

Table 1. Diagnosis of femoroacetabular impingement and labral tear: effectiveness of clinical tests and grading the quality of evidence.

Diagnosis / Clinical test / Studies & Participants	Setting	Reference test	Likelihood ratio, [95% CI]	Diagnostic effectiveness			
				High	Moderate	Low	Very low
Diagnosis of femoroacetabular impingement / acetabular labral tear							
<i>Flexion ADduction Internal Rotation (FADIR) test</i>							
Meta-analysis of 188 participants [1].	Secondary care (Hospital)	MRA	LR+ = 1.02 [0.96; 1.08] LR- = 0.45 [0.19; 1.09]				
Meta-analysis of 319 participants [1].	Secondary care (Hospital)	Surgery	LR+ = 1.04 [0.97; 1.12] LR- = 0.14 [0.02; 0.93]				
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon's clinic (tertiary referral)	Intra-articular injection	LR+ = 0.86 [0.67; 1.1] LR- = 2.33 [0.52; 10.4]				
<i>Flexion ABduction External Rotation (FABER) test</i>							
Single study with 50 participants with symptoms, findings and radiographs suggesting intra-articular hip pain [3].	Multispeciality musculoskeletal clinic at a university medical center	Intra-articular injection	LR+ = 1.10 [0.76; 1.59] LR- = 0.70 [0.20; 2.39]				
		Radiographs	LR+ = 0.75 [0.36; 1.56] LR- = 2.00 [0.59; 6.79]				
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon's clinic (tertiary referral)	Intra-articular injection	LR+ = 0.73 [0.5; 1.1] LR- = 2.20 [0.8; 6.0]				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = 0.81 [0.72; 0.9] LR- = N/A				
<i>Internal-Rotation test with overpressure</i>							
Single study with 50 participants with symptoms, findings and radiographs suggesting intra-articular hip pain [3].	Multispeciality musculoskeletal clinic at a university medical center	Intra-articular blockade	LR+ = 1.10 [0.83; 1.46] LR- = 0.50 [0.09; 2.69]				
		MRI/MRA	LR+ = 1.18 [0.83; 1.44] LR- = 0.00 [0.03; 0.59]				

Resisted straight leg raise				
Single study with 50 participants with symptoms, findings and radiographs suggesting intra-articular hip pain [3].	Multispeciality musculoskeletal clinic at a university medical center	Intra-articular blockade	LR+ = 0.87 [0.54; 1.40] LR- = 1.28 [0.50; 3.30]	
		MRI/MRA	LR+ = 0.93 [0.44; 1.97] LR- = 1.13 [0.36; 3.53]	
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = 0.21 [0.14; 0.33] LR- = N/A	
Scour test				
Single study with 50 participants with symptoms, findings and radiographs suggesting intra-articular hip pain [3].	Multispeciality musculoskeletal clinic at a university medical center	Intra-articular blockade	LR+ = 0.70 [0.43; 1.15] LR- = 1.72 [0.65; 4.52]	
		MRI / MRA	LR+ = 1.33 [0.81; 2.2] LR- = 0.50 [0.08; 2.99]	
Trochanteric tenderness				
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon's clinic (tertiary referral)	Intra-articular injection	LR+ = 1.10 [0.36; 3.6] LR- = 0.93 [0.49; 1.8]	
Anterior impingement test				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = 0.91 [0.85; 0.98] LR- = N/A	
“Catching”				
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon's clinic (tertiary referral)	Intra-articular injection	LR+ = 1.39 [0.81; 2.4] LR- = 0.68 [0.36; 1.3]	
“Pinching pain when sitting”				
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon's clinic (tertiary referral)	Intra-articular injection	LR+ = 1.10 [0.58; 1.9] LR- = 0.95 [0.25; 1.5]	

“Lack of lateral thigh pain”				
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon’s clinic (tertiary referral)	Intra-articular injection	LR+ = 1.20 [0.84; 1.8] LR- = 0.61 [0.25; 1.5]	
“Groin pain”				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = N/A LR- = 0.13 [0.07; 0.23]	
Single study with 49 participants with hip pain and being surgical candidates [2].	Single orthopaedic surgeon’s clinic (tertiary referral)	Intra-articular injection	LR+ = 0.67 [0.48; 0.98] LR- = 3.00 [0.95; 9.4]	
“Perceived stiffness in the hip”				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = 0.40 [0.3; 0.52] LR- = N/A	
“Perceived mobility restrictions”				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = N/A LR- = 0.78 [0.7; 0.88]	
“Giving way”				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = N/A LR- = 0.72 [0.62; 0.83]	
“Locking”				
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at ortho. dep. at a hospital	Surgery	LR+ = N/A LR- = 0.74 [0.65; 0.85]	

Table 1. Diagnosis of femoroacetabular impingement: effectiveness of clinical tests and grading the quality of evidence.

