

NIHR Dissemination Centre

THEMED REVIEW

MOVING FORWARD

Physiotherapy for Musculoskeletal Health and Wellbeing



FOREWORD

Musculoskeletal conditions are important not only to the individual, their family, friends and carers but also to wider society. The scale is massive. More years are lived with musculoskeletal disability than any other condition. This is because not only do more than 10 million people have a musculoskeletal problem, they often have these conditions for many years, sometimes a life time.

This report underlines the scope of musculoskeletal disease and management. Importantly, it considers the research necessary to define the most effective interventions in particular presentations of musculoskeletal disease. Equally the report supports the move towards more individualised patient care, focusing on supported self-management, shared decision-making and prevention through life style changes, particularly around activity. The report starts to use the evidence base to redefine the shape our musculoskeletal services should take and supports the development and evolution of the roles of healthcare workers and where they sit in the patients' interaction with the system.

NIHR-funded and other research will continue to drive the development of the most effective prevention, intervention and self-management in musculoskeletal conditions, allowing better access and improved support for the current patients and preventing significant musculoskeletal disease in the future.

Peter Kay,

National Clinical Director, Musculoskeletal Services, NHS England

Over the last thirty years, research has transformed musculoskeletal health and physiotherapy practice. A person-centred approach - focused on movement, exercise therapy and supported self-management - strengthens physiotherapists' role in encouraging the population to take up more active and healthy lifestyles.

This review brings together important current and impactful musculoskeletal research, giving clear direction to patients, physiotherapists, researchers, commissioners and planners of physiotherapy services. The review shows that investment in physiotherapy services for musculoskeletal conditions improves patient outcomes and saves healthcare costs. Pound for pound, the health gain from the funding of musculoskeletal research is considerable and cost-effective interventions for managing and preventing musculoskeletal conditions should be available to all.

There are still challenges ahead, not least the long gap between the funding of research and its impact on practice and patient care. We need clinicians and researchers to work more effectively together, for clinicians to be open to new ideas and new ways of working that can expedite the uptake and implementation of research into practice, and for researchers to be mindful of the concerns and challenges of clinical practice.

This review is a celebration of how the quality and impact of musculoskeletal research is delivering improvements in the quality of patient care. I hope it will serve as a springboard for wider engagement in research, evaluation and implementation.

Karen Middleton,

Chief Executive, Chartered Society of Physiotherapy



CONTENTS

Evidence highlights.....	4
Questions to ask about your physiotherapy musculoskeletal services	6
About this review.....	9
Setting the scene.....	10
Physiotherapy research on musculoskeletal conditions – why it matters.....	14
Seeking help.....	16
Getting treatment	22
Staying well	36
Future research.....	40
Summary.....	43
Glossary.....	44
Acknowledgements	45
Study summaries	47
References	63

EVIDENCE HIGHLIGHTS

Physiotherapy is important for preventing and reducing the negative impacts of musculoskeletal conditions. It helps to maintain and improve musculoskeletal health and wellbeing. Research continues to show the importance of exercise in terms of movement, muscle strength and general physical activity. We also know that people need to understand their condition and what they can do to remain healthy.

This review is focussed on physiotherapy research in musculoskeletal care, but we recognise that physiotherapy is delivered in the context of integrated multi-professional care. This review features 30 physiotherapy-related published studies funded by the National Institute for Health Research (NIHR) which have made a difference to musculoskeletal health and care. Other ongoing studies address areas of continued uncertainty. Together with research funded by organisations like Arthritis Research UK (ARUK) and the Chartered Society of Physiotherapy (CSP), this evidence shows us that investment in physiotherapy services for musculoskeletal conditions improves patient outcomes and reduces healthcare costs. The health gain from the funding of musculoskeletal research is considerable and cost-effective interventions for managing and preventing musculoskeletal conditions should be available to all.

Moving Forward is particularly for physiotherapy staff involved in direct clinical practice but is also relevant to other clinicians in the musculoskeletal care team, commissioners, provider organisations, employers, patients and the public. This review should be read alongside published clinical guidelines for musculoskeletal conditions. Information from this review, together with current clinical guidelines, should help those making decisions about musculoskeletal services to deliver better care.

Key findings from the research featured in this report are summarised below.

RESEARCH MATTERS

- » The estimated health gain return to the UK from musculoskeletal research is substantial and justifies the investments made
- » Six out of the seven studies recommended by Public Health England (PHE) as preferred musculoskeletal interventions relate to physiotherapy services
- » Investment in high quality rehabilitation adapted to individual patient need leads to better outcomes, reduces further investigations and treatment, and reduces costs
- » Movement and exercise are essential for health. There is overwhelming evidence that exercise and activity are effective and should be a core treatment in musculoskeletal pain

SEEKING HELP

- » Services offering direct access to physiotherapists can streamline care pathways and allow people with musculoskeletal problems quicker access to physiotherapy
- » Telephone assessment and treatment by physiotherapists has been shown to reduce waiting time to first physiotherapy contact without compromising patient outcomes
- » Research has demonstrated effective ways to help practitioners match treatments to patients, preventing over-treatment or inappropriate care



GETTING TREATMENT

- » There has been a shift in roles of physiotherapists including first contact practitioners and prescribing medication, as well as delivering psychologically-informed practice. More research is needed on the advanced practice role of physiotherapists
- » Physiotherapists can play a part in increasing productivity and minimising absence from work. Research demonstrates the effectiveness of physiotherapists in primary care in providing advice to overcome obstacles to staying at or returning to work, in people with musculoskeletal pain. Work absence is an important outcome for future physiotherapy research
- » Research has shown that physiotherapy can improve function and reduce pain in areas like exercise-based rehabilitation for knee joint pain and strengthening hands for people with rheumatoid arthritis
- » Research has informed clinical guidelines and provided practical tools to help in areas like low back pain and osteoarthritis care

STAYING WELL

- » Self-management is a long-term strategy for patients with musculoskeletal conditions. We still do not know enough about what works to sustain long-term adherence to exercise and physical activity to ensure benefits are sustained
- » Evidence has also helped to develop more effective and meaningful outcomes to measure impact on patient health and wellbeing

QUESTIONS TO ASK ABOUT YOUR PHYSIOTHERAPY MUSCULOSKELETAL SERVICES

The evidence in this review raises questions that you and your organisation may want to consider to improve physiotherapy musculoskeletal services and care. Whether you are using, delivering, planning or commissioning services, you can identify areas for improvement arising from what we know.

FOR PATIENTS

- » Do I know how and where I can access physiotherapy – from hospitals, community services, local GP practices, workplaces, community centres and leisure centres?
- » Can the physiotherapist explain how the treatment will help my pain and everyday activities, including work?
- » Can GPs and physiotherapists advise me on exercise videos and websites, and refer me for exercise at leisure centres and community physical activity groups?
- » Do I know what to do at home and after physiotherapy, to help me recover and keep me healthy?
- » Do I want to participate in research, and if so, how can I do this?

FOR PHYSIOTHERAPISTS

- » How can we make our service accessible to those that need our help?
- » Could we engage more with local communities away from NHS settings, such as leisure centres, to promote supported self-management, physical activity and encourage a healthy lifestyle?
- » Are we able to identify those who can self-manage and have a good prognosis, so that we can spend more time with patients who need more of our help?
- » How do we implement best evidence, and can we get involved in research?
- » Do we work in an integrated patient-centred way, working closely with other health professionals who contribute to the management of the person's musculoskeletal complaint?
- » How can we best encourage patients to keep to recommended advice, exercise and physical activity over time?

FOR LOCAL NHS ORGANISATIONS

- » Do we know how our musculoskeletal physiotherapy service compares to others?
- » Is our musculoskeletal service working closely with other parts of the musculoskeletal pathway in an integrated way?
- » How many research studies are running in our organisation? Could we do more?
- » Do we have a mechanism to implement best evidence from research in our organisation and is this mechanism quick and effective?
- » How do GPs and others decide which patients to refer to a physiotherapist or signpost towards community based self-directed physical activity?
- » How do waiting times for physiotherapy compare across different musculoskeletal services?

FOR COMMISSIONERS

- » Are we offering direct access to physiotherapy for people with musculoskeletal conditions?
- » Do we recognise the potential of using physiotherapists as first contact practitioners and independent prescribers?
- » How can we ensure that the physiotherapy resource is used most efficiently?
- » Are we commissioning best evidence interventions for people with musculoskeletal conditions?
- » Are we aware of the likely return on investment for different interventions designed to prevent and treat musculoskeletal conditions?
- » Have we commissioned enough training places for physiotherapists to be able to deliver (or to help them train others such as health trainers or gym instructors to deliver) rehabilitation exercise widely across the community?
- » Do we enable patients to access appropriate prevention support in a timely manner?
- » Can patients and the public help to shape our musculoskeletal services?





ABOUT THIS REVIEW

This report brings together recent evidence relevant to those using, planning and delivering musculoskeletal physiotherapy services. Together with other evidence, this review may be particularly useful for those developing musculoskeletal pathways and care. This is not a comprehensive review of all evidence on musculoskeletal services. It focuses on physiotherapy studies funded by the NIHR and other landmark studies funded by ARUK and the CSP. The NIHR was set up in 2006 to provide a comprehensive health research system focused on the needs of patients and the public. Over the last ten years, it has funded a number of programmes, projects, research centres, work streams and researchers working in physiotherapy musculoskeletal pain prevention, management and care. These different studies have not been brought together in this way before.

This review celebrates the range of recent studies funded by the NIHR on physiotherapy care and services for adult patients with musculoskeletal conditions. We have seen a great increase in the volume of physiotherapy studies and the numbers of patients, staff and organisations participating in physiotherapy research over the last ten years. This has strengthened the base of what we know about how best to organise care.

We have looked through the portfolio of NIHR funded research and identified studies with implications for the quality of physiotherapy musculoskeletal services and organisation of care. This includes 30 published and 25 ongoing studies and nine further high impact studies funded in part or wholly by ARUK or the CSP identified by those bodies as highly relevant and recommended by PHE as preferred musculoskeletal interventions.

We have not included all NIHR clinical research on musculoskeletal care, including drug therapies. These studies – together with other research funded by government, charities and industry – are instead reflected in relevant clinical guidelines.

Along with current clinical guidelines, other additional resources that should be read with this Themed Review are the Research Excellence Framework 2014 Impact Case Studies. These include

important published studies on physiotherapy research in musculoskeletal care regardless of the origin of funding.

Important further resources are available from the UK-based Cochrane Bone, Joint and Muscle Trauma Group of which the NIHR is the largest single funder and the NIHR funded Effective Practice and Organisation of Care Group. In this report, we feature only those Cochrane reviews supported by specific NIHR project grants or related directly to NIHR organisational research.

The review covers research starting at the first point of contact with physiotherapy for a musculoskeletal condition in primary care and through to secondary care, as well as guided self-management at home and in the community setting. Although fractures and falls are an important aspect of wider musculoskeletal health and are leading causes of disability, we have not included these topics here. There is considerable NIHR and other research on fractures and falls prevention and treatment which deserves separate consideration and is not in scope for this review. This review is also focused on adults and does not cover research around musculoskeletal conditions in children.

Unless stated otherwise, all research studies featured in this report (Studies 1-55) are funded entirely or substantively by the NIHR through direct programme or project support. Research funded by other bodies are identified separately (Studies A-I), with details of funding sources in the Study Summaries. Some of these projects also received NIHR infrastructure support.



SETTING THE SCENE

WHY DOES MUSCULOSKELETAL HEALTH AND WELLBEING MATTER?

- » **One in four** people are affected by musculoskeletal conditions, which are the leading cause of pain and disability in this UK^{1,4}
- » **30.8 million** working days were lost in 2016 due to musculoskeletal problems – the second leading cause of sickness absence at work²
- » **Third highest** Caring for patients with musculoskeletal conditions is the third highest area of NHS spend³

Musculoskeletal conditions range from simple strains and sprains to long-term conditions such as rheumatoid arthritis and osteoarthritis. They cover problems affecting joints, bones and muscles as well as rare conditions of the immune system. Characterised by pain and loss of function, these

conditions can diminish quality of life, impact on family and social relationships, make everyday activities difficult and limit a person's capacity to work. Taken together, these conditions are common and the leading cause of pain and disability. There are high costs to individuals and to society in addressing musculoskeletal problems. Further useful background information on the health needs and costs is available from ARUK.⁴

Impaired musculoskeletal health also impacts on general health and wellbeing, as reduced mobility is a risk factor for other diseases. The role of physiotherapy in maintaining mobility and physical function can help to re-focus healthcare towards health promotion, prevention and rehabilitation.⁵

Although musculoskeletal conditions increase with age, they occur at *all* ages. For many younger people problems will be transient yet have a high risk of recurrence, although an important minority will develop a persistent pain problem. Many older people will have musculoskeletal pain as part of ongoing conditions such as osteoarthritis. Physiotherapists are skilled to address all these needs, across the life-course.



