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Effect of Two Types of Squat Exercise in anterior cruciate ligament (ACL) Injured Persons

Submission date
25/08/2015

Recruitment status
No longer recruiting

Registration date
13/09/2015

Overall study status
Completed

Last Edited
14/09/2015

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
One of the most common types of knee injury is an anterior cruciate ligament (ACL) sprain or tear. The ACL is one of the four main ligaments within the knee which connects the thigh bone (femur) to the shin bone (tibia). These injuries often result in loss of size and weakness in the quadriceps muscles (a group of four muscles in the thigh). This problem is not often addressed in current rehabilitation therapy and can put strain on other muscles, which can increase the risk of future injury. Studies have shown that full squats are far better for strengthening the quadriceps than partial squats, which are what is generally used in typical rehabilitation, as the body moves closer to the floor. Additionally, a modified squat in which the un-injured foot is raised may also be beneficial, as it focuses on restoring strength in the injured leg. The aim of this study is to investigate the benefits of full squat exercise in ACL injured people, and to find out if single-foot elevated squat exercises are better than normal squat exercises for their recovery.

Who can participate?
Adults with a one sided non-contact ACL injury that are able to participate in weight-bearing exercise.

What does the study involve?
Participants are randomly allocated into one of two exercise programs. Those in group 1 perform normal squat exercises for 10 weeks. Those in group 2 perform single-foot elevated squat exercises, where the un-injured leg is placed on a raised (elevated) surface. Single-foot elevated squats are a type of squat which focuses on building strength and improving the range of movement in one leg (in this case, the injured leg). The strength of knee extension, as well as the movements of the hip, knee and ankle are measured during sit-to-stand and vertical jump before and after the study.

What are the possible benefits and risks of participating?
Participants will benefit from restored muscle strength from the therapy, which is important for return to activity following an ACL injury. There are no anticipated risks of participating in the study.

Where is the study run from?
University of Alberta (Canada)

When is the study starting and how long is it expected to run for?
September 2015 to August 2016

Who is funding the study?
National Strength and Conditioning Association (Canada)

Who is the main contact?
1. Miss Liane Jean (Scientific)
2. Dr Loren Chiu (Public)

Contact information

Type(s)
Scientific

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Additional identifiers

Study information

Scientific Title
Comparison of Normal and Single-Foot Elevated Full Squats in ACL Injured Persons

Study objectives
This research will compare the effectiveness of normal and single-foot elevated squat exercise to restore quadriceps strength and function in the involved limb of anterior cruciate ligament

(ACL) injured persons prior to surgery. It is hypothesized that single-foot elevated squats will be more effective for restoring quadriceps strength and function versus normal squats.

Ethics approval required
Old ethics approval format

Ethics approval(s)
University of Alberta Research Ethics Board 2, 11/09/2015, ref: Pro00058914

Primary study design
Interventional

Study design
Single-centre rnadomised parallel trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Non-contact anterior cruciate ligament rupture

Interventions
This trial will recruit up to 40 individuals with non-contact ACL injury. Participants will be randomly assigned to one of two exercise groups. Both groups will perform identical 10 week exercise programs, with the exception of type of squat exercise. One group will perform normal squat exercise while the second group will perform single-foot elevated squats.

Intervention Type
Other

Primary outcome(s)
1. Isometric knee extension strength will be measured using an isometric strength testing dynamometer before and after 10 week exercise program
2. Hip, knee and ankle net joint moments during sit-to-stand. Sit-to-Stand biomechanics will be measured using 3D motion analysis and force platforms, before and after 10 week exercise program

Key secondary outcome(s)
Hip, knee and ankle net joint moments during vertical jump and land. Vertical jumping and landing biomechanics will be measured using 3D motion analysis and force platforms, after 10 week exercise program.

Completion date
31/08/2016

Eligibility

Key inclusion criteria

1. Aged between 16 and 40 years
2. Unilateral, non-contact ACL injury
3. Clearance from surgeon and/or physiotherapist to participate in weight-bearing exercise

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Sex
All

Key exclusion criteria
1. Have had ACL reconstruction
2. Bilateral ACL injury
3. Symptomatic meniscal injury that prevents full knee flexion/extension range of motion

Date of first enrolment
07/09/2015

Date of final enrolment
31/05/2016

Locations

Countries of recruitment
Canada

Study participating centre
University of Alberta
75 Van Vilet Centre
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Sponsor information

Organisation
University of Alberta - Faculty of Physical Education and Recreation

ROR
https://ror.org/0160cpw27

Funder(s)

Funder type
Charity

Funder Name
National Strength and Conditioning Association

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration