013;21(4):570-573. [doi:10.1016/j.joca.2013.01.015](https://doi.org/10.1016/j.joca.2013.01.015)

89. Lee YK, Chung CY, Koo KH, et al. Transcultural adaptation and testing of psychometric properties of the Korean version of the Hip Disability and Osteoarthritis Outcome Score (HOOS). *Osteoarthritis Cartilage*. 2011;19(7):853-857. doi:10.1016/j.joca.2011.02.012
90. Mousavian A, Kachooie A, Birjandinejad A, Khoshsaligheh M, Ebrahimzadeh M. Translation and cross-cultural adaptation of the Hip Disability and Osteoarthritis Score into Persian language: reassessment of validity and reliability. *Int J Prev Med*. 2018;9(1):23. doi:10.4103/ijpvm.ijpvm_359_16
91. Glinkowski W, Żukowska A, Dymitrowicz M, Wołyniec E, Glinkowska B, Kozioł-Kaczorek D. Translation, cross-cultural adaptation, and psychometric properties of the Polish version of the Hip Disability and Osteoarthritis Outcome Score (HOOS). *Medicina*. 2019;55(10):614. doi:10.3390/medicina55100614
92. Gojło MK, Paradowski PT. Polish adaptation and validation of the hip disability and osteoarthritis outcome score (HOOS) in osteoarthritis patients undergoing total hip replacement. *Health Qual Life Outcomes*. 2020;18(1):135. doi:10.1186/s12955-020-01390-4
93. Cavalheiro LM, Gonçalves RS, Martins E, Pires J, Ferreira PL. Validity and reliability of the Portuguese version of the hip dysfunction and osteoarthritis outcome score-physical function short form (HOOS-PS). *Qual Life Res*. 2016;25(S1):137. doi:10.1007/s11136-016-1390-7
94. Machado RK, Casagrande AA, Pereira GR, Vissoci JRN, Pietrobon R, Ferreira APB. Hip Disability and Osteoarthritis Outcome Score (HOOS): a cross-cultural validation of the Brazilian Portuguese version study. *Rev Bras Ortop*. 2019;54(3):282-287. doi:10.1055/s-0039-1691764
95. Haragus H, Deleanu B, Prejbeanu R, Timar B, Levai C, Vermesan D. Cross-cultural adaptation and validation of the Romanian Hip disability and Osteoarthritis Outcome Score for joint replacement. *Int J Qual Health Care*. 2019;31(4):307-311. doi:10.1093/intqhc/mzy156
96. Trathitiphan W, Paholpak P, Sirichativapee W, et al. Cross-cultural adaptation and validation of the reliability of the Thai version of the Hip disability and Osteoarthritis Outcome Score (HOOS). *Rheumatol Int*. 2016;36(10):1455-1458. doi:10.1007/s00296-016-3505-4
97. Yilmaz O, Gul ED, Bodur H. Cross-cultural adaptation and validation of the Turkish version of the Hip disability and Osteoarthritis Outcome Score-Physical function Short-form (HOOS-PS). *Rheumatol Int*. 2014;34(1):43-49. doi:10.1007/s00296-013-2854-5
98. Costa RMP, Cardinot TM, Mathias L, Leporace G, de Oliveira LP. Validation of the Brazilian version of the Hip Outcome Score (HOS) questionnaire. *Adv Rheumatol*. 2018;58(1):4. doi:10.1186/s42358-018-0007-y
99. Naal FD, Impellizzeri FM, Miozzari HH, Mannion AF, Leunig M. The German Hip Outcome Score: validation in patients undergoing surgical treatment for femoroacetabular impingement. *Arthroscopy*. 2011;27(3):339-345. doi:10.1016/j.arthro.2010.07.021
100. Naal FD, Impellizzeri FM, Von Eisenhart-Rothe R, Mannion AF, Leunig M. Reproducibility, validity, and responsiveness of the hip outcome score in patients with end-stage hip osteoarthritis. *Arthritis Care Res*. 2012;64(11):1770-1775. doi:10.1002/acr.21746
101. Lee YK, Ha YC, Martin RL, Hwang DS, Koo KH. Transcultural adaptation of the Korean version of the Hip Outcome Score. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(11):3426-3431. doi:10.1007/s00167-014-2946-0
102. de Oliveira LP, Moura Cardinot T, Nunes Carreras Del Castillo L, Cavalheiro Queiroz M, Cavalli Polesello G. Translation and cultural adaptation of the Hip Outcome Score to the Portuguese language. *Rev Bras Ortop*. 2014;49(3):297-304. doi:10.1016/j.rboe.2014.03.011
103. Haragus H, Prejbeanu R, Poenaru DV, Deleanu B, Timar B, Vermesan D. Cross-cultural adaptation and validation of a patient-reported hip outcome score. *Int Orthop*. 2018;42(5):1001-1006. doi:10.1007/s00264-017-3742-5
104. Seijas R, Sallent A, Ruiz-Ibán M, et al. Validation of the Spanish version of the Hip Outcome Score: a multicenter study. *Health Qual Life Outcomes*. 2014;12(1):70. doi:10.1186/1477-7525-12-70
105. Polat G, Çelik D, Çil H, Erdil M, Aşık M. Evidence for reliability, validity and responsiveness of Turkish version of Hip Outcome Score. *Acta Orthop Traumatol Turc*. 2017;51(4):319-324. doi:10.1016/j.aott.2017.05.001
106. Stevens M, van den Akker-Scheek I, ten Have B, Adema M, Giezen H, Reininga IHF. Validity and reliability of the Dutch version of the International Hip Outcome Tool (iHOT-12NL) in patients with disorders of the hip. *J Orthop Sports Phys Ther*. 2015;45(12):1026-1034. doi:10.2519/jospt.2015.6178

107. Dion MO, Simonyan D, Faure PA, et al. Validation of the French version of the self-administered International Hip Outcome Tool-12 questionnaire and determination of the minimal clinically important difference (MCID) in the French speaking population. *Orthop Traumatol Surg Res.* 2021;107(8):103083. [doi:10.1016/j.otsr.2021.103083](https://doi.org/10.1016/j.otsr.2021.103083)
108. Baumann F, Popp D, Müller K, et al. Validation of a German version of the International Hip Outcome Tool 12 (iHOT12) according to the COSMIN checklist. *Health Qual Life Outcomes.* 2016;14(1):3. [doi:10.1186/s12955-016-0407-9](https://doi.org/10.1186/s12955-016-0407-9)
109. Stasi S, Stamou M, Papathanasiou G, et al. International Hip Outcome Tool (12-items) as health-related quality-of-life measure in osteoarthritis: validation of Greek version. *J Patient Rep Outcomes.* 2020;4(1):41. [doi:10.1186/s41687-020-00207-8](https://doi.org/10.1186/s41687-020-00207-8)
110. Watanabe N, Murakami S, Uchida S, et al. Exploring the validation of a Japanese version of the International Hip Outcome Tool 12: reliability, validity, and responsiveness. *J Orthop Sci.* 2019;24(4):652-657. [doi:10.1016/j.jos.2018.12.014](https://doi.org/10.1016/j.jos.2018.12.014)
111. Jónasson P, Baranto A, Karlsson J, et al. A standardised outcome measure of pain, symptoms and physical function in patients with hip and groin disability due to femoro-acetabular impingement: cross-cultural adaptation and validation of the international Hip Outcome Tool (iHOT12) in Swedish. *Knee Surg Sports Traumatol Arthrosc.* 2014;22(4):826-834. [doi:10.1007/s00167-013-2710-x](https://doi.org/10.1007/s00167-013-2710-x)
112. Atilla H, Akdogan M. Cross-cultural adaptation and validation of the Turkish version of the International Hip Outcome Tool - 12. *Sisli Etfal Hastan Tip Bul.* 2020;54(4):483-489. [doi:10.14744/semb.2020.33558](https://doi.org/10.14744/semb.2020.33558)
113. Li DH, Wang W, Li X, et al. Development of a valid Simplified Chinese version of the International Hip Outcome Tool (SC-iHOT-33) in young patients having total hip arthroplasty. *Osteoarthritis Cartilage.* 2017;25(1):94-98. [doi:10.1016/j.joca.2016.08.013](https://doi.org/10.1016/j.joca.2016.08.013)
114. Tjissen M, Tak I, Stubbe J, et al. Translation, Cross-cultural adaptation, and validation of the Dutch International Hip Outcome Tool-33 (iHOT-33 NL) in young, physically active individuals with symptomatic hip joint pathology. *J Orthop Sports Phys Ther.* 2018;48(4):289-298. [doi:10.2519/jospt.2018.7610](https://doi.org/10.2519/jospt.2018.7610)
115. Dion MO, Faure PA, May O, et al. Validation of the French version of the self-administered international hip outcome tool-33 questionnaire. *Orthop Traumatol Surg Res.* 2021;107(3):102858. [doi:10.1016/j.otsr.2021.102858](https://doi.org/10.1016/j.otsr.2021.102858)
116. Baumann F, Weber J, Zeman F, et al. Validation of a German version of the International Hip Outcome Tool (G-iHOT33) according to the COSMIN checklist: how much improvement is clinically relevant? *Arch Orthop Trauma Surg.* 2016;136(1):83-91. [doi:10.1007/s00402-015-2336-1](https://doi.org/10.1007/s00402-015-2336-1)
117. Ruiz-Ibán MA, Seijas R, Sallent A, et al. The international Hip Outcome Tool-33 (iHOT-33): multicenter validation and translation to Spanish. *Health Qual Life Outcomes.* 2015;13(1):62. [doi:10.1186/s12955-015-0255-z](https://doi.org/10.1186/s12955-015-0255-z)
118. Lertwanich P, Loog-In S, Pornrattanamaneewong C, Ganokroj P. Validity and reliability of the Thai version of the International Hip Outcome Tool in young to middle-aged physically active adults with hip disorders. *Orthop J Sports Med.* 2021;9(9):232596712110420. [doi:10.1177/23259671211042017](https://doi.org/10.1177/23259671211042017)
119. Almangoush A, Herrington L, Attia I, et al. Cross-cultural adaptation, reliability, internal consistency and validation of the Arabic version of the knee injury and osteoarthritis outcome score (KOOS) for Egyptian people with knee injuries. *Osteoarthritis Cartilage.* 2013;21(12):1855-1864. [doi:10.1016/j.joca.2013.09.010](https://doi.org/10.1016/j.joca.2013.09.010)
120. Alfadhel SA, Vennu V, Alnahdi AH, et al. Cross-cultural adaptation and validation of the Saudi Arabic version of the Knee Injury and Osteoarthritis Outcome Score (KOOS). *Rheumatol Int.* 2018;38(8):1547-1555. [doi:10.1007/s00296-018-4072-7](https://doi.org/10.1007/s00296-018-4072-7)
121. Alzhrani M. Knee Injury and Osteoarthritis Outcome Score Patellofemoral Questionnaire: psychometric properties among females of kingdom of Saudi Arabia. *Int J Environ Res Public Health.* 2022;19(10):6058. [doi:10.3390/ijerph19106058](https://doi.org/10.3390/ijerph19106058)
122. Ateef M. Measurement properties of the Knee Injury and Osteoarthritis Outcome Score Patello-Femoral questionnaire in Saudi Arabians. *PeerJ.* 2020;8:e9323. [doi:10.7717/peerj.9323](https://doi.org/10.7717/peerj.9323)
123. Xie F, Li SC, Roos EM, et al. Cross-cultural adaptation and validation of Singapore English and Chinese versions of the Knee injury and Osteoarthritis Outcome Score (KOOS) in Asians with knee osteoarthritis in Singapore. *Osteoarthritis Cartilage.* 2006;14(11):1098-1103. [doi:10.1016/j.joca.2006.05.005](https://doi.org/10.1016/j.joca.2006.05.005)
124. Cheung RTH, Ngai SPC, Ho KKW. Chinese adaptation and validation of the Knee Injury and Osteoarthritis Outcome Score (KOOS) in patients with knee osteoarthritis. *Rheumatol Int.* 2016;36(10):1449-1454. [doi:10.1007/s00296-016-3539-7](https://doi.org/10.1007/s00296-016-3539-7)

