

Keele Critically Appraised Topic (CAT Form)



Clinical Question

In adults undergoing a total knee replacement (TKR) are individualised, supervised, progressed exercise delivered face to face by a physiotherapist more effective in terms of return to function and quality of life, compared to a digital/remote self-directed programme of exercise?

Clinical bottom line

Two recent systematic reviews of moderate quality, indicate that digital / remote rehabilitation has a positive impact on pain, range of motion (ROM) and function in the short and long term. Whilst a third systematic review, had a wide variety of interventions, but suggested comparable results to traditional rehabilitation.

Plain language summary

Two recent pieces of reliable research have shown that digital/online rehabilitation options (e.g. an app or smart watch) have proved beneficial for reducing people's pain when receiving a new knee or following total knee replacement. The research also shows that this approach can improve the movement in the knee and improve walking and other day-to-day activities. These results were seen in the first few months, but also up to 2 years after the surgery. A third piece of research, which has a wide variety of digital/online rehabilitation options, suggests similar results to usual and more traditional Physiotherapy treatments in the hospital setting, with this research being the most relatable to NHS practice.

Why is this important?

Currently, national guidance recommends the use of digital innovations to support and promote self-management in long-term conditions. We are interested to explore how this can be applied to surgical intervention.

The growing burden of people on surgical waiting lists is well recognised, creating challenges for individuals and services alike. It is important that we utilise the scarce resource of physiotherapy expertise and ensure this is available to the people who will benefit the most. Offering alternatives to face-to-face management to those who are motivated and comfortable with this approach, may be part of a service offers in the future.

The group wanted to explore if there is any high-quality evidence looking at digital/wearable devices. We were really interested to explore if the physiotherapist and their ability to provide bespoke exercises to individuals is a key component to improving patient outcome.

Search timeframe (e.g. 2013-2023)

2013-2023

Search criteria

Population Intervention Comparison Outcomes (PICO) themes	Description	Search terms
Population and Setting E.g. adults with OA, primary care	Adults Primary Total Knee Replacement Arthroplasty	Adults Primary Total Knee Replacement Arthroplasty
Intervention or Exposure (i.e. what is being tested) e.g. manual therapy	Physiotherapy exercise	Post Operative rehabilitation Exercise Strengthening, Range of motion Supervised, individualised, progressed Individual (group)
Comparison, if any e.g. usual care, leaflet	Virtual, remote, App,	Apps, video, wearable devises Self-supported

Outcomes of interest e.g. Visual analogue scale, Range of motion	Quality of Life, Function, VAS, EQ5D	Quality of Life, Function
Types of studies e.g. Randomised Controlled Trails, Systematic reviews		SR RCT

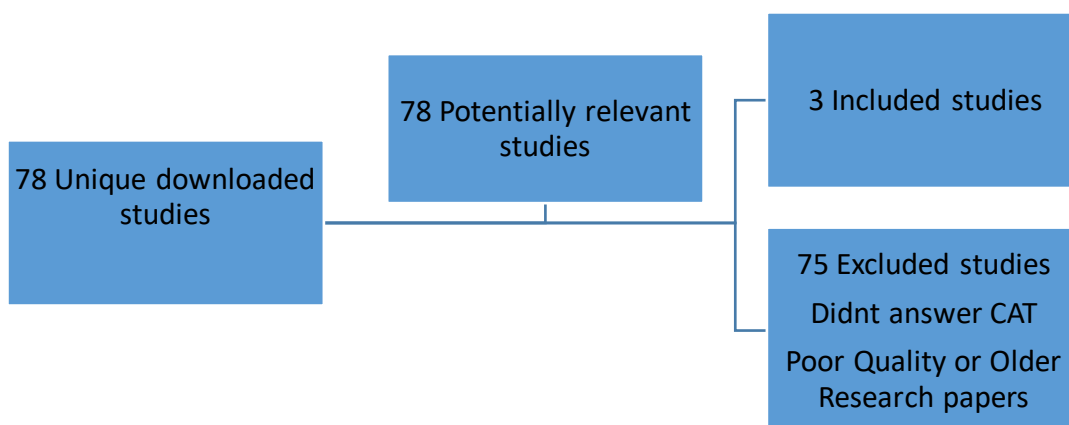
Databases searched

Clinical Knowledge Summaries (CKS), Physiotherapy Evidence Database (PEDro), British Medical Journal (BMJ) Updates, Clinical Evidence, Translation of Research into Practice (TRIP) Database, National Institute for Clinical Excellence (NICE), Health Technology Assessment (HTA), Bandolier, The Cochrane Library, Medline, Cinahl, Embase, PsycInfo, Professional websites, Joanna Briggs Institute, Web of Science, Sports discus and Pub Med

Date of search

January 2024.

Results of the search: include the number in each box



There were 78 unique downloaded studies. There were 78 relevant studies. There were 3 included and their critical appraisal is included in Table 1. There were 75 excluded studies.