Clinical test / Diagnosis / Studies & Participants	Setting	Reference test	Likelihood ratio, [95% CI]	Diagnostic effectiveness			
				High	Moderate	Low	Very low
Diagnosis of femoroacetabular impingement							
<i>Flexion ADduction Internal Rotation (FADIR) test</i>							
Single study with 49 participants with clinical signs and symptoms of hip impingement [5].	Orthopaedic dep. at a single hospital	MRI	LR+ = 1.00 [N/A] LR- = 0.35 [N/A]				
Single study with 69 participants with hip pain [6].	Single surgeon at orthopaedic clinic at a hospital	MRI	LR+ = 3.30 [0.48; 23] LR- = 0.53 [0.33; 0.86]				
Single study with 35 youth participants diagnosed with FAI [7].	Single surgeon at children's hospital	Radiographs	LR+ = 1.20 [0.95; 1.52] LR- = 0.09 [0.00; 3.41]				
Single study with 199 participants with unilateral groin or hip pain [8].	Single surgeons' clinic at a hospital	Radiographs	LR+ = 1.08 [0.99; 1.17] LR- = 0.36 [0.12; 1.08]				
Single study with 63 participants referred for non-arthritis hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 1.05 [0.81; 1.35] LR- = 0.83 [0.32; 2.19]				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.34 [1.04; 1.74] LR- = 0.28 [0.10; 0.74]				
Single study with 94 participants with FAI receiving open surgical dislocation [11]	Orthopaedic dep. at university	Surgery	LR+ = 1.0 [N/A] LR- = 0.18 [N/A]				
Single study with 41 participants with clinical diagnosis of FAI [12]	Orthopaedic dep. at hospital	MRA	LR+ = 1.1 [0.86; 1.41] LR- = 0.22 [0.01; 3.87]				
Single study with 68 participants undergoing joint-preserving surgery [13]	Orthopaedic dep. at hospital	MRA	LR+ = 1.0 [N/A] LR- = 0.59 [N/A]				
Flexion Internal Rotation test							
Single study with 241 participants with mechanical hip pathology and pain for more 4 months [14].	Four surgical centers	Radiographs	LR+ = 1.25 [1.01; 1.54] LR- = 0.68 [0.49; 0.96]				

Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 1.51 [0.87; 2.63] LR- = 0.70 [0.44; 1.12]	
<i>Flexion Abduction External Rotation (FABER) test</i>				
Single study with 603 participants with symptomatic unilateral FAI, who underwent hip arthroscopy [15]. – FABER distance	Single physician at a single medical center	Radiographs	LR+ = 1.36 [1.23; 1.5] LR- = 0.41 [0.28; 0.59]	
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 0.87 [0.57; 1.33] LR- = 1.21 [0.68; 2.17]	
Single study with 75 participants with hip-related pain or mechanical symptoms [10]			LR+ = 1.20 [0.89; 1.61] LR- = 0.62 [0.31; 1.26]	
Single study with 75 participants with hip-related pain or mechanical symptoms [10] – FABER (Restricted)	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.01 [0.83; 1.24] LR- = 0.93 [0.34; 2.53]	
Single study with 75 participants with hip-related pain or mechanical symptoms [10] – FABER (Pain)			LR+ = 0.79 [0.55; 1.14] LR- = 1.40 [0.79; 2.47]	
<i>Squat</i>				
Single study with 76 participants with hip pain [16].	Blinded researcher at outpatient orthopaedic clinic at a university	MRI/MRA	LR+ = 1.28 [0.93; 1.75] LR- = 0.61 [0.30; 1.21]	
<i>Trochanteric tenderness</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 0.78 [0.44; 1.38] LR- = 1.17 [0.80; 1.69]	
<i>Anterior impingement test</i>				
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 1.08 [0.82; 1.41] LR- = 0.77 [0.31; 1.93]	
<i>DEXRIT or DIRIT***</i>				
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 1.11 [0.72; 1.71] LR- = 0.87 [0.49; 1.54]	

