22nd Virtual EFORT Congress - VEC hybrid
30 June-02 July 2021

University of West Attica
LANECASM
Laboratory of Neuromuscular and Cardiovascular Study of Motion

Clinimetric Properties Of International Hip Outcome Tool - Greek Version In Hip Osteoarthritic Patients And Responsiveness After Direct Anterior Approach - Minimally Invasive Surgery

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Background – In recent years, patient-reported outcome (PRO) measures are widely used in research and clinical practice. PROs are considered ideal measurement tools for evaluating outcomes because their patient-focused perspective enables patients to participate actively in their own evaluation and to quantify their functional limitations, changes in symptoms over time, and post-treatment outcomes. The International Hip Outcome Tool-12items (iHOT12) [1] is a PRO targeted to the hip joint that assesses patients' quality of life.

Objectives – This study explored the clinimetric properties and the responsiveness after Direct Anterior Approach-Minimal Invasive Surgery (DAA-MIS) of the Greek version of International Hip Outcome Tool-12 items (iHOT12-Gr).

Table 1. Demographic and clinical characteristics of the study's participants (n=124)

Characteristics	Values*
Age (years) *	65.80±8.25 (50-85)
Sex, n (%): men/women	29 (23.4%) / 95 (76.6%)
Height (m) *	1.64±0.08 (1.50-1.83)
Weight (kg) *	76.14±15.57 (48-135)
Body mass index (kg/m^2) *	28.07±4.77 (17.4-45.6)
Dominant, n (%): right/left	104 (83.9%) / 20 (16.1%)
Affected hip, n (%): right/left	68 (54.8%) / 56 (45.2%)
Nocturnal pain, n (%): no/yes	61 (49.2%) / 63 (50.8%)
Morning stiffness, n (%): no/yes	48 (38.7%) / 76 (61.3%)
Assistive device, n (%): no/yes	100 (80.6%) / 24 (19.4%)
Kellgren–Lawrence classification of hip osteoarthritis, n (%): Grade 1/2/3/4	5 (4.0%) / 18 (14.5%) / 64 (51.6%) / 37 (29.8%)

* The values are expressed as mean± standard deviation (SD) and (minimum score – maximum score) for continuous variables and as frequencies (n) and percentages (%) for categorical variables.

Results – The participants' demographic and clinical characteristics are shown in Table 1.
Reliability: Internal consistency and test-retest reliability was were excellent (Table 2).
Reproducibility: the floor and ceiling effects were both 0.8%; measurement error was 3.22; minimal important change was lower than minimal detectable change (Table 2).
Validity: iHOT12-Gr correlated strongly with both LEFS-Greek and MHHS-Gr, while significant but weak were the correlations with 30-second chair-to-stand, TUG and 9S-A/D (Table 3). Known-groups validity showed that iHOT12-Gr scores were significantly higher in participants with LEFS-Greek>53 than in those with LEFS-Greek<53 (p<0.001) (Table 3). In ROC analysis, the area under the curve (AUC) was 0.909 [95%CI 0.86- 0.96 (p<0.001)] for the iHOT12-Gr cut-off point 45.2, yielded sensitivity 83% and specificity 87% (Figure 1).
Responsiveness: SRM means of 4th and 8th postoperative week were greater than 0.8 (Table 4).

Design and Methods – Official permission for reprinting and translating the English/original iHOT12-Gr questionnaire was granted by Professor Damian R. Griffin. Its adaptation into Greek followed the guidelines developed by Guillemin et al [2,3] and Beaton et al [4]. The internal consistency, test-retest reliability and reproducibility were evaluated in 124 hip osteoarthritic patients aged >50 years. The construct validity was tested against the Greek versions of the Lower Extremity Functional Scale (LEFS-Greek) [5] and Modified Harris Hip Score (MHHS-Gr) [6], the 30-sec chair-to-stand [7], Timed Up and Go (TUG) [8] and 9-stairs-ascend/descend (9S-A/D) [9] tests. Known-groups validity was examined using LEFS-Greek score (cut-off 53) as estimate variable. Responsiveness of iHOT12-Gr was examined by calculating the standardised response mean (SRM) in a sub-sample of our participants (n=25), who had undergone DAA-MIS. These participants completed the questionnaire on the further three occasions: preoperatively, at the 4th and 8th postoperative week.