125. Huang CC, Chen WS, Tsai MW, Wang WTJ. Comparing the Chinese versions of two knee-specific questionnaires (IKDC and KOOS): reliability, validity, and responsiveness. *Health Qual Life Outcomes*. 2017;15(1):238. doi:10.1186/s12955-017-0814-6
126. Cheng ASK, Chan K chun, Chan S yuet, et al. Cross-cultural adaptation and validation of the Hong Kong version of the Knee Injury and Osteoarthritis Outcome Score (HK-KOOS) for patients with knee osteoarthritis. *Occup Ther Int*. 2019;2019:1-9. doi:10.1155/2019/8270637
127. Zhang QH, Du SX, Zheng GZ, et al. Reliability, validity, and responsiveness of the Chinese version of the Knee Injury and Osteoarthritis Outcome Score (KOOS) in patients with anterior cruciate ligament reconstruction in mainland China. *Z Orthop Unfall*. 2019;157(01):42-47. doi:10.1055/a-0621-9504
128. Krogsgaard MR, Brodersen J, Christensen KB, et al. How to translate and locally adapt a PROM. Assessment of cross-cultural differential item functioning. *Scand J Med Sci Sports*. 2021;31(5):999-1008. doi:10.1111/sms.13854
129. de Groot IB, Favejee MM, Reijman M, Verhaar JA, Terwee CB. The Dutch version of the Knee Injury and Osteoarthritis Outcome Score: a validation study. *Health Qual Life Outcomes*. 2008;6(1):16. doi:10.1186/1477-7525-6-16
130. Bekkers JEJ, de Windt ThS, Raijmakers NJH, Dhert WJA, Saris DBF. Validation of the Knee Injury and Osteoarthritis Outcome Score (KOOS) for the treatment of focal cartilage lesions. *Osteoarthritis Cartilage*. 2009;17(11):1434-1439. doi:10.1016/j.joca.2009.04.019
131. van de Graaf VA, Wolterbeek N, Scholtes VAB, Mutsaerts ELAR, Poolman RW. Reliability and validity of the IKDC, KOOS, and WOMAC for patients with meniscal injuries. *Am J Sports Med*. 2014;42(6):1408-1416. doi:10.1177/0363546514524698
132. Multanen J, Honkanen M, Häkkinen A, Kiviranta I. Construct validity and reliability of the Finnish version of the Knee Injury and Osteoarthritis Outcome Score. *BMC Musculoskelet Disord*. 2018;19(1):155. doi:10.1186/s12891-018-2078-7
133. Ornetti P, Parratte S, Gossec L, et al. Cross-cultural adaptation and validation of the French version of the Knee injury and Osteoarthritis Outcome Score (KOOS) in knee osteoarthritis patients. *Osteoarthritis Cartilage*. 2008;16(4):423-428. doi:10.1016/j.joca.2007.08.007
134. Ornetti P, Perruccio AV, Roos EM, Lohmander LS, Davis AM, Maillefert JF. Psychometric properties of the French translation of the reduced KOOS and HOOS (KOOS-PS and HOOS-PS). *Osteoarthritis Cartilage*. 2009;17(12):1604-1608. doi:10.1016/j.joca.2009.06.007
135. Villanueva-Misa AMA, Penserga EG. Cross-cultural adaptation and validation of the Filipino translation of the Knee Injury and Osteoarthritis Outcome Score in Filipinos with knee osteoarthritis at a tertiary Hospital. *Acta Med Philipp*. 2022;56(2):13-20. doi:10.47895/amp.v56i2.1789
136. Kessler S, Lang S, Puhl W, Stöve J. Der Knee Injury and Osteoarthritis Outcome Score--ein Funktionsfragebogen zur Outcome-Messung in der Knieendoprothetik [The Knee Injury and Osteoarthritis Outcome Score--a multifunctional questionnaire to measure outcome in knee arthroplasty]. *Z Orthop Ihre Grenzgeb*. 2003;141(03):277-282. doi:10.1055/s-2003-40083
137. Moutzouri M, Tsoumpas P, Billis E, Papoutsidakis A, Gliatis J. Cross-cultural translation and validation of the Greek version of the Knee Injury and Osteoarthritis Outcome Score (KOOS) in patients with total knee replacement. *Disabil Rehabil*. 2015;37(16):1477-1483. doi:10.3109/09638288.2014.972583
138. Jha RK, Sen RK, Tripathy SK, Gopinathan NR, Goyal T, Sharma SK. Cross-cultural validation of Hindi version Knee Injury and Osteoarthritis Outcome Score (KOOS) in osteoarthritis knee. *Knee Surg Sports Traumatol Arthrosc*. 2021;29(6):1742-1749. doi:10.1007/s00167-020-06211-1
139. Briem K. KOOS-spurningalistinn til mats á einkenum og færni í hné; réttmæti og áreidanleiki íslenskrar thýdingar [Reliability, validity and responsiveness of the Icelandic version of the knee injury and osteoarthritis outcome score (KOOS)]. *Laeknabladid*. 2012;98(7-8):403-407. doi:10.17992/lb.1.2012.0708.444
140. Ateef M, Kulandaivelan S, Alqahtani M. Cross-cultural validation of Urdu version KOOS in Indian population with primary knee osteoarthritis. *Int J Rheumatol*. 2017;2017:1-4. doi:10.1155/2017/1206706
141. Phatama KY, Aziz A, Bimadi MH, Oktafandi I, Cendikiawan F, Mustamsir E. Knee Injury and Osteoarthritis Outcome Score: validity and reliability of an Indonesian version. *Ochsner J*. 2021;21(1):63-67. doi:10.31486/toj.20.0088

142. Monticone M, Ferrante S, Salvaderi S, et al. Development of the Italian version of the knee injury and osteoarthritis outcome score for patients with knee injuries: cross-cultural adaptation, dimensionality, reliability, and validity. *Osteoarthritis Cartilage*. 2012;20(4):330-335. [doi:10.1016/j.joca.2012.01.001](https://doi.org/10.1016/j.joca.2012.01.001)
143. Franchignoni F, Salaffi F, Giordano A, Carotti M, Ciapetti A, Ottonello M. Rasch analysis of the 22 knee injury and osteoarthritis outcome score-physical function items in Italian patients with knee osteoarthritis. *Arch Phys Med Rehabil*. 2013;94(3):480-487. [doi:10.1016/j.apmr.2012.09.028](https://doi.org/10.1016/j.apmr.2012.09.028)
144. Nakamura N, Takeuchi R, Ishikawa H, Saito T, Sawaguchi T, Goldhahn S. Cross-cultural adaptation and validation of the Japanese Knee Injury and Osteoarthritis Outcome Score (KOOS). *J Orthop Sci*. 2011;16(5):516-523. [doi:10.1007/s00776-011-0112-9](https://doi.org/10.1007/s00776-011-0112-9)
145. Oishi K, Tsuda E, Yamamoto Y, et al. The Knee injury and Osteoarthritis Outcome Score reflects the severity of knee osteoarthritis better than the revised Knee Society Score in a general Japanese population. *Knee*. 2016;23(1):35-42. [doi:10.1016/j.knee.2015.08.011](https://doi.org/10.1016/j.knee.2015.08.011)
146. Goldhahn S, Takeuchi R, Nakamura N, Nakamura R, Sawaguchi T. Responsiveness of the Knee Injury and Osteoarthritis Outcome Score (KOOS) and the Oxford Knee Score (OKS) in Japanese patients with high tibial osteotomy. *J Orthop Sci*. 2017;22(5):862-867. [doi:10.1016/j.jos.2017.04.013](https://doi.org/10.1016/j.jos.2017.04.013)
147. Lyman S, Omori G, Nakamura N, et al. Development and validation of a culturally relevant Japanese KOOS. *J Orthop Sci*. 2019;24(3):514-520. [doi:10.1016/j.jos.2018.11.014](https://doi.org/10.1016/j.jos.2018.11.014)
148. Zulkifli MM, Kadir AA, Elias A, Bea KC, Sadagatullah AN. Psychometric properties of the Malay language version of Knee Injury and Osteoarthritis Outcome Score (KOOS) Questionnaire among knee osteoarthritis patients: a confirmatory factor analysis. *Malays Orthop J*. 2017;11(2):7-14. [doi:10.5704/moj.1707.003](https://doi.org/10.5704/moj.1707.003)
149. Salavati M, Mazaheri M, Negahban H, et al. Validation of a Persian-version of Knee injury and Osteoarthritis Outcome Score (KOOS) in Iranians with knee injuries. *Osteoarthritis Cartilage*. 2008;16(10):1178-1182. [doi:10.1016/j.joca.2008.03.004](https://doi.org/10.1016/j.joca.2008.03.004)
150. Salavati M, Akhbari B, Mohammadi F, Mazaheri M, Khorrami M. Knee injury and Osteoarthritis Outcome Score (KOOS); reliability and validity in competitive athletes after anterior cruciate ligament reconstruction. *Osteoarthritis Cartilage*. 2011;19(4):406-410. [doi:10.1016/j.joca.2011.01.010](https://doi.org/10.1016/j.joca.2011.01.010)
151. Jalaie S, Ebrahimi N, Salsabili N, Ansari N, Naghdi S. Knee Injury and Osteoarthritis Outcome Score in patients with isolated meniscus injury; validity and reliability. *J Res Med Sci*. 2017;22(1):55. [doi:10.4103/jrms.jrms_941_16](https://doi.org/10.4103/jrms.jrms_941_16)
152. Ataeian M, Shafizadegan Z, Rahnemai-Azar AA, Irrgang JJ, Rezaeian ZS. Development of the Persian version of Knee Outcome Survey Activities for Daily Living Scale. *Iran J Med Sci*. 2020;45(6):434-443. [doi:10.30476/ijms.2019.72487](https://doi.org/10.30476/ijms.2019.72487)
153. Mostafaei N, Negahban H, Shaterzadeh Yazdi MJ, Goharpey S, Mehravar M, Pirayeh N. Responsiveness of a Persian version of Knee Injury and Osteoarthritis Outcome Score and Tegner activity scale in athletes with anterior cruciate ligament reconstruction following physiotherapy treatment. *Physiother Theory Pract*. 2020;36(9):1019-1026. [doi:10.1080/09593985.2018.1548672](https://doi.org/10.1080/09593985.2018.1548672)
154. Mostafaei N, Nourollahi F, Mostamand J, Negahban H. Responsiveness and the minimal important change of Knee injury and Osteoarthritis Outcome Score in Persian patients with knee osteoarthritis following physiotherapy intervention. *Physiother Theory Pract*. 2021;38(12):1-10. [doi:10.1080/09593985.2021.1926021](https://doi.org/10.1080/09593985.2021.1926021)
155. Paradowski PT, Witoński D, Kęska R, Roos EM. Cross-cultural translation and measurement properties of the Polish version of the Knee injury and Osteoarthritis Outcome Score (KOOS) following anterior cruciate ligament reconstruction. *Health Qual Life Outcomes*. 2013;11(1):107. [doi:10.1186/1477-7525-11-107](https://doi.org/10.1186/1477-7525-11-107)
156. Paradowski PT, Kęska R, Witoński D. Validation of the Polish version of the Knee injury and Osteoarthritis Outcome Score (KOOS) in patients with osteoarthritis undergoing total knee replacement. *BMJ Open*. 2015;5(7):e006947. [doi:10.1136/bmjopen-2014-006947](https://doi.org/10.1136/bmjopen-2014-006947)
157. Gonçalves RS, Cabri J, Pinheiro JP, Ferreira PL. Cross-cultural adaptation and validation of the Portuguese version of the Knee injury and Osteoarthritis Outcome Score (KOOS). *Osteoarthritis Cartilage*. 2009;17(9):1156-1162. [doi:10.1016/j.joca.2009.01.009](https://doi.org/10.1016/j.joca.2009.01.009)
158. Almeida GPL, da Costa RMO, Albano TR, Tavares MLA, Marques AP. Translation, cross-cultural adaptation, validation and responsiveness in the Brazilian Portuguese version of the Knee Injury and Osteoarthritis Outcome Score (KOOS-BR). *Knee Surg Sports Traumatol Arthrosc*. 2022;30(10):3343-3349. [doi:10.1007/s00167-022-06911-w](https://doi.org/10.1007/s00167-022-06911-w)

