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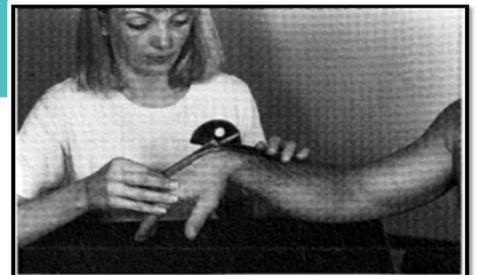
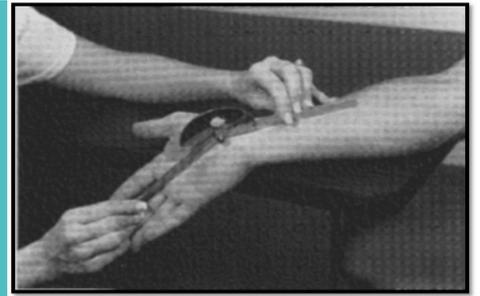


Inter-rater Reliability: Wrist Goniometer Placement

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Case: A 26-year-old female client sustained a right distal radius fracture due to a fall on an outstretched hand (FOOSH) while riding her bike with her dog two weeks ago. She had an open reduction internal fixation (ORIF) and now has limited range of motion (ROM) in both her right wrist and hand. ROM measurements were completed in order to accurately determine her progress in therapy. Correct goniometer placement is of great importance when making clinical decisions and when looking at overall therapy outcomes.



This critically appraised topic (CAT) examines the inter-rater reliability of various placements for wrist goniometry measurement, as well as, determines which is the most effective for measuring wrist range of motion (ROM).

1 Ask: Research Question

What is best? Inter-rater reliability with wrist goniometer measurement for radial placement vs. ulnar placement vs volar/dorsal?

2a Acquire: Search Terms

Patient/Client group: Any population with limited wrist ROM due to injury, disease, or congenital conditions

Intervention: Wrist goniometer placement/measurement

Comparison: Volar/dorsal vs. radial vs. ulnar placement

Outcome: Effective reading techniques and inter-rater reliability for volar/dorsal placement measuring wrist flexion and extension

2b Acquire: Selected Articles

LaStayo, P.C., & Wheeler, D.L. (1994): Level III evidence, repeated measures design, quasi-experimental . This study examined the inter-rater reliability of volar/dorsal vs. ulnar and radial alignment technique.

Carter, T.I, Pansy B, et al. (2009): Level III evidence, well designed trials, quasi-experimental. Cadaver upper extremities (UE) were used to evaluate both the reliability and accuracy of wrist flexion and extension measurements using three manual goniometric techniques (ulnar, radial, dorsal/volar).

3a Appraise: Study Quality

LaStayo, P.C., & Wheeler, D.L. (1994): Preponderant: Large population size with N=141. Sample assumed heterogeneity, which generalizes to broad range of patients and therapists. Biases were minimized by blinding the tester. Specific diagnostic criteria was not accounted for and could provide specific techniques for measurement in future studies.

Carter, T.I, Pansy B, et al. (2009): Suggestive: The sample size was N=10 (cadaver subjects). Limited external validity due to non-living subjects. Study showed good inter-rater reliability.

3b Appraise: Study Results

The findings from our research and these studies suggest the best approach to measure passive range of motion (PROM) is the volar/dorsal technique. This technique showed the highest inter-rater and intra-rater reliability. The generalizability theory accounts for standard errors, such as testing conditions (time of day, positioning of subject, and poor visualization of boney landmarks). Furthermore, the second study showed similar reliability results using the volar/dorsal technique with cadaveric wrists, rather than live human subjects.

4 Apply: Conclusions for Practice

Based on the evidence/findings, research supports the continued use of goniometry in clinical settings. The most reliable method to measure wrist flexion and extension is the volar/dorsal technique. The three techniques for goniometric measurement should not be used interchangeably due to inconsistent results. Dorsal/volar showed the most reliable results for both within and between testers for measurements of passive wrist flexion/extension. Having high ROM measurement reliability is useful because it can determine the success/failure of a given treatment. Limitations of these studies include: fatigue and order effect. Future research needs to measure reliability and validity for AROM wrist measurements and with a current study completed specifically for the occupational therapy profession.

References:

1. Carter, T, I., Pansy B. et. al (2009) Accuracy and Reliability of three different techniques for manual goniometry for wrist motion: A Cadaveric Study. *Journal of Hand Surgery vol. 34A*. DOI: 10.1016/j.jhsa.2009.06.002
2. LaStayo, P.C., & Wheeler, D.L (1994). Reliability of Passive Wrist Flexion and Extension Goniometric Measurements: A Multicenter Study. *Journal of Physical Therapy, 74(2), 162-174*. Retrieved June 1, 2016, from <http://ptjournal.apta.org/content/ptjournal/7412/162.full.pdf>

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