Table 2. Reliability properties of the International Hip Outcome Tool (12 items) - Greek version

Internal consistency (n=124)	Cronbach's alpha		
	0.907		
Test-retest reliability (n=50)	ICC 95%CI		*p*-value
	0.982 (0.97-0.99)		<0.001
	Paired samples *t* -test		p-value
	Initial assessment	Re-assessment	
	40.26±23.94 [a]	40.96±24.12 [a]	(NS) 0.282
Reproducibility (n=124)	Standard error of measurement	Minimal Detectable Change	Minimal Important Change
	3.22	8.92	12.0

[a] The values are expressed as mean± standard deviation (SD)
ICC=intraclass correlation coefficient, CI=confidence interval

Table 3. Validity properties of the International Hip Outcome Tool (12 items) - Greek version (n=124)

Construct validity	
	iHOT12-Gr[a]
	Spearman's correlation coefficient
Lower Extremity Functional Scale – Greek version	0.793
Modified Harris hip score – Greek version	0.725
30-second chair-to-stand test	0.248
Timed Up and Go test	-0.373
9stairs-Ascent/Descent test	-0.383

Known – groups validity

Functional status [b]	N	iHOT12-Gr[a] Score	*p*-value
Poor functionality < 53	94	29.60±18.83 [c]	<0.001
Good functionality > 53	30	65.01±17.95 [c]	

[a] The International Hip Outcome Tool (12 items) – Greek version
[b] As external criterion for examined the ability of iHOT12-Gr to distinguish subgroups of patients formed on the basis of their functional status, the cut-off point (53 points) of the Lower Extremity Functional Scale – Greek version was used. The independent samples t-test was used for the statistical analysis.
[c] The values are expressed as mean ± standard deviation (SD)

Table 4. Responsiveness of the International Hip Outcome Tool (12 items) - Greek version (n=25)

Pre-operative measurement	4th postoperative week measurement	8th postoperative week measurement	
Mean ± S.D	Mean ± S.D	Mean ± S.D	*p*-value
27.34 ± 18.13	57.23 ± 11.72 [a]	73.66±10.87 [a, b]	<0.001
	Standardised Response Mean		
	4th postoperative week	8th postoperative week	
	1.78	2.30	

[a] p<0.05 vs. pre-operative
[b] p<0.001 vs. 4th postoperative week

AUC	SE	Significance p	Cut-off Point	Sensitivity	Specificity	95% CI	
0.909	0.03	<0.001	45.2	83%	87%	0.86	0.96

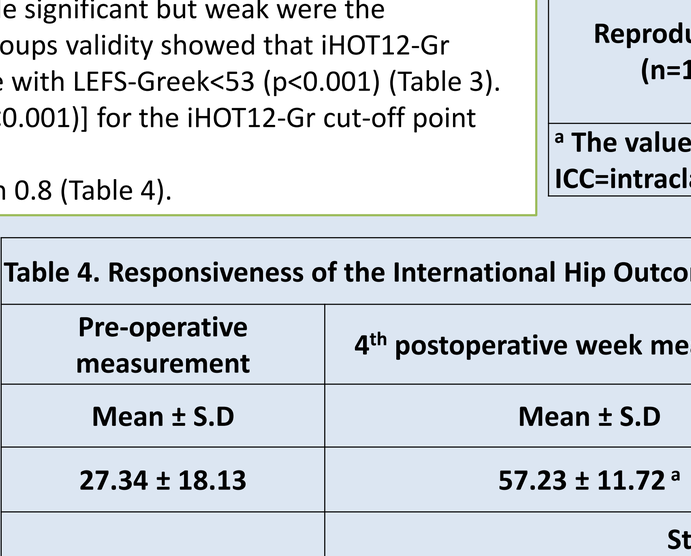

Figure 1. ROC analysis of International Hip Outcome Tool(12 items) - Greek version

Conclusion – iHOT12-Gr showed excellent reliability, significant weak to strong validity properties and excellent responsiveness. Overall, iHOT12-Gr could be a reliable and valid PRO measure for assessing patients with hip osteoarthritis and for detecting the level of improvement in patient's quality of life after DAA-MIS.

References

1. Griffin DR, Parsons N, Mohtadi NGH, Safran MR. A short version of the International Hip Outcome Tool (iHOT-12) for use in routine clinical practice. *Arthroscopy.* 2012; 28(5):611-618.
2. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *Journal of Clinical Epidemiology.* 1993; 46(12):1417-1432.
3. Guillemin F. Cross-cultural adaptation and validation of health status measures. *Scandinavian Journal of Rheumatology.* 1995; 24(2):61-63.
4. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine.* 2000; 25(24):3186–3191.
5. Stasi S, Papathanasiou G, Korres N, et al. Validation of the Lower Extremity Functional Scale in community-dwelling elderly people (LEFS-Greek); determination of functional status cut-off points using TUG test. *European Geriatric Medicine.* 2013; 4(4):237-241.
6. Stasi S, Papathanasiou G, Diochnou A, et al. Modified Harris Hip Score as Patient-Reported Outcome Measure in Osteoarthritic Patients: Psychometric Properties of the Greek version. *Hip International.* 2020. https://doi.org/10.1177/1120700020901682.
7. Jones JC, Rikli RE, Beam WC. A 30-s Chair-Stand Test as a Measure of Lower Body Strength in Community-Residing Older Adults. *Research Quarterly for Exercise and Sport.* 1999;70(2):113-119.
8. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *Journal of the American Geriatric Society.* 1991; 39(2):142–148.
9. Nightingale EJ, Pourkazemi F, Hiller CE. Systematic review of timed stair tests. *Journal of Rehabilitation Research & Development*. 2014;51(3):335–350.