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An assessment of bamboo as a potential low-cost material for exoskeleton design in normal walking

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In spite of the great progress made in the design and implementation of exoskeleton-type walking assistive devices, there is room for further improvement, especially if the cost of these exoskeletons is to be reduced. Some of the methods that can be explored include finding alternative materials and/or addressing the issue of design. Considering that bonesetters have utilized bamboos in developing world for splinting fractures as a means of immobilization. In this study, a detailed analysis of the properties of bamboo was carried out which revealed that the material is lightweight, has good flexibility and high strength. These are requisite properties of the structural components of the exoskeleton-type walking assistive devices. Property comparison with the currently known low-cost duralumin material used in exoskeleton revealed that bamboo compares favorably well. A correlation between kinematics and kinetics of human walking as well as bamboo property is presented. An evaluation of lower extremity loading and energy expenditure was analyzed to further investigate the relationship between exoskeleton design, lower-limb loading capacity and energy expenditure encountered during dynamic ambulation.

Biography

Kischa S Reed is an Assistant Professor in the Division of Physical Therapy since 2012. She graduated with a BS degree in Physical Therapy at FAMU in 1998. She earned her Doctorate in 2011 from Utica College, NY. Prior to joining the Faculty, she held a variety of clinical and administrative positions. She served as a Leading Rehabilitation Consultant to many industry leaders in television and music. Her background is in the areas of manual therapy and spine rehabilitation. She is a Member of the Florida Physical Therapy Association's (FPTA) and serves as a Florida Assembly representative.

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