THE ROLE OF PHYSIOTHERAPISTS

There are 57,000 physiotherapists (including students and assistants) in the UK and 65% of these work in musculoskeletal care. Other areas in health and social care where physiotherapists work include neurology, cardiovascular, respiratory, service management, education and research.

The NHS recognises that physiotherapists and other Allied Health Professionals (AHPs) are well placed to transform future health and wellbeing service delivery.⁶

Physiotherapists in public health and prevention

Society is challenged by a growing and ageing population with rising levels of physical inactivity and increasing obesity. In physical activity guidelines for adults the UK Chief Medical Officers recommend at least 150 minutes of moderate intensity physical activity per week.⁷ This target may be very challenging for some people, so there is an emphasis that just being active is important and small changes can be of benefit, especially for adults and older adults. The guidelines also recommend muscle strengthening two days per week, and to minimise the time spend being sedentary.

Physiotherapists are well placed to take an active role in encouraging a healthy lifestyle and reinforcing existing guidelines on recommended levels of physical activity. This is important for older people, given lower levels of physical activity as people age and higher rates of musculoskeletal conditions. For

children, recent years have seen trends of decreasing activity levels and increasing child obesity.⁸ By making every contact count (MECC) physiotherapists can have conversations with patients to promote changes in their behaviour that will have a positive effect on their health.⁹

Physiotherapists can also signpost their patients to look at the CSP campaign: love activity, hate exercise?¹⁰ and PHE One You¹¹ resources to help them make healthier lifestyle choices and have a positive effect on their health. "Sitting less" and "moving more" will be an important positive message for *all* ages. Physiotherapists should work increasingly with other health care professionals and organisations like PHE, schools, workplaces, and third-sector voluntary and community organisations (registered charities, self-help groups and community groups) to help get these public health messages not only to the patients they treat, but also to the wider population.

Physiotherapists and workplace health

Work is generally recognised as good for health and wellbeing.¹² Being absent from work due to a musculoskeletal condition is detrimental to a person's health. The Department of Work and Pensions report Working for a healthier tomorrow¹³ recommends early physiotherapy advice and support to help people return to work and lessen the negative consequences of being off work.

Physiotherapists can help promote musculoskeletal health and wellbeing at work. They can help manage the expectations of workers, employers and

health professionals of the individual's ability to return to work. Early interventions to identify and address musculoskeletal problems at work should be encouraged, with workers supported to remain in, or return to, work as soon as possible.

Physiotherapists in the wider community

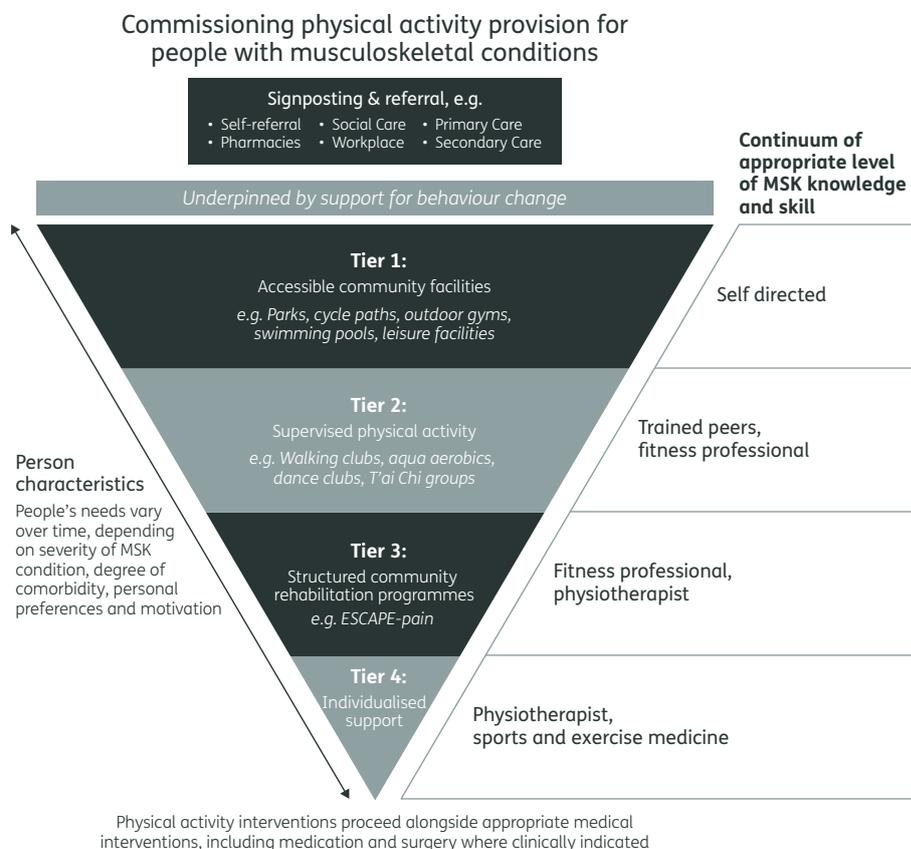
By working more closely with voluntary and community organisations, physiotherapists can reach more people to promote activity and wellbeing. This includes supporting non-clinical colleagues such as gym staff and health trainers to deliver the right messages and administer exercise and physical activity programmes. ARUK has developed a useful model to increase access and participation in physical activity to improve musculoskeletal health.¹⁴

Physiotherapists in Primary Care

Musculoskeletal problems represent the single largest group of chronic conditions for which patients consult their GPs. Some of the most common musculoskeletal problems seen in primary care include osteoarthritis and chronic musculoskeletal pain, gout and polymyalgia rheumatica. Musculoskeletal problems account for 12% of all GP consultations labelled with a diagnosis.¹⁵

The majority of musculoskeletal pain is managed in primary care and different models of care can be provided by physiotherapists to support general practice and patients consulting with joint pain. The World Health Organisation⁵ has put primary care and effective interventions¹⁶ as priority areas for reducing the global burden of musculoskeletal problems.

ARUK tiered model for providing physical activity interventions for people with musculoskeletal conditions [adapted from Arthritis Research UK, 2017¹⁴]



Physiotherapists working in integrated musculoskeletal teams and services

Physiotherapists work closely with other health professionals caring for people with musculoskeletal problems such as, but not limited to, occupational therapists, GPs, podiatrists, nurses, rheumatologists and orthopaedic surgeons. This requires understanding what each profession has to offer and how to access their services on behalf of the person with a musculoskeletal complaint. The soon to be published musculoskeletal core capabilities framework aims to clarify the competences, roles and responsibilities of physiotherapists and others providing a first point of contact for patients with musculoskeletal conditions (Health Education England (HEE) and NHS England Musculoskeletal Core Capabilities Framework).¹⁷ This framework should provide more coordinated care for patients, with seamless onward referral along the care pathway

when needed. Widening access for patients to first point of contact health professionals may help to relieve pressure on services such as GPs and A&E.

Summary

With the rising costs to the health and social care system, physiotherapists' traditional role in treating pain, restricted movement and disability needs to link with the public health challenge of encouraging movement and exercise throughout life. Healthy muscles, bones and joints throughout life will help lessen pain and disability due to musculoskeletal problems. The NIHR and its researchers will need to work collaboratively with organisations like Public Health England, ARUK and Arthritis and Musculoskeletal Alliance (ARMA) to promote research evidence on the importance of activity and maintaining good musculoskeletal health.



Reviews such as this improve clinician awareness of high quality research taking place within the field of musculoskeletal physiotherapy. This particular review demonstrates that NIHR funding is establishing usable evidence on which we can build better patient services and improve the quality of life for those who use them.

Robert Caine, Advanced Practitioner Physiotherapist - Betsi Cadwaladr University Health Board



PHYSIOTHERAPY RESEARCH ON
MUSCULOSKELETAL CONDITIONS –

WHY IT MATTERS

FUNDING OF MUSCULOSKELETAL RESEARCH AND RETURN IN HEALTH GAIN

- » 7% internal rate of return to the UK from investments in musculoskeletal research
- » Similar to 10% health gain for cancer research and 9% for cardiovascular disease

This important study published in 2018 was jointly funded by the NIHR, Wellcome Trust, ARUK, MRC and Academy of Medical Science. Between 1994 to 2013, the net monetary value of health gain to the UK from musculoskeletal research was £16 billion, with 30% of this attributable to UK research. The time between funding and the impact of musculoskeletal treatments was 16 years. The internal rate of return (health gain) from public and charitable funding of musculoskeletal research on health benefits was estimated to be 7% and justifies the investments made in musculoskeletal research. As a physiotherapist, look to get involved, stay involved and increase involvement in musculoskeletal research. It really makes a difference.



[READ MORE \(Study 1\)](#)

A priority of musculoskeletal research is to improve outcomes for people with musculoskeletal complaints and find better ways of delivering effective services and treatments. Research can also help people living with musculoskeletal conditions to understand better what works in maintaining good musculoskeletal health. It is encouraging that in the UK, the health gain from the funding of musculoskeletal research is considerable.¹⁸ Cost-effective interventions for managing and preventing musculoskeletal conditions should therefore be available to all.

Investment in musculoskeletal research has a significant positive impact for people with musculoskeletal conditions as well as the wider economy.

Liz Lawrence, Head of Health Services Improvement - Arthritis Research UK

Physiotherapy studies leading the way in musculoskeletal health and wellbeing

PHE has estimated the return on investment from musculoskeletal interventions.¹⁹ Six out of the seven interventions recommended by PHE as preferred musculoskeletal interventions relate to physiotherapy services. These include studies on matching treatment for back pain, rehabilitation programme for people with knee pain, consultation by telephone, self-referral to physiotherapy, cognitive behavioural therapy and exercise for low back pain, and vocational advice in primary care. These important studies, some funded or supported by the NIHR, will be considered later in the report as we describe the research along the patient pathway.

Clinical guidelines, based on best evidence, provide a more comprehensive overview of best practice for particular conditions and patient groups. We present here recent research from the NIHR and others which provide complementary evidence on services, workforce and patient experience, some of which has informed clinical guidelines. The following sections of the review presents these studies, largely from the NIHR, organised along the patient journey as follows:

SEEKING HELP

- ASSESSING AND MATCHING PATIENT TO TREATMENT

GETTING TREATMENT

- RESTORING MUSCULOSKELETAL HEALTH AND WELLBEING

STAYING WELL

- MAINTAINING MUSCULOSKELETAL HEALTH AND WELLBEING

SEEKING HELP

When seeking help for a musculoskeletal problem, the first step is for the patient to be assessed so the likely diagnosis, prognosis and options for treatment can be considered. People who seek help through the NHS usually go first to primary care, although some may be referred by a medical consultant or have already paid for private treatment, including physiotherapy. The physiotherapist will then assess and consider with the patient the treatment options in relation to personal goals and any service constraints. Developments in recent years have included programmes to find better ways of identifying groups of patients most likely to benefit from different activity and matching patients to treatments.

IMPROVING ACCESS

Recent policy developments in the NHS across all four UK countries have recommended national implementation of 'first contact physiotherapists' in general practice, to enable better access for people with musculoskeletal conditions. This builds on evidence that rapid access and early intervention improve the patient experience by streamlining care pathways. Robust implementation strategies are now needed to bring about this service change across the NHS. Rigorous research needs to be responsive to this rapidly changing health environment.

Patient self-referral to NHS physiotherapy has been universally available in Scotland for a number of years. A large study in Scotland in 2007 showed that self-referral to NHS physiotherapy services provided similar patient outcomes to those referred by GPs with quicker access and better adherence to treatment.²⁰

A pilot trial (STEMS) funded by the CSP looked at the feasibility of providing direct access to physiotherapy for adults with musculoskeletal pain when compared to usual access from a GP. Four GP practices were recruited with two remaining as GP-led care and two as GP-led care plus the option of direct access to a physiotherapist. There was good uptake of the direct access option. There was no evidence that it led to increases in waiting time for first physiotherapy consultation and it was found to be safe. A large trial was found to be feasible.

 [READ MORE \(Study A\)](#) 

An ongoing study (STEMS 2) funded by ARUK and others builds on the above pilot trial. It is investigating whether adding direct access to NHS physiotherapy can reduce GP workload, provide a cost-effective alternative to GP-led care and meet the needs of patients.

