Received: 1 October 2025 | Revised: 29 December 2025 | Accepted: 20 January 2026

DOI: 10.1002/pmrj.70114

ORIGINAL ARTICLE

PM&R

Validity and reliability of the "Pendleton test": An innovative special test for intraarticular hip pathology

Yao-Wen Eliot Hu MD, MBA, FAAFP, FACSM, FAMSSM[1] | Bryce D. Lokey DO[2] | John J. Fraser PhD, DPT, FACSM[3]

[1]Department of Family Medicine, Uniformed Services University of the Health Sciences, Department of Family Medicine and Community Health, University of Massachusetts Chan Medical School, Worcester, Massachusetts, USA

[2]Department of Radiology, Naval Medical Center San Diego, San Diego, California, USA

[3]Department of Physical Medicine and Rehabilitation, Uniformed Services University of the Health Sciences, University of Kentucky Sports Medicine Research Institute, Lexington, Kentucky, USA

Correspondence
Yao-Wen Eliot Hu, Department of Family Medicine, Uniformed Services University of the Health Sciences, Department of Family Medicine and Community Health, University of Massachusetts Chan Medical School, 281 Lincoln Street, Worcester, MA 01605, USA.
Email: yao-wen.hu@umassmemorial.org

Abstract

Background: Hip pain is common in sports medicine. Utility of legacy special tests for examination of intraarticular hip lesions is mixed at best.
Objective: To establish criterion-reference validity, intertester reliability, and test–retest reliability of the Pendleton test in screening for intraarticular hip pathology.
Design: Criterion standard, blinded.
Setting: Tertiary care, institutional.
Patients: Thirty patients (16 female, 14 male) with chronic anterior or anterior-medial hip pain were recruited from a military outpatient sports medicine clinic.
Interventions: The independent variables for test–retest and intertester reliability were session and tester, respectively. The relationship between intraarticular hip pathology and pain level was examined as a secondary objective.
Main Outcome Measures: Magnetic resonance imaging (MRI) positivity for intraarticular pathoanatomic injury was used as the criterion reference for validity. Sensitivity, specificity, positive predictive value, negative predictive value, and receiver-operator curves were calculated. Cohen's kappa statistics were used for establishing test–retest and intertester reliability.
Results: MRI positivity was 33% and 50% for anteroinferior or any intraarticular lesions, respectively, and was not significantly associated ($\beta = 0.59$, $p = .20$) with pain level when adjusted for gender, age, and rank. Sensitivity of the Pendleton test was 70% for anterior intraarticular lesions and 67% for any intraarticular lesion. Specificity was 15% for anterior intraarticular lesions and 6.7% for any intraarticular lesion. Positive predictive value was 29% for anterior intraarticular lesions and 42% for any intraarticular lesions, and negative predictive value was 50% and 17%, respectively. The area under the curve of the Pendleton test was 0.60 (95% confidence interval: 0.37–0.84) for anterior articular lesions and 0.71 (95% confidence interval: 0.52–0.90) for any intraarticular lesions. Intertester reliability (kappa $= 0.77$, $p < .001$) and test–retest reliability (kappa $= 0.80$, $p < .001$) were substantial.
Conclusions: The Pendleton test exhibited excellent reliability, adequate sensitivity, and poor specificity for detecting intraarticular lesions of the hip. The presence of intraarticular lesions on MRI was not associated with hip pain level.

INTRODUCTION

Hip pain is a common condition in sports medicine, accounting for 6% of athletic injuries in adults.[1] In the military health system, an average of approximately 55,000 service members are diagnosed with hip overuse/nonspecific pain, sprain, tear, or degeneration per year.[2] There are several described physical examination maneuvers used to evaluate potential intraarticular etiology of hip pain but current high-quality evidence for use of clinical examination tests in identification of pathoanatomy is lacking.[3,4]