159. Gonçalves RS, Cabri J, Pinheiro JP, Ferreira PL, Gil J. Reliability, validity and responsiveness of the Portuguese version of the Knee injury and Osteoarthritis Outcome Score – Physical Function Short-form (KOOS-PS). *Osteoarthritis Cartilage*. 2010;18(3):372-376. [doi:10.1016/j.joca.2009.10.012](https://doi.org/10.1016/j.joca.2009.10.012)
160. Vaquero J, Longo UG, Forriol F, Martinelli N, Vethencourt R, Denaro V. Reliability, validity and responsiveness of the Spanish version of the Knee Injury and Osteoarthritis Outcome Score (KOOS) in patients with chondral lesion of the knee. *Knee Surg Sports Traumatol Arthrosc*. 2014;22(1):104-108. [doi:10.1007/s00167-012-2290-1](https://doi.org/10.1007/s00167-012-2290-1)
161. Lizaur-Utilla A, Miralles-Muñoz FA, Gonzalez-Parreño S, Lopez-Prats FA. Validation of the Spanish version of the Knee Injury and Osteoarthritis Outcome Score (KOOS) for elderly patients with total knee replacement. *J Orthop Res*. 2019;37(10):2157-2162. [doi:10.1002/jor.24386](https://doi.org/10.1002/jor.24386)
162. Martinez-Cano JP, Vernaza-Obando D, Chica J, Castro AM. Cross-cultural translation and validation of the Spanish version of the patellofemoral pain and osteoarthritis subscale of the KOOS (KOOS-PF). *BMC Res Notes*. 2021;14(1):220. [doi:10.1186/s13104-021-05619-3](https://doi.org/10.1186/s13104-021-05619-3)
163. Gul ED, Yilmaz O, Bodur H. Reliability and validity of the Turkish version of the knee injury and osteoarthritis outcome score-physical function short-form (KOOS-PS). *J Back Musculoskelet Rehabil*. 2013;26(4):461-466. [doi:10.3233/bmr-130406](https://doi.org/10.3233/bmr-130406)
164. Yilmaz Tasdelen O, Utkan A, Ceritoglu KU, Ozalp Ates FS, Bodur H. Responsiveness of the Turkish KOOS-PS and HOOS-PS in knee and hip joint arthroplasty patients. *J Back Musculoskelet Rehabil*. 2020;33(6):977-981. [doi:10.3233/bmr-181420](https://doi.org/10.3233/bmr-181420)
165. Fatima S, Arslan SA, Sharif F, Ahmad A, Gillani SA, Zaheer A. Translation, cross-cultural adaptation and psychometric properties of the Urdu version of knee injury and osteoarthritis outcome score questionnaire for Pakistani population. *BMC Musculoskelet Disord*. 2021;22(1):592. [doi:10.1186/s12891-021-04477-1](https://doi.org/10.1186/s12891-021-04477-1)
166. Algarni AD, Alrabai HM, Al-Ahaideb A, Kachanathu SJ, AlShammari SA. Arabic translation, cultural adaptation, and validation study of Knee Outcome Survey: Activities of Daily Living Scale (KOS-ADLS). *Rheumatol Int*. 2017;37(9):1585-1589. [doi:10.1007/s00296-017-3776-4](https://doi.org/10.1007/s00296-017-3776-4)
167. Bouzubar FF, Aljadi SH, Alotaibi NM, Irrgang JJ. Cross-cultural adaptation and validation of the Arabic version of the knee outcome survey-activities for daily living scale. *Disabil Rehabil*. 2018;40(15):1817-1828. [doi:10.1080/09638288.2017.1313319](https://doi.org/10.1080/09638288.2017.1313319)
168. Jia ZY, Wang W, Nian XW, et al. Cross-cultural adaptation and validation of the simplified Chinese version of the Knee Outcome Survey Activities of Daily Living Scale. *Arthroscopy*. 2016;32(10):2009-2016. [doi:10.1016/j.arthro.2016.01.068](https://doi.org/10.1016/j.arthro.2016.01.068)
169. Roy JS, Esculier JF, Maltais DB. Translation, cross-cultural adaptation and validation of the French version of the Knee Outcome Survey-Activities of Daily Living Scale. *Clin Rehabil*. 2014;28(6):614-623. [doi:10.1177/0269215513511342](https://doi.org/10.1177/0269215513511342)
170. Bizzini M, Gorelick M. Development of a German version of the knee outcome survey for daily activities. *Arch Orthop Trauma Surg*. 2007;127(9):781-789. [doi:10.1007/s00402-006-0200-z](https://doi.org/10.1007/s00402-006-0200-z)
171. Kapreli E, Panelli G, Strimpakos N, Billis E, Zacharopoulos A, Athanasopoulos S. Cross-cultural adaptation of the Greek version of the Knee Outcome Survey – activities of Daily Living Scale (KOS-ADLS). *Knee*. 2011;18(6):424-427. [doi:10.1016/j.knee.2010.09.001](https://doi.org/10.1016/j.knee.2010.09.001)
172. Szczepanik M, Bejer A, Snela S, Szymczyk D, Jabłoński J, Majewska J. Polish Cross-cultural adaptation and validation of the Knee Outcome Survey Activities of Daily Living Scale (KOS-ADLS) in patients undergoing total knee arthroplasty. *Med Sci Monit*. 2018;24:5309-5319. [doi:10.12659/msm.908094](https://doi.org/10.12659/msm.908094)
173. Gonçalves RS, Cabri J, Pinheiro JP. Cross-cultural adaptation and validation of the Portuguese version of the Knee Outcome Survey-Activities of Daily Living Scale (KOS-ADLS). *Clin Rheumatol*. 2008;27(11):1445-1449. [doi:10.1007/s10067-008-0996-8](https://doi.org/10.1007/s10067-008-0996-8)
174. Evcik D, Ay S, Ege A, Turel A, Kavuncu V. Adaptation and validation of Turkish version of the Knee Outcome Survey-Activities for Daily Living Scale. *Clin Orthop Relat Res*. 2009;467(8):2077-2082. [doi:10.1007/s11999-009-0826-6](https://doi.org/10.1007/s11999-009-0826-6)
175. Ruiz-Muñoz M, González-Sánchez M, Li GZ, Cuesta-Vargas AI. Manchester–Oxford Foot Questionnaire Chinese version (MOXFQ-Ch): a validity and cross-cultural adaptation. *Disabil Rehabil*. 2021;43(1):104-111. [doi:10.1080/09638288.2019.1616834](https://doi.org/10.1080/09638288.2019.1616834)
176. Venkatesan S, Schotanus MGM, Hendrickx RPM. Dutch translation of the Manchester–Oxford Foot Questionnaire: reassessment of reliability and validity. article. *J Foot Ankle Surg*. 2016;55(6):1199-1201. [doi:10.1053/j.fas.2016.07.015](https://doi.org/10.1053/j.fas.2016.07.015)

