

applied on upper limbs, and style of walking. However, there was a huge gap between the performance of paraplegic and normal subjects walking with the new orthosis.

**Conclusion:** The higher stiffness of the MTK-RGO improves the performance of subjects while walking. In addition, changing the alignment of the orthosis is another advantage of the new design.

**Keywords:** Reciprocal gait orthosis, Walking, Energy consumption, Spinal cord injury, Gait

## Walking Performance of Subjects with Spinal Cord Injury Using the New MTK Reciprocal Gait Orthosis

Amir Esrafilian MSc<sup>۱</sup>, Mohammad Taghi Karimi PhD<sup>۲</sup>, Pouya Amiri MSc<sup>۱</sup>,

Mohammad Jafar Sadigh PhD<sup>1</sup>

### Abstract

**Background:** Spinal cord injury (SCI) influences the ability of the subjects to stand and walk. Various types of orthoses have been designed to solve the problems of these subjects during standing and walking. However, patients experience different problems in terms of high energy consumption during walking and forces applied on upper limb. A new reciprocal gait orthosis (RGO) was designed to solve the mentioned problems. Therefore, the aim of this study was to evaluate the performance of the new design of orthosis.

**Methods:** This study included 4 paraplegic patients with lesion levels T12 and 4 normal subjects as controls. Walking parameters of the subjects were assessed by a motion pattern analyzer equipped with a force plate. Consumed energy levels with a KAFO orthosis and the new MTK-RGO were evaluated using heart rate measurements. Paired t-test and two-sample t-test were used to compare performance while using the two orthoses and between normal and paralyzed individuals, respectively.

**Findings:** Our findings showed that compared to the available orthoses, MTK-RGO resulted in better performance in terms of energy consumption, force

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<sup>۱</sup>. Department of Mechanical Engineering, School of Mechanical Engineering, Isfahan University of Technology, Isfahan, Iran

<sup>۲</sup>. Musculoskeletal Research Centre, Isfahan University of Medical Sciences, Isfahan, Iran Corresponding Author: Amir Esrafilian MSc, Email: esrafilian@gmail.com