

An Assessment of 2 Objective Measurements of Web Space Position

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Purpose To describe 2 simple objective clinical methods of measuring the web position between fingers and to determine their intra-observer and inter-observer reliabilities.

Methods Two observers examined the second, third, and fourth web spaces on both hands of 30 adult healthy volunteers. The web index measured the web height as a relative ratio to constant anatomical landmarks on both fingers subtending the web. The dorsal web index took reference from the distance between the metacarpophalangeal and proximal interphalangeal joints, whereas the palmar web index was measured in relation to the distance between the most proximal basal digital and proximal interphalangeal joint creases. The intraclass correlation coefficient was used to determine intra-observer and inter-observer reliability.

Results Intraclass correlation coefficient values for intra-observer and inter-observer reliability were greater than 0.80, indicating excellent agreement. There was no statistically significant difference between the dorsal or palmar measurement methods in terms of reliability.

Conclusions The dorsal or palmar measurement method may be reliably used in healthy adults to establish a web index that describes the web position. The palmar method is considered easier to perform. (*J Hand Surg Am.* 2015;40(3):456–461. Copyright © 2015 by the American Society for Surgery of the Hand. All rights reserved.)

Type of study/level of evidence Diagnostic III.

Key words Web position, syndactyly, web creep.

SYNDACTYLY RESULTS FROM a failure of developmental separation of adjacent digital rays and is classified as a malformation of the hand plate in the extended version of the Oberg, Manske, and Tonkin classification.¹

Web creep is a common complication after surgical release of syndactyly and many authors have used its

incidence to compare different surgical techniques. Clinical and radiological methods have been deployed to measure change in the position of the web, which can then be used to quantify the severity of web creep. Some techniques describe measurements of web positions with the fingers in abduction.^{2–5} However, the extent to which the web is abducted and maintained during measurement is poorly described. Variations in the angle of abduction will affect the web position and produce varied results. Dorsal measurement techniques usually require determination of the levels of the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints and assessment of a web point, which may be difficult to determine in some hands. Palmar measurements usually demand a consistent estimation of palmar creases.^{2,3} Radiological methods require exposure to radiation and incur financial costs.^{4,5} Many methods have not undergone rigorous assessment to determine their reliability and reproducibility.^{6–8}

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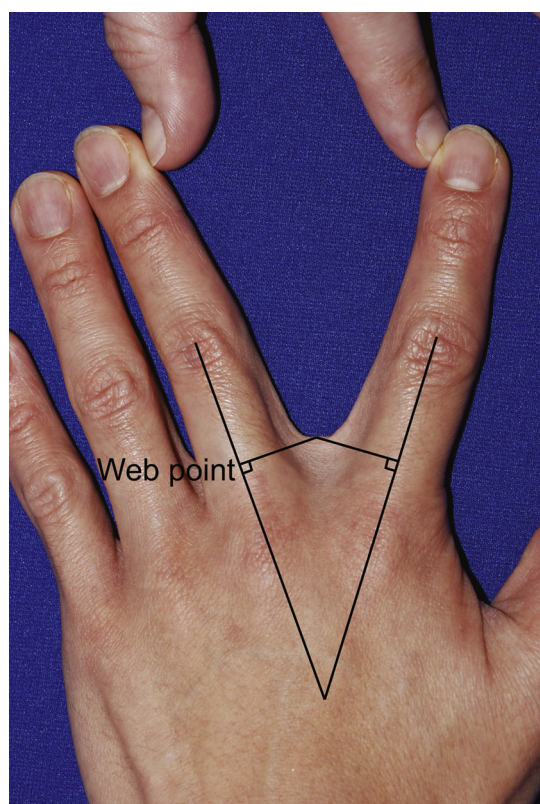


FIGURE 1: Dorsal method. The examiner places the fingers in maximum passive abduction without force. A perpendicular line is drawn from the midpoint of the web to meet the finger axis at the web point.

This article details 2 simple, objective, clinical methods of measuring the normal web position and demonstrates their intra-observer and inter-observer reliabilities.

MATERIALS AND METHODS

We undertook the assessment in adults because the process of obtaining permission to examine minors and the logistics of performing multiple assessments in an appropriate number of children were difficult to satisfy. Ethics approval was obtained from the hospital's human research ethics committee.

We used 2 methods: dorsal and palmar.

Dorsal measurement technique

The hand was placed with the palm on a flat, firm surface. The web being measured was placed by the examiner in maximal passive abduction without force, with all other fingers relaxed and maintained in this position with the assistance of the subject's opposite hand. The axes of the fingers subtending the web were then drawn. These lines connected the midpoints of the MCP and PIP joints of these fingers (Fig. 1). The

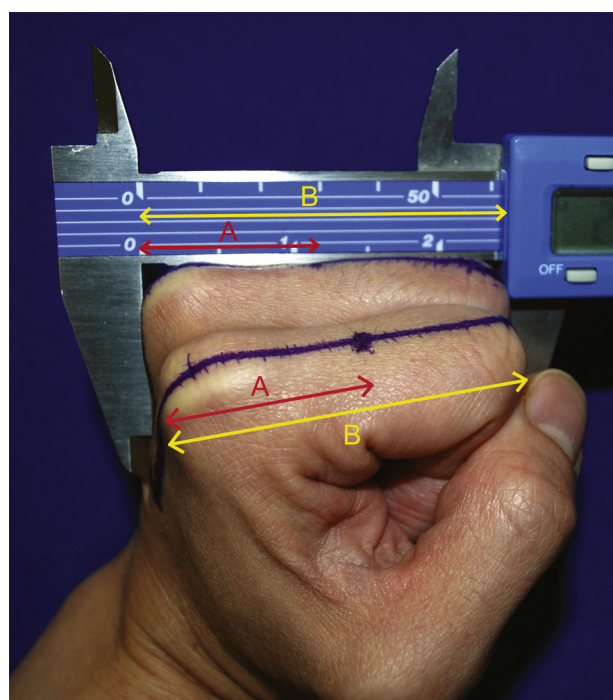


FIGURE 2: Dorsal method. A represents the distance between the MCP joint and the web point. B represents the distance between the MCP and PIP joints.

abduction angle was documented. We marked the midpoint of the web and drew perpendicular lines from the midpoint of the web to the axial line of each finger. The point at which the lines intersected was termed the web point. The MCP and PIP joints were flexed passively to 90° each, allowing a vernier caliper to be applied squarely on the dorsum of the proximal phalanx (Fig. 2). We measured the distances between the MCP joint and the web point (A) and between the MCP and PIP joints (B) to the nearest millimeter.

We calculated the web index as the mean of the ratios (A / B) of each of the 2 adjacent fingers. For example, the dorsal web index for the second web = $0.5 (A / B \text{ of index finger} + A / B \text{ of middle finger})$. If web creep developed, the web index was expected to be higher than the baseline measurement and closer to a ratio of one as the web extended toward the PIP joint. If the web extended distal to the PIP joint, distance A had to be measured with the PIP joint extended and the web index became greater than one.

Palmar measurement technique

The hand was placed with the dorsum on a flat, firm surface. The web being measured was fully and passively abducted by the examiner as for the dorsal method without force. All other fingers were relaxed. We drew axial lines on the palmar aspect of the fingers subtending the web (Fig. 3). We documented the

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