Clinical Trial Protocol
Iranian Registry of Clinical Trials

21 Jun 2026

The effects of low-load resistance training associated with blood-flow restriction on function, strength and thickness of the quadriceps muscles in COVID-19 survivors after recovery

Protocol summary

Study aim
Effects of low-load resistance training with blood-flow restriction on function, strength and thickness of the quadriceps muscles in COVID-19 survivors after recovery

Design
Randomized clinical trial with control group and double blinded with design of 18 patients. Sealed envelop will be used for randomization.

Settings and conduct
The COVID-19 survivors who are eligible for this study (negative PCR test) based on the inclusion criteria will allocated to experimental or control groups by using simple randomization method. The level of creatine kinase and C reactive protein will check by using blood sampling.The quadriceps muscle thickness will capture by an experienced physiotherapist in rest state as well as during maximum isometric contraction. The muscle strength will assess by using dynamometer.After primary assessments, 12 sessions of low-load training (3 sessions per week) will apply to the patients. for the experimental group. the exercises will apply by blood flow restriction device. after 12 sessions of training, the patient will assess again.

Participants/Inclusion and exclusion criteria
Males and females with the age range of 30-65 years old with grade 3 manual muscle test and body mass index below 30. Exclusion criteria are all factors that blood flow restriction training is contraindicated for them.

Intervention groups
Low-load resistance training associated with blood-flow restriction (BFR) apply in experimental group. In control group we use just low load resistance training without Blood flow restriction.

Main outcome variables
Quadriceps strength; quadriceps muscle thickness; pain pressure threshold by visual analogue scale; sit to stand functional test

General information

Reason for update

Acronym
BFR

IRCT registration information
IRCT registration number: **IRCT20210111050007N1**
Registration date: **2021-05-18, 1400/02/28**
Registration timing: **registered_while_recruiting**

Last update: **2021-05-18, 1400/02/28**
Update count: **0**

Registration date
2021-05-18, 1400/02/28

Registrant information

Name
Zinat Ashnagar

Name of organization / entity

Country
Iran (Islamic Republic of)

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2021-04-09, 1400/01/20

Expected recruitment end date
2021-09-23, 1400/07/01

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date

empty

Scientific title
The effects of low-load resistance training associated with blood-flow restriction on function, strength and thickness of the quadriceps muscles in COVID-19 survivors after recovery

Public title
The effects of resistance training associated with blood-flow restriction on the quadriceps muscles in CORONA virus survivors after recovery

Purpose
Treatment

Inclusion/Exclusion criteria

Inclusion criteria:
Males and females with the age range of 30-65 years old which affected by CORONA VIRUS at least from the past 3 months who developed muscles weakness after infection. The manual muscle testing which graded by MMT should be grade 3 at most. BMI should be under 30.

Exclusion criteria:
All contraindications of Blood Flow Restriction training should be controlled. Individuals should not have any history of blood clotting, hypertension above 180/100, acute sepsis, blood vessels disorders and varicose veins, cancer, stroke Thrombotic or Hemorrhagic, history of deep vein thrombosis , Arterial fibrillation. No history of hypertension or diabetes mellitus No history of fracture, surgery, and knee osteoarthritis

Age
From **30 years** old to **65 years** old

Gender
Both

Phase
N/A

Groups that have been masked

- Participant
- Outcome assessor
- Data analyser

Sample size
Target sample size: **18**

Randomization (investigator's opinion)
Randomized

Randomization description
In this study, simple randomization by using sealed envelop will be used to allocate the included participants in experimental and control group.

Blinding (investigator's opinion)
Double blinded

Blinding description
The patient is blind to the allocated group and type of treatment. The main researcher is not blind and apply the experiment (exercises) on patients. The assessor is blind to the type of treatment of the patients.

Placebo
Used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Ethics committee of Tehan University of Medical Sciences

Street address
Tehran University of Medical Sciences, Qods street, Keshavarz blvd.,Tehran, Iran

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1148956111

Approval date
2021-02-23, 1399/12/05

Ethics committee reference number
IR.TUMS.FNM.REC.1399.224

Health conditions studied

1

Description of health condition studied
Muscle weakness

ICD-10 code
COVID-19,v

ICD-10 code description
U071

Primary outcomes

1

Description
Muscle thickness

Timepoint
Before and after the intervention

Method of measurement
Ultrasound Imaging

Secondary outcomes

1

Description
C reactive protein level of blood sample

Timepoint
Before and after the intervention

Method of measurement
Blood sample

Intervention groups

1

Description
Intervention group : Using low load exercises with blood flow restriction device using strength training protocol in such a way that 80% of the pressure that causes the pulse to be cut is used . The sports version is in 4 sets with 30 repetitions in the first set and 15 times in the other three sets. Exercises with low load (15-40% of the maximum weight that a person can lift once). The device used is the standard model of the blood flow restriction device, which has vascular Doppler, which has the Smart Tools brand from the United States.

Category
Rehabilitation

2

Description
Control group: Exercises with low load using the cuff of the same device with minimal pressure to prevent the effects of placebo. The number of repetitions and sets as well as the amount of exercise load is similar to the intervention group.

Category
Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center
Rehabilitation faculty,Tehran University of Medical Sciences

Full name of responsible person
Zahra Poursaleh

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Rehabilitation faculty,Tehran University of Medical Sciences, Enghelab street, Pich-e-Shemiran, Tehran, Iran

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
Tehran University of Medical Sciences

Full name of responsible person
Dr. Ahmad-Reza Khatoonabadi

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Rehabilitation faculty,Tehran University of Medical Sciences, Enghelab street, Pich-e-Shemiran, Tehran, Iran

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Web page address
https://rehab.tums.ac.ir/section23/page34/lang/Fa.aspx

Grant name

Grant code / Reference number

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

Title of funding source
Tehran University of Medical Sciences

Proportion provided by this source
100

Public or private sector
Public

Domestic or foreign origin
Domestic

Category of foreign source of funding
empty

Country of origin

Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact

Name of organization / entity
Tehran University of Medical Sciences

Full name of responsible person
Dr. Zinat Ashnagar

Position
Assistant Professor

Latest degree
Ph.D.

Other areas of specialty/work
Physiotherapy

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Person responsible for scientific inquiries

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Person responsible for updating data

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Undecided - It is not yet known if there will be a plan to make this available

Data Dictionary

Undecided - It is not yet known if there will be a plan to make this available

Title and more details about the data/document

Every single piece of content is designed to be shareable.

When the data will become available and for how long

Six months after publishing the results

To whom data/document is available

Chief Editor of the academic journals

Under which criteria data/document could be used

To inform the chief editors of the journal that the article will be published

From where data/document is obtainable

Correspondent of the article

What processes are involved for a request to access data/document

By email

Comments