Although physical examination techniques, including the flexion-adduction-internal rotation (FADIR) test and the Scour test, are readily accessible to clinicians and commonly used when diagnosing a patient with hip pain, the measurement properties are suboptimal compared to magnetic resonance imaging (MRI).[5] The evidence to support the use of special tests on physical examination to screen for hip intraarticular pain generators, such as femoroacetabular impingement (FAI), is also mixed at best.[6–9] Most studies reported overall varied sensitivity and specificity for the FADIR and the Scour test.[5,6,8,9] Fernandes et al. reviewed the diagnostic accuracy of special tests when compared to diagnostic imaging for FAI and found that the FADIR test had sensitivity of 8%–100% and specificity of 3%–100% over 19 studies, the flexion-abduction-external rotation test had sensitivity of 41%–98% and specificity of 18%–100% over 8 studies, the resisted straight-leg raise test had sensitivity of 6%–75% and specificity of 29%–100% over 3 studies, the posterior impingement test had sensitivity of 18%–21% but specificity was not reported over 2 studies, the Scour test had sensitivity of 50%–88% and specificity of 29%–43% over 1 study, the internal rotation over pressure test had sensitivity of 80%–100% and specificity of 15%–18% over 1 study, and the log roll test had sensitivity of 30%; specificity was not reported over 1 study.[3,4] In summary, most clinical hip exam tests for intraarticular pathology had high sensitivity and low specificity, with the FADIR test exhibiting the highest sensitivity.

There are limitations to the legacy special tests used to evaluate potential intraarticular hip pathology. Although the FADIR test is provocative and encroaches the intraarticular structures of the superior and medial hip, emulating certain functional movements, this test is performed with hip unloaded.[10,11] Similarly, the Scour test is a provocative test that loads the superomedial, superior, and superolateral joint surfaces but lacks potentially relieving factors such as joint distraction that may improve the diagnostic accuracy.[10,11] Given the frustrations of poor access to radiology resources and over-reliance on advanced imaging, the Pendleton test is an innovative special test that was developed to limit the proclivity for advanced imaging during clinical decision-making, leveraging the provocative joint-loading strengths of the legacy tests while adding contextual information via joint distraction that may improve overall accuracy. Before this test is employed, measurement properties of the Pendleton test must be established to assess its clinical utility. Therefore, the purpose of this study was to assess the criterion-reference validity, test–retest reliability, and intertester reliability of the newly developed Pendleton test. Our hypothesis is that the Pendleton test will exhibit superior measurement properties, validity, and reliability when compared to legacy special tests for hip intraarticular pathoanatomy.

METHODS

The Pendleton test is a two-part test performed with the patient supine, allowing the clinician to passively flex both the hip and knee to 90 degrees. The clinician subsequently applies axial compression along the femur with femoral internal and external rotation, followed by assessment of pain. Next, while maintaining both the hip and the knee in 90 degrees of passive flexion, the clinician applies a distraction force to the femur along with the hip positioned in internal and external rotation, followed by assessment of pain. A positive test is defined as both worsening hip pain with the axial compression portion of the test and decreased hip pain with the distraction part of the test. Figure 1 details the maneuver, with the video and educational resources of the maneuver available as Supporting Material (https://doi.org/10.6084/m9.figshare.22313707.v1).[12]

FIGURE 1 Demonstration of the Pendleton Test.

A reliability and validation study was conducted using a sample of convenience consisting of service members with chronic hip pain from suspected intraarticular pathology. The independent variables in the establishment of test–retest and intertester reliability of the Pendleton test and the legacy FADIR and Scour tests were session and tester, respectively. The agreement between the Pendleton, FADIR, and Scour tests with MRI findings of intraarticular pathoanatomic injury was used as the criterion reference to establish validity. The association between the presence of intraarticular hip pathology and pain level was explored as a secondary aim.