Table 1- Detail of included studies

First author, year and type of study	Population and setting	Intervention or exposure tested	Study results	Assessment of quality and comments
<p>Garcia-Sanchez 2023</p> <p>Systematic Review and Meta analysis</p>	<p>Patients in post operative phase following TKR</p> <p>No UK trials</p>	<p>Included RCTs that assessed effect of virtual reality-based rehabilitation (VRBR) on function, pain, balance ROM and strength</p> <p>Included immersive and non-immersive virtual reality</p>	<p>12 RCTs included, 977 participants</p> <p>VRBR effective for pain immediately post rehab, knee function, balance, ROM (flexion) and strength. No difference in gait speed, functional independence and aerobic capacity.</p> <p>Knee pain improvement maintained at 3 months. Knee function maintained 3 and 6 months.</p> <p>When combined with conventional therapy VRBR more effective</p>	<p>PROSPERO and PRISMA</p> <p>Good search strategy including grey lit</p> <p>2 authors screened studies- 3rd for disagreements</p> <p>PEDro risk of bias tool used and GRADE</p> <p>Medium risk of bias</p> <p>Appropriate outcome measures used</p>

<p>Ozden 2023</p> <p>Systematic review and meta-analysis</p>	<p>RCTs</p> <p>Intervention included mobiles app-based education, care, rehab or combinations</p> <p>Patients post TKR</p>	<p>Aim to evaluate mobile based applications</p>	<p>6 RCTs included</p> <p>Application based rehab better than conventional rehab in terms of pain function and ROM</p> <p>ROM better at 1 month</p> <p>No difference in ROM at 3 months and 2 years</p> <p>Pain better at 1 month, discharge and 2 years</p>	<p>Limited search-didn't include CINAHL and EMBASE)</p> <p>Fair to moderate quality (PEDdro)</p> <p>2 researchers plus 3rd for disagreements</p> <p>Used revised Cochrane risk of bias tool</p> <p>PEDro for methodological quality</p> <p>Used PRISMA</p>
<p>Zhang et al 2023</p> <p>Systematic Review and Meta analysis</p>	<p>Aim To evaluate the effects of long-term home based tele rehab on pain and function in patients after TKR</p>	<p>Intervention group included studies that looked at unsupervised exercises or home exercises or tele rehab or internet delivered exercise</p> <p>Compared to</p> <p>Out/inpatient physical treatments</p> <p>Note- Most relatable to current practice/Physio provision</p>	<p>9 studies</p> <p>1944 patients</p> <p>No difference at any time points for pain, ROM and Function</p>	<p>PROSPERO and PRISMA</p> <p>Used 2 reviewers and a 3rd for disagreements</p> <p>Clear search terms but didn't look for grey lit or contact the experts</p> <p>Used Cochrane risk of bias tool</p> <p>Limitations- small no. of studies, significant risk of bias, low quality evidence (GRADE)</p>

--	--	--	--	--

Summary

The evidence presented indicates that virtual rehabilitation has a beneficial impact on pain, function and outcome in 2 systematic reviews, and is shown to be comparable to traditional rehabilitation in one. It is important to understand what the authors considered as virtual rehab, for example an app, a smart watch, a smart watch plus additional equipment or web based support. Some trials have described immersive and non-immersive virtual based rehabilitation (Garcia-Shanchez, 2023). Many clinicians may need to understand what this terminology means in practice, especially if there is a benefit of combined VBR and conventional care.

Implications for practice

This CAT helps clinicians, patients and service managers to consider alternatives to traditional face to face rehabilitation. The cost of providing alternatives has been considered and found to be a cost-effective alternative (Zhang, 2023). Any provision of tele-rehabilitation/ has to be understood and explained as part of a shared decision-making process with the patient.

What would you post on X (previously Twitter)?

Forms of virtual rehabilitation post TKR can improve outcomes, or are at least comparable. Need clear definitions of what virtual rehabilitation means within studies.




References

Garcia-Sanchez Manuel, Garcia-Robles Paloma, Osuna-Perez Maria Catalina, Lomas-Vega Rafael, Obrero-Gaitan Esteban, Cortes-Perez Irene Effectiveness of Virtual Reality-Based Early Postoperative Rehabilitation after Total Knee Arthroplasty: A Systematic Review with Meta-Analysis of Randomized Controlled Trials . Applied Sciences-Basel, 2023

Ozden Fatih, Sari Zubeyir. Archives of Gerontology and Geriatrics, 2023 The effect of mobile application-based rehabilitation in patients with total knee arthroplasty: A systematic review and meta-analysis

Zhang H., Wang J., Jiang Z., Deng T., Li K., Nie Y. Medicine (United States), 2023 Home-based tele-rehabilitation versus hospital-based outpatient rehabilitation for pain and function after initial total knee arthroplasty: A systematic review and meta-analysis

Please tick the box that best reflects your clinical bottom line and include the picture on page 1

CAT image	Evidence quality	Checkbox
	Good quality evidence to support use....	<input type="checkbox"/>
	Insufficient or poor-quality evidence OR substantial harms suggest intervention used with caution after discussion with patient...	<input checked="" type="checkbox"/>
	No good quality evidence, do not use until further research is conducted OR Good quality evidence to indicate that harms outweigh the benefits....	<input type="checkbox"/>

If you require this document in an alternative format, such as large print or a coloured background, please contact health.iau@keele.ac.uk

©Keele2023