

# The effectiveness of Nordic Hamstring Exercise for preventing hamstring re-injuries

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This study aims to investigate (1) the effectiveness of Nordic Hamstring Exercise for preventing hamstring re-injuries (2) the effectiveness of Nordic Hamstring Exercise for enhancing performance following Return to Play after hamstring injury.

|                              |                 |
|------------------------------|-----------------|
| <b>Ethical review</b>        | Approved WMO    |
| <b>Status</b>                | Pending         |
| <b>Health condition type</b> | Other condition |
| <b>Study type</b>            | Interventional  |

## Summary

### ID

NL-OMON55306

### Source

ToetsingOnline

### Brief title

Study on Hamstring Reinjury Prevention (SHARP)

### Condition

- Other condition
- Muscle disorders

### Synonym

hamstring rupture, hamstring strain

### Health condition

Research is being conducted to prevention of muscle (hamstring) re-injury

### Research involving

Human

## Sponsors and support

**Primary sponsor:** Academisch Medisch Centrum

**Source(s) of monetary or material Support:** Indonesia Endowment Fund for Education (LPDP)

## Intervention

**Keyword:** Hamstring, Nordic Hamstring Exercise, prevention, Re-injury

## Outcome measures

### Primary outcome

The primary outcome is the hamstring re-injury rate within two months (early recurrence) and one-year follow-up (late recurrence).

The one-year follow-up of the hamstring re-injury incidence will be recorded using weekly questionnaire (in the first 10 weeks) and continue in 6th, 9th and 12th months of follow-up. Subjects will be contacted via email or phone if they miss/forget to fill out the questionnaire during the follow-up period.

### Secondary outcome

Secondary outcome measures include (1) the effect of Nordic Hamstring Exercise on performance parameters, namely : sprint 10-meter and vertical jump (2) the adherence rate of the program and (3) the implementation of a self-initiated injury prevention program in the control group.

## Study description

### Background summary

Hamstring muscles are the most common anatomical site affected by injury in sports, especially in high intensity and explosive sports i.e., athletics, American football, rugby and football. Hamstring muscles have a high incidence of re-injury Most re-injury occurred soon after Return to Play (RTP). A study

from Orchard et al (2020) showed that hamstring had the highest risk of re-injury in the first match after RTP.<sup>22</sup> The hamstring re-injury risk in the first week was 9 % and the injury remained at elevated risk for 15 weeks. A study from Brooks et al (2006) also showed that more than half (59%) of hamstring re-injury occurred within 1 month after RTP. Hamstring re-injury are generally more severe compare to the initial injury (mean days lost : 25 vs 14 days).

Nordic hamstring exercise (NHE) program is an eccentric strengthening program designed to prevent primary hamstring injury. A recent meta-analysis showed that injury prevention programs that included the NHE could decrease the risk of primary hamstring injuries by up to 51 % in football players. Not only in football, but the evidence also suggests that NHE in isolation or as part of the injury prevention program is effective for preventing hamstring injury across multiple sports.

Although NHE is effective as primary hamstring injury prevention program, there is still no high-quality study on hamstring re-injury prevention. Existing data on re-injury risk reduction is limited to the study by Peterson. They showed that a high dose NHE exercise program in pre-season followed by a once-weekly low dose maintenance program during in-season effectively reduces the re-injury rate by approximately 85% in football players that had sustained a previous hamstring injury in the 12 months preceding the study. Although this indicates that the NHE intervention is effective in reducing re-injury risk in the subsequent season, the results cannot be generalized to a NHE intervention following RTP after hamstring injury. Performing NHE directly following RTP after a hamstring injury, the most vulnerable period for re-injuries is different from the primarily pre-season program studied by Peterson et al.

Moreover, a NHE intervention after RTP is generally performed during in-season period. Therefore, it remains unknown whether the NHE intervention directly following RTP after hamstring injury can protect athletes for re-injuries.

Besides injury prevention aspect, evaluating NHE's effect on performance is very important in this study. We need to know whether NHE may improve or reduce performance. Enhancement of performance may help the adherence of the program, but if the study shows the opposite result (reduce performance), the coach and athletes can outweigh prevention vs. performance in their decision to use it or not.

