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Measuring Somatosensation across the Lifespan: Development of Somatosensory Measures for the NIH Neurological and Behavioral Toolbox

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Introduction

Sensation is important for interacting with our environment and for function. Review of current measures indicates that relatively few meet the criteria of quantitative, brief and easy to administer, and able to detect change over the life span. These are the criteria set by the NIH Toolbox for developing measures to assess neurological and behavioral function across the lifespan for the general population.

Objectives

To identify which clinical and quantitative measures of somatosensation meet the NIH Toolbox criteria.

Methods

We implemented 2 studies. In the first study, we examined clinical measures of somatosensation to determine which methods would reveal differences in the general population across the lifespan. We examined touch detection and discrimination, temperature, proprioception, stereognosis and pain. We tested 120 people during tryouts.

In the second study, we investigated the capacity of brief versions of valid quantitative measures of texture discrimination, proprioception and stereognosis to differentiate sensory abilities across age groups at a comparable level to longer versions. We tested 38 children, adults and stroke survivors with these procedures.

We used descriptive, correlational and comparative analyses.

Results

In the first study, we found that some methods were not sensitive enough for the general population. For example, discriminative low cost temperature testing was not possible. Two-point discrimination was challenging for novices to administer properly. Asking where people had pain was ambiguous and clear patterns did not emerge. We found form perception, kinesthesia and single point perception to be useful.

In the second study, we found that brief versions of the Tactile Discrimination Test, Wrist Position Sense Test and functional Tactual Object Recognition Test can differentiate sensory performance across ages and detect impairment. The Manual Form Perception Test and PROMIS short form have potential.

Conclusion

The findings revealed that there are brief methods to quantify somatosensory testing that is sensitive for use in the general population over the life span.

Contribution to practice/ evidence base of OT

With quantitative somatosensory data from sensitive measures that are valid across the life span, OTs will have additional tools for testing and interpreting performance against known standards.