

# Atraumatic Hip Instability · Clinical Diagnosis

FAST & FRUGAL TREE · BEIGHTON-SCORE REPLACEMENT · 3-CUE LEXICOGRAPHIC DECISION AID

Adult hip-preservation clinic · Pre-arthroscopy work-up  
Walsh / OrthoScenius · 2026

## DECISION TREE — THREE CUES, FOUR EXITS

### CUE 1 · HIGHEST VALIDITY

≥2 of 3 provocative tests positive?

AB-HEER · Prone instability · HEER (anterior apprehension)

LR+ 15.9 (4.1–62.5) · Spec 95.7% (91.7–99.8) · Karimijashni 2026 Delphi · Level 1b Grade A

▲ YES

▼ NO

**EXIT 1 · INSTABILITY CONFIRMED**  
**Proceed to MR-arthrogram + surgical planning**  
Capsular plication ± labral repair candidate  
Specificity 95.7%; post-test probability >90% at prevalence 50%. Document candidate aetiology (dysplastic vs. iatrogenic vs. connective tissue).  
≥2 of 3 panel: LR+ 15.9 (Karimijashni 2026). All 3 positive → PPV 95% (Wong 2022; Hoppe 2017 EUA reference standard).

### CUE 2 · SINGLE-TEST VALIDITY

AB-HEER alone positive?

Lateral decubitus · Abd 30–45° · Ext + ER · ant force greater troch

LR+ 7.6 (3.3–17.5) · Sens 80.6% · Spec 89.4% · Accuracy 84.4% — highest single-test accuracy

▲ YES

▼ NO

**EXIT 2 · INSTABILITY LIKELY**  
**Confirmatory imaging pathway**  
MRI capsular thickness · FEAR index · IC/RF ratio  
Single high-validity provocative sign in isolation. PPV 90.9%. Avoid premature operative commitment; image first.  
AB-HEER LR+ 7.6 (Karimijashni 2026). FEAR ≥5° = 78% sens / 80% spec for unstable borderline dysplasia. IC/RF >1 → 89% PPV for DDH (AUC 0.78–0.85).

**CUE 3 · PRETEST STRATIFIER**  
Female sex AND borderline dysplasia (LCEA <25°)?

Grade B prognostic risk factors · Karimijashni 2026 Statement 3.1 · prevalence shift, not provocative-test signal

▲ YES

▼ NO

**EXIT 3 · EQUIVOCAL-HIGH**  
**Imaging confirmation**  
FEAR index · capsular thickness · labral height/length  
Phenotype (female + borderline dysplasia) shifts pre-test probability upward; image to confirm before invasive work-up.  
81.8% of divot-positive hips were Beighton ≥4 (Rosinsky 2020) — but female + LCEA <25° captures the phenotype directly without the construct mismatch.

**EXIT 4 · INSTABILITY UNLIKELY**  
**Reassess alternative diagnosis**  
FAI · labral pathology · extra-articular  
Panel-NPV 84% at moderate prevalence. Pursue FADDIR, internal-rotation-over-pressure, scour test; consider intra-articular vs. referred pain workup.  
Negative 3-test panel: NPV 84% (≥1 positive Sens 87.1%; Karimijashni 2026). Low pre-test probability without phenotype amplifier.

## CUE VALIDITY RANKING — QUANTIFIED EFFECT SIZES

| RANK | CUE                                                     | EFFECT SIZE (95% CI)                              | SOURCE · REFERENCE STANDARD                            |
|------|---------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------|
| 1    | <b>CUE 1</b><br>≥2 of 3 provocative tests positive      | LR+ 15.9 (4.1–62.5)<br>Sens 67.7 · Spec 95.7      | Karimijashni CORR 2026 (Hoppe 2017; EUA criterion)     |
| 1a   | <b>CUE 1</b><br>All 3 positive                          | LR+ 14.4 (2.0–104.8)<br>Spec 97.9 · PPV 95%       | Hoppe 2017 (replicated Wong 2022)                      |
| 2    | <b>CUE 2</b><br>AB-HEER test alone                      | LR+ 7.6 (3.3–17.5)<br>Sens 80.6 · Spec 89.4       | Karimijashni 2026 Accuracy 84.4 — best single test     |
| 2a   | <b>CUE 2</b><br>HEER (anterior apprehension)            | LR+ 4.8 (2.4–9.6)<br>Sens 71.0 · Spec 85.1        | Karimijashni 2026                                      |
| 2b   | <b>CUE 2</b><br>Prone instability test                  | LR+ 15.9 (2.2–114.2)<br>Sens 33.9 · Spec 97.9     | Karimijashni 2026 (highest specificity single test)    |
| 3    | <b>CUE 3</b><br>Female sex (atraumatic hip instability) | Grade B prognostic 92.3% of divot-positive cohort | Karimijashni 2026 (Statement 3.1) Rosinsky 2020 (n=13) |
| 3    | <b>CUE 3</b><br>Borderline dysplasia (LCEA <25°)        | Grade B prognostic Mean LCEA 19.2° (divot+)       | Karimijashni 2026 (Statement 3.1) Rosinsky 2020        |
| —    | <b>NOT USED</b><br>Beighton score ≥4                    | No consensus ICC 0.54–0.61 (fair-good)            | Karimijashni 2026 Stmt 1.3 "limited / conflicting"     |