177. Ponkilainen VT, Miettinen M, Sandelin H, et al. Structural validity of the Finnish Manchester-Oxford Foot Questionnaire (MOXFQ) using the Rasch model. *J Foot Ankle Surg.* 2021;27(1):93-100. [doi:10.1016/j.fas.2020.02.012](https://doi.org/10.1016/j.fas.2020.02.012)
178. Vieira Cardoso D, Dubois-Ferrière V, Hannouche D, Lübbecke A, Perneger T. Development and psychometric performance of the French language version of the Manchester-Oxford Foot Questionnaire (MOXFQ). *J Foot Ankle Surg.* 2020;26(8):902-906. [doi:10.1016/j.fas.2019.12.002](https://doi.org/10.1016/j.fas.2019.12.002)
179. Arbab D, Kuhlmann K, Ringendahl H, Bouillon B, Eysel P, König D. Reliability, validity and responsiveness of the German Manchester-Oxford Foot Questionnaire (MOXFQ) in patients with foot or ankle surgery. *J Foot Ankle Surg.* 2018;24(6):481-485. [doi:10.1016/j.fas.2017.05.007](https://doi.org/10.1016/j.fas.2017.05.007)
180. Arbab D, Kuhlmann K, Schnurr C, Lüring C, König D, Bouillon B. Comparison of the Manchester-Oxford Foot Questionnaire (MOXFQ) and the Self-Reported Foot and Ankle Outcome Score (SEFAS) in patients with foot or ankle surgery. *J Foot Ankle Surg.* 2019;25(3):361-365. [doi:10.1016/j.fas.2018.01.003](https://doi.org/10.1016/j.fas.2018.01.003)
181. Marinozzi A, Martinelli N, Panasci M, et al. Italian translation of the Manchester-Oxford Foot Questionnaire, with re-assessment of reliability and validity. *Qual Life Res.* 2009;18(7):923-927. [doi:10.1007/s11136-009-9508-9](https://doi.org/10.1007/s11136-009-9508-9)
182. Park MJ, Ko YC, Huh JW, Park SH, Park T hong, Park J hyung. Validation of the Korean version of the Manchester-Oxford Foot Questionnaire in patients with hallux valgus. *J Foot Ankle Surg.* 2017;56(2):252-254. [doi:10.1053/j.jfas.2016.11.013](https://doi.org/10.1053/j.jfas.2016.11.013)
183. Mousavian A, Ebrahimzadeh MH, Birjandinejad A, Omid-Kashani F, Kachooei AR. Translation and cultural adaptation of the Manchester-Oxford Foot Questionnaire (MOXFQ) into Persian language. *Foot.* 2015;25(4):224-227. [doi:10.1016/j.foot.2015.07.004](https://doi.org/10.1016/j.foot.2015.07.004)
184. Goldhahn S, Garces JBG, Winson I, Sands AK. Psychometric validation of the Spanish Manchester-Oxford Foot Questionnaire (MOXFQ) in patients with foot or ankle surgery. conference abstract. *Qual Life Res.* 2015;24(1):121. [doi:10.1007/s11136-015-1078-4](https://doi.org/10.1007/s11136-015-1078-4)
185. Garcés JBG, Winson I, Goldhahn S, et al. Reliability, validity and responsiveness of the Spanish Manchester-Oxford Foot Questionnaire (MOXFQ) in patients with foot or ankle surgery. *Foot Ankle Surg.* 2016;22(1):59-70. [doi:10.1016/j.fas.2015.09.004](https://doi.org/10.1016/j.fas.2015.09.004)
186. Talu B, Bayramlar K, Bek N, Yakut Y. Reliability and validity study of manchester-oxford foot questionnaire (MOXFQ) in the evaluation of hallux valgus deformity. *Fizyoterapi Rehabilitasyon.* 2010;21(3):242.
187. Talu B, Bayramlar K, Bek N, Yakut Y. Validity and reliability of the Turkish version of the Manchester-Oxford Foot Questionnaire for hallux valgus deformity evaluation. *Acta Orthop Traumatol Turc.* 2016;50(2):207-213. [doi:10.3944/aott.2015.15.0152](https://doi.org/10.3944/aott.2015.15.0152)
188. Del Castillo LNC, Leporace G, Cardinot TM, Levy RA, de Oliveira LP. Translation, cross-cultural adaptation and validation of the Brazilian version of the Nonarthritic Hip Score. *Sao Paulo Med J.* 2013;131(4):244-251. [doi:10.1590/1516-3180.2013.1314487](https://doi.org/10.1590/1516-3180.2013.1314487)
189. Kanik ZH, Sozlu U, Olmez SB, Basar S, Kanatli U. Cross-cultural adaptation, and validation of the Turkish version of the Nonarthritic Hip Score. *AOTT.* 2020;54(4):414-422. [doi:10.5152/j.aott.2020.19177](https://doi.org/10.5152/j.aott.2020.19177)
190. Zheng W, Li J, Zhao J, Liu D, Xu W. Development of a valid simplified Chinese version of the Oxford Hip Score in patients with hip osteoarthritis. *Clin Orthop Relat Res.* 2014;472(5):1545-1551. [doi:10.1007/s11999-013-3403-y](https://doi.org/10.1007/s11999-013-3403-y)
191. Paulsen A, Odgaard A, Overgaard S. Translation, cross-cultural adaptation and validation of the Danish version of the Oxford hip score: assessed against generic and disease-specific questionnaires. *Bone Joint Res.* 2012;1(9):225-233. [doi:10.1302/2046-3758.19.2000076](https://doi.org/10.1302/2046-3758.19.2000076)
192. Holmenlund C, Overgaard S, Bilberg R, Varnum C. Evaluation of the Oxford Hip Score: does it still have content validity? Interviews of total hip arthroplasty patients. *Health Qual Life Outcomes.* 2021;19(1):237. [doi:10.1186/s12955-021-01869-8](https://doi.org/10.1186/s12955-021-01869-8)
193. Gosens T, Hoefnagels NHM, de Vet RCW, et al. The "Oxford Heup Score": the translation and validation of a questionnaire into Dutch to evaluate the results of total hip arthroplasty. *Acta Orthop.* 2005;76(2):204-211. [doi:10.1080/00016470510030580](https://doi.org/10.1080/00016470510030580)
194. Delaunay C, Epinette JA, Dawson J, Murray D, Jolles BM. Cross-cultural adaptations of the Oxford-12 HIP score to the French speaking population. *Orthop Traumatol Surg Res.* 2009;95(2):89-99. [doi:10.1016/j.otsr.2009.01.003](https://doi.org/10.1016/j.otsr.2009.01.003)
195. Naal FD, Sieverding M, Impellizzeri FM, von Knoch F, Mannion AF, Leunig M. Reliability and validity of the cross-culturally adapted German Oxford hip score. *Clin Orthop Relat Res.* 2009;467(4):952-957. [doi:10.1007/s11999-008-0457-3](https://doi.org/10.1007/s11999-008-0457-3)

196. Impellizzeri F, Mannion AF, Naal FD, Leunig M. Validity, reproducibility and responsiveness of the Oxford hip score in patients with femoroacetabular impingement. *Swiss Medical Weekly*. 2013;143:27S-28S.
197. Impellizzeri FM, Mannion AF, Naal FD, Leunig M. Validity, reproducibility, and responsiveness of the oxford hip score in patients undergoing surgery for femoroacetabular impingement. *Arthroscopy*. 2015;31(1):42-50. [doi:10.1016/j.arthro.2014.07.022](https://doi.org/10.1016/j.arthro.2014.07.022)
198. Silitonga J, Djaja YP, Dilogio IH, Pontoh LAP. Cross-cultural adaptation and psychometric validation of the Indonesian version of the Oxford Hip Score. *Bone Jt Open*. 2021;2(9):765-772. [doi:10.1302/2633-1462.29.bjo-2021-0111.r1](https://doi.org/10.1302/2633-1462.29.bjo-2021-0111.r1)
199. Martinelli N, Longo UG, Marinozzi A, Franceschetti E, Costa V, Denaro V. Cross-cultural adaptation and validation with reliability, validity, and responsiveness of the Italian version of the Oxford Hip Score in patients with hip osteoarthritis. *Qual Life Res*. 2011;20(6):923-929. [doi:10.1007/s11136-010-9811-5](https://doi.org/10.1007/s11136-010-9811-5)
200. Uesugi Y, Makimoto K, Fujita K, Nishii T, Sakai T, Sugano N. Validity and responsiveness of the Oxford hip score in a prospective study with Japanese total hip arthroplasty patients. *J Orthop Sci*. 2009;14(1):35-39. [doi:10.1007/s00776-008-1292-9](https://doi.org/10.1007/s00776-008-1292-9)
201. Lee YK, Chung CY, Park MS, et al. Transcultural adaptation and testing of psychometric properties of the Korean version of the Oxford hip score. *J Orthop Sci*. 2012;17(4):377-381. [doi:10.1007/s00776-012-0230-z](https://doi.org/10.1007/s00776-012-0230-z)
202. Nourbakhsh M, Zarezadeh A, Shemshaki H, Etemadifar MR, Moezi M, Mazoochian F. Translation and cultural adaptation of the oxford hip score for Iranian population. *Int J Prev Med*. 2013;4(2):141-145.
203. Paulsen A. Patient reported outcomes in hip arthroplasty registries. *Dan Med J*. 2014;61(5):B4845.
204. Martín-Fernández J, Gray-Laymón P, Molina-Siguero A, et al. Cross-cultural adaptation and validation of the Spanish version of the Oxford Hip Score in patients with hip osteoarthritis. *BMC Musculoskelet Disord*. 2017;18(1):205. [doi:10.1186/s12891-017-1568-3](https://doi.org/10.1186/s12891-017-1568-3)
205. Martín-Fernández J, Morey-Montalvo M, Tomás-García N, et al. Mapping analysis to predict EQ-5D-5 L utility values based on the Oxford Hip Score (OHS) and Oxford Knee Score (OKS) questionnaires in the Spanish population suffering from lower limb osteoarthritis. *Health Qual Life Outcomes*. 2020;18(1). [doi:10.1186/s12955-020-01435-8](https://doi.org/10.1186/s12955-020-01435-8)
206. Tuğay BU, Tuğay N, Güney H, Hazar Z, Yüksel İ, Atilla B. Cross-cultural adaptation and validation of the Turkish version of Oxford hip score. *Arch Orthop Trauma Surg*. 2015;135(6):879-889. [doi:10.1007/s00402-015-2215-9](https://doi.org/10.1007/s00402-015-2215-9)
207. Alghadir AH, Al-Eisa ES, Anwer S. Cross-cultural adaptation and psychometric analysis of the Arabic version of the oxford knee score in adult male with knee osteoarthritis. *BMC Musculoskelet Disord*. 2017;18(1):190. [doi:10.1186/s12891-017-1552-y](https://doi.org/10.1186/s12891-017-1552-y)
208. Ahmed KM, Said HG, Ramadan EKA, Abd El-Radi M, El-Assal MA. Arabic translation and validation of three knee scores, Lysholm Knee Score (LKS), Oxford Knee Score (OKS), and International Knee Documentation Committee Subjective Knee Form (IKDC). *SICOT-J*. 2019;5:6. [doi:10.1051/sicotj/2018054](https://doi.org/10.1051/sicotj/2018054)
209. Bin Sheeha B, Williams A, Johnson DS, Granat M, Bin Nasser A, Jones R. Responsiveness, reliability, and validity of Arabic version of Oxford Knee Score for total knee arthroplasty. *J Bone Joint Surg Am*. 2020;102(15):e89. [doi:10.2106/jbjs.19.00949](https://doi.org/10.2106/jbjs.19.00949)
210. Xie F, Li SC, Lo NN, et al. Cross-cultural adaptation and validation of Singapore English and Chinese versions of the Oxford Knee Score (OKS) in knee osteoarthritis patients undergoing total knee replacement. *Osteoarthritis Cartilage*. 2007;15(9):1019-1024. [doi:10.1016/j.joca.2007.02.013](https://doi.org/10.1016/j.joca.2007.02.013)
211. Xie F, Ye H, Zhang Y, Liu X, Lei T, Li SC. Extension from inpatients to outpatients: validity and reliability of the Oxford Knee Score in measuring health outcomes in patients with knee osteoarthritis. *Int J Rheum Dis*. 2011;14(2):206-210. [doi:10.1111/j.1756-185x.2010.01580.x](https://doi.org/10.1111/j.1756-185x.2010.01580.x)
212. Cheung RTH, Ngai SPC, Ho KKW. Chinese translation and validation of the Oxford Knee Scale for patients with knee osteoarthritis. *Hong Kong Physiother J*. 2017;37:46-49. [doi:10.1016/j.hkpj.2017.03.002](https://doi.org/10.1016/j.hkpj.2017.03.002)
213. Lin K, Bao L, Wang J, Fujita K, Makimoto K, Liao X. Validation of the Chinese (Mandarin) version of the Oxford Knee Score in patients with knee osteoarthritis. *Clin Orthop Relat Res*. 2017;475(12):2992-3004. [doi:10.1007/s11999-017-5495-2](https://doi.org/10.1007/s11999-017-5495-2)
214. Liebs TR. CORR Insights®: Validation of the Chinese (Mandarin) version of the Oxford Knee Score in patients with knee osteoarthritis. *Clin Orthop Relat Res*. 2018;476(3):612-614. [doi:10.1007/s11999-000000000000157](https://doi.org/10.1007/s11999-000000000000157)