Patients

Pain level of the participants was assessed using the numeric pain rating scale (NPRS). Data from 30 service members with hip pain were included: 16 female (mean ± SD, age: 24.8 ± 7.4 years; NPRS: 4.9 ± 0.6) and 14 male (mean ± SD, age: 33.4 ± 9.6 years; NPRS: 4.8 ± 1.4) recruited from an outpatient sports medicine clinic in the Military Health System. A sample size estimation of 16 patients was needed for the establishment of reliability using an acceptability coefficient threshold of 0.6 across two measurements.[13] Patients were screened by the principal investigator and were included if they were active-duty military of the United States Marine Corps or Navy and presented to the sports medicine clinic with chronic anterior or anterior-medial hip pain lasting longer than 6 weeks. Patients were excluded if they had prior hip surgery, surgical hardware around the hip region, active or history of infection of the hip region, active or history of rheumatologic or autoimmune disease, active or history of neoplasms or tumors in the hip region, active or history of traumatic or stress fracture in the hip region, active or history of relative energy deficiency in sport, or if they were scheduled to leave the military either via contract expiration or retirement within 3 months of the initial evaluation. All patients provided informed consent and this study was approved by the institutional review board.

Imaging

MRI was obtained for all participants before the clinical encounter and prior to recruitment as a part of the usual referral process to the sports medicine clinic. All patients underwent imaging with the Philips Ingenia Elition X 3.0-Tesla MRI (Cambridge, MA) with standard hip protocol consisting of T1 and short tau inversion recovery sequences in the coronal plane of the whole pelvis, followed by oblique-axial, coronal, and sagittal plane fat-suppressed proton density sequences of the hip. MRI has been found to have excellent measurement properties for the diagnosis of various hip intraarticular pathologies.[14–16] Technological advances in diagnostic imaging quality with 3.0-Tesla MRI have allowed this modality to be comparable to 1.5-Tesla MR arthrography, the established gold standard for the diagnosis of intraarticular hip pathology.[17,18]

Examiners

Five family physicians who were sports medicine fellows with 1 year of specialized musculoskeletal experience served as the initial examiners and performed the history and physical examinations. A board-certified sports medicine physician with 12 years of specialized musculoskeletal experience who served as fellowship clinical faculty served as the standardized examiner #2. All examiners were trained and calibrated on how to perform the Pendleton test and were provided an educational handout and a video detailing the procedure (https://doi.org/10.6084/m9.figshare.22313707.v1).[12] The order of examiners performing the assessments were selected using simple randomization. All examiners were blinded to the MRI interpretation and each other's physical examination findings. One physician who was board-certified in diagnostic radiology, with 12 years of specialized experience and was blinded to the history and physical examination findings, interpreted the imaging.

Testing procedures

Figure 2 details the study flow. Following screening and informed consent, information regarding gender, age, and rank was recorded on the initial visit. The patient's pain level at its worst was assessed using the NPRS. The interventions of FADIR, Scour, and Pendleton tests were performed in this particular order for all examiners, although the sequence of the interventions would not theoretically influence outcomes due to the criteria for positivity and negativity of these tests. Following the examination by the initial examiner, a second examiner repeated the same examination tests in the same particular order. The participant also returned 3 to 5 days later for a repeat examination with the same second examiner, again of the same tests in the same order.

Statistical analysis

Sensitivity, specificity, positive likelihood ratio, negative likelihood ratio, prevalence, positive predictive value, negative predictive value, accuracy, and receiver-operator curves were calculated to establish criterion-validity of the Pendleton test with MRI positivity. Cohen's

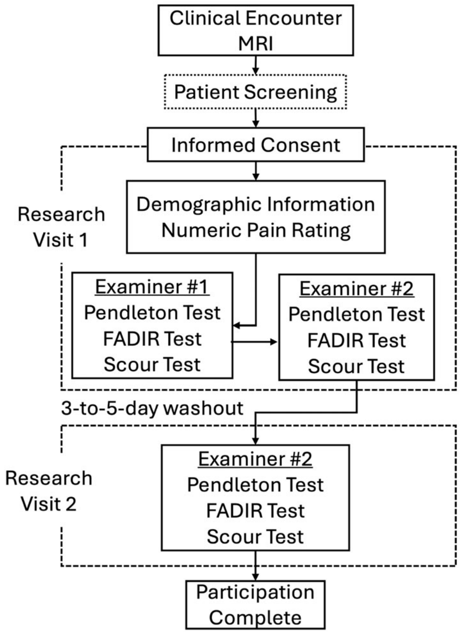

FIGURE 2 Study flow diagram. FADIR, flexion-adduction-internal rotation; MRI, magnetic resonance imaging.

kappa statistic was used to evaluate test–retest and intertester reliability. Agreement (kappa statistics) was interpreted as defined by Cohen: 0.81–1.00, almost perfect; 0.61–0.80, substantial; 0.41–0.60, moderate; 0.21–0.40, fair; and ≤0.20, slight to poor.[19] Adjusted multivariable linear models were employed to assess the effects of MRI positivity of intraarticular pathology on NPRS, adjusted for gender, age, and rank. Linear regression analyses were performed using R (version 4.3.3, The R Foundation for Statistical Computing, Vienna, Austria). The level of significance was defined as $p < .05$ for all analyses.

