

# What are the effects of balance exercises in patients' following total knee replacement ability to perform every day life activities?

<b>Submission date</b> 11/03/2017	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
<b>Registration date</b> 14/03/2017	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
<b>Last Edited</b> 26/04/2023	<b>Condition category</b> Musculoskeletal Diseases	<input type="checkbox"/> Individual participant data

## Plain English Summary

### Background and study aims

Osteoarthritis of the knee is a type of arthritis that is caused by the wear and tear of the cartilage lining the knee joint. This causes pain, stiffness and a loss in mobility (movement). The best treatment option for knee osteoarthritis is to have a total knee replacement (TKR) surgery. TKR is a common procedure where the weight bearing surfaces of the knee joint are replaced with metal and plastic components. This is done to relieve pain and disability. The main complaints of patients who are undergoing TKR due to osteoarthritis are the difficulties performing everyday tasks (such as going up a staircase or walking on uneven roads) and the increased risk of falling. Usual care after a TKR is to undergo rehabilitation that is aimed to increase the muscle and improve the motion of the knees. However, this does not address patient's difficulties performing daily tasks. Research has shown that rehabilitation that includes specific techniques aimed at increasing balance, managing pain, and improving daily function can reduce the risk of falling and improve surgery outcomes. Despite this knowledge, there are no guidelines as to what type of rehabilitation is the best practice. Following a TKR surgery, patients still have difficulties doing their normal daily activities. Therefore, the aim of this study is to investigate the effects of a self-managed rehabilitation programme targeted to improve balance has on improving patient's daily function.

### Who can participate?

Adults aged 65-80 who have osteoarthritis and require a total knee replacement

### What does the study involve?

After undergoing total knee replacement surgery, participants are randomly allocated to one of two groups. Those in the first group undergo standard rehabilitative exercises but also undergo self-managed exercises that are aimed at improving balance. This involves daily exercise (including walking) for around 10-20 minutes (building up to 34-40 minutes with time) for 12 weeks. Those in the second group continue with routine rehabilitation care. The same number of exercises are performed by both groups. Participants are assessed to see how well their knee works before the surgery and at eight and 14 weeks post-surgery.

What are the possible benefits and risks of participating?

Participants may benefit from the rehabilitation programmes. There are no notable risks with participating, however participants may experience some discomfort during the exercise training.

Where is the study run from?

University Hospital of Rion (Greece)

When is the study starting and how long is it expected to run for?

September 2011 to August 2015

Who is funding the study?

1. Queen Mary University (UK)

2. Musculoskeletal Association of Chartered Physiotherapists (UK)

Who is the main contact?

1. Mrs Maria Moutzouri (Scientific)

2. Professor Nigel Gleeson (Scientific)

## Contact information

### Type(s)

Scientific

### Contact name

Mrs Maria Moutzouri

### ORCID ID

<http://orcid.org/0000-0002-7014-892X>

### Contact details

Physiotherapy Department

Technological Educational Institute Of Western Greece

Aigio

Greece

25100

### Type(s)

Scientific

### Contact name

Prof Nigel Gleeson

### Contact details

Queen Margaret University

Queen Margaret Drive

Edinburgh

United Kingdom

EH21 6UU

# Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers

1945

## Study information

### Scientific Title

What are the effects of enhanced sensori-motor rehabilitation on indices of functional performance associated with patients following total knee replacement?

### Acronym

ESMET

### Study hypothesis

Sensori-motor rehabilitation training is better than usual care functional exercise training in patients' following knee replacement functional performance.

### Ethics approval required

Old ethics approval format

### Ethics approval(s)

1. The Institutional Committees of University Hospital of Patras, 22/08/2011 (Greece)
2. Queen Margaret University Edinburgh, 22/05/2012, ref: 7052/4-7-2011 (UK)

### Study design

Single-centre interventional single blind prospective randomised controlled trial

### Primary study design

Interventional

### Secondary study design

Randomised controlled trial

### Study setting(s)

Hospital

### Study type(s)

Treatment

### Participant information sheet

See additional files

### Condition

## Osteoarthritis

### Interventions

After a total knee replacement, participants are randomly allocated to either the intervention rehabilitation group or the control rehabilitation group. Randomisation is done using a computer generated programme.

**Intervention group:** Participants undergo the early initialised, self-managed, enhanced sensori-motor programme as well as the standard rehabilitation. This includes participants being prescribed to perform the same number of exercises daily for 35-45 minutes which includes walking (progressively for 10-20 minutes) for six weeks. This is followed by a further six weeks of training (three times weekly for 45 minutes). Participants are taught by a physiotherapist all the required exercises that they should be doing and they are provided with a booklet that contains instructions. Participants who report signs of effusion or discomfort are given clinical help. Participants received support during the programme including encouragement to continue with the self-managed exercises.

