

Is learning together in virtual reality better than learning individually for surgical teams training for complex operations?

Submission date 23/08/2022	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
Registration date 24/08/2022	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
Last Edited 29/12/2023	Condition category Surgery	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

There is good evidence that effective teamwork in surgery is linked to fewer surgical errors and better patient outcomes. Virtual reality is excellent way to train surgeons and scrub nurses individually, however could also be used to train them together in a team. This study aims to use an innovative multiplayer virtual reality training platform to test whether the training together approach is better than learning separately for novices learning a complex open operation. This complex open operation is performing a hip replacement, accessing it from the front of the hip rather than the more usual approach from the back.

Who can participate?

Junior surgeons with less than 5 years experience for the surgeon role, student nurses, medical students and newly qualified scrub nurses with less than 1 year experience for the scrub nurse role. They must have no experience with performing hip replacements coming in from the front of the hip

What does the study involve?

Participants will be randomised to learning in a team or individually. They will all undergo 5 sessions of immersive virtual reality training. In this training they will enter a virtual operating theatre and will be guided on performing their role within the operation (surgeon or scrub nurse). The only difference will be that those assigned to the team group will do the training together live in pairs, whereas the individually trained group will learn separately with a computer avatar playing the alternative role. Otherwise training will be identical. Following the 5th session they will all undergo a real world assessment. Teams will perform this together in their training teams, individual participants will be randomly paired up with a member of the alternative role. The assessment will take place in a simulated operating theatre, with real equipment and on an anatomical model. They will be asked to perform the operation as they learned in virtual reality. They will be marked on their team work, technical performance by blinded expert assessors.

What are the possible benefits and risks of participating?

This is a non-interventional study and so the risks are very small. Some people get headaches or eye strain from the virtual reality training, and there is a small risk using the sharps/drills/saws in the real world assessment. The benefits are that if this method of training proves beneficial it could be rolled out across health services and may benefit patients in the long term

Where is the study run from?

MSk Lab at Imperial College London (UK)

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

March 2021 to October 2022

Who is funding the study?

Johnson and Johnson (UK)

Who is the main contact?

Mr Thomas Edwards, thomas.edwards@imperial.ac.uk

Contact information

Type(s)

Principal Investigator

Contact name

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Additional identifiers

EudraCT/CTIS number

Nil known

IRAS number

237607

ClinicalTrials.gov number

Nil known

Secondary identifying numbers

IRAS 237607

Study information

Scientific Title

Collaborative training vs individual training in immersive virtual reality: A randomised controlled trial for novices learning complex open surgery

Study objectives

Multiplayer team training in immersive virtual reality will be superior to individual training for novices learning anterior approach total hip replacements

Ethics approval required

Old ethics approval format

Ethics approval(s)

Approved 10/04/2018, Health Research Authority (2 Redman Place, Stratford, London, E20 1JQ, UK; +44 207 104 8000; contact@hra.nhs.uk), ref: 18/HRA/2085

Study design

Randomized controlled trial

Primary study design

Interventional

Secondary study design

Randomised controlled trial

Study setting(s)

Other

Study type(s)

Other

Participant information sheet

Not available in web format, please use the contact details to request a patient information sheet.

Health condition(s) or problem(s) studied

Educational study examining learning complex surgery in virtual reality

Interventions

At enrolment in the study, the following baseline data is collected: Baseline knowledge assessed using a written assessment developed through expert consensus, baseline demographics: Age, sex, handedness, video game experience, virtual reality experience, role, experience with anterior approach THR, experience with THRs any approach

Randomisation: Block randomisation in a 1:1 ratio performed by an external trial manager using a computer generated random number sequence, allocation concealed until participants have been enrolled in the study. Participants allocated to one of two parallel groups:

Team training arm: The intervention is learning anterior approach total hip replacement surgery in a multiplayer virtual reality platform. Surgeons and scrub nurses work together to learn how to perform their roles in the operations

Individual training arm: The intervention is learning anterior approach total hip replacement surgery in a more conventional single player mode, where the alternative role is played by a computer avatar. Otherwise the training is identical

Each group goes through 5 virtual reality training sessions over a 6 week period, following the 5th and final session they all undergo a real world, assessment in a simulated operating theatre with real equipment and on a validated model hip.

Final follow up is immediately following the real world assessment at 6 weeks

Intervention Type

Other

Primary outcome measure

Nontechnical performance in a simulated real world assessment using the NOTSS score (Non-Operative Technical Skills for Surgeons) at baseline and 6 weeks

Secondary outcome measures

At baseline and 6 weeks:

1. Nontechnical performance in simulated real world assessment using NOTECHS II Score, SPLINTS Scores. 2. Technical performance in simulated real world assessment, using an expert derived task specific checklist, acetabular component positioning (anteversion and inclination), procedure time.

Overall study start date

01/03/2021

Completion date

01/10/2022

Eligibility

Key inclusion criteria

Surgeons: training surgeons FY2 - ST4 level, No experience performing supervised total hip replacements via the anterior approach, <10 THAs performed supervised using any approach. No previous orthopaedic or open virtual reality surgical simulation training

Scrub technician: Student nurses, Newly qualified scrub nurses or ODPs with < 1 year experience in orthopaedic surgery, Medical students. No experience scrubbing for anterior approach THR surgery, no specific training in THR instrumentation or technique, No experience of virtual reality surgical simulation

Participant type(s)

Health professional

Age group

Adult

Sex

Both

Target number of participants

40

Total final enrolment

40

Key exclusion criteria

Surgeons: Performed supervised > 10 THR operations any approach, Performed supervised any anterior approach THA's, previous open or orthopaedic surgical virtual reality simulation training

Scrub nurses: > 1 year orthopaedic scrub nurse experience, specific training in THR instrumentation/ technique, scrubbed for any anterior approach THA operations, previous surgical virtual reality simulation training

Date of first enrolment

01/04/2021

Date of final enrolment

01/10/2022

Locations

Countries of recruitment

England

United Kingdom

Study participating centre

Imperial College London

MSk Lab

2nd Floor, Sir Michael Uren Hub

White City Campus

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Sponsor information

Organisation

Imperial College London

Sponsor details

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Sponsor type

University/education

Website

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

ROR

<https://ror.org/041kmwe10>

Funder(s)**Funder type**

Industry

Funder Name

Johnson and Johnson

Alternative Name(s)

Johnson & Johnson, johnson & Johnson Services, Inc., Johnson&Johnson, , Johnson & Johnson Private Limited, , J&J, JNJ

Funding Body Type

Government organisation

Funding Body Subtype

For-profit companies (industry)

Location

United States of America

Results and Publications**Publication and dissemination plan**

Planed publication in a high-impact peer-reviewed journal

Intention to publish date

01/12/2022

Individual participant data (IPD) sharing plan

All data generated or analysed during this study will be included in the subsequent results publication

IPD sharing plan summary

Published as a supplement to the results publication

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		01/12/2023	29/12/2023	Yes	No