 [READ MORE \(Study B\)](#) 

PHYSIODIRECT TELEPHONE SERVICE

- » Provided faster access to treatment (waiting time of only seven days versus 34 days)
- » Fewer face-to-face appointments than usual care patients
- » Safe and generally acceptable to patients
- » Recommended by PHE as one of seven preferred musculoskeletal interventions
- » Positive financial return on investment in healthcare savings for every £1 spent

Ensuring timely access to physiotherapy has long been a challenge in the NHS, with waiting times of several months in some areas. A trial funded by the MRC, managed by the NIHR and published in 2013, compared PhysioDirect telephone service with usual physiotherapy care for patients with musculoskeletal problems in primary care. PhysioDirect consisted of an initial assessment and advice session with a physiotherapist over the telephone, with subsequent face-to-face care if necessary. 'Usual care' patients were placed on a wait-list for face-to-face physiotherapy as per usual practice. It was found that both interventions were equally clinically effective. There were small increases in Quality Adjusted Life Years (QALY) associated with PhysioDirect which combined with very small increase in costs meant it was likely overall to be a cost-effective option.



[READ MORE \(Study 2\)](#)



MATCHING PATIENTS TO TREATMENT

Stratified Primary Care for Musculoskeletal Pain

It is a huge challenge for healthcare services, including physiotherapy, to meet the rising demand and workload associated with musculoskeletal pain. A series of studies has developed and tested approaches that stratify patients (or subgroup and match treatment) into those who can be supported to self-manage and those who need more treatment.

These studies suggest many patients have a good prognosis, will recover well without much healthcare treatment and can be supported in self-management. Other patients are identified as having a greater risk of persistent pain and disability and can benefit more from approaches such as supported exercise and pain management programmes. Being able to distinguish between those patients who could be supported to self-manage and those who need more physiotherapy treatment, would help alleviate workload pressures on musculoskeletal services by getting the right patient to the right treatment at the right time, and avoiding unnecessary investigations and treatments that take valuable resource time and are costly.



SUBGROUPING AND MATCHING TREATMENT FOR LOW BACK PAIN

- » Matches patients to treatments based on their prognosis
- » Reduces unnecessary investigations and treatments in those at low risk of developing persistent back pain
- » Saves money for the NHS by reducing GP consultations, referral rates to secondary care, medications and investigations such as MRIs
- » Significantly decreases disability and work absence due to low back pain
- » Recommended by PHE as one of seven preferred musculoskeletal interventions
- » Positive financial return on investment in healthcare savings, QALY and productivity gains for every £1 spent
- » Recommended in NICE low back pain guidelines and national care pathway²¹
- » Screening tool is free to the NHS (www.keele.ac.uk/sbst/startbacktool/)

STarT Back trial was led by researchers at Keele University with funding from ARUK and NIHR infrastructure support. It involves a screening tool to subgroup patients with low back pain based on their risk of developing persistent back pain – low, medium and high risk. It also involves matched treatments for each group of patients. Using both the tool and matched treatments helps reduce over-treatment by directing patients who are at low risk of persistent disabling pain to supported self-management. The healthcare professional gives written information on self-management including advice to keep active and reassurance of a good prognosis, with prescribed pain medication if needed. Patients at medium risk receive a course of physiotherapy treatment, and patients in the high-risk group receive a course of psychologically-informed physiotherapy (a combined physical and psychological intervention).

 [READ MORE \(Study C\)](#) 

The IMPaCT Back study published in 2014, was funded by the Health Foundation with NIHR support. It aimed to determine the effects of implementing the STarT Back stratified care approach for low back pain in GP surgeries and physiotherapy services on healthcare professionals' clinical behaviour, patient outcomes and costs. The study showed stratified care (use of the STarT Back tool and matched treatments) can be implemented into everyday clinical practice. It changes GPs' referral behaviour, leads to improvements in patient disability outcomes and halves time off work, with no increase in healthcare costs.

 [READ MORE \(Study D\)](#)

Further work has been done to use existing research data to try to identify which groups of patients might benefit most from particular treatments. This NIHR programme used data from 19 trials on therapist-led interventions for low back pain to develop a large database. The aim was to identify patient characteristics and sub-groups which might get most benefit from different treatments. Sub-group analyses found the differences in the effect size in different subgroups were typically small and unlikely to be clinically meaningful. The researchers were therefore unable to confidently identify which participant characteristics predict response to different treatments. It was suggested that a different approach is needed to identify and define specific sub-groups which might get most benefit from different treatments. The pooled database that was created remains a valuable resource in low back pain research.

 [READ MORE \(Study 3\)](#)

A current trial (SCOPic) aims to evaluate the clinical and cost-effectiveness of a modified approach to stratified care for patients with sciatica in primary care. Patients randomised to the intervention arm are subgrouped and matched to one of three treatments; brief treatment package of advice and support: for self-management; a course of physiotherapist-led treatment; or 'fast-track' referral to spinal specialists, with an MRI, for consideration of suitability for invasive treatments of spinal injections or surgery. The control group receive usual, non-stratified, primary care. The time to patient reported resolution of sciatica symptoms (either 'completely recovered' or 'much better') is the primary outcome. Qualitative

interviews will determine the acceptability of the 'fast-track' pathway to patients and clinicians.

 [READ MORE \(Study 4\) ongoing](#)

Matching treatment for other musculoskeletal conditions

An NIHR-funded programme of research aims to refine and validate a new screening tool (the Keele STarT-MSK tool) to group patients consulting in primary care with the five most common musculoskeletal pain presentations, into low, medium and high risk of persistent disability for matched treatments. This stratified care approach is aimed at a much broader group of patients (those with back, neck, knee, shoulder and multi-site pain) than the previous STarT Back research. The programme has recently completed the validation of the free to use STarT MSK Tool. A feasibility and pilot trial of stratified care for patients with musculoskeletal pain has recently completed, will report soon and has been used to inform the main, ongoing, randomised trial

 [READ MORE \(Study 5\) ongoing](#)

A further study is reviewing the benefits of exercise for patients with knee osteoarthritis together with other conditions such as asthma, diabetes and heart disease. It is common for people to live with multiple health conditions and these may have different impacts on the individual's function and wellbeing. This study aims to see what is known about the benefits of exercise for people with knee osteoarthritis and other co-morbidities. The results will provide a better understanding as to whether a targeted treatment approach may be beneficial for those with knee osteoarthritis and other health conditions.

 [READ MORE \(Study 6\) ongoing](#)

An individual participant data meta-analysis (STEER OA) funded by the CSP and the NIHR aims to inform new ways to better target and refine exercise programmes for people with knee and hip osteoarthritis. It will update a previous systematic review²² and identify trials that compare the effects on pain and physical function of therapeutic exercise to no-exercise controls. It aims to identify: subgroups of people with knee and hip osteoarthritis that do or do not respond to exercise, or to different types of exercise, and mediators of the effect of exercise for reducing pain and improving physical function. This

will be the first study of exercise and osteoarthritis to combine individual participant data from trials – over 60 trials are sharing data for this study. It will facilitate standardised analyses across studies and increase the ability to identify who benefits most from exercise and the underlying mechanisms of action of exercise.

 [READ MORE \(Study E\)](#)

The SPRAINED study which is soon to report aimed to develop a tool to identify patients with acute ankle sprains whose recovery may be prolonged. The tool will aim to guide clinicians in allocating patients to the most appropriate care pathway which may include additional investigation or early treatment such as physiotherapy for those at higher risk of slow recovery. Reserving early treatment that has previously been found to be effective for those who need it most is likely to result in NHS cost savings and better patient outcomes.

 [READ MORE \(Study 7\)](#)

The PANDA-S ongoing programme of research, co-funded by the NIHR and ARUK, brings together diagnostic and prognostic information to identify subgroups of people presenting with shoulder pain in primary care who are likely to benefit from matched treatments. This will lead to the development of a screening and decision tool for clinicians. As with matching treatment for other musculoskeletal conditions, this approach should improve outcomes for individual patients and may reduce unnecessary investigations and treatments in patients who don't need them. The effectiveness of this approach will then be evaluated in a trial. Patients at low-risk of poor outcome will receive a brief package of reassurance and supported self-management. Patients at higher risk of poor outcome and more likely to experience long-lasting pain will receive treatment or referral matched to their likelihood to respond well.

 [READ MORE \(Study 8\) ongoing](#)

MEASURES OF MUSCULOSKELETAL HEALTH

In addition to tools like the Keele STarT Back tool that also works well as an outcome measure, the MSK-HQ has the potential to become an essential patient-reported outcome measure in musculoskeletal services. It is a short questionnaire that allows people with musculoskeletal conditions to report their symptoms and quality of life in a consistent way. It is designed to be used across different musculoskeletal care pathways in different healthcare settings.

It was developed with participation and feedback from people with musculoskeletal conditions, clinicians, service leads and academics. The aim was to develop holistic indicators that reflect how well services improve quality of life for people with musculoskeletal conditions. The MSK-HQ gives an overall rating of a person's musculoskeletal health, enabling patients and clinicians to monitor progress and response to treatment. Individual components of the score, such as sleep quality can be considered allowing particular aspects of a patient's musculoskeletal health to be addressed. This project was funded by ARUK with NIHR support and the MSK-HQ is free to use for the NHS.

 [READ MORE \(Study F\)](#)

The MSK-PROM study developed and validated patient-reported outcome measures for people with musculoskeletal conditions to improve ways of measuring quality and impact of interventions on health and wellbeing. To make it easier to complete for patients, it excluded domains recorded by standard quality of life measures (EQ-5D-5L). It was published in 2014 and the MSK-PROM demonstrated excellent reliability, construct validity, responsiveness and acceptability to clinicians and patients.

 [READ MORE \(Study 9\)](#)

Patient story – Jennifer Bostock

“I have Ehlers Danlos Syndrome and have had physio for many years, private and NHS and have found it helpful. However, it is not necessarily the easy option. It is time consuming, often boring and nearly always painful. It requires patience and practice and a willingness to perform repetitive exercises at home. It is often the case that pain becomes worse before it improves whilst doing physio. In my experience, research evidence is rarely or never shared with us patients. I think if it were then that might encourage us to take the exercises more seriously if we could see the evidence of them being effective.”



GETTING TREATMENT

Having been assessed, patients can receive appropriate treatment. The role of the physiotherapist in healthcare has changed. Some research explores new responsibilities for practitioners, such as prescribing. Other research looks at areas of activity from advice on staying at work to combining physical activity with psychological support.

Many studies in this section show the range of physiotherapist-led exercise programmes and the effectiveness of different forms of activity, rehabilitation and support. There are also a few projects directed at women's health, from pelvic floor muscle training to back pain in pregnancy and increasing interest in exploring ways in which digital technologies can complement what physiotherapists do. Given the focus on appropriate care, there are several large ongoing studies comparing physiotherapy with surgical interventions for musculoskeletal conditions. This represents a substantive part of the research portfolio and findings should be useful to commissioners, practitioners and patients.

CHANGING ROLES OF PHYSIOTHERAPISTS

Expanding scope

Due to changes in legislation, physiotherapists are now able to train to be independent prescribers of medicines. This project found a lack of evidence on the effectiveness of prescribing by physiotherapists or podiatrists. The physiotherapists surveyed were mainly prescribing medicines for patients within musculoskeletal, orthopaedics, respiratory or pain conditions. Medicine management was involved in 24% of patient consultations, with pain or movement control the primary reason for physiotherapists to prescribe medicines.

Although prescribing by physiotherapists and podiatrists was supported by most patients, a minority expressed a preference for doctors to prescribe their medicines. No safety concerns were found. The research suggests that independent

prescribing by advanced physiotherapy practitioners in order to improve patient care is developing as policy intended. There is some limited evidence to suggest that care is slightly costlier, but this needs to be investigated in detail.

 [READ MORE \(Study 10\)](#) 

There are very few studies on the NIHR portfolio that have looked at service delivery of physiotherapy for musculoskeletal care. This 2004 study reviewed relevant studies on advanced practice roles in AHP groups including physiotherapists. In their advanced practice role physiotherapists were found to be requesting and interpreting investigations, giving a diagnosis and planning a patient's care pathway. The authors found that evidence about the impact of these roles was lacking, with many studies in physiotherapy limited to audits rather than more robust research. Since this study published, there have been substantive changes in the role and numbers of advanced practitioners. More research is needed to evaluate advanced physiotherapy practice, consultant physiotherapy and first-contact practitioner roles within the NHS and their effect on patient health outcomes and the healthcare system.

 [READ MORE \(Study 11\)](#) 

Management and leadership roles

Observational research can provide insights into the lived experience of staff and patients. This ethnographic study looked at AHPs in management and leadership roles. Different professions were examined, but two out of the four study sites (one acute, one community trust) involved physiotherapist leaders. Methods used were observational and qualitative, including a range of interviews, focus groups and shadowing of clinical leads. Researchers identified a number of themes from this observational work. One was the problematic nature of identity for those who were both clinicians and

managers – and often representing a range of AHP groups. There were different management styles observed, associated with gender and professional values, sometimes at odds with a traditional ‘heroic’ model of leadership. Researchers observed problematic transitions from management to leadership in part because of these tensions. They also noted the emotional labour involved and how it was not possible to separate the management from the clinical in these frontline management roles.

