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Editorial

Toward a unified methodological standard for measuring handgrip strength in schoolchildren: Grip width standardization

Handgrip strength is a useful biomarker of overall muscular strength, with easy-to-measure, relatively accurate assessments across the lifespan,[1] and has been used in a variety of educational and clinical settings for diverse purposes. However, standard methodological conditions remain undefined.[2] For example, handgrip strength is typically measured with a hand dynamometer, though there are two main types (i.e., Jamar and Smedley). The Jamar is a variable-hand-span dynamometer that allows adjustment of the handle across five different positions. Most research articles provide little to no information about the grip width (also called grip span; the distance between the two grip bars) used as a measurement condition.[3] Changing the handle position by one step changes the grip width by 1.3 cm. Several studies examining the impact of changing grip width on maximum handgrip strength have reported an optimal width at which maximum strength occurs, and that handgrip strength is lower when the width is narrower or broader than the optimal width.[4,5] Therefore, during the growth period, as height and limb length increase, hand size also changes, making it important to adjust the grip width to ensure it is appropriate.

Historically, in Japan, the Smedley-type dynamometer has been used, and its distinguishing feature is its freely adjustable grip width. Device manufacturers provide manuals that specify recommended grip widths, and measurements are generally taken according to those specifications. The recommended condition is to "adjust the grip width so that when holding the device, the second joint of the index finger forms a 90-degree angle." Although many public and private organizations, including the Japanese government, recommend that measurements be taken under these conditions,[6] not all handgrip strength measurements are conducted under them. In particular, handgrip strength, a physical fitness test item used in educational settings, requires measuring a relatively large number of people in a short time and, in some cases, relies on children or adolescents to measure it themselves, meaning it is not conducted under sufficient supervision. Although the optimal grip width is essential for accurately measuring each individual's maximum handgrip strength, it has received little attention in practical settings. Furthermore, the condition "gripping so that the second joint of the index finger is at a 90-degree angle" may not always be clear for children, adolescents, or even some adults who are asked to assess strength themselves. As a result, it remains unclear whether everyone understands the optimal grip width. Therefore, it would be useful to have a simple scale to standardize grip width during measurement.

Grip width can be adjusted to fit hand size, and a relevant scale is hand length,[7] defined as the linear distance from the distal wrist crease to the tip of the middle finger. When the grip width is set to a percentage of hand length, many individuals reach their maximum at 30% of hand length, in both children[4] and adults (unpublished observation). In handgrip strength tests for children[8] and adults[9], a simple scale, such as the one shown in the supplementary figure, can be used to determine grip width. This simplified scale for standardizing grip width has attracted interest among educators and clinical professionals, and we have been asked to make it widely available. We hope that standardizing grip width in handgrip strength measurement will advance in the future.

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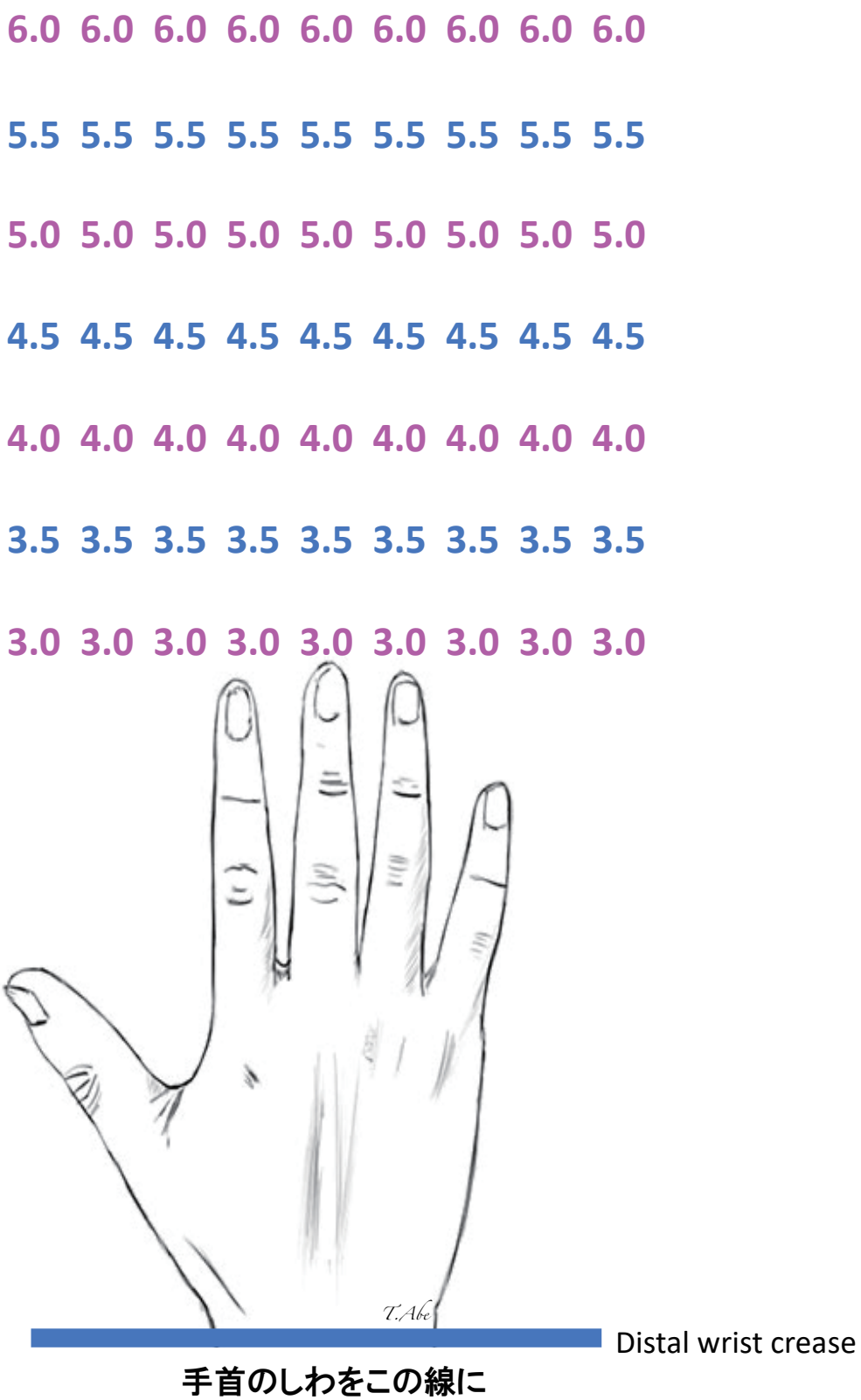

Supplementary Figure: Simple Scale to determine the grip width