<i>Passive hip flexion</i>				
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 1.59 [0.86; 2.94] LR- = 0.72 [0.47; 1.11]	
<i>Internal rotation with 0 degrees hip flexion</i>				
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 4.83 [1.06; 22] LR- = 0.76 [0.60; 0.96]	
<i>External rotation with 90 degrees hip flexion</i>				
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 1.76 [0.77; 4.01] LR- = 0.80 [0.58; 1.10]	
<i>Passive hip abduction</i>				
Single study with 63 participants referred for non-arthritic hip and groin pain [9].	Single surgeon and physio at orthopaedic dep. at single university hospital	Radiographs + intra-articular injection	LR+ = 2.19 [1.01; 4.75] LR- = 0.68 [0.47; 0.98]	
<i>Foot Progression Angle Walking</i>				
Single study with 199 participants with unilateral groin or hip pain [8].	Single surgeons' clinic at a hospital	Radiographs	LR+ = 1.34 [1.05; 1.83] LR- = 0.70 [0.52; 0.94]	
<i>Pain with passive hip extension</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.64 [0.65; 4.11] LR- = 0.88 [0.70; 1.10]	
<i>Resisted hip abduction</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 0.35 [0.16; 0.76] LR- = 1.47 [1.07; 2.02]	
<i>Bilateral resisted hip adduction</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 0.47 [0.16; 1.41] LR- = 1.13 [0.93; 1.37]	

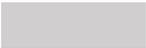
<i>Resisted External Derotation</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Outpatient clinic	FAIS according to Warwick	LR+ = 0.72 [0.41; 1.28] LR- = 1.20 [0.85; 1.69]	
<i>Thomas test</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.19 [0.44; 3.19] LR- = 0.96 [0.77; 1.20]	
<i>Log Roll</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 0.40 [0.10; 1.68] LR- = 1.09 [0.94; 1.27]	
<i>“Clicking or Catching”</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.24 [0.64; 2.4] LR- = 0.88 [0.62; 1.27]	
<i>“Clicking”</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.24 [0.64; 2.4] LR- = 0.88 [0.62; 1.27]	
<i>“Catching”</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.24 [0.64; 2.4] LR- = 0.88 [0.62; 1.27]	
<i>“Pain when sitting”</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 1.06 [0.66; 1.68] LR- = 0.95 [0.60; 1.49]	
<i>“Anterior/Groin/Hip Pain”</i>				
Single study with 75 participants with hip-related pain or mechanical symptoms [10]	Single specialist at outpatient clinic	FAIS according to Warwick	LR+ = 0.81 [0.36; 1.82] LR- = 1.08 [0.79; 1.49]	

Table 1. Diagnosis of acetabular labral tear: effectiveness of clinical tests and grading the quality of evidence.

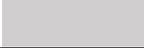
Clinical test / Diagnosis / Studies & Participants	Setting	Reference test	Likelihood ratio, [95% CI]	Diagnostic effectiveness			
				High	Moderate	Low	Very low
Diagnosis of acetabular labral tear							
Flexion ADduction Internal Rotation (FADIR) test							
Single study with 35 youth participants diagnosed with FAI [7].	Single surgeon at children's hospital	MRI	LR+ = 1.00 [N/A] LR- = 0.76 [N/A]				
Single study with 30 participants with painful non-dysplastic hips and positive impingement sign [17]	Orthopaedic dep. at university	MRA	LR+ = 1.3 [0.59; 2.86] LR- = 0.06 [0.00; 3.03]				
Single study with 101 participants with clinical signs and symptoms of ALT [18]	Orthopaedic dep. at single hospital	MRA	LR+ = 1.0 [N/A] LR- = 0.3 [N/A]				
Single study with 97 participants who underwent surgical treatment for FAI [19]	Single hospital	Surgery	LR+ = 1.1 [0.87; 1.38] LR- = 0.09 [0.00; 1.85]				
Single study with 23 participants with ARS [20]	Orthopaedic dep. at university hospital	Surgery	LR+ = 1.1 [0.78; 1.55] LR- = 0.23 [0.01; 9.98]				
Single study with 18 participants with hip dysplasia undergoing arthroscopy and PAO [21]	Orthopaedic dep. at a public hospital	MRA	LR+ = 2.3 [0.08; 68] LR- = 0.56 [0.16; 1.99]				
Single study with 21 participants with acetabular labral tears undergoing hip arthroscopy [22]	Orthopaedic dep. at a hospital	Radiographs	LR+ = 1.0 [N/A] LR- = 0.7 [N/A]				
Flexion Internal Rotation test							
Meta-analysis of 27 participants [1].	Secondary care (hospital)	Surgery	LR+ = 1.28 [0.72; 2.27] LR- = 0.15 [0.01; 1.99]				
Single study with 30 participants with suspected labral tears [23].	Orthopaedic dep. at a hospital	MRA	LR+ = 1.10 [0.82; 1.48] LR- = 0.23 [0.01; 6.13]				