RESULTS

MRI positivity was 33% for anterior labral pathology in this sample of patients with hip pain and 50% for any intraarticular lesion. MRI positivity was not a significant predictor ($\beta = 0.59$, $p = .20$) for pain level in the multivariable linear regression, when adjusted for gender, age, and rank. Table 1 details the counts of true and false positivity and negativity of clinical hip measures and diagnostic accuracy of clinical hip measures compared to MRI. The sensitivity of the Pendleton test was 70% for anterior intraarticular lesions and 67% for any intraarticular lesion. Specificity was found to be 15% for anterior intraarticular lesions and 6.7% for any intraarticular lesion. The positive predictive value and negative predictive value for the Pendleton test were 29% and 50% for anterior intraarticular lesions, respectively, and 42% and 17% for any intraarticular lesions. The area under the curve of the Pendleton test was 0.60 (95% confidence interval: 0.37–0.84) for anterior articular lesions and 0.71 (95% confidence interval: 0.52–0.90) for any intraarticular lesions (Figure 3).

Intertester reliability (kappa = 0.77, $p < .001$) and test–retest reliability (kappa = 0.80, $p < .001$) of the Pendleton test were substantial.

DISCUSSION

The primary findings of this study were that the Pendleton test exhibited adequate sensitivity and poor specificity for detecting intraarticular lesions of the hip when compared with MRI. These findings were similar to the measurement properties of legacy special tests of the hip FADIR and Scour. The test–retest and intertester reliability of the Pendleton test were excellent. The presence of intraarticular lesions on MRI was not associated with hip pain level and found in only one-third to one-half of the patients.

MR arthrography is the gold standard in the evaluation of intraarticular hip pathology.[16] The invasive nature and poor access within hospital systems necessitate comparable, readily accessible, and noninvasive approaches. With recent advances in technology, 3.0-Tesla MRI is readily available in hospital systems and provides excellent visualization of hip intraarticular pathology when compared to MR arthrography.[17] Although the presence of intraarticular hip pathology on imaging is common, MRI positivity is not always associated with clinical symptoms,[20] a finding that was similarly observed in the current study. Special tests for intraarticular hip pathology typically have varying measurement properties and diagnostic accuracy, suggesting that physical exam alone cannot reliably confirm diagnosis.[3,9,21] Despite their inconsistencies, various hip physical examination tests are still considered to be the standard of clinical practice, with the most common legacy special tests being the FADIR and Scour tests.

The associations between physical examination and diagnostic imaging findings for hip intraarticular lesions have been found to be highly variable,[5,9,22] an important consideration when evaluating patients with suspected intraarticular lesions. MRI findings of hip intraarticular pathology may be falsely positive when considering the actual etiology of pain and clinical function.[23] The converse, where the MRI is falsely negative in cases of true hip intraarticular pathology, may also be present.[24] Fernandes et al. found that imaging modalities used for the evaluation of FAI, which include plain radiography, MR arthrography, and 4-dimensional computed tomography, all had excellent sensitivity but varied specificity.[3] Judicious use of imaging as a correlate to patient history, physical examination findings, and response to trial-by-treatment provided by sports medicine and rehabilitation specialists is recommended

TABLE 1 Diagnostic accuracy of clinical hip measures compared to magnetic resonance imaging, stratified by lesion type.