215. Chen C, Wang W, Wu H, et al. Cross-cultural translation and validation of the Chinese Oxford Knee Score and the Activity and Participation Questionnaire. *J Orthop Surg (Hong Kong)*. 2020;28(2):230949902091066. doi:10.1177/2309499020910668
216. Ngwayi JRM, Tan J, Liang N, Porter DE. Reliability and validity of 3 different Chinese versions of the Oxford knee score (OKS). *Arthroplasty*. 2020;2(1). doi:10.1186/s42836-020-00049-1
217. Deng W, Shao H, Zhou Y, Li H, Wang Z, Huang Y. Reliability and validity of commonly used patient-reported outcome measures (PROMs) after medial unicompartmental knee arthroplasty. *Orthop Traumatol Surg Res*. 2021;108(8):103096. doi:10.1016/j.otsr.2021.103096
218. Liu XL, Huang YY, Wang T, et al. Psychometric assessment of the Chinese version of the Oxford Knee Score in breast cancer survivors experiencing hormone treatment-related knee dysfunction. *Asia-Pacific J Oncol Nurs*. 2022;9(3):135-142. doi:10.1016/j.apjon.2022.01.001
219. Haverkamp D, Breugem SJM, Sierevelt IN, Blankevoort L, van Dijk CN. Translation and validation of the Dutch version of the Oxford 12-item knee questionnaire for knee arthroplasty. *Acta Orthop*. 2005;76(3):347-352. doi:10.1080/00016470510030814
220. Raukas M, Metsna V, Tammaru M. Cross-cultural adaptation and validation of the Estonian version of the Oxford Knee Score. *Acta Orthopaed Traumatol Turc*. 2022;56(1):54-58. doi:10.5152/j.aott.2022.21229
221. Reito A, Järivistö A, Jämsen E, et al. Translation and validation of the 12-item Oxford knee score for use in Finland. *BMC Musculoskelet Disord*. 2017;18(1):74. doi:10.1186/s12891-017-1405-8
222. Jenny JY, Diesinger Y. Validation of a French version of the Oxford knee questionnaire. *Orthop Traumatol Surg Res*. 2011;97(3):267-271. doi:10.1016/j.otsr.2010.07.009
223. Jenny JY, Diesinger Y. The Oxford Knee Score: compared performance before and after knee replacement. *OrthopTraumatol Surg Res*. 2012;98(4):409-412. doi:10.1016/j.otsr.2012.03.004
224. Naal FD, Impellizzeri FM, Sieverding M, et al. The 12-item Oxford Knee Score: cross-cultural adaptation into German and assessment of its psychometric properties in patients with osteoarthritis of the knee. *Osteoarthritis Cartilage*. 2009;17(1):49-52. doi:10.1016/j.joca.2008.05.017
225. Impellizzeri FM, Mannion AF, Leunig M, Bizzini M, Naal FD. Comparison of the reliability, responsiveness, and construct validity of 4 different questionnaires for evaluating outcomes after total knee arthroplasty. *J Arthroplasty*. 2011;26(6):861-869. doi:10.1016/j.arth.2010.07.027
226. Strimpakos N, Dapka F, Papachristou A, Kapreli E. The 12-item oxford knee score: cross-cultural adaptation into greek and assessment of its psychometric properties. *Physiotherapy*. 2015;101:e1445-e1446. doi:10.1016/j.physio.2015.03.1408
227. Takeuchi R, Sawaguchi T, Nakamura N, Ishikawa H, Saito T, Goldhahn S. Cross-cultural adaptation and validation of the Oxford 12-item knee score in Japanese. *Arch Orthop Trauma Surg*. 2011;131(2):247-254. doi:10.1007/s00402-010-1185-1
228. Eun IS, Kim OG, Kim CK, Lee HS, Lee JS. Validation of the Korean version of the Oxford Knee Score in patients undergoing total knee arthroplasty. *Clin Orthop Relat Res*. 2013;471(2):600-605. doi:10.1007/s11999-012-2564-4
229. Ebrahimzadeh MH, Makhmalbaf H, Birjandinejad A, Soltani-Moghaddas SH. Cross-cultural adaptation and validation of the persian version of the oxford knee score in patients with knee osteoarthritis. *Iran J Med Sci*. 2014;39(6):529-535.
230. Gonçalves RS, Tomás AM, Martins DI. Cross-cultural adaptation and validation of the Portuguese version of the Oxford Knee Score (OKS). *Knee*. 2012;19(4):344-347. doi:10.1016/j.knee.2011.04.006
231. Paravlic AH, Pisot S, Mitic P, Pisot R. Validation of the Oxford Knee Score and Lower Extremity Functional Score questionnaires for use in Slovenia. *Arch Orthop Trauma Surg*. 2020;140(10):1515-1522. doi:10.1007/s00402-020-03498-0
232. Martín-Fernández J, García-Maroto R, Sánchez-Jiménez FJ, et al. Validation of the Spanish version of the Oxford knee score and assessment of its utility to characterize quality of life of patients suffering from knee osteoarthritis: a multicentric study. *Health Qual Life Outcomes*. 2017;15(1):186. doi:10.1186/s12955-017-0761-2
233. Charoencholvanich K, Pongcharoen B. Oxford knee score and SF-36: translation & reliability for use with total knee arthroscopy patients in Thailand. *J Med Assoc Thai*. 2005;88(9):1194-1202.
234. Umut Tuğay B, Tuğay N, Güney H, Yüksel I, Atilla B. Oxford Knee Score: cross-cultural adaptation, validation and reliability of the Turkish version in patients with osteoarthritis of the knee. *Fizyoterapi Rehabilitasyon*. 2010;21(3):192.

