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# **Clinimetrics of Ultrasound Pathologies in Osteoarthritis:**

## **Systematic Literature Review and Meta-analysis**

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## **Abstract**

**Objective:** The aims of this study were to systematically review clinimetrics of commonly assessed ultrasound pathologies in knee, hip and hand osteoarthritis (OA), and to conduct a meta-analysis for each clinimetric.

**Methods:** MEDLINE, EMBASE, and Cochrane Library databases were searched from their inception to September 2016. According to the OMERACT Instrument Selection Algorithm, data extraction focused on ultrasound technical features and performance metrics.

Methodological quality was assessed with modified 19-item Downs and Black score and 11-item Quality Appraisal of Diagnostic Reliability (QAREL) score. Separate meta-analyses were performed for clinimetrics: 1)inter-rater/intra-rater reliability; 2)construct validity; 3)criteria validity; and 4)internal/external responsiveness. SPSS, Excel and Comprehensive Meta-analysis were used.

**Result:** Our search identified 1126 records; of these, 100 were eligible, including a total of 8542 patients and 32373 joints. The average Downs and Black score was 13.01, and average QAREL was 5.93. The stratified meta-analysis was performed only for knee OA, which

demonstrated moderate to substantial reliability [minimum kappa>0.44(0.15,0.74), minimum ICC>0.82(0.73-0.89)], weak construct validity against pain(r=0.12 to 0.27), function(r=0.15 to 0.23), and blood biomarkers(r=0.01 to 0.21), but weak to strong correlation with plain radiography(r=0.13 to 0.60), strong association with MRI [minimum r=0.60(0.52,0.67)] and strong discrimination against symptomatic patients(OR=3.08 to 7.46). There was strong criterion validity against cartilage histology [r=0.66(-0.05,0.93), and small to moderate internal(SMD=0.20 to 0.58) and external(r=0.35 to 0.43) responsiveness to interventions.

**Conclusion:** Ultrasound demonstrated strong criterion validity with cartilage histology, poor to strong correlation with patient findings and MRI, moderate reliability, and low responsiveness to interventions.

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