		Anterior intraarticular lesion		Any intraarticular lesion	
	Statistic	**Value**	**95% CI**	**Value**	**95% CI**
Pendleton test	True positive (*n*)	7	-	10	-
	False positive (*n*)	17	-	14	-
	True negative (*n*)	3	-	5	-
	False negative (*n*)	3	-	1	-
	Sensitivity	70%	35%–93%	67%	38%–88%
	Specificity	15%	3.2%–38%	6.7%	0.17%–32%
	Positive likelihood ratio	0.8	0.5–1.3	0.7	0.5–1.1
	Negative likelihood ratio	2.0	0.5–8.2	5.0	0.7–38
	Injury prevalence	33%	17%–53%	50%	31%–69%
	Positive predictive value	29%	21%–39%	42%	33%–52%
	Negative predictive value	50%	20%–81%	17%	2.6%–60%
	Accuracy	33%	17%–53%	37%	20%–56%
FADIR test	True positive (*n*)	10	-	15	-
	False positive (*n*)	20	-	15	-
	True negative (*n*)	0	-	0	-
	False negative (*n*)	0	-	0	-
	Sensitivity	100%	69%–100%	100%	78%–100%
	Specificity	0.0%	0.0%–17%	0.0%	0.0%–22%
	Positive likelihood ratio	1.0	1.0–1.0	1.0	1.0–1.0
	Negative likelihood ratio	-	-	-	-
	Injury prevalence	33%	17%–53%	50%	31%–69%
	Positive predictive value	33%	33.33%–33.33%	50%	50%–50%
	Negative predictive value	-	-	-	-
	Accuracy	33%	17%–53%	50%	31%–69%
Scour test	True positive (*n*)	10	-	15	-
	False positive (*n*)	19	-	14	-
	True negative (*n*)	0	-	0	-
	False negative (*n*)	1	-	1	-
	Sensitivity	100%	69%–100%	100%	78%–100%
	Specificity	5.0%	0.1%–25%	6.7%	0.2%–32%
	Positive likelihood ratio	1.1	1.0–1.2	1.1	0.9–1.2
	Negative likelihood ratio	0.0	-	0.0	-
	Injury prevalence	33%	17%–53%	50%	31%–69%
	Positive predictive value	35%	32%–37%	52%	48%–55%
	Negative predictive value	100%	2.5%–100%	100%	2.5%–100.00%
	Accuracy	37%	20%–56%	53%	34%–72%

to prevent overdiagnosis and unnecessary treatment.[20] However, overdependence on false-negative diagnostic imaging when working up the patient with hip pain may also result in underdiagnosis and delayed treatment.[20]

The Pendleton test exhibited excellent intertester and test–retest reliability. When compared to the legacy special tests that have been shown to have varying reliability,[5,22] the Pendleton test is superior in this regard. The lower reliability observed in the legacy hip examination is likely attributed to variations in technique between experienced specialized clinicians.[25] This variation may be amplified in less experienced and nonspecialized clinicians, resulting in misdiagnosis and inappropriate treatment.[25] The multistep nature of the Pendleton test may help to improve the repeatability of the examination and explain the observations in the current study.

But in reality, the legacy special tests and the Pendleton test all have fairly poor accuracy, Thus, in clinical