**Control group:** Participants receive the usual level of care which consists of 15 exercises, focusing on improving knee motion and muscle strengthening. The same principles are followed in the case of discomfort or participants need clarification about exercises.

Participants in both groups are supervised by regular weekly phone-calls with a physiotherapist and/or orthopedic surgeon. Follow up includes a clinical evaluation at the end of the exercise programme, which is 14 weeks post-surgery. Another follow-up is planned for two years from the surgery and includes self-reported questionnaires (KOOS, KOS- ADLS and SF-12) and takes place over the telephone.

### Intervention Type

Other

### Primary outcome measure

1. Function is assessed using the Timed Up and Go Test at baseline, eight and 14 weeks post-surgery
2. Pain is measured using Visual Analogue Scale (VAS) at baseline, eight and 14 weeks post-surgery

### Secondary outcome measures

1. Balance is measured using Biodex balance system at baseline, eight and 14 weeks post-surgery
2. Knee proprioception is measured using joint position error with a bubble inclinometer at baseline, eight and 14 weeks post-surgery
3. Muscle strength is measured using quadriceps maximum voluntary isometric contraction at 60 degrees of knee flexion with Primus Isokinetic dynamometer at baseline, eight and 14 weeks post-surgery
4. Muscle size is measured using rectus femoris cross sectional area with real time ultrasound at baseline, eight and 14 weeks post-surgery
5. Range of knee motion is measured using a goniometer while the patient is sitting at baseline, eight and 14 weeks post-surgery
6. Peak force of quadriceps with Spike electromyographic EMG during isometric contraction on the dynamometer at baseline, eight and 14 weeks post-surgery

7. Daily living function and quality of life are measured using the Knee injury and Osteoarthritis Outcome Score (KOOS), Knee Outcome Survey: Activities of Daily Living Scale (KOS-ADL) and the Short-Form 12 (SF1-2) at baseline, eight, 14 weeks and two years post-surgery

**Overall study start date**

20/09/2011

**Overall study end date**

30/08/2015

## **Eligibility**

**Participant inclusion criteria**

1. Ambulatory patients with osteoarthritis (clinical and radiological findings of advanced osteoarthritis, 6-12 months length of wait for surgery)
2. Undergoing primary standardized cemented total knee replacement by the same surgeon
3. Aged 65-80 years old

**Participant type(s)**

Patient

**Age group**

Adult

**Sex**

Both

**Target number of participants**

60

**Total final enrolment**

52

**Participant exclusion criteria**

1. Infection, or complications after total knee replacement (TKR)
2. Scheduled for TKR revision surgery
3. Having had any surgery in their lower limbs affecting their gait
4. Cardiovascular diseases, high blood pressure not controlled with medication
5. Neurological/ neuromuscular problems
6. Medical or other musculoskeletal problems that could affect ability to complete objective assessments

**Recruitment start date**

20/05/2012

**Recruitment end date**

30/05/2014

## **Locations**

**Countries of recruitment**

Greece

**Study participating centre**

University Hospital of Rion

Orthopedic Department

Rio 265 04

Patras

Greece

26504

**Sponsor information****Organisation**

Queen Margaret University

**Sponsor details**

Queen Margaret Drive

Musselburgh

Edinburgh

Scotland

United Kingdom

EH21 6UU

+44 131 474 0000

ngleeson@qmu.ac.uk

**Sponsor type**

University/education

**Website**

<http://www.qmu.ac.uk/>

**ROR**

<https://ror.org/002g3cb31>

**Funder(s)****Funder type**

University/education

**Funder Name**

Queen Margaret University

**Alternative Name(s)**

Queen Margaret University, Edinburgh, QMU

**Funding Body Type**

Private sector organisation

**Funding Body Subtype**

Universities (academic only)

**Location**

United Kingdom

**Funder Name**

Musculoskeletal Association of Chartered Physiotherapists

## Results and Publications

**Publication and dissemination plan**

Systematic reviews and surveys to help with setting the protocol published in Medline journals.

**Intention to publish date**

31/07/2017

**Individual participant data (IPD) sharing plan**

The datasets generated during and/or analysed during the current study will be stored in a non-publicly available repository at the Technological Education Institute of Western Greece and can be accessed after the an application and approval from the Institute and from Queen Margaret University.

**IPD sharing plan summary**

Stored in repository

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>		14/03/2017	15/03/2017	No	Yes
<a href="#">Results article</a>	results	01/07/2018		Yes	No
<a href="#">Other publications</a>	Secondary analysis	17/05/2019	26/04/2023	Yes	No