Effect of neurocognitive load during hop tests on jump distance, muscle activity and joint angles in patients with anterior cruciate ligament (ACL) reconstruction versus healthy individuals

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To investigate the hypothesis that both patients with an ACLr and individuals without a knee injury show a significantly reduced jump distance during hoptests with a neurocognitive load compared to traditional hop tests.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Tendon, ligament and cartilage disorders
Study type	Interventional

Summary

ID

NL-OMON52024

Source
ToetsingOnline

Brief title
Neurocognitive load during hop tests

Condition

- Tendon, ligament and cartilage disorders

Synonym
tear of the anterior cruciate ligament; anterior cruciate ligament rupture

Research involving
Human

Sponsors and support

Primary sponsor: Ziekenhuisgroep Twente
Source(s) of monetary or material Support: Eigen financiering door OCON

Intervention

Keyword: Anterior cruciate ligament reconstruction, Hop tests, Neurocognition, Return to sports

Outcome measures

Primary outcome

The primary outcome is the difference in jump distance between a traditional hoptest and the hoptests with added neurocognitive load in 1) patients after ACLr and 2) individuals without knee injury. The jump distance between the traditional jump test, the first neurocognitive jump test and the second neurocognitive jump test is compared.

Secondary outcome

The first secundary outcome is the left-right difference in traditional jump tests and the left-right difference in jump tests with added neurcognitive load. Other secondary outcomes consist of parameters derived from muscle activity and joint angles, measured with EMG and 3D motion sensors, respectively.

Study description

Background summary

An anterior cruciate ligament reconstruction (ACLr) is the gold standard for restoring knee stability in young athletic patients. After a ACLr, more than 90% of amateur athletes expect to be able to return to the preoperative sports level. Unfortunately, only 55% of patients achieve this goal. In addition, it is worrying that 23-33% of the athletes under the age of 25 develop a new ACL rupture in the same or the other knee. Most of these new injuries occur within

two years after return to sports, half of them in the first 6 months after return to sport. This implies that there may be a mismatch between completing rehabilitation and resuming sport. Hoptests are often used to determine whether patients can return to sports. However, these hoptests may not be specific enough to determine if an athlete is ready to return to his/her sport. In this study, hoptests with a neurocognitive load are evaluated. In this way, the sport-specific tasks may be better represented. The jumps are performed instrumented, so that the quality of movement can be evaluated. The results of this study provide more information about which tests provide more insight into whether a patient is ready to return to sport. With this insight, rehabilitation can be better adapted to the needs of the patient in the future, so that the number of re-ruptures and / or the number of patients who do not return to their old sports level can hopefully be reduced.

Study objective

To investigate the hypothesis that both patients with an ACLr and individuals without a knee injury show a significantly reduced jump distance during hoptests with a neurocognitive load compared to traditional hop tests.

Study design

This study is a two-arm cross-sectional patient control study consisting of 30 patients with an ACL rupture and 30 individuals without a knee injury.

Intervention

Participants are asked to walk a distance of 15 meters and perform three different hoptests while wearing motionsensors and EMG sensors. During the first hoptest, the participant may decide when he/she will jump. During the second hoptest, the participant must jump as soon as a light is turned on. During the third and final hoptest, it depends on the color of the light whether the participant is allowed to jump. In each hoptest, three good jumps must be performed with the right leg and three with the left leg.

Study burden and risks

Participation in this study takes approximately 60-90 minutes. This is considered to be a small additional burden, especially given the fact that the study is linked to an existing appointment whenever possible, or can be planned at a time that suits the individual without a knee injury. The hoptests with neurocognitive load will be slightly more difficult than the traditional hoptests. Jumping with the injured leg may cause some discomfort. There is a small risk that the participant will drop through the knee when landing after the jump. However, no cases have been reported in scientific literature. Participation in this study does not entail more risks than participation in a

training, competition or physiotherapy treatment. For the participants without a knee injury, these are daily movements that they will also make in their sport and therefore this test does not involve any additional risks.

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Inclusion criteria

To participate in this study, a participant of the ACLr group must meet the following criteria:
- At the time of inclusion, an age between 18 and 30 years old
- Primary ACLr, as evidenced by history and physical examination and additional examination (MRI);
- Physiotherapy during rehabilitation after ACLr;
- Between 6-24 months after ACLr.

To participate in this study, a participant in the control group must meet the following criteria:
- At the time of inclusion, an age of 18 to 30 years;
- No knee injury that affects knee instability, such as ACL rupture;
- No lower extremity injury in the 6 months prior to study entry, resulting in more than 2 weeks of inability to exercise;
- No motor impairment at the time of the measurement.

Exclusion criteria

A potential participant who meets any of the following criteria will be excluded from this study:
- Color blindness
- Visual impairment;
- Neurological disabilities.

A potential participant of the ACLr group who meets one of the following criteria will be excluded from participation in this study:
- Complications during rehabilitation (re-rupture, additional knee damage and/or no functional recovery after 6 months);
- Bilateral ACL rupture and/or revision ACLr;
- Multiligamentary knee injury;
- Swelling of the knee, defined as stroke > 2;
- Degenerative changes in the knee joint;
- Surgical procedures or injuries of the contralateral leg.

Study design

Design

Study type:	Interventional
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Prevention

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	21-09-2021
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO Date:	04-08-2021
Application type:	First submission
Review commission:	MEC-U: Medical Research Ethics Committees United (Nieuwegein)
Approved WMO Date:	31-08-2021
Application type:	Amendment
Review commission:	MEC-U: Medical Research Ethics Committees United (Nieuwegein)
Approved WMO Date:	01-09-2022
Application type:	Amendment
Review commission:	MEC-U: Medical Research Ethics Committees United (Nieuwegein)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL77864.100.21