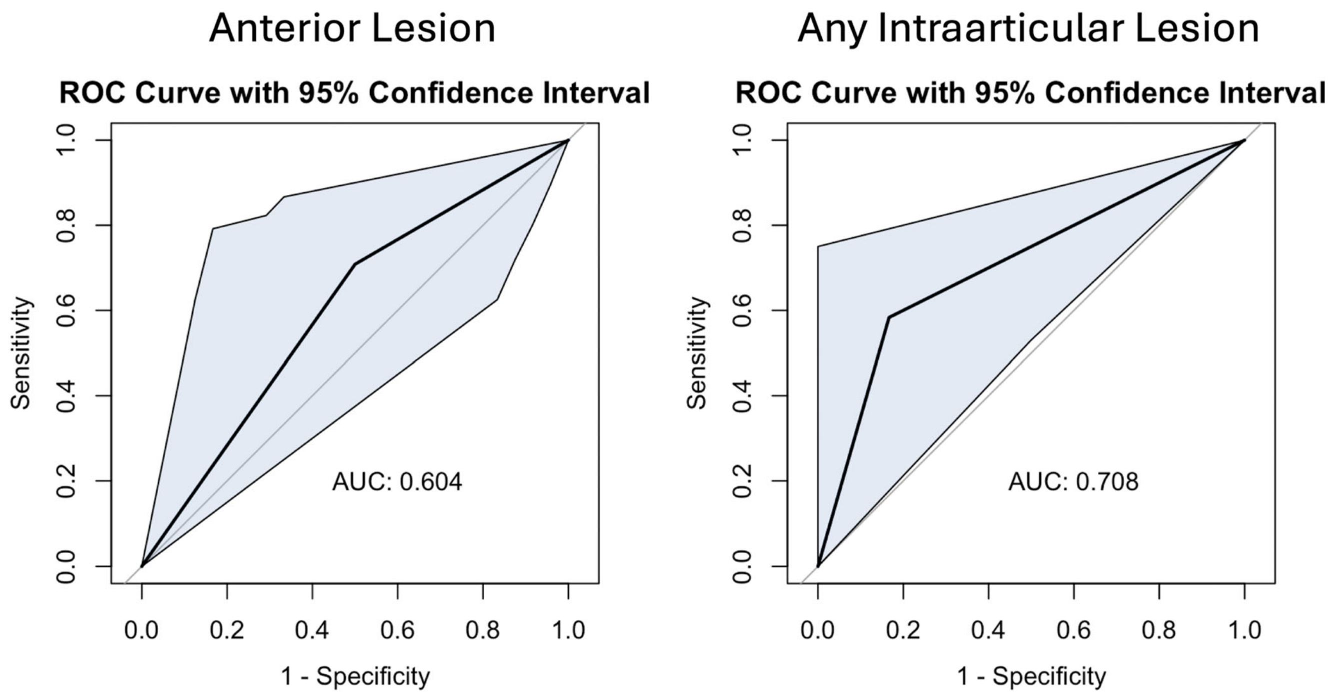

FIGURE 3 Receiver operator curve evaluating the validity of the Pendleton test for anterior or any intraarticular lesions identified on magnetic resonance imaging. AUC, area under the curve; ROC, receiver operator curve.

practice, comprehensive evaluation of intraarticular hip pathology should bring together detailed clinical history, focused physical examination, appropriately indicated diagnostic imaging, and possible diagnostic anesthetic injections to confirm the pain generator. The legacy special tests of the hip are easily performed as a part of an efficient yet detailed physical examination. If desired, the Pendleton test may be incorporated into the physical examination without difficulty as the first part of the Pendleton test is performed similarly to those of the legacy special tests. The addition of the second half of the Pendleton test is also easily performed without addition of significant time or effort. Still, the Pendleton test remains only comparable to legacy special tests where it displays adequate sensitivity and poor specificity. If it demonstrates improved measurement properties in the future with further research, the Pendleton test may decrease the need for advanced imaging with regards to clinical decision-making, especially in resource-poor environments.

Limitations

A major limitation of this study was the reliance on MRI as the standard for hip intraarticular pathology. The presence of MRI findings does not necessarily correlate with symptoms or clinical function.[23] Conversely, the absence of MRI findings also does not preclude the clinical presentation of hip pain, especially in cases where image-guided intraarticular diagnostic injections to confirm the pain generator are performed.[24,26] Future research to reexamine the validity of the Pendleton test may involve image-guided hip intraarticular anesthetic injections as the standard to confirm hip intraarticular pathology. It is also unclear if use of MR arthrography may have changed the results of this study. Modern imaging and processing technology have vastly improved the accuracy of MRI in diagnosing intraarticular hip pathology without contrast.[17,18]

CONCLUSION

When compared with MRI, the Pendleton test exhibited adequate sensitivity and poor specificity for detecting intraarticular lesions of the hip. These findings were comparable to the measurement properties of legacy special tests of the hip, requiring further research prior to employment of the Pendleton test in clinical practice. The test–retest and intertester reliability of the Pendleton test were excellent. The presence of intraarticular lesions on MRI was not associated with hip pain level and found in only one-third to one-half of the patients. Given that all of the special tests, including the Pendleton test, exhibited fairly poor validity, evaluation should not be overly dependent on specific physical examination tests or advanced imaging in isolation. Rather, assessment should combine clinical history, physical examination tests, appropriate diagnostic imaging, and possible diagnostic intraarticular anesthetic injections.