## ERROR COST ASYMMETRY · THRESHOLD RATIONALE

**ALWAYS:** Symptom screen (anterior hip pain on sitting/squatting/sport, popping/clicking, subjective looseness) · Plain AP pelvis + false-profile · Document age, sex, BMI · Record provocative-test position + verbatim response · Shared decision-making documented

WHY THIS REPLACES THE BEIGHTON SCORE

**Construct mismatch:** 7 of 9 Beighton items are upper-extremity/spine — measures systemic collagen tone, not hip capsular insufficiency. **Threshold arbitrariness:** ≥4 cutoff is convention; not evidence-derived for hip instability. **Reliability:** Beighton total-score ICC 0.54–0.61 (fair-to-good only). **2026 consensus:** Beighton placed in Statement 1.3 — "conflicting or lack of evidence for diagnosis of hip instability, utility may be limited" (Karimijashni 2026). The three provocative tests above were the only consensus-recommended physical-exam signs for diagnosis.

MISS (FALSE NEGATIVE)

Missed instability → **Progressive capsulolabral damage**, failed conservative therapy, delayed capsular plication. Late capsulolabral changes are *not fully reversible*.

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FALSE ALARM (FALSE POSITIVE)

Spurious diagnosis → MR-arthrogram (reversible cost), risk of inappropriate plication if work-up is not honoured. Imaging gate reduces the FP→OR cascade.

**Asymmetry Rule:** At Cue 1 — high-specificity gate (95.7%) is the rule-IN; the cost of a false positive is bounded by the imaging step that follows Exit 1 (no patient goes directly to plication on physical exam alone). At Cues 2 and 3 — equivocal stratum; risk-factor stratification (female + LCEA <25°) sharpens pre-test probability without committing to invasive work-up. At Exit 4 — accept false negatives in low pretest-probability cases (no positive provocative test, no phenotype amplifier); the trade-off is reassessment over time, not a missed irreversible event. **The tree is structured so that the asymmetry rule that justified the Beighton score (specificity-only screening) is no longer in force — every cue is hip-specific and has a published LR+.**

THRESHOLD CHOICES · JUSTIFICATION

- Cue 1 = ≥2/3 provocative tests positive (not "all 3"):** LR+ 15.9 vs. 14.4 — comparable diagnostic odds, but Sens 67.7% vs. 30.6% means ≥2/3 retains more true positives at the entry gate. The "all 3 positive" rule is too narrow for a screening cue.
- Cue 2 = AB-HEER alone (not HEER or prone instability):** Accuracy 84.4% — the highest of the three single tests. Sens 80.6% lets it function as a sensitivity-second-tier gate without requiring the patient to reach the high-specificity Cue 1 threshold.
- Cue 3 = LCEA <25° (borderline dysplasia threshold):** Karimijashni 2026 explicitly identifies borderline hip dysplasia (Grade B prognostic) as a risk factor. Mean LCEA in the Rosinsky 2020 divot-positive cohort was 19.2°, with 12/14 hips ≤25°. LCEA <20° (frank dysplasia) is captured by this cutoff and benefits from the same imaging pathway.
- Beighton score is omitted, not modified:** The 2026 Delphi did not place Beighton in the "not recommended" bin (insufficient evidence to negate) but in the "limited / conflicting evidence" bin. The construct (systemic collagen) is incongruent with the target (hip-specific capsular insufficiency); no threshold rescue is plausible.
- Symptoms are the gate, not the cue:** Anterior hip pain on ADL/sitting/squatting/sport, popping/clicking, sensation of looseness reached Grade B consensus but with overlap across FAI and labral pathology; symptoms *activate* the tree rather than serve as cues within it.

**Sources (peer-reviewed):** Karimijashni M, Beaulé PE, Carsen S, et al. *Clin Orthop Relat Res* 2026 (clinical-diagnosis Delphi) · Wagner M, Anderson AE, Parisien A, et al. *Clin Orthop Relat Res* 2026 (biomechanical Delphi) · Hoppe DJ, Truntzer JN, Shapiro LM, Abrams GD, Safran MR. *Orthop J Sports Med* 2017;5:2325967117740121 (EUA reference standard for 3-test panel) · Wong SE, Cogan CJ, Zhang AL. *Curr Rev Musculoskelet Med* 2022;15:38–52 · Rosinsky PJ, Mayo BC, Kyin C, et al. *Orthop J Sports Med*

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2020;8:2325967120917919 (divot sign) · Packer JD et al. *Orthop J Sports Med* 2018 (cliff sign) · Saadat AA et al. *Am J Sports Med* 2019 (Beighton prevalence in hip-arthroscopy populations).