

令和元年11月15日現在

機関番号：34504

研究種目：基盤研究(C) (一般)

研究期間：2016～2018

課題番号：16K01580

研究課題名(和文) 筋肉の協同発揮に基づく起立能力モデルと介入最小原理による能動的起立支援

研究課題名(英文) Encouraging standing assistance with human model on muscle cooperation and minimum assistance algorithm

研究代表者

中後 大輔 (Chugo, Daisuke)

関西学院大学・理工学部・准教授

研究者番号：90401322

交付決定額(研究期間全体)：(直接経費) 3,600,000円

研究成果の概要(和文)：本研究は、高齢者の能動的起立支援のため、身体能力と規範起立動作の関係性で定義される起立能力モデルの設計論を確立することと、これを用いた介入最小原理による起立支援法を見出すことを目的とする。起立動作は異なる性質を持つ複数の動作より成り、個々人の身体能力によってその組み合わせが決定されると言う現象を表現する起立能力モデルを新たに提唱した。さらに本モデルに対して、高齢者個々人の筋力駆動特性を与え、身体能力に応じた起立が可能となる規範起立動作パターンを設計した。さらに高齢者の自発的な起立動作を最小限の支援力介入にて実現する介入最小原理を体系化し、開発中の起立支援装置実装し、能動的起立支援法を実現した。

研究成果の学術的意義や社会的意義

本研究の学術的な成果は、人間機械のフィードバック系における多自由度制御問題を、身体力学的・神経生理学的な見地から取り扱えるようにして、それを用いて個々人に適した支援方策を導く手法を体系化した一例となることであると考えられる。

本研究の社会的な意義は、専ら専門家の経験則に依っていた起立動作の支援策を、個々人の体型・身体能力に応じてテーラーメイドに、かつ定量的・客観的に設計できるという点において、意義が有ると考える。

研究成果の概要(英文)：This study aims to develop a standing human model based on the relationship between remaining physical strength and suitable standing way, and to realize an encouraging standing assistance scheme using minimum assistance force. A standing human model consists of remaining physical strength and suitable moving way according to it. Our proposed robot inputs this model to individual physical parameter and derives suitable standing way individually. Furthermore, our robot estimates the safety margin and capacity of physical strength of the patient and realizes standing assistance with minimum assistance force.

研究分野：福祉工学

キーワード：起立支援

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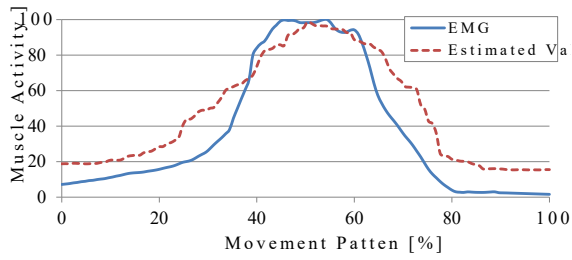
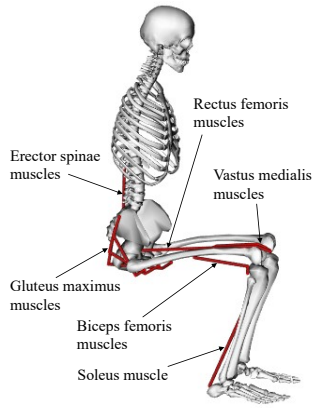
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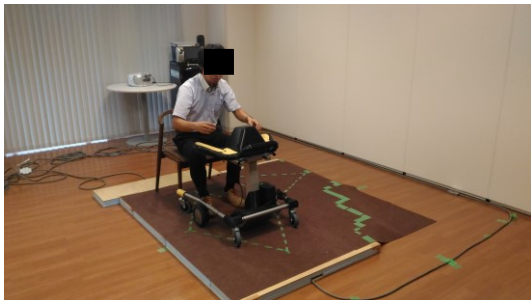
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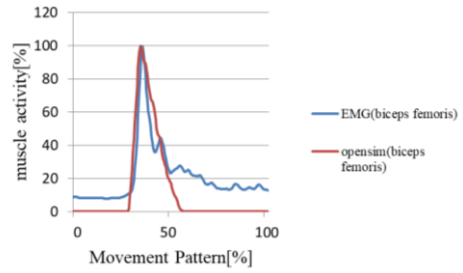
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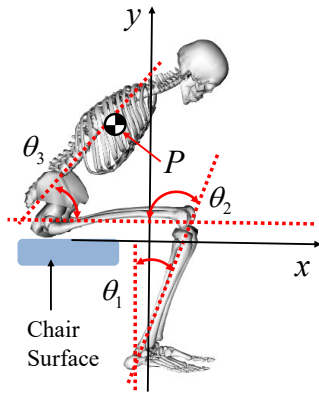
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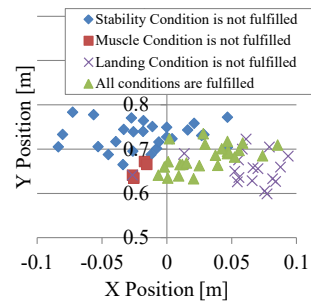
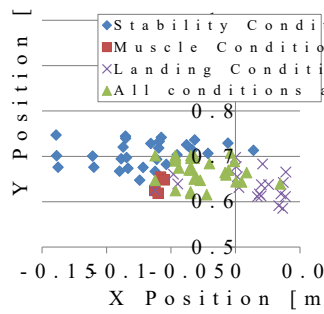
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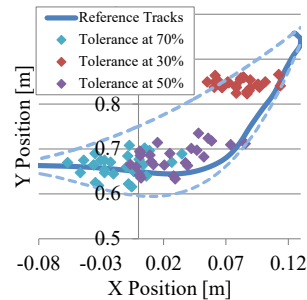
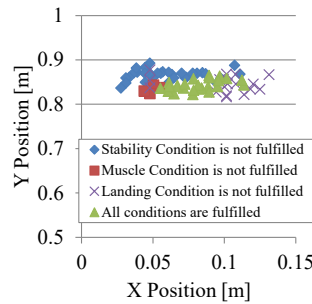


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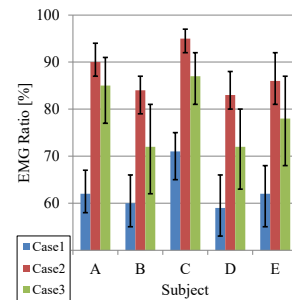
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