Revisiting the Assessment of Volume of Action for Wheelchair Basketball Classification

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Summary

We assessed the suitability of the seated multidirectional reach test (SMRT) as a wheelchair basketball (WCBB) classification tool to describe volume of action. Eleven athletes performed the SMRT and a 2-handed forward reach. Vertical and forward reaches aligned better than lateral reaches with classification level and lower-classified athletes had greater differences in 1-handed reach. Our findings suggest SMRT may be a suitable WCBB classification tool.

Introduction

Competitive parasports require consistent and accurate classification processes to create an even playing field where athletes do not gain advantage purely due to a less-involved medical condition. Although the SMRT has been used in other sports as part of classification, it is currently not used in WCBB [1,2]. This assessment, originally developed to evaluate trunk control in persons with spinal cord injury, measures a person's maximum reach in different planes, creating a volume of action [3,4]. In this study, we assess the suitability of SMRT as a WCBB classification tool to distinguish between athletes' capacity for trunk control.

Methods

Eleven competitive WCBB athletes previously classified by the International Wheelchair Basketball Federation and with varying medical diagnoses participated in the study [1]. Participants performed a SMRT in their competition chair by reaching as far as possible in the vertical, forward, left, and right directions using one hand. Participants then performed a maximal forward reach using both hands. Movements were recorded, with the end of the third fingertip digitized using Kinovea (http:/www.kinovea.org). Reach distance was then calculated as the change in position of this point from a standardized starting posture. Distances in each direction were then compared to classification level to identify trends.

Results and Discussion

Vertical and Forward reach distances tended to better align with classification level than the lateral directions (i.e., greater variability in Left and Right directions; Fig. 1A). These results demonstrate how anthropometric differences, which influence lateral reach more than vertical and forward reaches, may not be fully accounted for when assessing trunk control using SMRT and volume of action. For example, during side leans two athletes with identical trunk control (i.e., same maximum achievable trunk angle) may have different shoulder (and consequently arm) excursions solely due to differences in trunk height. These results indicate the need to revisit the ability of SMRT to distinguish between athletes' capacity for trunk control, especially across different diagnoses such as those encountered in WCBB.

Currently, a 2-handed forward reach is used exclusively in classification. However, athletes with lower classifications (<3.0) in this study tended to have larger 1-handed than 2-handed reaches, presumably due to their ability to use the contralateral arm to improve trunk stability though shoulder extensors rather than trunk extensors (Fig. 1B). These results suggest that the inclusion of a 1-handed reach could provide additional, contextually relevant insight into trunk control (e.g., grabbing the ball with one hand).

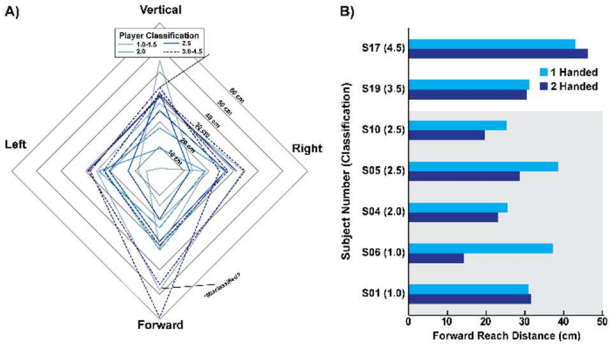

Figure 1: A) SMRT distances in all 4 directions. B) Comparison between 1-handed and 2-handed forward reach tasks.

Conclusions

Our pilot SMRT data highlights some concepts to consider when using it as a tool for WCBB classification: (1) the potential impact of anthropometric differences on reach distances, particularly in lateral directions, and (2) the potential use of 1-handed reach tests as a complementary measure of trunk control to provide contextually relevant insights into athletes' functional capabilities.

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References

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