

Integrated Multimodal Diagnostic Strategy for Focal Knee Chondral Lesions: Correlation of Clinical Findings with Ultrasound and MRI-Based ICRS Scores

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Study Aim / Objectives

- To evaluate the diagnostic value of clinical examination in identifying high-grade focal chondral knee lesions

Approach

- Integration of:
 - Clinical tests
 - MSK-US findings
 - MRI-based ICRS grading
- Outcome → Development of an evidence-informed diagnostic algorithm for improved clinical decision-making

MRI remains the gold standard for cartilage assessment

- However:
 - Clinical symptoms are often **nonspecific**
 - Functional scores do **not reflect lesion severity**



Materials and Methods

- This observational cross-sectional study included 57 patients with mechanical knee pain and MRI-confirmed focal chondral lesions, conducted between January 2021 and July 2023 at the Orthopedics and Physiotherapy Departments of the Medlife-Micromedica Clinic, Piatra Neamț.
- Eligible patients were adults presenting with load-related pain, recurrent effusion, and functional limitation, while major confounding pathologies were excluded.
- All patients underwent a standardized clinical, MSK-US, and MRI evaluation, with lesion classification based on the **ICRS grading system**.
- Following diagnostic assessment, all participants received **surgical treatment by mosaicplasty**, and intraoperative arthroscopic findings confirmed the presence and severity of **ICRS Grade 3 and 4 lesions**.

ICRS Grade 3: 50 patients

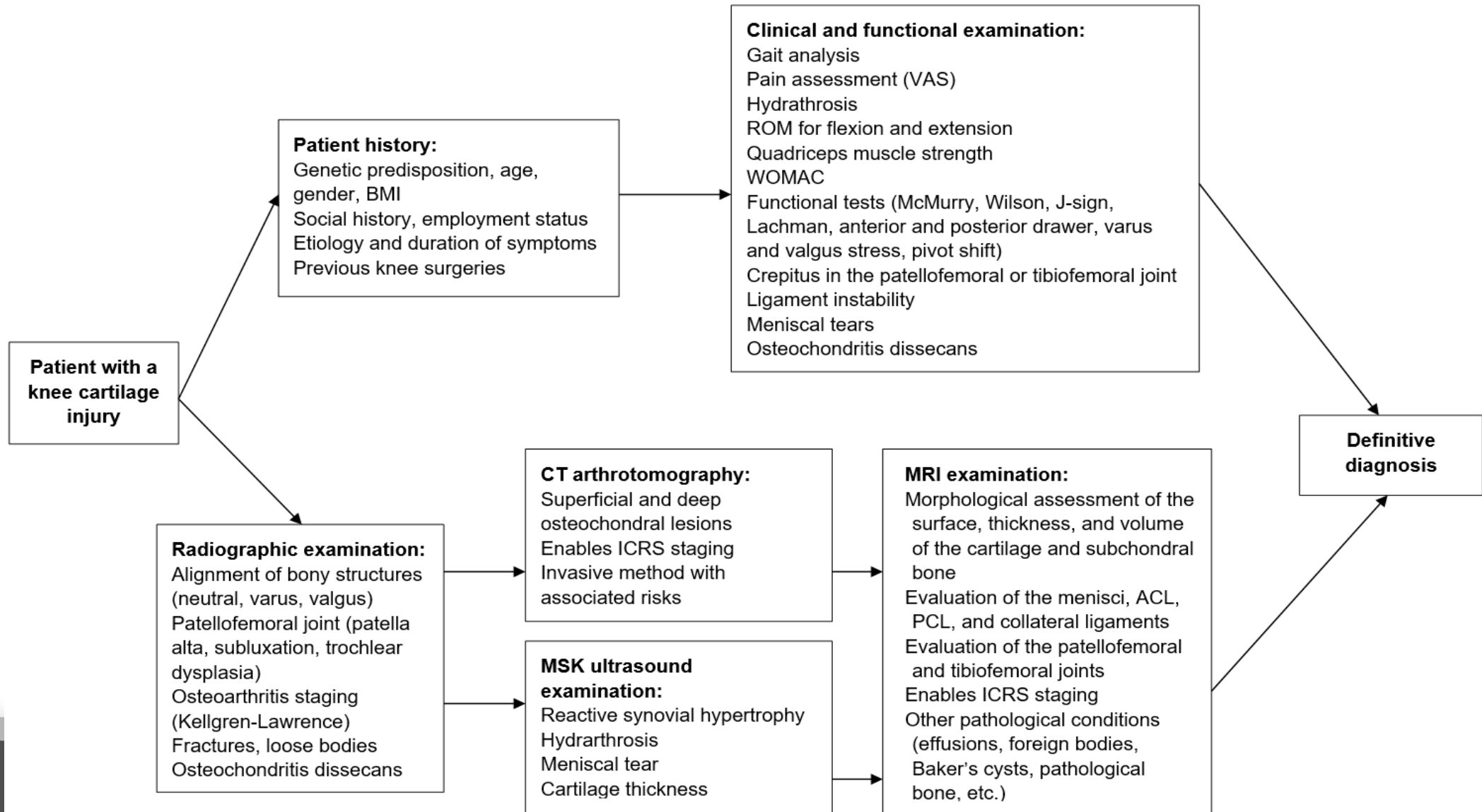
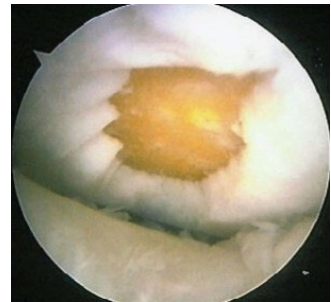
ICRS Grade 4: 7 patients

Clinical Evaluation of Articular Cartilage Lesions

- Clinical evaluation begins with a detailed medical history, including age, BMI, previous treatments, and surgical interventions, followed by assessment of common symptoms such as mechanical pain, joint swelling, limping, and instability. Physical examination focuses on gait, joint effusion, alignment, range of motion, muscle strength, and patellofemoral status.
- However, diagnosis remains challenging due to nonspecific symptoms and overlap with other knee pathologies. Provocative tests such as the **Wilson test** and **McMurray test** may provide additional diagnostic orientation, but their findings should always be interpreted in conjunction with imaging, particularly MRI.



