



JHT READ FOR CREDIT ARTICLE #379.

Practice Forum

A new method for measuring forearm rotation using a modified finger goniometer



Mike Szekeres OT Reg (Ont), PhD (c), CHT^{a,c,*}, Joy C. MacDermid PT, PhD^{a,b,c}, Joanne Rooney PT^c

^a Health and Rehabilitation Sciences, Western University, London, Ontario, Canada

^b School of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada

^c The Roth McFarlane Hand and Upper Limb Centre, London, Ontario, Canada

In this manuscript, the authors describe the challenges with measuring forearm range of motion, and propose a new method for obtaining this measurement. Pros, cons, and future research directions are discussed.
—VICTORIA PRIGANC, PhD, OTR, CHT, CLT, Practice Forum Editor

Introduction

Two general types of forearm motion goniometry have been reported using a standard goniometer. The first approach measures a combination of forearm and inter-carpal rotation with a modified handheld goniometer and plumb line, or by measuring a patient while holding a pencil during forearm motion.^{1,2} This approach is sometimes considered functional rotation since it is measuring the hand's position in space. The second type involves measurement of isolated forearm rotation, where measurement occurs directly at the distal radio-ulnar joint and does not include intercarpal and metacarpal motion occurring within the hand. This method of measurement is currently supported by the American Society of Hand Therapists, and several standard range of motion (ROM) textbooks.^{3–5} Both approaches have been shown to have acceptable measurement properties.

One conceptual problem with measuring isolated forearm motion is that the current technique involves placing a flat goniometer arm onto the round surface of the distal forearm (Fig. 1). Placement of the goniometer is along the flexion/extension creases of the wrist just distal to the ulnar styloid, and the point of contact along the wrist is “eyeballed” to be the centre of the wrist. The assessor must also visually estimate perpendicular for the stationary arm, or align the stationary arm with the humerus. Inter-rater reliability may be limited as assessors may estimate the placement of the goniometer arms differently depending on their experience, posture, and even their positioning relative to the patient.

The modified finger goniometer

The purpose of this article is to introduce another potential measuring technique for isolated forearm rotation. The tool used for measurement, a modified finger goniometer (MFG), is easily created in the clinic using a finger goniometer, fishing line, and a small weight (Fig. 2). The fishing line is simply taped to the small arm of the goniometer. The tape does not affect the goniometer reading as this arm does not touch the patient and is only used for determining vertical position. The amount of weight attached to the fishing line should be sufficient to allow free motion of the small arm of the goniometer when rotated. This design offers several potential advantages to the standard goniometer currently used to measure isolated forearm rotation. The plumb line eliminates the need to estimate vertical position of one of the goniometer arms. The flat surface of the finger goniometer allows the assessor to hold the measurement tool in place over bony landmarks while measuring forearm rotation to avoid estimating a contact point with the wrist.

Measurement technique

The patient is in a seated position with the elbow on their hip to maintain the upper arm in a vertical position, and any upper body motion is discouraged. The flat portion of the finger goniometer is placed across the dorsal bony landmarks of the wrist (Lister's tubercle of the radius and the ulnar head). The protractor portion of the goniometer is placed toward the ulnar side of the wrist. Slight pressure is placed on the goniometer between the two bony landmarks by the assessor to hold the goniometer in a fixed

* Corresponding author.
E-mail address: mike.szekeres@gmail.com (M. Szekeres).



Fig. 1. Placing a straight edge on the rounded surface of the distal forearm. The forearm remains in the same position, but a difference of up to 20° is possible depending on angle of placement.

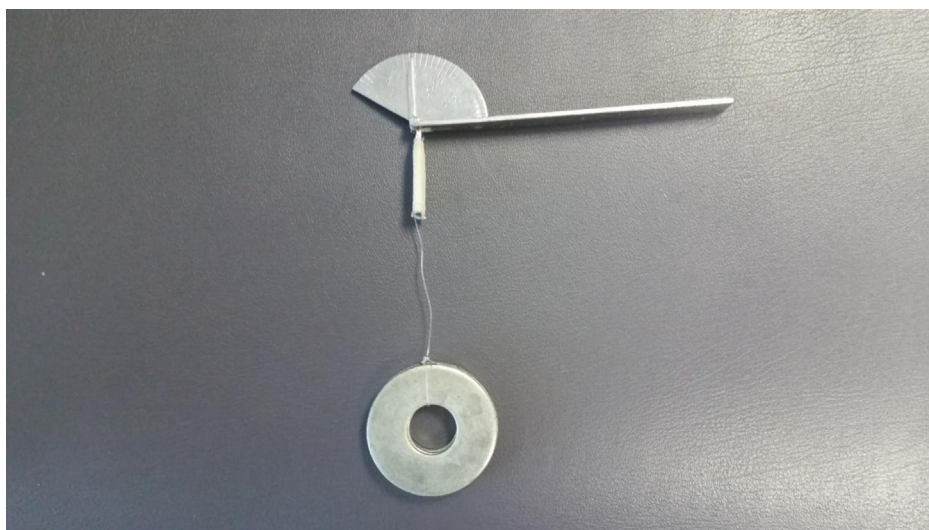


Fig. 2. A modified finger goniometer (MFG), with a weight attached to the moveable arm.



Fig. 3. The modified finger goniometer technique for measuring pronation and supination. The assessor maintains pressure to align the goniometer across Lister's tubercle and the ulnar head. The goniometer is simply flipped over for measurement of supination.

position. The goniometer is flipped over to allow the plumb line to measure perpendicular depending on whether pronation or supination is being measured (Fig. 3).

Summary

There is some debate about what type of forearm measurement is most clinically useful. A handheld method assesses the ability to rotate the hand in space while a forearm based measurement focuses on distal radio-ulnar joint motions. It is

possible that both approaches have value for different clinical purposes. This article outlines a method of measuring isolated forearm rotation with a tool that is simple to create in the clinic. The technique offers some potential advantages and helps eliminate the conceptual problem of placing a flat edge along a curved surface. The presence of a plumb line, and the use of bony landmarks for goniometer placement, may also present advantages for improving accuracy and decreasing measurement error. Future study is needed to determine the intra-rater and inter-rater reliability of this technique.

Download English Version:

<https://daneshyari.com/en/article/2691930>

Download Persian Version:

<https://daneshyari.com/article/2691930>

[Daneshyari.com](https://daneshyari.com)