ACKNOWLEDGMENTS

We acknowledge the contributions from Jack Stacey, Joseph Marquez, Jordan Lyons, Keifer Walsh, and Edgar Van Horne for their assistance in serving as examiners during data collection. We acknowledge the contribution of Jack Stacey in assisting in creation of the supporting material and serving as the model for Pendleton Test demonstration in Figure 1 and the supporting material. The authors are military service members and employees of the United States Government. This work was prepared as part of their official duties. Title 17 U.S.C. 105 provides that copyright protection under this title is not available for any work of the United States Government. Title 17 U.S.C. 101 defines a U.S. Government work as work prepared by a military service member or employee of the U.S. Government as part of that person's official duties. The views expressed in this publication are those of the authors and do not reflect the official policy or position of the Department of the Navy, the Department of Defense, the Department of Veterans Affairs, or the U.S. Government.

FUNDING INFORMATION

There was no funding received for this manuscript and research project. Dr Fraser reports grants from Congressionally Directed Medical Research Programs and the Office of Naval Research, outside of the submitted work.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The ethics committee and institutional review board at Naval Medical Center San Diego reviewed and approved this study. All participants provided informed consent prior to their inclusion in the study.

DISCLOSURE

The authors declare no relevant conflicts of interest and do not have any relevant financial disclosures. Dr Fraser reports grants from Congressionally Directed Medical Research Programs and the Office of Naval Research, outside of the submitted work. In addition, Dr Fraser has a patent pending for an Adaptive and Variable Stiffness Ankle Brace, US Provisional Patent Application No. 63254,474 and provides consulting for Luna Laboratories.

REFERENCES

1. Lynch TS, Bedi A, Larson CM. Athletic hip injuries. *J Am Acad Orthop Surg*. 2017;25(4):269-279.
2. Pav V, Yuan X, Isaacson B, Colahan C, Hando B. Burden of musculoskeletal injuries in U.S. active duty service members: a 12-year study spanning fiscal years 2010–2021. *Mil Med*. 2024;189:1-9.
3. Fernandes DA, Fernandes DA, Melo G, et al. Diagnostic accuracy of clinical tests and imaging exams for femoroacetabular impingement: an umbrella review of systematic reviews. *Clin J Sport Med*. 2021;32:635-647.
4. Enseki KR, Bloom NJ, Harris-Hayes M, et al. Hip pain and movement dysfunction associated with nonarthritic hip joint pain: a revision. *J Orthop Sports Phys Ther*. 2023;53(7):CPG1-CPG70.
5. Palsson A, Pålsson A, Kostogiannis I, Ageberg E. Combining results from hip impingement and range of motion tests can increase diagnostic accuracy in patients with FAI syndrome. *Knee Surg Sports Traumatol Arthrosc*. 2020;28(10):3382-3392.
6. Martin RL, Martin RL, Irrgang JJ, Sekiya JK. The diagnostic accuracy of a clinical examination in determining intra-articular hip pain for potential hip arthroscopy candidates. *Arthroscopy*. 2008;24(9):1013-1018.
7. Maslowski E, Maslowski E, Sullivan W, et al. The diagnostic validity of hip provocation maneuvers to detect intra-articular hip pathology. *PM R*. 2010;2(3):174-181.
8. Reiman MP, Reiman MP, Goode AP, Hegedus EJ, Cook CE, Wright AA. Diagnostic accuracy of clinical tests of the hip: a systematic review with meta-analysis. *Br J Sports Med*. 2013;47(14):893-902.
9. Dhillon J, Hernandez EJ, Keeter C, Kraeutler MJ. Sensitivity and specificity for physical examination tests in diagnosing prearthritic intra-articular hip pathology are highly variable: a systematic review. *Arthrosc Sports Med Rehabil*. 2025;7(3):101117.
10. Shanmugaraj A, Shell JR, Horner NS, et al. How useful is the flexion-adduction-internal rotation test for diagnosing Femoroacetabular impingement: a systematic review. *Clin J Sport Med*. 2020;30(1):76-82.
11. Wong SE, Cogan CJ, Zhang AL. Physical examination of the hip: assessment of femoroacetabular impingement, labral pathology, and microinstability. *Curr Rev Musculoskelet Med*. 2022;15(2):38-52.
12. Stacey J. Pendleton test for hip pathology. *Figshare*. 2023. doi:10.6084/m9.figshare.22313707.v1
13. Donner A, Eliasziw M. Sample size requirements for reliability studies. *Stat Med*. 1987;6(4):441-448.
14. Byrd JW, Byrd JW, Jones KS. Diagnostic accuracy of clinical assessment, magnetic resonance imaging, magnetic resonance arthrography, and intra-articular injection in hip arthroscopy patients. *Am J Sports Med*. 2004;32(7):1668-1674.
15. Lee GY, Lee GY, Kim S, Baek SH, Jang EC, Ha YC. Accuracy of magnetic resonance imaging and computed tomography arthrography in diagnosing acetabular labral tears and chondral lesions. *Clin Orthop Surg*. 2019;11(1):21-27.
16. Rajeev A, Rajeev A, Tuinebreijer W, Mohamed A, Newby M. The validity and accuracy of MRI arthrogram in the assessment of painful articular disorders of the hip. *Eur J Orthop Surg Traumatol*. 2018;28(1):71-77.
17. Crespo-Rodriguez AM, Crespo-Rodríguez AM, De Lucas-Villarrubia JC, et al. The diagnostic performance of non-contrast 3-Tesla magnetic resonance imaging (3-T MRI) versus 1.5-Tesla magnetic resonance arthrography (1.5-T MRA) in femoroacetabular impingement. *Eur J Radiol*. 2017;88:109-116.
18. Crespo-Rodriguez AM, Crespo Rodríguez AM, de Lucas Villarrubia JC, Pastrana Ledesma MA, Millán Santos I, Padrón M. Diagnosis of lesions of the acetabular labrum, of the labral-chondral transition zone, and of the cartilage in femoroacetabular impingement: correlation between direct magnetic resonance arthrography and hip arthroscopy. *Radiologia*. 2015;57(2):131-141.
19. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33:159-174.

