



Measurement properties of walk tests in interstitial lung diseases

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Abstract

The last European Respiratory Society/American Thoracic Society review on the measurement properties of walk tests for chronic respiratory diseases was published in 2014. Since then, new information has been reported for people with interstitial lung diseases (ILD). This growth in knowledge is an opportunity to update the synthesis on field test measurement properties and interpretation in ILD.

CINAHL, MEDLINE, PsycINFO, SCOPUS, SportDiscus and Web of Science were searched until September 2021. Articles reporting on measurement properties of field walk tests in people with ILD were included. The quality of the measures was assessed using the COnsensus-based Standards for the selection of health status Measurement INstruments (COSMIN) and modified GRADE criteria. Hypotheses regarding the validity and responsiveness of the measures were defined by the reviewing team prior to study analysis.

The search strategy resulted in 1421 possibly eligible articles and 37 were withheld for data extraction. Walk tests assessed were the 6-Minute Walk Test (6MWT) (n=28), Incremental (ISWT) (n=5) and modified (MSWT) (n=1) shuttle walk tests, and 4-meter gait speed (4MGS) (n=5). A summary of the measurement properties is in table 1. Minimal clinically important difference of the 6MWT was reported with a range of 22-45m.

Table 1. Measurement properties of field walk tests in people with interstitial lung diseases

Measure	Quality	Reliability		Validity			Responsiveness		Before and after intervention
		Test-retest	Measurement error	Criterion Validity	Convergent validity	Known-groups validity	Comparison with other outcome measures	Comparisons between groups	
6MWT	Results rating	ICC=0.82 to 0.96 (+)	SEM=17 to 45 Mean diff. 7 to 21 (-)	Hypothesis met (3) Hypothesis not met (2) (+)	Hypothesis met (50) Hypothesis not met (42) (+)	Hypothesis met (17) Hypothesis not met (5) (+)	Hypothesis met (8) Hypothesis not met (2) (+)	Hypothesis met (8) Hypothesis not met (1) (+)	Hypothesis met (1) Hypothesis not met (4) (-)
	Evidence GRADE	Moderate ¹ (n=891)	Moderate ¹ (n=1260)	Low ² (n=178)	Low ³ (n=1977)	Moderate ⁴ (n=2706)	Moderate ⁴ (n=781)	High (n=1006)	High (n=1212)
ISWT	Results rating	ICC=0.91 (+)	Mean diff. 29 LoA=-34.3 to 92 (7)	Hypothesis met (3) (+)	Hypothesis met (2) Hypothesis not met (5) (-)			Hypothesis met (1) Hypothesis not met (1) (+)	Hypothesis met (2) Hypothesis not met (1) (+)
	Evidence GRADE	Low ^{2,7} (n=27)	Very Low ^{1,4,8} (n=27)	Low ² (n=37)	Very low ^{3,7} (n=37)			Very low ^{3,7} (n=48)	Very low ^{4,6} (n=111)
MSWT	Results rating			Hypothesis met (1) Hypothesis not met (3) (+)	Hypothesis not met (3) Hypothesis not met (3) (-)				
	Evidence GRADE			Low ² (n=33)	Low ² (n=33)				
4MSG	Results rating	ICC=0.92 to 0.98 (+)	SEM 0.0002 to 0.04 (7)	Hypothesis met (29) Hypothesis not met (20) (+)	Hypothesis met (1) Hypothesis not met (1) (+)		Hypothesis met (1) Hypothesis met (1) (+)		Hypothesis met (1) Hypothesis met (1) (+)
	Evidence GRADE	High (n=137)	Moderate ⁸ (n=86)	Low ⁵ (n=305)	Low ^{4,8} (n=238)		Low ^{4,8} (n=60)		Moderate ⁸ (n=60)

Results rating: (+) sufficient, (-) insufficient, (?) indeterminate. The quality of evidence was downgraded for: 1. Serious risk of bias, 2. Very serious risk of bias, 3. Extremely serious risk of bias, 4. Serious inconsistency (>50% of inconsistent results), 5. Very serious inconsistency (> 50% of inconsistent results), 6. Serious imprecision (N < 100), 7. Very serious imprecision (N < 50), 8. Indeterminate results based on author's consensus.

Abbreviations: 6MWT: 6-min walk test, 4MSG: 4-metre gait speed, GRADE: Grading of Recommendations Assessment, Development, and Evaluation (high, moderate, low, very low), ISWT: incremental shuttle walk test, ICC: intraclass correlation coefficient, LoA: limits of agreement, MSWT: modified shuttle walk test, SEM: standardize error of the measure.

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The 6MWT and 4MSG had the highest quality evidence and may therefore be used in people with ILD.

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Footnotes

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Kenji Nemoto et al., European Respiratory Journal, 2018

Physical activity and mortality risk in people with interstitial lung disease: a systematic review and meta-analysis

Vânia Patrícia Martins Rocha et al., European Respiratory Journal

Post-COVID interstitial lung disease in symptomatic patients after hospital discharge

L Polivka et al., European Respiratory Journal, 2022

Reliability and validity of the Chester Step Test in people with Interstitial Lung Disease

Ana Alves et al., European Respiratory Journal

Lower limb function in pediatric interstitial lung disease

Kübra Kılıç et al., European Respiratory Journal, 2020

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Huaping Wang et al., RSC ChemComm, 2022

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Deniz Uçar, Journal of Water Reuse and Desalination, 2018

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Qinglin Yang et al., RSC ChemComm, 2022

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