 [READ MORE \(Study 12\)](#) 



PHYSIOTHERAPISTS HELPING PEOPLE TO REMAIN AT OR RETURN TO WORK

A brief, physiotherapist-delivered, vocational advice service led to:

- » Fewer days off work over a period of four months (9.3 days versus 14.4 days)
- » Improved confidence in returning to work and improved performance at work
- » Recommendation by PHE as one of seven preferred musculoskeletal interventions
- » Positive financial return on investment for every £1 spent when days of work saved were included

This NIHR-funded trial of work and pain (SWAP) took place in six general practices. It evaluated the effect of a service that identified obstacles to working with musculoskeletal pain and provided vocational advice and support to those who were struggling at work or absent from work for less than six months. The aim was to support patients in remaining at or returning to work. People received either best current practice from their GP or nurse practitioner, who had participated in a one-hour education session (in three practices); or best current practice plus the brief vocational advice service, from a physiotherapist, to address obstacles to working (in the other three practices). The vocational advice service consisted of an initial telephone contact with the patient followed by one or more face-to-face appointments if required. Future research will need to focus on targeting the intervention towards those who will benefit most.

 [READ MORE \(Study 13\)](#) 

Researchers should consider the effects on work when designing trials. In the large NIHR-funded MINT study published in 2012, there were two linked trials for patients with acute whiplash injury who had attended emergency departments. In Study 1, a psycho-educational approach, where emergency department staff emphasised key messages and provided patients with “The Whiplash Book”, was found to be no better than usual care in reducing neck disability. Participants who still had symptoms after three weeks entered the second study and received either a single physiotherapy advice session or a physiotherapist package of up to six sessions. The physiotherapy package was only moderately better at reducing neck disability in the first six weeks and it was not considered cost-effective for the NHS. The physiotherapy package did however result in an estimated 4.2 fewer work days lost at four months and this effect persisted at eight and 12 months.

 [READ MORE \(Study 14\)](#)

COMBINING PHYSICAL AND COGNITIVE BEHAVIOURAL THERAPY INTERVENTIONS

- » Decreased low back pain and disability over 1-year
- » Recommended by PHE as one of seven preferred musculoskeletal interventions
- » Positive financial return on investment for every £1 spent when QALYs included

A cognitive behavioural therapy study which included exercise for patients with low back pain, was funded by ARUK. An information booklet and audio-cassette containing advice on self-management were provided to all participants. The intervention was eight two-hour sessions over six-weeks consisting of education and exercise delivered in a group setting (four to 10 participants) by physiotherapists using a cognitive behavioural approach. The comparison arm received no additional intervention and continued to be treated as usual through their GP. There were modest effects of the cognitive behavioural therapy including exercise programme in decreasing low back pain and disability over one year. The programme did not result in productivity gains (days of work saved) and was not found to have a positive financial return on investment in relation to healthcare costs.

 [READ MORE \(Study G\)](#)

COMBINED PHYSICAL AND PSYCHOLOGICAL APPROACH

This NIHR study on back skills training (BeST trial) found that group-based cognitive behavioural therapy for patients with subacute and long-term low back pain led to:

- » Decreased disability and improved physical health-related quality of life
- » Improvements which were sustained or increased over 12-months and still there at 3-years
- » Changes which were cost-effective
- » Services which could be implemented within the NHS with relative ease
- » Practice changes – combined physical and psychological interventions now feature in recommendations of all major low back pain guidelines
- » Influence elsewhere - findings have also been replicated in the USA

This trial involved 56 GP practices in 7 English regions. It compared active management in general practice versus active management plus a group-based, professionally led cognitive behavioural approach. The trial involved training predominantly physiotherapists to deliver the combined physical and psychological approach. Active management was consistent with best practice in primary care discouraging bed rest and advocating physical activity. It was delivered by nurses at a 15-minute session and included a copy of an information booklet - The Back Book, which had facilitated implementation of the active management guidelines in the UK. In the cognitive behavioural approach each participant had an initial assessment (up to 90 minutes) followed by six (90 minute) group sessions. These sessions included goal setting, pacing, challenging beliefs, managing pain and improving communication with health professionals. This group-based cognitive behavioural therapy intervention is used within the STarTBack programme of care or can be used stand alone.

The Oxford CLAHRC has funded the implementation of an online version of the training programme in the combined physical and psychological approach from this trial.

 [READ MORE \(Study 15\)](#) 

Cognitive behavioural therapy is considered to potentially offer more long-term help to people with persistent or recurrent musculoskeletal pain than more traditional treatments. Acceptance and commitment therapy is a new type of cognitive behavioural therapy that has been shown to be effective in chronic pain. The lack of clinical psychologists means that training physiotherapists in this approach could help widen patient access. The primary aim of this ongoing trial is to see whether acceptance and commitment therapy, when delivered by a physiotherapist, can help improve patient outcome in people with chronic low back pain compared with usual care. Results of the trial are expected soon.

 [READ MORE \(Study 16\) ongoing](#) 

EXERCISE AS A CORE TREATMENT IN ALL MUSCULOSKELETAL CONDITIONS

Exercise is a core part of physiotherapy interventions and underpins much of the physiotherapy related research found on the NIHR portfolio. A systematic review in 2013²² carried out as part of a large NIHR programme (**Study 17**) concluded there is clear benefit of exercise in patients with lower limb osteoarthritis, particularly knee osteoarthritis, when compared to no exercise controls. The review identified 60 trials (44 knee, two hip, and 14 mixed), involving 8218 participants and 18 exercise interventions.

From 2002 there has been good evidence to demonstrate significant benefit of exercise over non-exercise controls. The review suggests for pain relief: strengthening, flexibility plus strengthening, flexibility plus strengthening plus aerobic, aquatic strengthening, and aquatic strengthening plus flexibility exercises were more effective than no exercise controls. For improving function: a combined intervention of strengthening, flexibility and aerobic exercise was more effective than no exercise controls. It can be concluded that an exercise programme that combines strengthening, flexibility and aerobic

exercise is most likely to improve pain and function.

Further studies comparing exercise to no exercise seem unnecessary in patients with knee osteoarthritis. More research is needed comparing exercise with non-exercise controls in other body regions affected by osteoarthritis, such as the hip, hand, foot, shoulder and back. Studies are needed that identify ways to support sustained exercise adherence, that investigate the long-term clinical and cost-effectiveness of exercise, and to identify which patients benefit most from exercise.

Exercise as treatment for knee pain

Following this review, a large trial – the BEEP trial (**Study 17a**) – was funded as part of the NIHR programme of work (**Study 17**) aiming to address some of these uncertainties. It compared three physiotherapy-led exercise approaches for older adults with knee pain and/or stiffness with a clinical diagnosis of osteoarthritis. Patients either received individually-tailored lower limb exercise (six to eight treatment sessions over 12 weeks), targeted exercise adherence (supporting a transition from lower limb exercise to general physical activity in eight to 10 treatment contacts over six months), or usual physiotherapy care for knee pain (up to four sessions of advice and exercise over 12 weeks). All sessions were delivered by physiotherapists.

On average, patients allocated to all three interventions reported moderate improvements in pain and function at six months, and the benefits remained at 18 months. There were no significant differences in pain and function between the three interventions. Exercise adherence was similarly high across all groups at three months but was higher for longer in the targeted exercise adherence group. The two enhanced physiotherapy interventions were costlier and slightly less effective in terms of general health-related quality of life than usual physiotherapy care. The analysis concluded that usual physiotherapy care was likely to be the most cost-effective option for the NHS.

 [READ MORE \(Study 17a\)](#) 

This BEEP trial was part of a large NIHR programme of research from 2008-2014 aimed to improve the management and health of patients with osteoarthritis in primary care and improve the potential for healthy ageing. It looked at how best to prioritise osteoarthritis care among patients, health professionals and the NHS, and how to make interventions more effective and more widely available. It had multiple work streams, including investigating how to find the right exercise routine for people and how best to maintain it over time (BEEP) and work to develop a “model consultation” and guidebook to use when seeing patients with joint pain (MOSAICS). In a trial of this approach, although it did not change health function at six months, it did increase the uptake of physiotherapy and uptake of core NICE recommendations such as

written advice on osteoarthritis, exercise and weight management. (Study 17b). Another trial as part of this programme tested whether prompting general practitioners to check for anxiety and depression in people presenting with osteoarthritis improved pain outcomes. The researchers concluded that there was no benefit for osteoarthritic pain when GPs routinely screened for and managed comorbid anxiety and depression. (Study 17c). Both were large trials in general practice settings, illustrating the growing number of research studies on musculoskeletal health in out of hospital settings in recent years.

 [READ MORE \(Study 17\)](#) 

INTEGRATED REHABILITATION FOR CHRONIC KNEE PAIN

ESCAPE-knee pain is a group-based rehabilitation programme for people with chronic knee joint pain. A trial funded by ARUK showed large initial improvements in physical function, which declined over time but represented a positive financial return on investment.

At 30 months after completing the programme:

- » ESCAPE-knee pain participants still had better physical function
- » ESCAPE-knee pain participants had lower community-based health care costs, medication costs and total health and social care costs

Since the evaluation, this intervention has been:

- » Recommended by PHE as one of seven preferred musculoskeletal interventions
- » NICE and QIPP approved
- » Endorsed and recommended by ARUK and NHS Right Care
- » Awarded an NHS Innovation Accelerator award which will help roll-out the programme with the Academic Health Science Networks in England

- » Supported by ARUK to achieve widespread scale up
- » Introduced in community leisure centres, reducing the strain on physiotherapy staff and NHS facilities

The programme is individualised for each participant, integrating progressive exercises with education on self-management and strategies to help cope with pain and dispel negative health beliefs and encourage regular physical activity. Participants receive 12 supervised sessions, twice weekly for six weeks. They are discharged with advice on continuing home exercises and a physical activity like walking. The trial compared ESCAPE-knee pain with usual GP care and effects at six months. A 30-month follow up of patients has also been reported.

It saves money for the NHS as it reduces GP consultations, medical referrals and investigations like X-rays and MRI scans. In addition, participants take fewer pain-killers.

 [READ MORE \(Study H\)](#) 





Escape Pain: Arlene's story*

Arlene Rowe used to suffer from terrible pain because of her osteoarthritis and found her life becoming more and more restrictive.

"I first visited my doctor because I was having severe problems with my knees, hip and arm. I was in tremendous pain. I couldn't use my left arm fully and had started walking in an odd way. I found it difficult to go up and down stairs or get on trains and I wasn't sleeping because of the pain. I was given steroid injections and asked to consider having an operation on my hip and knees which I really didn't want to do. So I went back to my doctor. He referred me to a physiotherapy specialist who suggested I might be a suitable candidate for the ESCAPE-pain programme. When I started the programme I couldn't see how the pain in my limbs was going to go. But I was ready to try anything. Since being on the ESCAPE-pain programme my life has changed massively. My first goal was just to stand straight. Now I'm not hunched over and I'm beginning to walk properly. I'm still stiff, I've still got arthritis but what I don't have is the pain. Occasionally I get twinges but nothing that makes me miserable. I'm not afraid to go out, I'm not afraid to cross the road and I can get on and off the bus and the train. Being able to sleep at night is wonderful; now I can sleep, I can think clearly. So I feel better mentally as well as physically."

*Courtesy of the Health Innovation Network, the Academic Health Science Network for South London"

A 2004 study evaluated home exercises involving 214 patients with osteoarthritis of the knee. It tested whether a home-based exercise programme supplemented with structured classes delivered by a physiotherapist (twice a week for eight weeks) in a hospital outpatient physiotherapy department, was better than just a home-based exercise programme. Patients in both groups were found to be compliant with the home-based exercises. Those in the home-based and classes group had greater improvement in walking, pain while walking, balance and lower limb strength. As most patients with osteoarthritis of the knee are managed in primary care, the researchers recommended further studies to look at implementing home-based exercise programmes in primary care.

 [READ MORE \(Study 18\)](#)

A 2015 Cochrane review evaluated 31 trials of exercise therapy that aimed to improve knee pain and function for people with patellofemoral pain. It found consistent evidence that exercise therapy results in clinically significant reduction in pain and improvement in function in studies which compared exercise therapy with no treatment. Hip and knee exercises appear to be better in improving pain than just knee exercises. The evidence was however of low quality and the best form of exercise therapy is unknown. There is opportunity for physiotherapists to design high quality trials in this very commonly seen knee condition.

 [READ MORE \(Study 19\)](#)

A new NIHR trial is planned to compare best primary care with and without use of a knee brace for people with knee osteoarthritis. Both groups will receive best primary care with advice on self-management, including pain management and exercises from a physiotherapist. In addition, some will also receive a knee brace with follow-ups to check use of the brace. Over 400 patients should take part in this trial which starts later in 2018.