In summary, NHE exercises have proven to be effective as primary hamstring injury prevention program. The evaluation of starting NHE directly after RTP with the aim to prevent re- injuries (secondary prevention) has never been done. In this study, we will primarily investigate the effectiveness of NHE as a re-injury prevention program following RTP after hamstring injury. In a sub-study we will evaluate the effect of NHE on physical performance enhancement following RTP.

## **Study objective**

This study aims to investigate (1) the effectiveness of Nordic Hamstring Exercise for preventing hamstring re-injuries (2) the effectiveness of Nordic

Hamstring Exercise for enhancing performance following Return to Play after hamstring injury.

## **Study design**

Monocenter, Randomized Controlled Trial (RCT) study in athletes at RTP following hamstring injury. Randomization will be performed to determine subjects who selected as the experiment (Nordics) and control (Control) group.

## **Intervention**

In this study, the subjects will be randomized to the Nordics group and Control group. Participants in Nordics group perform the Nordic Hamstring Exercise Program in addition to the normal routine training. The participants in Control group will NOT carry out the program, but only their routine training.

The Nordics group perform 27 sessions of the hamstring exercise in a 10-week. After 10 weeks, the exercise will conduct once a week until the end of the 12 months (52 weeks) follow-up. A total of intervention is 69 session.

The Nordic Hamstring Exercise:

Alternative 1 (with partner) : The subjects start in a kneeling position, with his/her torso from the knees upward held rigid and straight. A partner applies pressure to the athlete\*s heels/lower legs to ensure that the feet stay in contact with the ground throughout the movement. The subjects then attempt to resist a forward-falling motion using his hamstring muscles to maximize loading in the eccentric phase. The subjects are asked to break the forward fall for as long as possible using the hamstrings. The subjects are asked to use their arms and hands to buffer the fall, let the chest touch the surface, and immediately get back to the starting position by pushing with their hands to minimize loading in the concentric phase.

Alternative 2 (without partner):

The subjects are asked to hook the feet underneath the bottom of fixed equipment (cable pull-down machine, a nautilus machine, or anything else that has an opening a few inches off the ground). Remember to put something soft under their knee. The subjects then attempt to resist a forward-falling motion using his hamstring muscles to maximize loading in the eccentric phase. Break the forward fall for as long as possible using the hamstrings. The subjects are asked to use their arms and hands to buffer the fall, let the chest touch the surface, and immediately get back to the starting position by pushing with their hands to minimize loading in the concentric phase

## **Study burden and risks**

Based on the current literature, there is no increased injury risk associated

with the study's prescribed exercises. In the initial stage, mild muscle soreness may occur due to the high eccentric training load. This study's benefit is that the participants can be involved in the hamstring muscles' re-injury prevention program. The previous study showed that the intervention (Nordic Hamstring Exercise) proved as primary injury prevention to prevent acute hamstring injury.

## Contacts

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### Scientific

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## Trial sites

### Listed location countries

Netherlands

## Eligibility criteria

### Age

Adults (18-64 years)

### Inclusion criteria

- Male and Female football players
- Age 18-40 years old
- Fully recovered from hamstring injury (within 1 week)

## Exclusion criteria

Refusal to participate in this study

## Study design

### Design

|                     |                             |
|---------------------|-----------------------------|
| Study type:         | Interventional              |
| Intervention model: | Parallel                    |
| Allocation:         | Randomized controlled trial |
| Masking:            | Open (masking not used)     |

**Primary purpose:** Prevention

### Recruitment

|                           |             |
|---------------------------|-------------|
| NL                        |             |
| Recruitment status:       | Pending     |
| Start date (anticipated): | 01-09-2021  |
| Enrollment:               | 368         |
| Type:                     | Anticipated |

## Ethics review

|                    |                    |
|--------------------|--------------------|
| Approved WMO       |                    |
| Date:              | 04-08-2021         |
| Application type:  | First submission   |
| Review commission: | METC Amsterdam UMC |

## 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

CCMO

### ID

NL74942.018.21