235. Erichsen JL, Jensen C, Larsen MS, Damborg F, Viberg B. Danish translation and validation of the self-reported foot and ankle score (SEFAS) in patients with ankle related fractures. *Foot Ankle Surg.* 2021;27(5):521-527. [doi:10.1016/j.fas.2020.06.014](https://doi.org/10.1016/j.fas.2020.06.014)
236. Arbab D, Kuhlmann K, Schnurr C, Bouillon B, Lüring C, König D. Reliability, validity and responsiveness of the German self-reported foot and ankle score (SEFAS) in patients with foot or ankle surgery. *BMC Musculoskelet Disord.* 2017;18(1):409. [doi:10.1186/s12891-017-1772-1](https://doi.org/10.1186/s12891-017-1772-1)
237. Ortega-Avila AB, Cervera-Garvi P, Morales-Asencio JM, et al. Transcultural adaptation and validation of the Spanish-French versions of the Self-reported Foot and Ankle Score (SEFAS). *Disabil Rehabil.* 2020;44(12):2896-2901. [doi:10.1080/09638288.8.2020.1849428](https://doi.org/10.1080/09638288.8.2020.1849428)
238. Cöster M, Karlsson MK, Nilsson JÅ, Carlsson Å. Validity, reliability, and responsiveness of a self-reported foot and ankle score (SEFAS). *Acta Orthop.* 2012;83(2):197-203. [doi:10.3109/17453674.2012.657579](https://doi.org/10.3109/17453674.2012.657579)
239. Cöster MC, Bremander A, Rosengren BE, Magnusson H, Carlsson Å, Karlsson MK. Validity, reliability, and responsiveness of the Self-reported Foot and Ankle Score (SEFAS) in forefoot, hindfoot, and ankle disorders. *Acta Orthop.* 2014;85(2):187-194. [doi:10.3109/17453674.2014.889979](https://doi.org/10.3109/17453674.2014.889979)
240. Cöster M, Rosengren B, Carlsson Å, Montgomery F, Karlsson M. Patientrapporterade SEFAS:--Frågeformulär bra utvärderingsmetod vid fot- och fotledsbesvär [Patient-reported SEFAS: Questionnaire good evaluation method in foot and ankle disorders]. *Läkartidningen.* 2015;112.
241. Cöster MC, Nilsson A, Brudin L, Bremander A. Minimally important change, measurement error, and responsiveness for the Self-Reported Foot and Ankle Score. *Acta Orthopaedica.* 2017;88(3):300-304. [doi:10.1080/17453674.2017.1293445](https://doi.org/10.1080/17453674.2017.1293445)
242. Cöster MC, Rosengren BE, Karlsson MK, Carlsson Å. Age- and gender-specific normative values for the Self-Reported Foot and Ankle Score (SEFAS). *Foot Ankle Int.* 2018;39(11):1328-1334. [doi:10.1177/1071100718788499](https://doi.org/10.1177/1071100718788499)
243. Harnirattisai T, Johnson RA, Kawinwonggowit V. Evaluating functional activity in older Thai adults. *Rehabil Nurs.* 2006;31(3):124-128. [doi:10.1002/j.2048-7940.2006.tb00016.x](https://doi.org/10.1002/j.2048-7940.2006.tb00016.x)
244. Yazici G, Yazici MV, Bayraktar D, Varol F, Guclu Gunduz A, Bek N. Validity and reliability of the Turkish version of the self-reported Foot and Ankle Score in patients with foot or ankle pain. *Acta Orthop Traumatol Turc.* 2020;54(4):408-413. [doi:10.5152/j.aott.2020.19185](https://doi.org/10.5152/j.aott.2020.19185)
245. Lee G wan, Yi C hwi, Kim G mo, Lee Y jung, Yoon J whon. Cross-cultural adaptation and clinical evaluation of a Korean version of the Work, Osteoarthritis or joint-Replacement Questionnaire. *Int J Ther Rehabil.* 2019;26(5):1-8. [doi:10.12968/ijtr.2018.0120](https://doi.org/10.12968/ijtr.2018.0120)
246. Guermazi M, Poiraudau S, Yahia M, et al. Translation, adaptation and validation of the Western Ontario and McMaster Universities osteoarthritis index (WOMAC) for an Arab population: the Sfax modified WOMAC. *Osteoarthritis Cartilage.* 2004;12(6):459-468. [doi:10.1016/j.joca.2004.02.006](https://doi.org/10.1016/j.joca.2004.02.006)
247. Alghadir A, Anwer S, Iqbal ZA, Alsanawi HA. Cross-cultural adaptation, reliability and validity of the Arabic version of the reduced Western Ontario and McMaster Universities Osteoarthritis index in patients with knee osteoarthritis. *Disabil Rehabil.* 2016;38(7):689-694. [doi:10.3109/09638288.2015.1055380](https://doi.org/10.3109/09638288.2015.1055380)
248. Rabbani MG, Haq SA, Bellamy N, et al. Development, linguistic and clinimetric validation of the WOMAC® VA3.01 Bangla for Bangladesh Index. *Rheumatol Int.* 2015;35(6):997-1003. [doi:10.1007/s00296-014-3192-y](https://doi.org/10.1007/s00296-014-3192-y)
249. Metsavaht L, Leporace G, de Mello Sposito MM, Riberto M, Batista LA. What is the best questionnaire for monitoring the physical characteristic of patients with knee osteoarthritis in the Brazilian population? *Rev Bras Ortop.* 2011;46(3):256-261. [doi:10.1016/s2255-4971\(15\)30191-9](https://doi.org/10.1016/s2255-4971(15)30191-9)
250. Ferreira C de SB, Dibai-Filho AV, Almeida DO, et al. Structural validity of the Brazilian version of the Western Ontario and McMaster Universities Osteoarthritis Index among patients with knee osteoarthritis. *Sao Paulo Med J.* 2020;138(5):400-406. [doi:10.1590/1516-3180.2020.0046.r1.26062020](https://doi.org/10.1590/1516-3180.2020.0046.r1.26062020)
251. Lage PTS, Machado LAC, Barreto SM, de Figueiredo RC, Telles RW. Measurement properties of Portuguese-Brazil Western Ontario and McMaster Universities osteoarthritis index (WOMAC) for the assessment of knee complaints in Brazilian adults: ELSA-Brasil Musculoskeletal cohort. *Rheumatol Int.* 2020;40(2):233-242. [doi:10.1007/s00296-019-04496-1](https://doi.org/10.1007/s00296-019-04496-1)
252. Xie F, Li SC, Goeree R, et al. Validation of Chinese Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) in patients scheduled for total knee replacement. *Qual Life Res.* 2008;17(4):595-601. [doi:10.1007/s11136-008-9340-7](https://doi.org/10.1007/s11136-008-9340-7)

253. Symonds T, Hughes B, Liao S, Ang Q, Bellamy N. Validation of the Chinese Western Ontario and McMaster Universities Osteoarthritis Index in patients from mainland China with osteoarthritis of the knee. *Arthritis Care Res (Hoboken)*. 2015;67(11):1553-1560. [doi:10.1002/acr.22631](https://doi.org/10.1002/acr.22631)
254. Tong WW, Wang W, Xu WD. Development of a Chinese version of the Western Ontario Meniscal Evaluation Tool: cross-cultural adaptation and psychometric evaluation. *J Orthop Surg Res*. 2016;11(1):90. [doi:10.1186/s13018-016-0424-8](https://doi.org/10.1186/s13018-016-0424-8)
255. Shen ZD, Yu HM, Wang JT, Shi GY, Sun Y. Modified Western Ontario and McMaster University Osteoarthritis Index Scale used in patients with knee osteoarthritis. *Zhonghua Yi Xue Za Zhi*. 2019;99(7):537-541. [doi:10.3760/cma.j.issn.0376-2491.2019.07.012](https://doi.org/10.3760/cma.j.issn.0376-2491.2019.07.012)
256. Yang L, Wang D, Li X, Yuan H, Fang H, Guo X. Comparison of the responsiveness of the WOMAC and the 12-item WHODAS 2.0 in patients with Kashin–Beck disease. *BMC Musculoskelet Disord*. 2020;21(1):188. [doi:10.1186/s12891-020-03210-8](https://doi.org/10.1186/s12891-020-03210-8)
257. Roorda LD, Jones CA, Waltz M, et al. Satisfactory cross cultural equivalence of the Dutch WOMAC in patients with hip osteoarthritis waiting for arthroplasty. *Ann Rheum Dis*. 2004;63(1):36-42. [doi:10.1136/ard.2002.001784](https://doi.org/10.1136/ard.2002.001784)
258. Yang KGA, Raijmakers NJH, Verbout AJ, Dhert WJA, Saris DBF. Validation of the short-form WOMAC function scale for the evaluation of osteoarthritis of the knee. *J Bone Joint Surg Br*. 2007;89-B(1):50-56. [doi:10.1302/0301-620x.89b1.17790](https://doi.org/10.1302/0301-620x.89b1.17790)
259. Burgers PTPW, Poolman RW, Van Bakel TM, et al. Reliability, validity, and responsiveness of the Western Ontario and McMaster Universities Osteoarthritis Index for elderly patients with a femoral neck fracture. *J Bone Joint Surg Am*. 2015;97(9):751-757. [doi:10.2106/jbjs.n.00542](https://doi.org/10.2106/jbjs.n.00542)
260. Soininen JV, Paavolainen PO, Gronblad MA, Kaapa EH. Validation study of a Finnish version of the Western Ontario and McMasters University osteoarthritis index. *Hip Int*. 2008;18(2):108-111. [doi:10.5301/hip.2008.1229](https://doi.org/10.5301/hip.2008.1229)
261. Ponkilainen VT, Häkkinen AH, Uimonen MM, Tukiainen E, Sandelin H, Repo JP. Validation of the Western Ontario and McMaster Universities Osteoarthritis Index in patients having undergone ankle fracture surgery. *J Foot Ankle Surg*. 2019;58(6):1100-1107. [doi:10.1053/j.jfas.2019.01.018](https://doi.org/10.1053/j.jfas.2019.01.018)
262. Ponkilainen VT, Tukiainen EJ, Uimonen MM, Häkkinen AH, Repo JP. Assessment of the structural validity of three foot and ankle specific patient-reported outcome measures. *Foot Ankle Surg*. 2020;26(2):169-174. [doi:10.1016/j.fas.2019.01.009](https://doi.org/10.1016/j.fas.2019.01.009)
263. Tubach F, Baron G, Falissard B, et al. Using patients' and rheumatologists' opinions to specify a short form of the WOMAC function subscale. *Ann Rheum Dis*. 2005;64(1):75-79. [doi:10.1136/ard.2003.019539](https://doi.org/10.1136/ard.2003.019539)
264. Faucher M, Poiraudau S, Lefevre-Colau MM, Rannou F, Fermanian J, Revel M. Algo-functional assessment of knee osteoarthritis: comparison of the test-retest reliability and construct validity of the WOMAC and Lequesne indexes. *Osteoarthritis Cartilage*. 2002;10(8):602-610. [doi:10.1053/joca.2002.0533](https://doi.org/10.1053/joca.2002.0533)
265. Faucher M, Poiraudau S, Lefevre-Colau MM, Rannou F, Fermanian J, Revel M. Assessment of the test–retest reliability and construct validity of a modified WOMAC index in knee osteoarthritis. *Joint Bone Spine*. 2004;71(2):121-127. [doi:10.1016/s1297-319x\(03\)00112-x](https://doi.org/10.1016/s1297-319x(03)00112-x)
266. Stucki G, Meier D, Stucki S, et al. Evaluation einer deutschen Version des WOMAC (Western Ontario und McMaster Universities) Arthroseindex [Evaluation of a German version of WOMAC (Western Ontario and McMaster Universities) Arthrosis Index]. *Z Rheumatol*. 1996;55(1):40-49.
267. Stucki G, Sangha O, Stucki S, et al. Comparison of the WOMAC (Western Ontario and McMaster Universities) osteoarthritis index and a self-report format of the self-administered Lequesne–Algofunctional index in patients with knee and hip osteoarthritis. *Osteoarthritis Cartilage*. 1998;6(2):79-86. [doi:10.1053/joca.1997.0097](https://doi.org/10.1053/joca.1997.0097)
268. Theiler R, Sangha O, Schaeren S, et al. Superior responsiveness of the pain and function sections of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) as compared to the Lequesne-algofunctional Index in patients with osteoarthritis of the lower extremities. *Osteoarthritis Cartilage*. 1999;7(6):515-519. [doi:10.1053/joca.1999.0262](https://doi.org/10.1053/joca.1999.0262)
269. Theiler R, Bischoff-Ferrari HA, Good M, Bellamy N. Responsiveness of the electronic touch screen WOMAC 3.1 OA Index in a short term clinical trial with rofecoxib. *Osteoarthritis Cartilage*. 2004;12(11):912-916. [doi:10.1016/j.joca.2004.08.006](https://doi.org/10.1016/j.joca.2004.08.006)
270. Bischoff-Ferrari HA, Vondechend M, Bellamy N, Theiler R. Validation and patient acceptance of a computer touch screen version of the WOMAC 3.1 osteoarthritis index. *Ann Rheum Dis*. 2005;64(1):80-84. [doi:10.1136/ard.2003.019307](https://doi.org/10.1136/ard.2003.019307)