Flexion Abduction External Rotation (FABER) test				
Single study with 18 participants with hip dysplasia undergoing arthroscopy and PAO [21]	Orthopaedic dep. at a public hospital	MRA	LR+ = 1.70 [0.05; 58] LR- = 0.78 [0.24; 2.50]	
THIRD test				
Single study with 100 participants [24].	Outpatient multidisciplinary sports medicine clinic	Surgery	LR+ = 3.90 [0.98; 16] LR- = 0.03 [0.01; 0.12]	
Thomas Test				
Single study with 59 participants with hip pain for 6 months [25].	Hospital	Surgery	LR+ = 11.10 [N/A] LR- = 0.12 [N/A]	
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at a hospital	Surgery	LR+ = 0.33 [0.06; 1.8] LR- = 1.34 [0.89; 2.01]	
Internal rotation-flexion-axial compression test				
Single study with 18 participants, active in sports and with groin pain [26].	Single surgeon in a sports clinic	MRA	LR+ = 1.30 [0.60; 2.80] LR- = 0.58 [0.07; 4.69]	
“Clicking”				
Single study with 18 participants, active in sports and with groin pain [26].	Single surgeon in a sports clinic	MRA	LR+ = 6.67 [1.63; 16] LR- = 0.00 [0.01; 2.03]	
Single study with 59 participants with hip pain for 6 months [25].	Hospital	Surgery	LR+ = 11.13 [N/A] LR- = 0.12 [N/A]	
Single study with 79 participants with at least one imaging finding correlated with intra-articular hip pathology [4].	Single surgeon at a hospital	Surgery	LR+ = N/A LR- = 0.43 [0.34; 0.56]	
“Locking”				
Single study with 59 participants with hip pain for 6 months [25].	Hospital	Surgery	LR+ = 0.16 [N/A] LR- = 2.70 [N/A]	

“Anterior groin pain”

Single study with 59 participants with hip pain for 6 months [25].	Hospital	Surgery	LR+ = 1.04 [N/A] LR- = 0.00 [N/A]		
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“Giving way”

Single study with 59 participants with hip pain for 6 months [25].	Hospital	Surgery	LR+ = 3.35 [N/A] LR- = 0.52 [N/A]		
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- 1 Reiman MP, Goode AP, Cook CE, *et al.* Diagnostic accuracy of clinical tests for the diagnosis of hip femoroacetabular impingement/labral tear: a systematic review with meta-analysis. *Br J Sports Med* 2015;**49**:811. doi:10.1136/bjsports-2014-094302
- 2 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**:1013–8. doi:10.1016/j.arthro.2008.04.075
- 3 Maslowski E, Sullivan W, Forster Harwood J, *et al.* The diagnostic validity of hip provocation maneuvers to detect intra-articular hip pathology. *PM R* 2010;**2**:174–81. doi:10.1016/j.pmrj.2010.01.014
- 4 Tijssen M, van Cingel RE, de Visser E, *et al.* Hip joint pathology: relationship between patient history, physical tests, and arthroscopy findings in clinical practice. *Scand J Med Sci Sports* 2017;**27**:342–50. doi:10.1111/sms.12651
- 5 Domayer SE, Ziebarth K, Chan J, *et al.* Femoroacetabular cam-type impingement: diagnostic sensitivity and specificity of radiographic views compared to radial MRI. *Eur J Radiol* 2011;**80**:805–10. doi:10.1016/j.ejrad.2010.10.016
- 6 Hananouchi T, Yasui Y, Yamamoto K, *et al.* Anterior impingement test for labral lesions has high positive predictive value. *Clin Orthop Relat Res* 2012;**470**:3524–9. doi:10.1007/s11999-012-2450-0
- 7 Sink EL, Gralla J, Ryba A, *et al.* Clinical presentation of femoroacetabular impingement in adolescents. *J Pediatr Orthop* 2008;**28**:806–11. doi:10.1097/BPO.0b013e31818e194f
- 8 Ranawat AS, Gaudiani MA, Slullitel PA, *et al.* Foot Progression Angle Walking Test: A Dynamic Diagnostic Assessment for Femoroacetabular Impingement and Hip Instability. *Orthop J Sports Med* 2017;**5**:2325967116679641. doi:10.1177/2325967116679641
- 9 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* Published Online First: 25 April 2020. doi:10.1007/s00167-020-06005-5
- 10 Owusu-Akyaw KA, Hutyra CA, Evanson RJ, *et al.* Concurrent validity of a patient self-administered examination and a clinical examination for femoroacetabular impingement syndrome. *BMJ Open Sport Exerc Med* 2019;**5**:e000574. doi:10.1136/bmjsem-2019-000574
- 11 Peters CL, Schabel K, Anderson L, *et al.* Open Treatment of Femoroacetabular Impingement is Associated with Clinical Improvement and Low Complication Rate at Short-term Followup. *Clinical Orthopaedics & Related Research* 2010;**468**:504–10. doi:10.1007/s11999-009-1152-8
- 12 Aprato A, Massè A, Faletti C, *et al.* Magnetic resonance arthrography for femoroacetabular impingement surgery: is it reliable? *J Orthopaed Traumatol* 2013;**14**:201–6. doi:10.1007/s10195-013-0227-1
- 13 Barton C, Salineros MJ, Rakhra KS, *et al.* Validity of the Alpha Angle Measurement on Plain Radiographs in the Evaluation of Cam-type Femoroacetabular Impingement. *Clinical Orthopaedics & Related Research* 2011;**469**:464–9. doi:10.1007/s11999-010-1624-x
- 14 Nogier A, Bonin N, May O, *et al.* Descriptive epidemiology of mechanical hip pathology in adults under 50 years of age. Prospective series of 292 cases: Clinical and radiological aspects and physiopathological review. *Orthop Traumatol Surg Res* 2010;**96**:S53-58. doi:10.1016/j.otsr.2010.09.005

