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The effectiveness of assisted standing in improving bone mineral density in children with cerebral palsy, GMFCS III-V: A systematic review and meta-analysis

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INTRODUCTION:

This meta-analysis aimed to determine the effectiveness of assisted standing in improving bone mineral density (BMD) in children aged 18 years old and below with cerebral palsy (CP), Gross Motor Function Classification System (GMFCS) III-V.

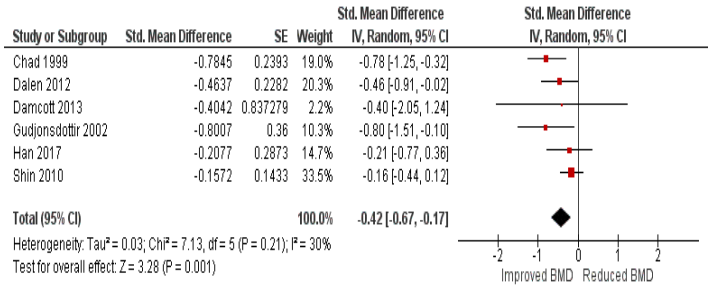
METHODS:

PubMed, Scopus, Cochrane, and Web of Science (WOS) were searched for randomised controlled trials and longitudinal studies assessing (1) Children aged 18 years old with a diagnosis of cerebral palsy GMFCS III-V; (2) assisted standing as intervention; and (3) measures differences in BMD. Two independent researchers screened articles for inclusion, extracted data, and evaluated the methodological quality of the studies. Findings were summarised, and a meta-analysis was conducted.

RESULTS:

Ten studies met the inclusion criteria. Pooled analysis showed that assisted standing positively affects the BMD of both the spine (SMD -0.91, 95% CI -1.21 to -0.61; studies = 7) and the femur (SMD -0.38, 95% CI -0.70 to -0.07; studies = 6). A greater effect size is seen in more severe GFMCS. There is no difference between static and dynamic stander (SMD 0.38, 95% CI -0.12 to 0.88; studies = 3). In addition, standing at a minimum of 120 minutes per week is needed to reproduce a significant increase in BMD.

Figure 1: Meta-analysis for the effectiveness of SS in femur.



CONCLUSION:

Assisted standing is effective in improving BMD. A minimum of two hours is required for successful intervention. However, the dose-effect response is still unknown and requires further exploration.

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