 [READ MORE \(Study 20\) ongoing](#) 

The TargET knee-pain proof-of-principle study, published in 2016, consisted of a physiotherapist teaching an individually-tailored 12-week home exercise programme targeted at weak quadriceps, decreased knee range of motion and poor balance. A physiotherapist also made six home visits alternated with six telephone calls to encourage adherence to the programme. Participants were found to have significant improvements in quadriceps isometric strength, but not in knee range of movement or balance. There were modest improvements in self-reported pain and function.

 [READ MORE \(Study 21\)](#) 

Exercise as treatment for other conditions

This soon to be completed feasibility and pilot trial investigated a personalised exercise programme and shoe insoles in the treatment of plantar heel pain. Pain under the heel is relatively common condition with one in 10 adults affected during their lifetime. It restricts the ability to walk, complete everyday tasks and work, and can last for 18-months or more. Evidence is lacking to inform clinical decisions about effective treatments. In this trial participants are: randomly assigned to one of four interventions high quality self-management advice booklet (control arm); self-management advice booklet, plus personalised exercise programme; self-management advice booklet, plus prefabricated shoe insoles used for a minimum of four hours a day; or self-management advice booklet, plus a combination of exercise and shoe insoles. The exercise and foot insole groups will receive six treatment sessions over 12 weeks from podiatrists or physiotherapists. The results will be used to inform the design of a full trial.

 [READ MORE \(Study 22\) ongoing](#) 

A small feasibility and pilot trial in joint hypermobility syndrome in adults, compared a single advice session plus advice booklets, with advice plus the addition of six 30-minute one-to-one physiotherapy sessions supported by a handbook. The additional physiotherapy aimed to increase patients' physical activity by improving understanding and self-management skills. Both the advice and physiotherapy interventions were rated positively and a full RCT was considered feasible.

 [READ MORE \(Study 23\)](#) 

In older age, low back pain is associated with decline in mobility, frailty and falls leading to loss of independence. Research into low back pain has often focused on younger people. This programme of research "Better Outcomes for Older people with Spinal Trouble (BOOST)" will refine and evaluate a physiotherapy intervention for low back pain in older people with neurogenic claudication (leg pain and / or tingling when standing or walking) due to lumbar spinal stenosis (narrowing of the spinal canal or where nerves exit the spine). Physiotherapy will include the most up to date knowledge of exercise, behavioural and pain management strategies. A feasibility study will test the physiotherapy intervention and inform a full trial. A prognostic tool will also be developed to identify the lower back pain presentation likely to result in poor outcomes related to mobility, disability, frailty and falls. The aim of the trial is to improve outcomes in these factors. MRI of the spinal canal will be used to help determine who will respond best to physiotherapy treatment. GPs will also be asked about their attitudes and beliefs on managing low back pain in older patients.

 [READ MORE \(Study 24\) ongoing](#) 

HAND EXERCISES FOR RHEUMATOID ARTHRITIS

In 2015, an NIHR funded trial reported whether usual care plus strengthening and stretching for people with rheumatoid arthritis of the hands (SARAH) was better than usual care alone.

- » The study took place in 17 NHS trusts in England
- » Exercise programme was found to be clinically and cost-effective
- » Hand function was better in the exercise group
- » Therapist input was found to be crucial in patients incorporating exercises into their lives
- » Tailored hand exercise programme is an excellent, low-cost intervention to provide alongside a patient's drug regimen

The exercise programme consisted of six exercise sessions with a hand therapist (physiotherapist or occupational therapist), daily home exercises and strategies to maximise adherence. Usual care consisted of joint protection education and general exercise advice. Following this trial, an NIHR-funded implementation study is taking place in twelve trusts, with resources and support for further scale-up.

 [READ MORE \(Study 25\)](#) 



A current trial is evaluating a supervised gait rehabilitation programme for adults with rheumatoid arthritis of less than two years' disease duration, who have foot and/or ankle pain and/or synovitis. Participants will receive usual care; or usual care plus supervised physiotherapy-led or podiatry-led gait rehabilitation of two to six, one-to-one treatment sessions over 12 weeks. The aim is to improve balance, strength and walking. Rehabilitation will

include supported home-based gait rehabilitation and promotion of positive behaviour change, supplemented by telephone-based sessions to encourage adherence and provide advice on progression. Usual care will be rheumatology medical management and referrals to physiotherapy and/or podiatry as required.

 [READ MORE \(Study 26\) ongoing](#) 

PHYSIOTHERAPY, SURGERY AND INJECTION THERAPY

In the shoulder

Most patients who seek treatment for shoulder pain receive treatment from GPs or physiotherapists. Seven times more patients, though, are having surgery compared with 10 years ago, yet evidence that surgery provides better results than treatments such as shoulder exercises is lacking.

Systematic reviews are useful to identify the effectiveness of treatments that may help to inform clinical practice and research. In this review of 31 studies published in 2012, the researchers found there was limited evidence on the clinical and cost effectiveness of treatments for a common musculoskeletal condition found in the shoulder – “frozen shoulder”. Treatments included steroid injection, sodium hyaluronate, supervised neglect, physiotherapy, acupuncture, manipulation under anaesthesia, distension and capsular release. Studies were commonly of poor methodology with often small numbers of participants. No studies looked at patient views about treatments and there was little evidence related to the stage of condition, treatment pathways and impact on quality of life. There is opportunity for wide ranging high-quality research on frozen shoulder.

 [READ MORE \(Study 27\)](#) 

The UK FROST study will compare early structured physiotherapy delivered over a 12-week period; manipulation under anaesthesia supplemented with a steroid injection; or keyhole surgery with manipulation under anaesthesia for treating frozen shoulder. The physiotherapy package will include an information leaflet containing education, advice on pain management and function, a steroid injection into the joint, ‘hands-on’ mobilisation techniques and instruction on a graduated home exercise programme progressing from gentle pendular exercises to firm stretching exercises. Measures of pain, function and general well-being will be recorded, and an economic evaluation will be conducted. Participants and healthcare professionals will be asked about their experiences and views on treatments. The aim is to recruit 500 participants with a clinical diagnosis of frozen shoulder from 25 NHS hospitals.

 [READ MORE \(Study 28\) ongoing](#) 

The SUPPORT trial evaluated four treatments for subacromial impingement syndrome which is a very common cause of shoulder pain, where a tendon (band of tissue connecting bone to muscle) inside the shoulder rubs or catches on nearby tissue and bone as the arm is lifted. Treatments were ultrasound-guided injection and physiotherapist-led exercise; ultrasound-guided injection and an advice and exercise leaflet; unguided injection and physiotherapist-led exercise; or unguided injection and an advice and exercise leaflet. The physiotherapist-led individualised, supervised and progressed exercise provided greater improvements in pain and function than a standardised advice and exercise leaflet. Ultrasound-guided injection provided no additional benefits over unguided injection.

 [READ MORE \(Study 29\)](#) 

Another trial is comparing the effectiveness of different treatments for rotator cuff disorders. Participants with a new episode of shoulder pain attributable to a rotator cuff disorder will receive either progressive exercise (up to six sessions); best practice advice (one session); progressive exercise and corticosteroid injection; or best practice advice and corticosteroid injection. The primary comparison will be shoulder pain and disability at 12 months.

 [READ MORE \(Study 30\) ongoing](#) 

An NIHR funded systematic review and network meta-analysis aimed to provide evidence of the comparative effectiveness of conservative treatment (e.g. advice and education, medication, exercise therapies including physiotherapy) and surgery in managing subacromial shoulder conditions. Particular outcomes of interest were pain and function. In a summary of initial findings already presented, 142 trials of 21 different treatments were identified. A total of 10,589 patients were included in the meta-analysis. Treatment options were ranked based on their effectiveness at <6 weeks, up to three months and greater than six months follow-up times. There were only small differences between the effectiveness of different treatments. Physiotherapy interventions (including patient education and advice, and exercise) were as effective as other types of treatment. Considerable heterogeneity was found, as trials tested treatments in isolation or combination, with wide variation in follow-up times. Many studies also had small sample sizes. The study has helped identify gaps in evidence and establish priorities for future

research. Specifically, the findings have informed a programme of research (PANDA-5) funded by the NIHR and ARUK (Study 8), which aims to design and evaluate a model of stratified care for shoulder pain.

 [READ MORE \(Study 31\) ongoing](#) 

In the knee

Following a total knee replacement, physiotherapy is routinely provided in hospital to help recovery before discharge. Approximately 20% of patients will have significant long-term pain and disability after joint replacement. Physiotherapy is important for recovery because it can help improve movement and strength, allowing patients to gain the maximum benefit from surgery. There is wide variation in practice as to whether physiotherapy is provided after discharge. Evidence suggests physiotherapy after discharge from hospital can improve functional outcomes up to three-months post knee replacement, but long-term benefits of physiotherapy are not known. As part of a programme of research aimed at improving patient experience and outcomes following total hip or knee joint replacement for osteoarthritis, a novel outpatient group-based physiotherapy programme was developed. This approach was in part based on reviews of the relevant literature, and by gaining an understanding of the patient experience and 'journey' through a total joint replacement.

 [READ MORE \(Study 32\)](#) 

As part of this work, it was found that a full trial was feasible, and the intervention acceptable to patients. This full trial aims to establish if physiotherapy given post-discharge can help patients gain a better long-term functional outcome after total knee replacement. It will evaluate the effectiveness of a six-week group-based outpatient physiotherapy intervention after knee replacement surgery. Patients will either receive usual care (a booklet about exercise and referral to physiotherapy if needed) or usual care, plus group-based physiotherapy class starting six weeks after surgery. This class will be every week for six weeks. Patients will practice individualised exercises and task-related exercises such as walking, kneeling and stair climbing. The primary outcome will be self-reported lower limb function at 12 months after surgery.

 [READ MORE \(Study 33\) ongoing](#) 

The CORKA project aims to investigate community-based rehabilitation after knee replacement and develop a screening tool to identify patients at risk of poor outcomes. A systematic review and an online survey will be used to identify factors linked to poor outcomes. The study will also look at data on outcomes after lower limb joint replacement from a previous NIHR funded study.²³ The information gained will be used in a subsequent trial of exercise-based home rehabilitation that will target patients most at risk of poor outcomes. Occupational therapy will focus on a pre-operative assessment with adaptations made to patients' homes to ensure the environment is safe for the home-based programme. Exercises will aim to mobilise and improve strength, and treatment will also include advice on pain management, confidence building, gait and the home environment. Generic rehabilitation assistants will be used to assist physiotherapists with the delivery of the intervention, an approach used successfully in community-based therapy trials. The control group will receive up to six sessions of out-patient physiotherapy. Researchers will assess the effectiveness of the intervention, as well as exploring views and experiences of patients.

 [READ MORE \(Study 34\) ongoing](#) 

In a study comparing non-surgical to surgical treatment of non-acute anterior cruciate ligament deficiency of the knee, patients receive either a specific rehabilitation programme to rebuild muscle strength, joint mobility and maintain levels of activity (with the option for later surgery) or surgical anterior cruciate ligament reconstruction. The researchers aim to recruit 320 patients from 30 NHS orthopaedic units and an initial pilot phase has been completed confirming feasibility of the main trial. Participants will be followed up at 18-months and measures will include pain, symptoms, difficulty in sports and recreational activities, and knee related quality of life and cost-effectiveness.

 [READ MORE \(Study 35\) ongoing](#) 

In the hip

A trial published in 2013 found that a tailored physiotherapy rehabilitation programme was more effective than standard post-operative physiotherapy at improving function, hip movement and health-related quality of life at one-year in patients who had metal-on-metal hip resurfacing surgery.

 [READ MORE \(Study 36\)](#) 

WOMEN'S HEALTH AND PHYSIOTHERAPY EXERCISE

This trial has evaluated the effectiveness of hip arthroscopic (keyhole) surgery compared to physiotherapist-led personalised hip therapy for impingement in the hip (known as femoroacetabular impingement syndrome). This is a painful condition that can occur when the ball of the joint is more egg shaped than round causing it to rub unevenly against the socket. This causes progressive damage to the cartilage lining the socket, increasing pain and loss of movement, and tends to affect young active people. Patients were over 16 years with hip or groin pain and radiographic signs of the condition. Participants received either hip arthroscopy to repair the damage to the hip and to reshape the ball to make it round again, or personalised hip therapy (an individualised, supervised, and progressive physiotherapist-led programme of between six to ten contacts over 12–24 weeks). The primary comparison was hip related quality of life at 12-months. Both groups led to improvement in quality of life, but improvement was significantly more in those treated with arthroscopic surgery. Hip arthroscopy was however more expensive and at 12-months was not found to be cost-effective compared to physiotherapist-led personalised hip therapy.

