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INTRODUCTION

Motor milestones and clinical tests provide insight into whether a child is developing typically, helping reduce long-term effects of an underlying motor disability by enabling early detection and intervention. Conversely, they can help deter unnecessary intervention. Predictive validity is a valuable psychometric property to help determine how well a clinical test can predict future functional capacity. The Movement Assessment of Children (MAC) was developed to find a uniform approach to the evaluation of pediatric patients referred for potential motor delay, however, its predictive validity is yet to be determined. One way to test the predictive validity is to compare it to an established, validated test such as the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2). Research has found that motor proficiency is associated with increased activity levels in children and that earlier infant motor development may be associated with increased physical fitness in adolescents and adults.[1-6] Presumably, an infant who displays more advanced motor abilities would have more skills to build from and likely remain ahead of his/her counterpart.

Purpose: To determine the MAC's predictive validity by re-analyzing the motor development in 8 children, 5.5 years after assessment with the MAC, using the BOT-2.

Hypothesis: We hypothesized that the subject's MAC scores at 12 months of age would be predictive of the same individual's BOT-2 scores 5 and a half years later.

METHODS

Eight typically developing children aged 6.5 +/- 2 weeks were included in this study.

Inclusion and Exclusion criteria: All subjects participated in a previous research study in 2010.[7]
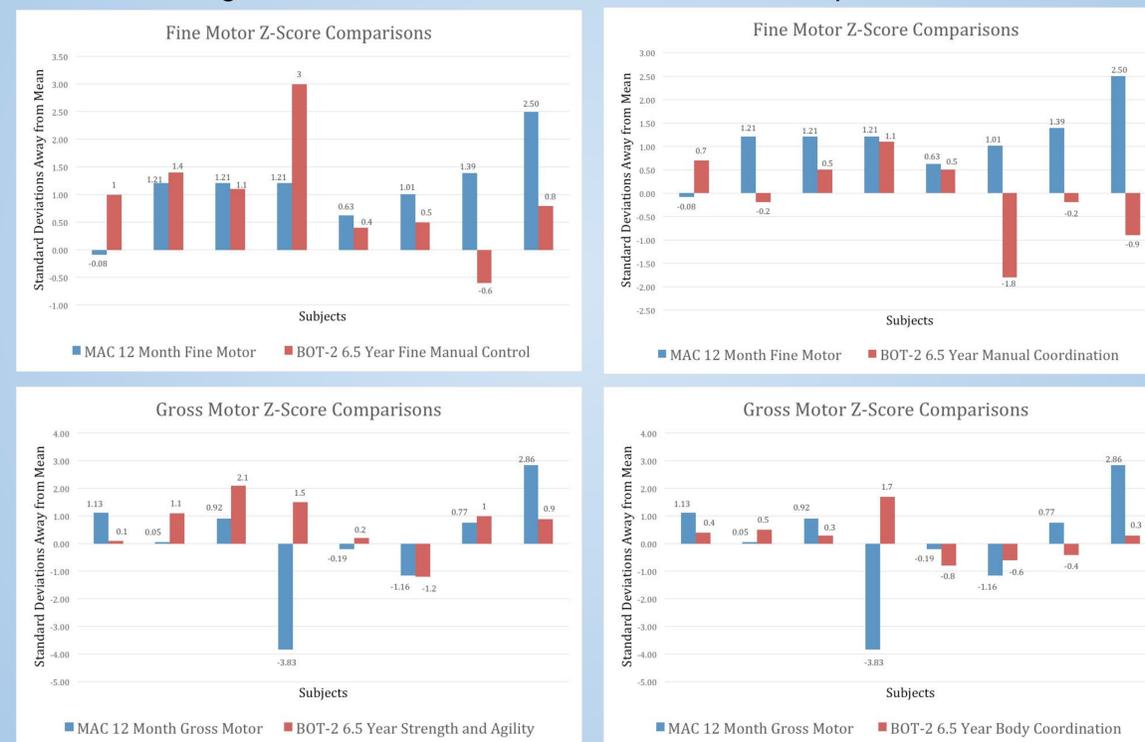
Outcome measures: Bruininks-Oseretsky Test of Motor Proficiency (BOT-2)

Procedure: Each child completed the BOT-2 in a single 60-90 minute session, administered by two of the four co-investigators. After completion of the test, the co-investigators scored each test, then scoring was reviewed by the remaining two co-investigators. After each section was scored, z-scores were calculated for participants scores in both the MAC at age 12 months and the BOT-2 at age 6.5. A Spearman correlation was then performed to compare the data.

Figures 1-2: Examples of BOT-2 fine and gross motor skill subtests

Figure 3-6: Fine and Gross Motor Z-Score Comparisons

RESULTS

A Spearman rank correlation was performed to compare the MAC Fine and Gross Motor scores to the respective BOT-2 categories. Unfortunately, no significant correlations exist between any of the pairs of z-scores with Spearman rho's all much less than 1.0. This indicates that, similar to other existing tests of motor development, the MAC is unable to predict motor function at an approximately 5 year follow up. It is possible the MAC may successfully predict motor development on a shorter timeline (<5 years), but more research is necessary.

DISCUSSION

Contrary to our hypothesis, there is no correlation between motor performance at age 12 months and at 6 and a half years. By age 6.5, all of the participant's BOT-2 scores were within two standard deviations of the mean, regardless of their MAC score at age 12 months. The results of this study underscore the importance of neuroplasticity in typically developing children. All of the participants demonstrated good quality and variability of movement at age 1, which allowed them to explore their environment, experiment with new motor patterns, and correct the motor deficits that were identified by the MAC. It is important to note that our study was conducted on typically developing children, and more research is necessary to determine the MAC's long-term predictive validity for children who are not developing typically.

CONCLUSION

Based on the limited results of this study, we can conclude that the MAC is unable to predict motor function in typically developing children at a 5 and a half year follow up. It is possible the MAC may successfully predict motor development on a shorter timeline (<5 years) or in non-typically developing children, but more research is necessary.

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