20. Metcalfe D, Perry DC, Claireaux HA, Simel DL, Zogg CK, Costa ML. Does this patient have hip osteoarthritis?: the rational clinical examination systematic review. *JAMA*. 2019;322(23):2323-2333.
21. Tijssen M, van Cingel R, Willemsen L, de Visser E. Diagnostics of femoroacetabular impingement and labral pathology of the hip: a systematic review of the accuracy and validity of physical tests. *Arthroscopy*. 2012;28(6):860-871.
22. Sutlive TG, Lopez HP, Schnitker DE, et al. Development of a clinical prediction rule for diagnosing hip osteoarthritis in individuals with unilateral hip pain. *J Orthop Sports Phys Ther*. 2008;38(9):542-550.
23. Register B, Pennock AT, Ho CP, Strickland CD, Lawand A, Philippon MJ. Prevalence of abnormal hip findings in asymptomatic participants: a prospective, blinded study. *Am J Sports Med*. 2012;40(12):2720-2724.
24. Buikstra JG, Fary C, Tran P. Arthroscopic findings of a diagnostic dilemma- hip pathology with normal imaging. *BMC Musculoskelet Disord*. 2017;18(1):120.
25. Martin HD, Kelly BT, Leunig M, et al. The pattern and technique in the clinical evaluation of the adult hip: the common physical examination tests of hip specialists. *Arthroscopy*. 2010;26(2):161-172.
26. Kheterpal AB, Bunnell KM, Husseini JS, et al. Value of response to anesthetic injection during hip MR arthrography to differentiate between intra- and extra-articular pathology. *Skeletal Radiol*. 2020;49(4):555-561.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Hu Y-WE, Lokey BD, Fraser JJ. Validity and reliability of the "Pendleton test": An innovative special test for intraarticular hip pathology. *PM&R*. 2026;1-8. doi:10.1002/pmrj.70114