

Clinical Trial Protocol

Iranian Registry of Clinical Trials

07 Jul 2026

The effect of plantar flexor muscle fatigue on postural control and muscular activation pattern during external perturbation in healthy students (20-35 Y/O) of Shiraz Rehabilitation School

Protocol summary

Summary

Aim: The purpose of this study is to identify the effect of localized muscle fatigue on postural stability and muscular activation patterns before, during and after sudden hand loading. Study design: Quasi- experimental, subjects randomly will select among students of Shiraz Faculty of Rehabilitation. Method: Fifteen healthy young adults (20-35 years) will recruit to participate in this study. The exclusion criteria are experience of any surgery in the trunk and lower extremity, history of injury or pain to the trunk and lower extremity for at least previous 6 months, musculoskeletal , neurological or other impairments that could affect the postural control. Subjects will sit on the bed and maximum voluntary contractions (MVC) will collect from both plantar flexor muscles. In the next step, we will have 3 experiment consist of: pre-fatigue test, the fatigue protocol and post-fatigue test. In all experiments, subjects will stand on a force platform with feet shoulder width apart and surface electromyographic activities from the following muscles will record: transvers abdominals, semitendinosus, erector spinae and soleus. In the pre and post fatigue situations, the subjects will expose to a rapid loading in to the right palm (25% of body weight) with two expected and unexpected conditions. The fatigue protocol consists of three sets of isometric submaximal plantar flexion to make the subjects fatigued. In this experiment the total time for each subject will be about one hour

General information

Acronym

IRCT registration information

IRCT registration number: **IRCT201109196767N1**

Registration date: **2011-10-12, 1390/07/20**

Registration timing: **prospective**

Last update:

Update count: **0**

Registration date

2011-10-12, 1390/07/20

Registrant information

Name

Samaneh Ebrahimi

Name of organization / entity

Shiraz University of Medical Sciences

Country

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+98 71 3627 1551

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Recruitment status

Recruitment complete

Funding source

Shiraz University of Medical Sciences

Expected recruitment start date

2011-10-22, 1390/07/30

Expected recruitment end date

2011-12-21, 1390/09/30

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

The effect of plantar flexor muscle fatigue on postural control and muscular activation pattern during external perturbation in healthy students (20-35 Y/O) of Shiraz Rehabilitation School

Public title

The effect of ankle muscle fatigue on postural control and muscular activation patterns

Purpose

Prevention

Inclusion/Exclusion criteria

Inclusion criteria: Healthy students aged 20-35 years old
Exclusion criteria: Any deviation in the lower extremities and spine alignment; History of pain and trauma to the lower extremities and trunk in the past six months; Musculoskeletal and neuromuscular disorders; History of diseases that involve vestibular system, eyes, central nervous system and peripheral nervous system; Inner ear disease; History of surgery in the lower extremities and trunk; History of back pain in past 6 months; Doing regular exercise at least 3 times a week for 30-45 minutes

Age

From **20 years** old to **35 years** old

Gender

Both

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **15**

Randomization (investigator's opinion)

N/A

Randomization description

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Single

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Shiraz University of Medical Sciences

Street address

Zand Ave

City

Shiraz

Postal code

Approval date

2010-09-15, 1389/06/24

Ethics committee reference number

CT-90-5682

Health conditions studied

1

Description of health condition studied

Normal subjects

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Bilateral transverse abdominals muscle activation

Timepoint

Before and after expected and unexpected sudden hand loading (before and after plantar flexor muscle fatigue)

Method of measurement

Telemetry EMG (Mega electronics Ltd.Finland)

2

Description

Bilateral semitendinosus muscle activation

Timepoint

Before and after expected and un expected sudden hand loading (before and after plantar muscle fatigue)

Method of measurement

Telemetry EMG (Mega electronics Ltd.Finland)

3

Description

Center of pressure displacement

Timepoint

Before and after expected and unexpected sudden hand loading (before and after plantar flexor muscle fatigue)

Method of measurement

Kistler force plate (9286AA,Sweden)

4

Description

Center of pressure velocity

Timepoint

Before and after expected and unexpected sudden hand loading (before after plantar flexor muscle fatigue)

Method of measurement

Kistler force plate (9286AA,Sweden)

5

Description

Bilateral erector spinae muscle activation

Timepoint

Before and after expected and unexpected sudden hand loading (before and after plantar flexor muscle fatigue)

Method of measurement

Telemetry EMG (Mega electronics Ltd.Finland)

6

Description

Bilateral soleus muscle activation

Timepoint

Before and after expected and unexpected sudden hand loading (before and after plantar flexor muscle fatigue)

Method of measurement

Telemetry EMG (Mega electronics Ltd.Finland)

Secondary outcomes

empty

Intervention groups

1

Description

External perturbation (expected and unexpected): Subjects expose to a rapid loading in to the right palm (25% of body weight) from 20 cm above his/har right palm, while the shoulder is in 90 flexion. In expected condition the subjects are aware of loading time (3 seconds after the beep sound the loading will occure). But in unexpected condition the subjects do not any thing about the loading time.

Category

Diagnosis

2

Description

Making the plantar flexor muscles fatigued: The person sitting on the bed with the thigh and leg on the it. One end of the load cell strap will be fixed to the bar behind the person and the other end will be fixed below the ankles. The maximum voluntary contraction of both flexor muscles will be evaluated using the electrical load cell. Then, 60 percent of this amount is applied to fatigue the muscles; The person will asked to apply pressure to the strap while maintain 60 percent of his/her maximum voluntary contraction by looking at the bar scale on the monitor until feel fatigue. When the bar scale is in green territory the person would maintain the contraction. But if it is in red territory and last for 5 seconds it assumes as fatigue

Category

Other

Recruitment centers

1

Recruitment center

Name of recruitment center

Shiraz School of Rehabilitation

Full name of responsible person

Fatemeh Amiri

Street address

Shiraz School of Rehabilitation, First Abiverdi Ave.
Chamran Boulevard.

City

Shiraz

Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Shiraz University of Medical Sciences

Full name of responsible person

Dr Gholam Reza Hatam

Street address

Shiraz University of Medical Sciences, Zand Ave

City

Shiraz

Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

Yes

Title of funding source

Shiraz University of Medical Sciences

Proportion provided by this source

100

Public or private sector

empty

Domestic or foreign origin

empty

Category of foreign source of funding

empty

Country of origin

Type of organization providing the funding

empty

Person responsible for general inquiries

Contact

Name of organization / entity

Shiraz University of Medical Sciences

Full name of responsible person

Dr Zahra Rojhani

Position

Assistant Ppofessor of Shiraz University of Medical Sciences

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

empty

Study Protocol

empty

Statistical Analysis Plan

empty

Informed Consent Form

empty

Clinical Study Report

empty

Analytic Code

empty

Data Dictionary

empty