

Effect of preventive exercises on hamstring and calf muscle characteristics

No registrations found.

Ethical review	Positive opinion
Status	Recruiting
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON23246

Source

NTR

Brief title

BAMI

Health condition

Hamstring muscle injuries

Calf muscle injuries

Sponsors and support

Primary sponsor: Amsterdam University Medical Centers (Amsterdam UMC)

Source(s) of monetary or material Support: National Basketball Association (NBA) and General Electronics Healthcare (GE Healthcare)

Intervention

Outcome measures

Primary outcome

The two DT-MRI derived parameters to evaluate muscle characteristics include the pennation angle (PA: the angle of the fascicles relative to the tendon; degrees); fascicle length (FL: the length of the muscle fascicles running between the aponeuroses/tendons; mm) of the Biceps

Femoris, Semitendinosus and Semimembranosus or Gastrocnemius and soleus muscle.

Secondary outcome

Clinical examination will be performed at every visit. Findings will be scored accordingly on a standardized form and include pain on palpation, active and passive range of motion. Hamstring and calf strength will be evaluated with dynamometer.¹⁹⁻²²

- Hamstring strength
- Calf strength
- Playing hours per participant
- MR outcome parameters to assess muscle characteristics
 - o cross-sectional area (CSA; mm²)
 - o muscle thickness (MT; mm)
 - o muscle volume (MV; mm³)
- Injury rate (injury per 1000 playing hours) with injury type and location
 - o Severity defined as time-loss injuries. Time-loss is defined as time (in days) absent from either training or matches.
 - o Patient reported Outcome score: Functional Assessment Scale for Acute Hamstring Injuries.¹⁴
- EMG amplitude and activation patterns of the following muscles:
 - o Hamstrings
 - o Gastrocnemius
 - o Quadriceps
 - o Adductor
 - o Gluteal and trunk muscles
- Spatiotemporal EMG distribution within the hamstring muscle
- Joint kinematics of the:
 - o Ankle

- o Knee
- o Hip
- o Trunk

Study description

Background summary

The current literature on prevention of muscle injuries in basketball is limited and there are no clinical outcome studies in elite female basketball. Previous studies among football players have shown that preventive exercises can be successful in the prevention of muscle injuries. These exercises seem to induce changes in muscle characteristics e.g. lengthening of fascicle length (FL) and alteration of pennation angle (PA), which are measured by ultrasound. There are some concerns about the reliability of ultrasound measurements as it is an investigator-dependent procedure and only allows indirect calculation of FL and PA. With diffusion tensor magnetic resonance imaging (DT-MRI) it is possible to directly assess these muscle characteristics with a high reliability. For this reason two randomized controlled trials will be performed among dutch male and female basketball players. The basketball players will be asked to perform a preventive exercise for 3 months (or no exercise for the control group) whereafter alterations within their hamstring (male) and calf (female) muscle architecture will be assessed through DT-MRI measures. Volunteers will be recruited in the Netherlands.

Study objective

Evaluate the efficacy of exercise prevention programs on hamstring and calf injuries by assessing muscle characteristics using DT-MRI.

Study design

All outcomes will be measured at two timepoints, namely baseline and 3 months follow-up. The outcomes will be measured as described above in primary and secondary outcomes.

Intervention

Participants will be randomized to either i) Nordic exercises (NHE) ii) Diver exercises or iii) no-training specific hamstrings intervention. Duration, sessions per week and sets/repetitions for the hamstring prevention exercises are based on previous reports with a total duration of 3 months. Instruction of the exercises will be given through the caregiver with written and video documentation. These hamstring exercises are well described in the current literature and examples are presented on YouTube (NHE:

https://www.youtube.com/watch?v=qPRZcNx_COA; Diver:

<https://www.youtube.com/watch?v=3JwxQy2OSus>)

For the calf prevention study (CIP) female basketball players will be randomized to i) modified eccentric Alfredson's heel drop exercises; ii) concentric heel drop exercises or iii) no-training specific calf intervention. Basketball players are instructed to perform each repetition in 2 seconds.² Duration, sessions per week and sets/repetitions for calf prevention exercises are based on previous reports with a total duration of 3 months. These calf exercises are well described in the current literature and examples are presented on YouTube (Alfredson's heel drop exercise: <https://www.youtube.com/watch?v=ge3XDjjKofk>)

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Eligibility criteria

Inclusion criteria

- Capable of doing an active exercise program
- Male basketball player (only for the hamstring injury prevention study)
- Both male, and female basketball players (for the calf injury prevention study)
- Age > 16 years old

The hamstring injury prevention study has completed the target size of $n = 72$ (May 2020)

Exclusion criteria

- There are contraindications for the MR: claustrophobia, pregnancy, pacemaker etc.
- Hamstring/calf muscle injuries within the past year

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Single blinded (masking used)
Control:	Placebo

Recruitment

NL	
Recruitment status:	Recruiting
Start date (anticipated):	27-08-2018
Enrollment:	144
Type:	Anticipated

IPD sharing statement

Plan to share IPD: Undecided

Ethics review

Positive opinion	
Date:	13-07-2018
Application type:	First submission

Study registrations

Followed up by the following (possibly more current) registration

ID: 55614

Bron: ToetsingOnline

Titel:

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

No registrations found.

In other registers

Register	ID
NTR-new	NL7248
NTR-old	NTR7455
CCMO	NL63496.018.17
OMON	NL-OMON55614

Study results