

Gabel, Charles P, Jason Osborne, and B. Burkett (2015) Abstract

Quadriceps Rehabilitation, Activation And Intensity

Objective

The research aimed to see the influence of 'Slacklining' on quadriceps rehabilitation, activation and intensity, using exercise test trials. The activity of slacklining is defined as "the action of retaining balance while standing or moving on a tightened band".

Results

The main findings of the study demonstrated that slacklining, as an exercise for rehabilitation of the knee in the acute injury phase, enabled a statistically higher level of quadriceps activation to be achieved than traditional open-chain and closed-chain exercises.

This level of activation is achieved by the injured individual at a lower level of perceived effort. Consequently, the activity provides substantially enhanced quadriceps activation with substantially reduced perceived effort.

Previous research has found that closed-chain exercises, such as step-ups and unilateral leg press exercises, had the greatest levels of quadriceps activation and that the straight leg raise had the highest level for open-chain exercises. The use of slacklining provides a composite-chain exercise that appears to garner the optimal aspects of both the open-chain and closed-chain activities.

Participants and Researchers

There were 49 participants, with an age range of 13-72 years (57% female), recruited from a physiotherapy outpatients setting. Inclusion criterion were a knee injury sustained within the preceding two weeks. Exclusion criteria were red flag signs, including fracture and those aged under 13.

The researchers were Charles Gabel and Brendan Burkett, Faculty of Science, Health, Education and Engineering, University of the Sunshine Coast, Queensland, Australia; and Jason Osborne, Educational and Counselling Psychology, University of Louisville, Kentucky, USA.

Methods

Participants were permitted two familiarisation test trials for each exercise and then repeated each exercise three times. The five exercises were performed in the same order by all participants. The median score was recorded from the digital output on a **NeuroTrac Myoplus** (Verity Medical) using skin-mounted **electromyography (EMG) electrodes**.

This system provided both audio and visual biofeedback to the participant and ease of recording of the digital output. Active encouragement from the therapist was not provided during the exercise, only through the initial instructions described and the EMG dual outputs. A one-minute rest was taken between each different exercise. A simple repeated measures analysis of variance (RMANOVA) was performed with each type of activity (inner range quadriceps, straight leg raise, step-up, step-down, and slackline) as the within-subjects variable.

This abstract can be found at <https://doi.org/10.1016/j.jsams.2013.11.007>.