Diagnostic algorithm



Wilson's Test

Clinical Relevance

- Detect osteochondritis dissecans
- Assesses painful osteochondral overload
- Does not differentiate lesion depth
- Provoke pain at the medial femoral condyle
- Low diagnostic specificity and sensitivity

Procedure

- Knee flexed at $\sim 90^\circ$ → gradual extension
- Tibia is **internally rotated**
- Pain that decreases with **external rotation** = **positive test**



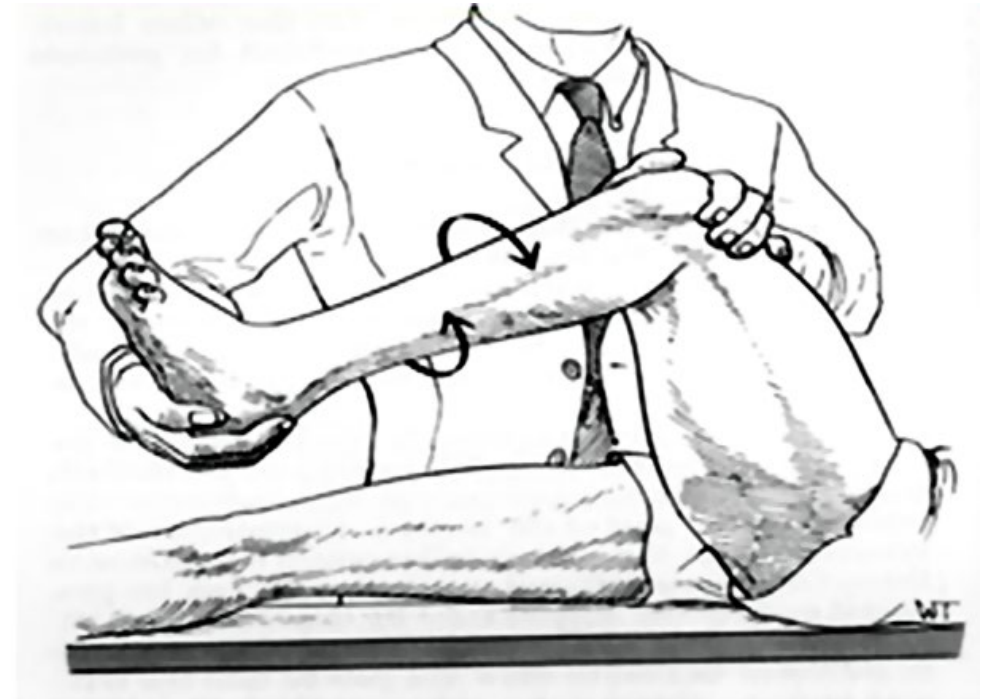
McMurray's Test

Clinical Relevance

- Used to identify **associated meniscal pathology**
- Interpreted as an indirect marker of lesion complexity

Procedure

- Patient in **supine position**, knee fully flexed
- Examiner applies **rotation of the tibia** (internal/external)
- Combined with **valgus or varus stress** during knee extension
- **Pain, clicking, or locking** = positive test



Results

- A total of **57 patients** were included, of which **50 (87.7%)** were classified as **ICRS Grade 3** and **7 (12.3%)** as **ICRS Grade 4** lesions based on MRI and intraoperative findings.
- All patients presented with **mechanical knee pain and recurrent joint effusion**, confirming their high sensitivity but limited specificity for lesion severity.
- Distinct patterns emerged in clinical testing. **Wilson's test** showed high sensitivity, being positive in **66% of ICRS 3** and **100% of ICRS 4** cases, without significant association with lesion severity.
- In contrast, **McMurray's test** demonstrated discriminative value, being positive in **30% of ICRS 3** and **86% of ICRS 4** lesions. It was the only test significantly associated with lesion grade ($\chi^2 = 4.29$, $p = 0.038$; $OR = 0.20$, $95\% CI: 0.05-0.79$).
- MRI findings revealed a higher prevalence of **meniscal pathology in ICRS Grade 4 lesions (86%) compared to Grade 3 (30%)**, supporting the role of McMurray's test as a marker of lesion complexity rather than cartilage depth.

Clinical Implications & Final Message

Clinical Impact

- Enables better patient stratification
- Supports more efficient MRI indication
- Allows earlier therapeutic decisions

Differentiates between:

- **Isolated chondral lesions (ICRS 3)**
- **Complex osteochondral–meniscal lesions (ICRS 4)**

Our Key Findings

- Clinical symptoms and functional scores are **not reliable indicators** of lesion severity
- **Wilson's test** → sensitive for overload, **not for lesion depth**
- **McMurray's test** → reflects **meniscal involvement and lesion complexity**

Take-Home Message

- A structured clinical assessment can: provide early diagnostic orientation, suggest lesion severity, and identify associated meniscal pathology
- Clinical examination is **not a replacement for MRI**, but a **powerful triage and decision-support tool**

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A Multimodal Diagnostic Algorithm for Focal Knee Chondral Defects: Correlating Clinical Tests, Musculoskeletal Ultrasound, and MRI-Based ICRS Grading

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