 [READ MORE \(Study 37\)](#) 

In the low back

This study published in 2018 looked at whether it was feasible to investigate if physiotherapy for patients with lumbar radicular syndrome (sciatica) resulted in fewer patients requiring surgery. At one week before surgery, three patients of 30 patients in the non-physiotherapy group and five out of 29 patients in the physiotherapy group did not require surgery. Although this was a small feasibility study and not powered to demonstrate effectiveness, patients in the physiotherapy group had a greater improvement in pain scores, disability and health-related quality of life. In a linked qualitative report of the study reported in 2016, patients with sciatica commonly reported positive experiences of physiotherapy. These findings should encourage research into conservative treatment for patients with sciatica, as an adjunct to or as an alternative to surgery.

 [READ MORE \(Study 38\)](#) 

This Themed Review also highlights a small number of physiotherapy related NIHR-funded studies in women's health. The research relates to pelvic floor muscle training recommended by NICE as treatment for urinary incontinence.

A study found physiotherapy pelvic floor muscle training with or without electric stimulation improves sexual function in women with urinary incontinence.

 [READ MORE \(Study 39\)](#) 

Another study is comparing pelvic floor muscle training versus biofeedback-mediated intensive pelvic floor muscle training on the severity of urinary incontinence in a new episode of stress or mixed urinary incontinence. Using biofeedback may increase women's self-efficacy for pelvic floor muscle training and hence their adherence, resulting in improved treatment response.

 [READ MORE \(Study 40\) ongoing](#) 

Individualised pelvic floor muscle training by specialist physiotherapists is effective in improving symptoms of prolapse and quality of life. Its implementation remains limited, partly due to lack of specialist physiotherapists. This project will study implementation and outcomes of different models of pelvic floor muscle training delivery to increase service provision across three NHS sites. It will provide training of the exercise programme to new groups of staff (including nurses and other physiotherapists). A process and economic evaluation will assess implementation and outcomes of the different delivery models.

 [READ MORE \(Study 41\) ongoing](#) 

Another study is aiming to facilitate implementation of antenatal pelvic floor muscle exercises and reduce urinary incontinence after birth. A motivational training programme and toolkit will be developed to enable midwives to help pregnant women to correctly and regularly perform pelvic floor exercises. A trial will evaluate the training programme. It is hoped that a toolkit will be produced for healthcare professionals and be available for women on NHS websites and social media.

 [READ MORE \(Study 42\) ongoing](#) 

ACUPUNCTURE IN LOW BACK PAIN AND KNEE PAIN DUE TO OSTEOARTHRITIS

Although acupuncture is not currently recommended in UK guidelines for people with low back pain or in osteoarthritis, continued research will help inform future updates of guidelines.

A feasibility and pilot trial that reported in 2016 tested the benefit of adding acupuncture to standard care for pregnancy-related back pain. Pregnant women received either standard care consisting of advice and self-management booklet; standard care plus true-acupuncture delivered by physiotherapists; or standard care plus non-penetrating acupuncture delivered by physiotherapists. Standard care consisted of a self-management booklet and two to four, one-to-one physiotherapy sessions if needed. Acupuncture consisted of the self-management booklet, advice and exercise, and six to eight treatments with a physiotherapist comprising either true-acupuncture or non-penetrating acupuncture. Exploratory analysis suggested benefits from acupuncture over standard care for both pain and function, and potential benefits of true-acupuncture over non-penetrating acupuncture for function. There were no serious adverse events on mothers or birth outcomes. It was concluded that a future full-trial is feasible.

 [READ MORE \(Study 43\)](#) 

A pilot and feasibility trial based in GP practices looked at the effect of giving acupuncture within a group setting, or individually, for patients with severe knee pain due to osteoarthritis. Patients received either standard advice and exercise booklet; booklet plus group acupuncture; or booklet plus individual acupuncture. Both acupuncture groups were given up to 10 treatments over 12 weeks. Greatest pain improvement was found with group acupuncture. The results of the study suggest that a definitive trial of group acupuncture is feasible for patients with severe knee pain.

 [READ MORE \(Study 44\)](#) 

PHYSIOTHERAPY GOES ONLINE

Use of digital web-based health intervention has been highlighted in some recent NIHR musculoskeletal funded studies.

A qualitative study published in 2017 aimed to evaluate the acceptability of a web-based tool (TRAK) to support rehabilitation after anterior cruciate ligament reconstruction. TRAK was used together

with face-to-face physiotherapy and was found to increase patient confidence and motivation for rehabilitation.

 [READ MORE \(Study 45\)](#) 

This feasibility study developed an internet-based intervention 'SupportBack' for use in primary care to encourage patients with low back pain to self-manage and remain active. 'SupportBack' is a six-week, tailored programme that received positive feedback and useful amendments suggested from participants, that is now being tested in the full trial below.

 [READ MORE \(Study 46\)](#) 

The trial is comparing the effectiveness of "SupportBack" and a physiotherapist intervention for low back pain. Participants will receive either usual care and internet intervention; usual care, internet intervention and physiotherapist telephone support; usual care alone. "SupportBack" is a six-week internet intervention offering behavioural self-management support focusing on graded goal setting, self-monitoring and tailored feedback to encourage physical activity. The physiotherapist telephone support consists of three brief phone calls to provide reassurance and address any concerns. The primary comparison will be low back disability.

 [READ MORE \(Study 47\) ongoing](#) 

PATIENTS HAVING CHOICE IN THEIR TREATMENT

A pilot trial set in a community physiotherapy service evaluated a decision support package to help people choose between low back pain treatments. The decision support package consisted of a patient booklet detailing the available treatment options - exercise, manual therapy, acupuncture and a cognitive behavioural approach. The booklet also provided answers to the frequently asked questions associated with each option. This was posted ahead of the participant's first consultation and used as a basis for discussion when they attended. The decision support package had an unexpected negative effect on clinical outcomes in terms of patient satisfaction with treatment after four months. It is possible that the decision support package led to uncertainty about the effect of available treatment options and therefore reduced any expectation of benefit.

 [READ MORE \(Study 48\)](#) 

STAYING WELL

Musculoskeletal conditions can be long-term and affect people over many years. While helping to resolve immediate problems, physiotherapists also play an important role in helping people stay well and active over time. Prevention, early intervention, treatment and rehabilitation are not always discrete areas of activity. Research has been presented in sections following the patient pathway, but many studies span a number of these areas. Across all aspects of care, a key role for the physiotherapist is to provide motivation and support for people to continue with exercises and activity outside the clinic. Self-management is an important part of any long-term condition and physiotherapists are part of the musculoskeletal team who help people living with these problems over time. This section covers research looking at adherence to exercise and the role of the physiotherapist in health promotion and prevention, as well as particular studies on the portfolio around older people and around exercise for people with cancer.

CHALLENGES OF LONG-TERM ADHERENCE TO EXERCISE

Exercise is a recommended core treatment for musculoskeletal conditions, but short-term benefits of exercise are often lost due to poor longer-term adherence to exercise. Improving exercise adherence therefore remains a research priority. This systematic review is looking at interventions to improve adherence to exercise for chronic musculoskeletal pain in adults. It is updating the previous version published in 2010 which had shown uncertainty about effective ways to improve exercise adherence. It is expected that 30-40 additional trials will be added to this current review. This aims to address the existing uncertainty and help inform clinicians of the optimal ways to improve exercise adherence.

 [READ MORE \(Study 49\) ongoing](#) 

PHYSIOTHERAPIST ROLE IN HEALTH PROMOTION

Physiotherapists should be actively engaged in advising patients on their health and wellbeing. There remains a need to build on their current achievements and better develop their role in health promotion. Physiotherapists will increasingly become the first (and for many the only) point of contact with musculoskeletal services in both primary and secondary/intermediary care – therefore there is an obligation to provide health promotion within these roles. Developing post-registration education to support the public health role of physiotherapists may be an interesting area for PHE and other stakeholders to explore further.

A small scoping study on the place of public health learning in AHPs pre-registration education showed a desire to do more to develop AHPs role in preventative healthcare.²⁴

A review published in 2011 that looked at studies that had investigated the role of AHPs in health promotion found that it is a routine part of practice, but poorly planned with little evaluation. The research highlighted the need to develop health promotion by physiotherapists in a more organised way. It reported that physiotherapists tended to subscribe to a biomedical model and that they should be educated to see health promotion as a complex intervention requiring also a behavioural change approach.

 [READ MORE \(Study 50\)](#) 

Patient story – David Symes

"I am a sixty-eight year old man with a number of complex long-term conditions, some of which led to me needing to have both hips replaced and further hip revision operations. I now attend two balance sessions each week at local gyms and I follow a home exercise programme. Together these help to improve my strength, gait and balance. I cannot grumble about my experiences of pre and post-operative physiotherapy because it helped me quite well in the short-term. However, I believe that I could have benefitted greatly from a multi-professional assessment every ten years or so, had such a service been available. I would include podiatrists and orthotists as part of this team. I have had repeated difficulties accessing these services in a timely manner and believe the delays made my musculoskeletal problems worse. I sense that my fellow patients at the weekly gym group sessions are unrepresentative of the wider population. They tend to come disproportionately from professional and well-informed backgrounds. However good or well-staffed physiotherapy services are and however well they follow evidence-based methods I think the outcomes for patients will continue to depend on ease of access, waiting times and the degree of team working with other professionals."



People with long term musculoskeletal pain have increased risk of developing other health conditions and early mortality compared to people without pain. Despite evidence supporting physical activity in reducing these risks, there has been limited review of evidence. This review funded by the Public Health Agency in Northern Ireland examined the components of physical activity interventions and their effectiveness in improving levels of physical activity. There was found to be some evidence, mostly from poor quality studies, showing the effectiveness of interventions in improving levels of physical activity using self-reported measures. Future studies should include objective measures of activity and provide greater details on physical activity interventions.

 [READ MORE \(Study 1\)](#)

The NHS commonly offers a primary care referral system for patients with a medical condition that will benefit from exercise. This may involve a 10-12 week programme of supervised aerobic and resistance exercise tailored to individual needs, at a council run health club or physical activity counselling support. Unfortunately, the uptake and adherence can be low and there is uncertainty about long-term change in physical activity. This ongoing study is a multi-centre trial evaluating the use of a web-based e-coach behavioural support in individuals with a medical condition including musculoskeletal disorders. Patients will receive either standard care (structured exercise or physical activity counselling), or standard care plus e-coach support. Outcomes in meeting recommended physical activity guidelines after a year will be compared.

 [READ MORE \(Study 51\) ongoing](#)

STAYING WELL IN OLDER AGE

There has been a recent NIHR Themed Review Research on older people living with frailty in hospital²⁵ which discusses falls, immobility and exercise in older people and an earlier review on research in care homes, including some related studies such as occupational therapy interventions for residents. Duplication of research in this current review has been avoided.

Physical activity levels in care homes

Care home residents spend the majority of their time inactive. This programme of research aims to develop strategies to increase physical activity in

residents of care homes to improve their physical, psychological and social wellbeing. Although physiotherapists could provide expertise on the best ways to deliver exercise to increase activity levels, their limited availability makes this an unrealistic option for many care homes. The researchers will first undertake observations and interviews in care homes to assess current levels of activity and to consider how an intervention could be incorporated into daily life, as well as looking at any barriers to change. A physical activity implementation package including training materials will be designed and tested in a feasibility study. This will also assess ways of measuring outcomes, such as use of accelerometers. Physical function, mood and quality of life will be recorded, and the results will inform a future full trial.

 [READ MORE \(Study 52\) ongoing](#)

MAINTAINING MUSCULOSKELETAL HEALTH AND WELLBEING IN PEOPLE WITH CANCER

This Themed Review also highlights a small number of physiotherapy related NIHR-funded studies in cancer. Cancer is now commonly a long-term condition and all clinical areas of physiotherapy are involved in caring for patients with cancer. The common theme to these ongoing physiotherapy related NIHR-funded research is the use of exercise in the management of patients with cancer. These NIHR-funded studies aim to inform progression to full trials.

PREeMPT will test the feasibility of conducting a trial of a personalised pre-transplant exercise programme under supervision of a physiotherapist for patients awaiting stem cell transplantation. Participants are required to attend the gym once/twice a week for a minimum of six weeks. Questionnaires and walking tests will be recorded and patients' views and experiences of the "prehabilitation" exercise programme will be explored.

 [READ MORE \(Study 53\) ongoing](#)

The BETTER study aims to develop an isometric-resistance exercise programme for patients undergoing elective abdominal and thoracic surgery for oesophageal and stomach cancer. Resistance exercise could help combat muscle wasting following surgery, improving physical function including breathing. The researchers aim to determine the most

suitable exercise programme for use in hospital and at home, and how best to measure physical function. Views of patients and clinicians will be explored.