271. Huber J, Satkauskas I, Theiler R, Zumstein M, Ruffin G. Klinische Resultate 2 Jahre nach Hüfttotalendoprothese (WOMAC/SF-36) und Vergleich mit der Normbevölkerung (SF-36) [Clinical results 2 years after total hip replacement (WOMAC/SF-36) and comparison with the normal population (SF-36)]. *Z Orthop Ihre Grenzgeb*. 2006;144(3):296-300. [doi:10.1055/s-2006-933443](https://doi.org/10.1055/s-2006-933443)
272. Rothenfluh DA, Reedwisch D, Müller U, Ganz R, Tennant A, Leunig M. Construct validity of a 12-item WOMAC for assessment of femoro-acetabular impingement and osteoarthritis of the hip. *Osteoarthritis Cartilage*. 2008;16(9):1032-1038. [doi:10.1016/j.joca.2008.02.006](https://doi.org/10.1016/j.joca.2008.02.006)
273. Konstantinidis GA, Aletras VH, Kanakari KA, Natsis K, Bellamy N, Niakas D. Comparative validation of the WOMAC osteoarthritis and Lequesne algofunctional indices in Greek patients with hip or knee osteoarthritis. *Qual Life Res*. 2014;23(2):539-548. [doi:10.1007/s11136-013-0490-x](https://doi.org/10.1007/s11136-013-0490-x)
274. Papathanasiou G, Stasi S, Oikonomou L, et al. Clinimetric properties of WOMAC Index in Greek knee osteoarthritis patients: comparisons with both self-reported and physical performance measures. *Rheumatol Int*. 2015;35(1):115-123. [doi:10.1007/s00296-014-3043-x](https://doi.org/10.1007/s00296-014-3043-x)
275. Wigler I, Neumann L, Yaron M. Validation study of a Hebrew version of WOMAC in patients with osteoarthritis of the knee. *Clin Rheumatol*. 1999;18(5):402-405. [doi:10.1007/s100670050126](https://doi.org/10.1007/s100670050126)
276. Salaffi F, Leardini G, Canesi B, et al. Reliability and validity of the Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index in Italian patients with osteoarthritis of the knee. *Osteoarthritis Cartilage*. 2003;11(8):551-560. [doi:10.1016/s1063-4584\(03\)00089-x](https://doi.org/10.1016/s1063-4584(03)00089-x)
277. Monticone M, Ambrosini E, Secci C, Rocca B, Ferrante S, Capone A. Responsiveness and minimal important changes of the Western Ontario and McMaster Universities Osteoarthritis Index in subjects undergoing rehabilitation following hip fracture. *Am J Phys Med Rehabil*. 2017;96(5):321-326. [doi:10.1097/phm.0000000000000609](https://doi.org/10.1097/phm.0000000000000609)
278. Hashimoto H, Hanyu T, Sledge CB, Lingard EA. Validation of a Japanese patient-derived outcome scale for assessing total knee arthroplasty: comparison with Western Ontario and McMaster Universities osteoarthritis index (WOMAC). *J Orthop Sci*. 2003;8(3):288-293. [doi:10.1007/s10776-002-0629-0](https://doi.org/10.1007/s10776-002-0629-0)
279. Fujita K, Makimoto K. The reliability and validity of the Japanese version of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for patients with total hip arthroplasty. *J Japan Acad Nurs Sci*. 2007;27(2):53-60. [doi:10.5630/jans.27.2_53](https://doi.org/10.5630/jans.27.2_53)
280. Bae SC, Lee HS, Yun HR, Kim TH, Yoo DH, Kim SY. Cross-cultural adaptation and validation of Korean Western Ontario and McMaster Universities (WOMAC) and Lequesne osteoarthritis indices for clinical research. *Osteoarthritis Cartilage*. 2001;9(8):746-750. [doi:10.1053/joca.2001.0471](https://doi.org/10.1053/joca.2001.0471)
281. Park SH, Kang BH, Kim MJ, et al. Validation of the Western Ontario and McMaster Universities Arthritis Index short form (WOMAC-SF) and its relevance to disability and frailty. *Yonsei Med J*. 2020;61(3):251-256. [doi:10.3349/ymj.2020.61.3.251](https://doi.org/10.3349/ymj.2020.61.3.251)
282. Mohamad Z, Haron R, Justine M. Validity and reliability of the Malay versions of Western Ontario McMaster University Osteoarthritis Index (WOMAC) and Knee Algofunctional Osteoarthritis Index (AFI) among women with knee arthritis symptoms in Malaysia. *Int Med J*. 2016;23(6):691-695.
283. Gogtay N, Thatte U, Dasgupta B, Deshpande S. Use of the WOMAC questionnaire in Mumbai and the challenges of translation and cross cultural adaptation. *Indian J Med Ethics*. 2013;10(1):33-35. [doi:10.20529/ijme.2013.007](https://doi.org/10.20529/ijme.2013.007)
284. Faik A, Benbouazza K, Amine B, et al. Translation and validation of Moroccan Western Ontario and Mc Master Universities (WOMAC) osteoarthritis index in knee osteoarthritis. *Rheumatol Int*. 2008;28(7):677-683. [doi:10.1007/s00296-007-0498-z](https://doi.org/10.1007/s00296-007-0498-z)
285. Nakarmi S, Haq SA, Vaidya B. Translation, validation and cross-cultural adaptation of the Nepali version of WOMAC® LK 3.1. *Int J Rheum Dis*. 2019;22(10):1877-1883. [doi:10.1111/1756-185x.13690](https://doi.org/10.1111/1756-185x.13690)
286. Nadrian H, Moghimi N, Nadrian E, et al. Validity and reliability of the Persian versions of WOMAC Osteoarthritis Index and Lequesne Algofunctional Index. *Clin Rheumatol*. 2012;31(7):1097-1102. [doi:10.1007/s10067-012-1983-7](https://doi.org/10.1007/s10067-012-1983-7)
287. Ebrahimzadeh MH, Makhmalbaf H, Birjandinejad A, Keshtan FG, Hoseini HA, Mazloumi SM. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) in Persian speaking patients with knee osteoarthritis. *Arch Bone Jt Surg*. 2014;2(1):57-62.

288. Escobar A, Quintana JM, Bilbao A, Azkárte J, Güenaga JI. Validation of the Spanish version of the WOMAC questionnaire for patients with hip or knee osteoarthritis. Western Ontario and McMaster Universities Osteoarthritis Index. *Clin Rheumatol*. 2002;21(6):466-471. [doi:10.1007/s100670200117](https://doi.org/10.1007/s100670200117)
289. Villanueva I, del Mar Guzman M, Javier Toyos F, Ariza-Ariza R, Navarro F. Relative efficiency and validity properties of a visual analogue vs a categorical scaled version of the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index: Spanish versions. *Osteoarthritis Cartilage*. 2004;12(3):225-231. [doi:10.1016/j.joca.2003.11.006](https://doi.org/10.1016/j.joca.2003.11.006)
290. Quintana JM, Escobar A, Bilbao A, Arostegui I, Lafuente I, Vidaurreta I. Responsiveness and clinically important differences for the WOMAC and SF-36 after hip joint replacement. *Osteoarthritis Cartilage*. 2005;13(12):1076-1083. [doi:10.1016/j.joca.2005.06.012](https://doi.org/10.1016/j.joca.2005.06.012)
291. Escobar A, Quintana JM, Bilbao A, Aróstegui I, Lafuente I, Vidaurreta I. Responsiveness and clinically important differences for the WOMAC and SF-36 after total knee replacement. *Osteoarthritis Cartilage*. 2007;15(3):273-280. [doi:10.1016/j.joca.2006.09.001](https://doi.org/10.1016/j.joca.2006.09.001)
292. Escobar A, González M, Quintana JM, Bilbao A, Ibañez B. Validation of a prioritization tool for patients on the waiting list for total hip and knee replacements. *J Eval Clin Pract*. 2009;15(1):97-102. [doi:10.1111/j.1365-2753.2008.00961.x](https://doi.org/10.1111/j.1365-2753.2008.00961.x)
293. Bilbao A, Quintana JM, Escobar A, Las Hayas C, Orive M. Validation of a proposed WOMAC short form for patients with hip osteoarthritis. *Health Qual Life Outcomes*. 2011;9(1):75. [doi:10.1186/1477-7525-9-75](https://doi.org/10.1186/1477-7525-9-75)
294. Escobar A, Vrotsou K, Bilbao A, Quintana JM, García Pérez L, Herrera-Españeira C. Validación de una escala reducida de capacidad funcional del cuestionario WOMAC [Validation of a short form of the function dimension of the WOMAC questionnaire]. *Gac Sanit*. 2011;25(6):513-518. [doi:10.1016/j.gaceta.2011.06.003](https://doi.org/10.1016/j.gaceta.2011.06.003)
295. Ayala A, Bilbao A, Garcia-Perez S, Escobar A, Forjaz MJ. Scale invariance and longitudinal stability of the Physical Functioning Western Ontario and MacMaster Universities Osteoarthritis Index using the Rasch model. *Rheumatol Int*. 2018;38(3):473-479. [doi:10.1007/s00296-017-3901-4](https://doi.org/10.1007/s00296-017-3901-4)
296. Roos EM, Klässbo M, Lohmander LS. WOMAC osteoarthritis index. Reliability, validity, and responsiveness in patients with arthroscopically assessed osteoarthritis. Western Ontario and MacMaster Universities. *Scand J Rheumatol*. 1999;28(4):210-215. [doi:10.1080/03009749950155562](https://doi.org/10.1080/03009749950155562)
297. Söderman P, Malchau H. Validity and reliability of Swedish WOMAC osteoarthritis index: a self-administered disease-specific questionnaire (WOMAC) versus generic instruments (SF-36 and NHP). *Acta Orthop Scand*. 2000;71(1):39-46. [doi:10.1080/00016470052943874](https://doi.org/10.1080/00016470052943874)
298. Dunbar MJ, Robertsson O, Ryd L, Lidgren L. Appropriate questionnaires for knee arthroplasty. Results of a survey of 3600 patients from the Swedish knee arthroplasty registry. *J Bone Joint Surg Br*. 2001;83-B(3):339-344x. [doi:10.1302/0301-620x.83b3.0830339](https://doi.org/10.1302/0301-620x.83b3.0830339)
299. Tangtrakulwanich B, Wiwatwongwana S, Chongsuvivatwong V, Geater AF. Comparison of validity, and responsiveness between general and disease-specific quality of life instruments (Thai version) in knee osteoarthritis. *J Med Assoc Thai*. 2006;89(9):1454-1459.
300. Kuptniratsaikul V, Rattanachaiyanont M. Validation of a modified Thai version of the Western Ontario and McMaster (WOMAC) osteoarthritis index for knee osteoarthritis. *Clin Rheumatol*. 2007;26(10):1641-1645. [doi:10.1007/s10067-007-0560-y](https://doi.org/10.1007/s10067-007-0560-y)
301. Tüzün EH, Eker L, Aytar A, Daşkapan A, Bayramoğlu M. Acceptability, reliability, validity and responsiveness of the Turkish version of WOMAC osteoarthritis index. *Osteoarthritis Cartilage*. 2005;13(1):28-33. [doi:10.1016/j.joca.2004.10.010](https://doi.org/10.1016/j.joca.2004.10.010)
302. Basaran S, Guzel R, Seydaoglu G, Guler-Uysal F. Validity, reliability, and comparison of the WOMAC osteoarthritis index and Lequesne algofunctional index in Turkish patients with hip or knee osteoarthritis. *Clin Rheumatol*. 2010;29(7):749-756. [doi:10.1007/s10067-010-1398-2](https://doi.org/10.1007/s10067-010-1398-2)
303. Tuncay Duruöz M, Acer Kasman S, Hande Gezer H, Duruöz E. Validity and reliability of the Mini-Osteoarthritis Knee and Hip Quality of Life scale in Turkish population. *Arch Rheumatol*. 2021;37(1):119-128. [doi:10.4649/archrheumatol.2022.8863](https://doi.org/10.4649/archrheumatol.2022.8863)
304. Roos EM, Roos HP, Ekdahl C, Lohmander LS. Knee injury and Osteoarthritis Outcome Score (KOOS) - validation of a Swedish version. *Scand J Med Sci Sports*. 1998;8(6):439-448. [doi:10.1111/j.1600-0838.1998.tb00465.x](https://doi.org/10.1111/j.1600-0838.1998.tb00465.x)
305. Roos EM, Lohmander LS. *Health Qual Life Outcomes*. 2003;1(1):64. [doi:10.1186/1477-7525-1-64](https://doi.org/10.1186/1477-7525-1-64)
306. Roos EM, Toksvig-Larsen S. Knee injury and Osteoarthritis Outcome Score (KOOS) - validation and comparison to the WOMAC in total knee replacement. *Health Qual Life Outcomes*. 2003;1(1):17. [doi:10.1186/1477-7525-1-17](https://doi.org/10.1186/1477-7525-1-17)