- 15 Trindade CAC, Briggs KK, Fagotti L, *et al.* Positive FABER distance test is associated with higher alpha angle in symptomatic patients. *Knee Surg Sports Traumatol Arthrosc* 2019;**27**:3158–61. doi:10.1007/s00167-018-5031-2
- 16 Ayeni O, Chu R, Hetaimish B, *et al.* A painful squat test provides limited diagnostic utility in CAM-type femoroacetabular impingement. *Knee Surg Sports Traumatol Arthrosc* 2014;**22**:806–11. doi:10.1007/s00167-013-2668-8
- 17 Beaulé PE, Zaragoza E, Motamedi K, *et al.* Three-dimensional computed tomography of the hip in the assessment of femoroacetabular impingement. *J Orthop Res* 2005;**23**:1286–92. doi:10.1016/j.orthres.2005.03.011.1100230608
- 18 Keeney JA, Peelle MW, Jackson J, *et al.* Magnetic Resonance Arthrography versus Arthroscopy in the Evaluation of Articular Hip Pathology: *Clinical Orthopaedics and Related Research* 2004;**429**:163–9. doi:10.1097/01.blo.0000150125.34906.7d
- 19 Laude F, Sariali E, Nogier A. Femoroacetabular Impingement Treatment Using Arthroscopy and Anterior Approach. *Clin Orthop Relat Res* 2009;**467**:747–52. doi:10.1007/s11999-008-0656-y
- 20 Leunig M, Werlen S, Ck AU, *et al.* EVALUATION OF THE ACETABULAR LABRUM BY MR ARTHROGRAPHY. *THE JOURNAL OF BONE AND JOINT SURGERY* 1997;**79**:5.
- 21 Troelsen A, Mechlenburg I, Gelineck J, *et al.* What is the role of clinical tests and ultrasound in acetabular labral tear diagnostics? *Acta Orthop* 2009;**80**:314–8. doi:10.3109/17453670902988402
- 22 Wang W, Yue D, Zhang N, *et al.* Clinical diagnosis and arthroscopic treatment of acetabular labral tears: Arthroscopy and acetabular labral tears. *Orthopaedic Surgery* 2011;**3**:28–34. doi:10.1111/j.1757-7861.2010.00121.x
- 23 Chan Y-S, Lien L-C, Hsu H-L, *et al.* Evaluating hip labral tears using magnetic resonance arthrography: a prospective study comparing hip arthroscopy and magnetic resonance arthrography diagnosis. *Arthroscopy* 2005;**21**:1250. doi:10.1016/j.arthro.2005.07.007
- 24 Myrick KM, Nissen CW. THIRD Test: Diagnosing Hip Labral Tears With a New Physical Examination Technique. *The Journal for Nurse Practitioners* 2013;**9**:501–5. doi:10.1016/j.nurpra.2013.06.008
- 25 McCarthy JC, Busconi B. The role of hip arthroscopy in the diagnosis and treatment of hip disease. *Orthopedics* 1995;**18**:753–6.
- 26 Narvani AA, Tsiridis E, Kendall S, *et al.* A preliminary report on prevalence of acetabular labrum tears in sports patients with groin pain. *Knee Surg Sports Traumatol Arthrosc* 2003;**11**:403–8. doi:10.1007/s00167-003-0390-7