 [READ MORE \(Study 54\) ongoing](#) 

Women who undergo surgery for breast cancer are at high risk of developing shoulder problems if surgery includes extensive axillary involvement or postoperative radiotherapy; if there is limited pre-operative shoulder movement; and in those with obesity. The aim of the “Prevention Of Shoulder Problems Study (PROSPER)” is to evaluate early physiotherapy-led supervised exercise to prevent shoulder conditions in patients after breast cancer surgery. The study will examine shoulder and hand function, and explore acceptability of the intervention.

 [READ MORE \(Study 55\) ongoing](#) 



FUTURE RESEARCH

This review provides an overview of research by the NIHR on the effectiveness of physiotherapy in musculoskeletal care. We have also featured some relevant landmark studies in this area funded by Arthritis Research UK and the Chartered Society of Physiotherapy. Much interesting research has been published and is underway. The last ten years has seen enormous advances in the evidence base and the system to support research and researchers. This review has shown examples of a joined-up system, where we can move from funding feasibility studies of promising initiatives to full trials and implementation studies, or from developing an intervention to testing it at scale. National evaluation studies are often accompanied by local or regional implementation work to deliver benefit to the service.

We know the health gain from funding musculoskeletal research is considerable but there are still many areas where further research is needed. There is good evidence on the benefits of exercise and activity for musculoskeletal health and that it is a core part of the interventions found in physiotherapy research.

Research on physiotherapy-led exercise is still needed to better understand the best exercise programmes, duration and setting; how to sustain long-term adherence to exercise and physical activity to ensure long-term benefits; and how to identify exercise responders from non-responders to target regimens more successfully.

We also need to know why some people recover or improve with physiotherapy so much quicker than others. The other big gap is prevention research – most of the studies featured in this review focus on treatment, but we need to shift research attention and funding to greater research on primary and secondary prevention of musculoskeletal conditions.

Recent developments in primary care suggest that physiotherapists acting as first contact practitioners and direct access to physiotherapy for musculoskeletal pain could help the NHS to cope with increasing demand and help to alleviate some of the pressures on GP and A&E services. More research on delivery

and models would be useful, as well as studies to investigate the effectiveness of other changing physiotherapy roles such as advanced physiotherapy practitioners, consultant posts and independent prescribing of medicines are also needed.

An important question for policymakers is whether improving speed of access to physiotherapy care helps people participate more fully in work. Researchers should therefore consider the effects on work when designing trials.

We could also know more about the routine use of patient-reported outcomes and feedback to shape improvements in care and address quality issues in musculoskeletal services.

These are some gaps arising from reflecting on the current research portfolio for this review. A more systematic exercise to identify future research priorities involving clinicians, researchers and patients was undertaken recently by the James Lind Alliance (supported by the NIHR) and the CSP²⁶. Priorities were published in March 2018 and included the top three areas below:

1. When health problems are developing, at what point is physiotherapy most/least effective for improving patient results compared to no physiotherapy? What factors affect this?
2. When used by physiotherapists, what methods are effective in helping patients to make health changes, engage with treatment, check their progress, or manage their health after discharge?
3. What are the best ways to deliver physiotherapy services to meet patients' needs and improve outcomes for patients and services?

At times of financial constraint, we need research to help us make best use of skilled staff. We do not know how to provide equitable services in musculoskeletal care across diverse geographic areas. Nor do we know how to meet the needs of the most vulnerable of patients such as those with severe mental health needs who also have musculoskeletal conditions, or those from the most socially disadvantaged backgrounds, or those whose musculoskeletal conditions presents as only one part of multi-morbidity – increasingly the case with our ageing population.

Although we now know far more about psychological impacts and risk factors than social impacts and risk factors, more work is needed to understand the cognitive and emotional impacts of musculoskeletal conditions. It is important that future research investigates how best to support those with

long-term disabilities to better help themselves. This includes developing and testing interventions that work in the community setting to enable more people to access effective prevention and treatment interventions away from primary care and secondary NHS care settings.

This review has highlighted some of the ongoing work funded by the NIHR but there are other important uncertainties in this rapidly changing field. Importantly, with all our research we need to investigate how to implement best evidence from physiotherapy research into clinical practice and understand any barriers.

GETTING INVOLVED IN CLINICAL RESEARCH

More staff and organisations are now taking part in musculoskeletal research, including physiotherapists. Figures from the NIHR show:

- » **Over 16,000** patients now take part in NIHR studies on musculoskeletal services – this has tripled over five years
- » **Over two thirds** of trusts in England are now recruiting into musculoskeletal studies
- » **86 CCGs recruiting** - almost double the number from five years ago.

Source: NIHR Clinical Research Network 2018

We need more high-quality research on musculoskeletal health with involvement of physiotherapists and other clinical staff in research. Over the last ten years, the NIHR has helped to strengthen research capacity. The NIHR Clinical Research Network's Allied Health Professionals Strategy 2018-2020²⁷ guides the growth of Allied Health Professionals (AHP) involvement in research. It seeks to increase the visibility of AHPs as research leaders, strengthen research capability and capacity and support AHPs to deliver visible research impact.

Research career funding is available to AHPs via competitive application to the NIHR Trainees' Coordinating Centre for NIHR fellowships (pre-doctoral training upwards) and via the Health Education England/NIHR Integrated Clinical Academic Programme (internship upwards).

Four physiotherapists are currently NIHR Senior Investigators - among the top clinical health researchers in the UK. Physiotherapists have shown that they can compete and lead high quality research of national and international importance.

The Council for Allied Health Professions Research (CAHPR) (www.cahpr.csp.org.uk) is also helping

to raise the profile and increase the influence of physiotherapy and other allied health professions. It aims to enhance patient care by helping develop research and strengthen evidence of value, and impact.

I am a clinician - how can I start to get involved in clinical research?

The first step in getting involved is by participating in the delivery of NIHR portfolio studies within the NHS through working with the NIHR Clinical Research Network (CRN). All can do this. The CRN provides the infrastructure to allow high-quality clinical research to be undertaken in the NHS. The next step is to develop your own questions and design and undertake research studies to address them.

There are some simple initial steps to take. Discuss ideas with your work colleagues, join or set-up a journal club, go to local research seminars and national conferences to network. Importantly ask your patients for ideas about the research that would make a difference to them and involve patients and carers in any research study that you design. A good starting point would be to look at the National Institute for Health and Care Excellence and see whether the topic area you are interested in is recommended as an area for future research. This may help you to decide on a specific question that is more likely to be successful when submitting a grant application.

If you progress to considering submitting a grant application for funding, contact the relevant research support service at an early stage in your bid development to discuss your research ideas. In England, the NIHR Research Design Service (RDS) can provide you with free advice and support on all aspects of developing a grant application prior to submitting to a national peer reviewed funding body. NHS Research Scotland, the Research Design and Conduct Service in Wales and the Health and Social Care, Research and Development (HSC R&D) in Northern Ireland can be contacted to discuss the availability of local support.

How do I create a career pathway combining clinical practice and clinical research?

The NIHR offers clinicians the opportunity to develop important clinical academic roles. Physiotherapists have traditionally been very successful in gaining these prestigious awards. Two inspiring physiotherapists who have benefited from NIHR funding and have been successful in developing their clinical academic roles in musculoskeletal care are featured here.



Lisa Roberts is using her current NIHR Senior Clinical Lectureship (2013-2019) and earlier ARUK fellowship (2007-2013) to focus on communication skills and training needs of student practitioners in consultations. This has included support to co-design the web-based package called 'SupportBack' (Study 46) and (Study 47 - ongoing). She has combined research with clinical improvement work leading a new musculoskeletal services self-referral scheme for staff at University Hospital Southampton. She has also played a general role in promoting research, supporting staff from seven professions at the hospital to deliver audits, service evaluations and quality improvement projects.

On the opportunities that have been possible through her NIHR award, Lisa said: "There are often many logistical issues to overcome to enable these posts to happen, but their impact can be immense. Clinical academic roles are a fantastic opportunity to enable physiotherapists to maintain their clinical roles and use them to ensure research is timely and relevant. Having regular, direct contact with patients is a great help as it ensures a project will address issues that really matter to patients."

Rebecca Kearney is currently undertaking an NIHR Career Development Fellowship (2017-2021). She had previously completed an NIHR Clinical Lectureship (2013-2016) and ARUK Fellowship (2009-2012).

She worked closely with a range of clinical colleagues in general practice and orthopaedic care to develop and test the use of plaster casts or early movement and/or weight-bearing in a 'functional brace' in the non-surgical management of Achilles tendon ruptures. This work attracted NIHR funding through feasibility and full trial stages. Rebecca's research and clinical roles have helped her to lead the development of other health professionals who wish to become non-medical clinical academics.

Rebecca says that: "Access to high quality NIHR training awards has been the opportunity that has linked the training environment, key people and infrastructure to enable me to be a leading non-medical clinical academic in trauma and orthopaedic research. Successfully delivering programmes of physiotherapy research to improve clinical practice is a team effort."

SUMMARY

NIHR infrastructure and research funding has supported much leading physiotherapy musculoskeletal research. Research projects of different kinds have helped to improve musculoskeletal care. These range from clinical trials, mixed-methods evaluations, quantitative and qualitative research. The NIHR has engaged frontline staff and patients to find the most important research questions. Different parts of the research system have been able to develop new interventions and services, test them and evaluate for everyday use. To do this, NIHR has funded fellowships and trainee posts as well as established teams and units to ensure that new research can be done. NIHR-funded networks have also helped research supported by other funders to be carried out in the NHS.

Research shows the need to achieve optimum function and physical health at all stages of life to prevent and manage musculoskeletal conditions. NIHR funded research has developed and tested different tools to identify the needs of people with musculoskeletal conditions and target treatment where needed. There remains much to do on research into prevention of musculoskeletal conditions.

We know that there is often a gap between needs and availability of some physiotherapy musculoskeletal services. Several studies have developed and tested programmes to develop coping skills for people with musculoskeletal conditions. These include self-management support delivered to individuals and in groups, which could be cheaper for physiotherapy services to deliver.

Patient education and behaviour change with some organisational support could help to lessen the disability and pain associated with musculoskeletal conditions. Staying active and participating in regular exercise is vitally important in musculoskeletal care. Research on what motivates people with musculoskeletal conditions to take exercise and stay active remains important. This will help inform existing services and the design of new physiotherapy and activity programmes.

"This review has proved great value to all within our community-based musculoskeletal service. It provides insight to a wide-ranging portfolio of research, the findings of which have been used to inform our day to day practice."

**Andrew Bennett, Consultant Physiotherapist,
The Royal Marsden Community Services.**



GLOSSARY

Terms mentioned here are used more than once in the report.

CLINICAL AND ORGANISATIONAL TERMS

Allied health professionals (AHPs)	AHPs work in partnership with health and social care colleagues across all specialities and settings. An AHP will be a member of at least one of the following 14 professional groups: art therapy, dietetics (concerned with diet), occupational therapy, orthoptics (eye care), physiotherapy, podiatry (feet and lower limbs), prosthetics and orthotics (for patients with limb loss or problems of the neuro, muscular and skeletal systems), speech and language therapy, radiography, drama therapy, music therapy, osteopathy, operating department practice, and paramedic practice. (Based on Department of Health definition.)
Cognitive behaviour therapy (CBT)	A talking therapy, focusing on practical ways to deal with current problems.
Musculoskeletal	The joints, bones and muscles.
Osteoarthritis	A condition that causes joints to become painful and stiff.
Self-management	Includes all the actions taken by people to recognise, treat and manage their own health, either independently or in partnership with the healthcare system. (Based on NHS England definition.)
Stratified care	Matching treatment to groups of patients according to their clinical characteristics and needs.
Vocational advice	Advice about employment issues, including coping with a health condition in the workplace, or returning to the workplace.

STUDY DESIGN TERMS

Qualitative study	Research that explores people's feelings, opinions and experiences in depth, typically using open-ended questions such as "How do you feel about...?"
Quantitative study	Research that measures quantity, such as counting numbers of patients, length of time, specific outcomes, or scales of satisfaction ranked 1 to 5 for example.
Randomised	People are assigned to different groups randomly, without taking into account any similarities or differences between them. This is often as part of a trial, where an intervention is being compared with care as usual or a control.
Systematic review	A review that summarises the published evidence on a specific question, using clearly defined methods to identify, analyse and report on relevant studies and assess the quality of research.