307. Zhou M, Wang H, Zeng X, et al. Mortality, morbidity, and risk factors in China and its provinces, 1990-2017: a systematic analysis for the global burden of disease study 2017. *Lancet*. 2019;394(10204):1145-1158. [doi:10.1016/s0140-6736\(19\)30427-1](https://doi.org/10.1016/s0140-6736(19)30427-1)
308. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol*. 1988;15(12):1833-1840.
309. Roos EM, Roos HP, Lohmander LS, Ekdahl C, Beynnon BD. Knee Injury and Osteoarthritis Outcome Score (KOOS)--development of a self-administered outcome measure. *J Orthop Sports Phys Ther*. 1998;28(2):88-96. [doi:10.2519/jospt.1998.28.2.88](https://doi.org/10.2519/jospt.1998.28.2.88)
310. Theiler R, Spielberger J, Bischoff HA, Bellamy N, Huber J, Kroesen S. Clinical evaluation of the WOMAC 3.0 OA Index in numeric rating scale format using a computerized touch screen version. *Osteoarthritis Cartilage*. 2002;10(6):479-481. [doi:10.1053/joca.2002.0807](https://doi.org/10.1053/joca.2002.0807)
311. Putman S, Preda C, Girard J, Duhamel A, Migaud H. Mapping and crosswalk of the Oxford Hip Score and different versions of the hip disability and osteoarthritis outcome score. *Clin Orthop Relat Res*. 2021;479(7):1534-1544. [doi:10.1097/corr.00000000000001675](https://doi.org/10.1097/corr.00000000000001675)
312. Roos EM, Lohmander LS. The Knee injury and Osteoarthritis Outcome Score (KOOS): from joint injury to osteoarthritis. *Health Qual Life Outcomes*. 2003;1(1):64. [doi:10.1186/1477-7525-1-64](https://doi.org/10.1186/1477-7525-1-64)
313. Nilsson-Helander K, Thomeé R, Grävare-Silbernagel K, et al. The Achilles tendon Total Rupture Score (ATRS): development and validation. *Am J Sports Med*. 2007;35(3):421-426. [doi:10.1177/0363546506294856](https://doi.org/10.1177/0363546506294856)
314. Martin RL, Hutt DM, Wukich DK. Validity of the Foot and Ankle Ability Measure (FAAM) in diabetes mellitus. *Foot Ankle Int*. 2009;30(4):297-302. [doi:10.3113/fai.2009.0297](https://doi.org/10.3113/fai.2009.0297)

Appendix. Cross-culturally adapted PROMs psychometric properties. Number of the supporting psychometric properties for reliability, validity, and responsiveness for each PROMs language version are listed. PROMs language versions supported by evidence of reliability, validity, and responsiveness are highlighted in bold.

PROMs	Language	Reliability	Validity	Responsiveness
ACL-RSL	Arabic	1	1	0
	Brazilian	1	1	0
	Chinese	2	2	0
	Dutch	1	1	1
	French	0	1	0
	German	1	1	0
	Italian	3	3	0
	Japanese	1	1	0
	Korean	1	1	0
	Lithuanian	1	1	0
	Norwegian	1	1	0
	Spanish	1	1	0
	Swedish	1	1	0
	Turkish	1	1	0
	Chinese	1	1	1
ATRS	Danish	1	1	0
	Dutch	1	1	1
	French	1	1	0
	Greek	1	1	0
	Italian	1	1	0
	Korean	1	1	0
	Norwegian	1	1	0
	Persian	1	1	0
	Portuguese	1	1	0
	Polish	1	1	0
	Swedish	1	1	0
	Turkish	1	1	0
AKPS	Arabic	1	1	0
	Brazilian	1	1	1
	Dutch	2	1	0
	French	1	1	0
	Greek	1	1	0
	Norwegian	1	1	0
	Spanish	1	1	0
FAAM	Brazilian	1	1	0
	Chinese	1	1	0
	Danish	0	1	0
	Dutch	1	1	0
	Finnish	0	1	0
	French	1	1	0
	German	1	1	0
	Italian	1	1	0
	Japanese	1	1	0

PROMs	Language	Reliability	Validity	Responsiveness
	Persian	1	1	0
	Spanish	1	0	0
	Thai	1	1	0
	Turkish	1	1	0
FADI	Italian	1	1	0
HAGOS	Brazilian	1	1	0
	Chinese	1	1	1
	Danish	1	2	0
	Dutch	3	3	0
	Italian	1	1	0
	Norwegian	0	1	0
	Swedish	1	1	0
HOOS	Chinese	1	1	1
	Dutch	1	1	0
	French	1	1	1
	German	1	2	1
	Italian	1	1	1
	Japanese	1	1	1
	Korean	1	1	1
	Persian	1	1	0
	Polish	2	2	1
	Portuguese	2	2	0
	Romanian	1	1	0
	Thai	1	1	0
	Turkish	1	1	0
HOS	Brazilian	1	1	0
	German	2	2	1
	Korean	1	1	1
	Portuguese	0	1	0
	Romanian	1	1	0
	Spanish	1	1	0
	Turkish	1	1	1
IHOT-12	Dutch	1	1	0
	French	1	1	1
	German	1	1	1
	Greek	1	1	1
	Japanese	1	1	1
	Swedish	1	1	1
	Turkish	1	1	0
IHOT-33	Chinese	1	1	1
	Dutch	1	1	0
	French	1	1	0
	German	1	1	1
	Spanish	1	1	0
	Thai	1	1	0

PROMs	Language	Reliability	Validity	Responsiveness
KOOS	Arabic	4	4	0
	Chinese	5	5	2
	Danish	1	1	0
	Dutch	2	2	1
	Finnish	1	1	0
	French	2	2	2
	Filipino	1	1	0
	German	1	1	0
	Greek	1	1	0
	Hindi	1	1	1
	Icelandic	1	1	0
	India	1	1	0
	Indonesian	1	1	0
	Italian	2	2	0
	Japanese	1	3	1
	Malay	1	1	0
	Norwegian	0	1	0
	Persian	4	4	1
	Polish	2	0	2
	Portuguese	3	3	2
	Spanish	2	3	3
	Swedish	3	3	3
	Turkish	1	1	1
	Urdu	1	1	0
KOS-ADLS	Arabic	2	2	2
	Chinese	1	1	1
	French	1	0	1
	German	1	1	0
	Greek	1	1	0
	Persian	1	1	1
	Polish	1	1	1
	Portuguese	1	1	1
	Turkish	1	1	0
MOXFQ	Chinese	1	0	1
	Dutch	1	1	0
	Finnish	0	1	0
	French	1	1	0
	German	2	2	2
	Italian	1	1	1
	Korean	1	1	0
	Persian	1	1	0
	Spanish	2	2	2
	Turkish	2	2	0
NHS	Portuguese	0	1	0
	Turkish	1	1	0

PROMs	Language	Reliability	Validity	Responsiveness
OHS	Chinese	1	1	1
	Danish	1	2	0
	Dutch	0	1	0
	French	0	1	0
	German	1	3	2
	Indonesian	1	1	1
	Italian	1	1	1
	Japanese	0	1	1
	Korean	1	1	1
	Persian	2	2	0
	Romanian	0	1	0
	Spanish	2	2	1
	Turkish	0	1	0
OKS	Arabic	3	3	1
	Chinese	6	9	0
	Dutch	1	1	0
	Estonian	1	1	0
	Finish	1	1	1
	French	1	1	0
	German	2	2	1
	Greek	1	1	0
	Japanese	1	1	1
	Korean	1	1	0
	Persian	1	1	0
	Portuguese	1	1	0
	Slovenia	1	1	0
	Spanish	1	1	0
	Thai	1	1	0
	Turkish	1	1	0
SEFAS	Danish	1	1	1
	German	1	1	1
	Spanish-French	0	1	0
	Swedish	3	4	4
	Thai	1	1	0
	Turkish	1	1	0
WORQ	Korean	1	1	0
WOMAC	Arabic	2	2	0
	Bengali	1	1	0
	Brazilian	2	3	0
	Chinese	2	5	2
	Dutch	4	4	1
	Finnish	2	3	1
	French	0	0	1
	French-Canadian	2	2	0
	German	3	4	3

PROMs	Language	Reliability	Validity	Responsiveness
	Greek	2	2	0
	Hebrew	1	1	0
	Italian	1	1	1
	Japanese	1	2	0
	Korean	1	2	1
	Malay	1	1	0
	Marathi	0	1	0
	Moroccan	1	1	0
	Nepali	1	1	0
	Persian	2	2	0
	Spanish	4	5	4
	Swedish	3	3	1
	Thai	2	2	1
	Tturkish	3	3	1