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## Portable haptic device for lower limb amputee gait feedback : Assessing static and dynamic perceptibility (Conference Paper)

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### Abstract

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Loss of joints and severed sensory pathway cause reduced mobility capabilities in lower limb amputees. Although prosthetic devices attempt to restore normal mobility functions, lack of awareness and control of limb placement increase the risk of falling and causing amputee to have high level of visual dependency. Haptic feedback can serve as a cue for gait events during ambulation thus providing sense of awareness of the limb position. This paper presents a wireless wearable skin stretch haptic device to be fitted around the thigh region. The movement profile of the device was characterized and a preliminary work with able-bodied participants and an above-knee amputee to assess the ability of users to perceive the delivered stimuli during static and dynamic mode is reported. Perceptibility was found to be increasing with stretch magnitude. It was observed that a higher magnitude of stretch was needed for the stimuli to be accurately perceived during walking in comparison to static standing, most likely due to the intense movement of the muscle and increased motor skills demand during walking activity. © 2017 IEEE.

### SciVal Topic Prominence ⓘ

Topic: Prosthetics | Sensory feedback | grasping force

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### Indexed keywords

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Engineering uncontrolled terms: [Above knee amputees](#) [Haptic feedbacks](#) [Limb positions](#) [Lower - limb amputees](#) [Mobility capabilities](#) [Mobility functions](#) [Prosthetic devices](#) [Walking activity](#)

Engineering main heading: [Artificial limbs](#)

EMTREE medical terms: [adult](#) [amputee](#) [biomechanics](#) [equipment design](#) [feedback system](#) [functions of the skin and its appendages](#) [gait](#) [human](#) [limb prosthesis](#) [lower limb](#) [male](#) [pathophysiology](#) [physiology](#) [rehabilitation](#) [touch](#) [young adult](#)

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