A Multi-center Pilot and Feasibility Study of Low Magnitude Mechanical Stimuli to Improve Bone Mass in Children and Adolescents with Cerebral Palsy

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Synopsis:
Bone accrual during childhood is a critical determinant of life-long skeletal health. Children with cerebral palsy (CP) have markedly reduced bone mass and significantly increased risk of fractures. The bone deficits are largely a consequence of decreased mobility and weight-bearing activity. Mechanical forces on the skeleton arise from muscle contraction and these forces generate signals that promote bone formation. The capacity of bone to respond to mechanical loading with increased bone strength is greatest during growth. Animal and human studies have demonstrated that daily exposure to 10-20 minutes of low magnitude mechanical stimuli (LMMS) enhanced bone quantity and quality, with no adverse effects. One of the co-investigators (Leonard) is currently conducting an NIH-funded LMMS trial in children with Crohn’s disease, with excellent enrollment and adherence. However, the feasibility of administering this therapy in children with physical and cognitive disabilities has not been established. This study will determine the feasibility of administering the LMMS intervention in the home and in a school setting in children with CP and will investigate strategies to promote adherence with the intervention. These data in 25 children will support a subsequent NIH grant application to conduct a randomized placebo-controlled multicenter trial of LMMS in CP.