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- » **Jane Whitehurst** Public Contributor

STUDY SUMMARIES AND REFERENCES

5 STUDY SUMMARIES

NIHR STUDIES

STUDY 1 (NIHR, WELLCOME TRUST, ARTHRITIS RESEARCH UK, MRC, & ACADEMY OF MEDICAL SCIENCE) PUBLISHED

Estimating the returns to United Kingdom publicly funded musculoskeletal disease research in terms of net value of improved health outcomes

Published, 2018, Glover

This study estimated the economic returns from UK public and charitable-funded musculoskeletal disease (MSD) research that came from the net value of the improved health outcomes in the UK. The project was jointly funded by the NIHR, the Wellcome Trust, Arthritis Research UK, the MRC and the Academy of Medical Science. The researchers look at expenditure on MSD-related research in the UK between 1970 and 2013. Overall, they found that total expenditure on MSD-related research was £3.5 billion (expressed in 2013 prices), and for the period used to estimate the rate of return (1978-1997) was £1.4 billion. Over the period 1994–2013, the key interventions analysed produced 871,000 QALYs (quality adjusted life years) with a net monetary benefit of £16 billion. On average, the elapsed time between funding and impact of MSD treatments was 16 years. The researchers concluded that the health gain from investing in MSD research is substantial and justified.

Glover M, Montague E, Pollitt A, Guthrie S, Hanney S, Buxton M, et al. Estimating the returns to United Kingdom publicly funded musculoskeletal disease research in terms of net value of improved health outcomes. *Health Research Policy and Systems*. 2018. 16:1. <https://doi.org/10.1186/s12961-017-0276-7>

STUDY 2 (EME MRC 09/800/12) PUBLISHED

Pragmatic cluster randomised trial of PhysioDirect telephone assessment and advice services for physiotherapy

Published, 2013, Salisbury / Foster

This randomised controlled trial was designed to test whether PhysioDirect services were equally clinically effective but more cost-effective and improved access compared to usual care for patients with musculoskeletal problems in primary care. It was designed as a non-inferiority trial. The PhysioDirect service, available in some areas in the UK, enables a patient to telephone a physiotherapist for an initial assessment and treatment advice. The trial involved four community physiotherapist services in England. Patients who had been referred for physiotherapy by their GP, were randomised in a 2:1 ratio to PhysioDirect or usual care. Patients in the PhysioDirect group (n=1506) were invited to telephone a senior physiotherapist for initial assessment and advice, with subsequent face-to-face care if necessary. Usual care patients (n=743) were put on the usual waiting list for face-to-face care. The primary outcome was physical health measured using the Short-Form questionnaire-36 items Physical Component Score (SF-36 PCS). The researchers found that PhysioDirect and usual care were clinically equivalent in terms of SF-36 PCS at six months. However, the PhysioDirect patients had a shorter wait to first contact with the physiotherapist (mean 7 days) than the usual care patients (mean 34 days). Patients in both groups were satisfied with access to the care, but slightly less satisfied overall with PhysioDirect. There were small increases in Quality Adjusted Life Years associated with PhysioDirect which combined with the very small increase in costs of £19.30 per patient meant that it had an 88% probability of being cost-effective at a willingness-to-pay threshold of £20,000. The researchers concluded that PhysioDirect provides faster access to treatment, appears to be safe, is acceptable to patients, and is likely to be cost-effective compared with usual care.

Salisbury C, Foster N, Hopper C, Bishop A, Hollinghurst S, Coast J, et al. A pragmatic randomised controlled trial of the effectiveness and cost-effectiveness of 'PhysioDirect' telephone assessment and advice services for physiotherapy. *Health Technology Assessment*. 2013. 17(2).

<https://doi.org/10.3310/hta17020>

STUDY 3 (RP-PG-0608-10076) PUBLISHED

Improving outcomes from the treatment of back pain

Published, 2016, Underwood/Hee

This programme of research looked at how patients benefit from treatments for low back pain (LBP) and which treatments are most effective. The researchers aimed to understand how patients and therapists chose a particular treatment. Treatments might include acupuncture, exercise, manipulation and psychological treatments. As part of the project, the researchers conducted a review to identify randomised controlled trials of therapist delivered interventions for LBP. From this, they extracted data to develop a database of individual patient data (IPD). The dataset contained over 3 million data points from 9,328 participants, which included many variables and outcome data at baseline and follow-up. Although the authors were able to do robust sub-group analyses, the differences in the effect size in the different sub-groups were typically small and unlikely to be clinically meaningful. The authors suggested that a different approach is needed to identify sub-groups based on targeting interventions at defined sub-groups based on observed traits for whom there is a theoretical basis for expecting a good effect. The researchers indicated that the pooled dataset can be used by other researchers to better understand LBP, treatment and outcomes over time.

Patel S, Hee S, Mistry D, Jordan J, Brown S, Dritsaki M, et al. Identifying back pain subgroups: developing and applying approaches using individual patient data collected within clinical trials. *Programme Grants for Applied Research*. 2016. 4(10):1-314. <https://www.journalslibrary.nihr.ac.uk/pgfar/pgfar04100/#/abstract>

STUDY 4 (HTA 12/201/09) ONGOING

Stratified Care for Patients with Sciatica and Suspected Sciatica in Primary Care: A randomised trial (the SCOPiC trial - Sciatica Outcomes in Primary Care)

Due to publish 2019, Foster/Konstantinou

This randomised controlled trial aims to evaluate stratified care for patients with sciatica consulting in primary care. Stratified care involves sub-grouping patients into one of three sub-groups to receive a matched intervention. The algorithm that places patients into a sub-group combines information about the severity of the sciatica (clinical indicators) and information about the patient's prognosis (prognostic indicators). Patients randomised to the intervention arm will be stratified into one of three sub-groups (group one – brief treatment package; group two – course of physiotherapist-led treatment; group three – immediate referral to spinal specialists, with an MRI, for assessment for more invasive treatments). The control group will receive usual, non-stratified care. The primary outcome is time to patient-reported resolution of sciatica symptoms collected using regular SMS text messages. These will occur weekly for the first 16 weeks, then monthly from months four to 12 (or until the patient reports complete resolution). The trial has completed recruitment (476 patients) and is now in follow-up, with results expected in 2019.

Foster NE, Konstantinou K, Lewis M, Ogollah R, Dunn KM, van der Windt D, Beardmore R, Artus M, Bartlam B, Hill JC, Jowett S, Kigozi J, Mallen C, Saunders B, Hay EM. The clinical and cost-effectiveness of stratified care for patients with sciatica: the SCOPiC randomised controlled trial protocol (ISRCTN75449581). *BMC Musculoskeletal Disord*. 2017 Apr 26;18(1):172. doi: 10.1186/s12891-017-1513-5. <https://www.journalslibrary.nihr.ac.uk/programmes/hta/1220109>

STUDY 5 (RP-PG-1211-20010) ONGOING / PUBLISHED (INTERIM)

Stratified Primary Care for Musculoskeletal Pain (STaT MSK)

Programme due to publish 2019 (interim publications)

This programme of research comprises of four work packages to develop a stratified primary care model for patients with musculoskeletal (MSK) conditions. The researchers will refine and validate a new tool (the Keele STaT-MSK tool) aimed to help group people with the five most common MSK pain presentations into low, medium and high risk of poor outcome. Grouping, or stratifying patients, will enable a treatment option to be identified and agreed with the patient. The matched treatment options will be agreed through expert consensus. Following a feasibility study of stratified primary care (use of the new tool and matched treatment options), the researchers will conduct a full randomised controlled trial to test the clinical and cost-effectiveness of stratified primary care for patients with MSK problems compared with usual non-stratified care. They aim to recruit 1,200 patients from 24 GP practices. A subsample of patients will also be interviewed about their experiences.

Campbell P, Hill JC, Protheroe J, Afolabi EK, Lewis M, Beardmore R et al. Keele Aches and Pains Study protocol: validity, acceptability, and feasibility of the Keele STaT MSK tool for subgrouping musculoskeletal patients in primary care. *J Pain Res.* 2016 Oct 14;9:807-818. eCollection 2016.

<https://www.journalslibrary.nihr.ac.uk/programmes/pgfar/RP-PG-1211-20010/#/>

STUDY 6 (SCHOOL FOR PRIMARY CARE RESEARCH REF 351) ONGOING

Subgrouping and Targeted Exercise Programmes for Osteoarthritis: the role of comorbidity

Due to publish 2018, Holden

This study is investigating whether individuals with knee osteoarthritis (OA) who also have other health conditions such as asthma, diabetes and heart disease, would benefit from an exercise programme. The researchers will complete a systematic review of the literature to look at the benefits of exercise for knee OA and whether information on the influence of other health conditions has also been collected. They will also re-analyse three clinical trials to investigate whether individuals with knee OA who have other health conditions benefit from exercise. The results will provide a better understanding as to whether a targeted treatment approach may be beneficial for those with knee OA and other health conditions.

<https://www.spcr.nihr.ac.uk/projects/subgrouping-and-targeted-exercise-programmes-for-osteoarthritis-the-role-of-comorbidity>

STUDY 7 (13/19/06) PUBLISHED (INTERIM)

Synthesising a clinical Prognostic Rule for Ankle Injuries in the Emergency Department (SPRAINED)

Publish in 2018 (interim results), Lamb

The study aimed to develop and evaluate a tool that helps clinicians assess the risk of patients having a good or poor recovery following an ankle sprain. The researchers recruited 675 participants with ankle sprains and followed them for nine months. The tool makes use of information taken during the A&E visit, including age, gender, ability to walk, stability of the ankle and swelling. It is hoped the tool will be used as a guide to assess the chances of recovery for each patient. As part of the project, the researchers carried out a systematic review. They looked at literature focusing on the identification of early prognostic factors associated with poor recovery from ankle sprains (acute lateral ankle ligament sprain). They identified nine relevant articles. They found that a number of factors were independent predictors of poor recovery: age, female gender, swelling, restricted range of motion, limited weight bearing ability, pain (at the medial joint

line and on weight-bearing dorsi-flexion at four weeks, and pain at rest at three months), higher injury severity rating, palpation/stress score, non-invasive mechanism injury, lower self-reported recovery, re-sprain within three months, MRI determined number of sprained ligaments, severity and bone bruise. They concluded that there is insufficient evidence to recommend any particular factor as an independent predictor of outcome.

Lamb S, Wilson D, Hormbrey P, Gwilym S, Bostock J, Collins G. Synthesising a clinical Prognostic Rule for Ankle Injuries in the Emergency Department (SPRAINED).

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/131906>

STUDY 8 (RP-PG-0615-20002) ONGOING

Maximising outcome for patients with shoulder pain: using optimal diagnostic and prognostic information to target treatment (PANDA-S)

Due to publish 2025, van der Windt

This programme of research aims to develop and evaluate a better approach to assessing the likely cause and future outcome of shoulder problems, so that clinicians can offer optimal treatments matched to patients' characteristics (stratified care). The researchers will first use data from existing trials to identify characteristics of patients likely to benefit from core treatments such as exercise, shoulder injection or surgery. They will then recruit 1,000 patients with shoulder pain to a three year cohort study. Participants will receive a clinical assessment, including physical examination and ultrasound scan of the shoulder at baseline, and complete follow-up questionnaires over a period of three years to examine treatment decisions and outcomes such as pain, function, quality of life, work absence and health service use. From these results, they will develop a screening and decision tool to help clinicians identify the most appropriate treatment for their patient. The clinical and cost-effectiveness of the tool will be evaluated in a randomised controlled trial, involving 530 patients.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22van+der+Windt+D%22&gid:%22RP-PG-0615-20002%22+ga:%22DH/NIHR%22>

STUDY 9 (PB-PG-0909-20283) PUBLISHED

Development and validation of a core set of patient reported outcome measures (PROMs) for musculoskeletal conditions

Published, 2015, Hill

This study developed and validated a patient report outcome measure (PROM) to monitor health status of patients with musculoskeletal (MSK) disorders. The MSK-PROM was designed with input from patients with MSK conditions (n=4), clinicians (n=6), researchers (n=6), clinical managers (n=4) and a commissioner. The development processes identified 10 key domains for monitoring musculoskeletal health status: pain intensity, quality of life, physical capacity, interference with social/leisure activities, emotional wellbeing, severity of most difficult thing reported by individuals, activities and roles, understanding independence and overall impact. The MSK-PROM is based on the six latter domains, as the EuroQol (EQ-5D-5L) already captures the first four domains and is a widely used PROMs tool. The MSK-PROM was tested with 425 patients (mean age 53 years, 64% female) who had MSK pain and had used physiotherapy services in the UK. The MSK-PROM demonstrated excellent reliability, validity and acceptability to patients and clinicians for use in clinical practice. The researchers concluded that further studies are now needed to test the tool in other MSK healthcare settings.

Hill J, Thomas E, Hill S, Foster N, van der Windt D. Development and Validation of the Keele Musculoskeletal Patient Reported Outcome Measure (MSK-PROM). *PLoS One.* 2015. 10(4):e0124557.

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0124557>

**STUDY 10 (POLICY RESEARCH PROGRAMME PR-R7-0513-11002)
PUBLISHED**

**Evaluation of independent prescribing of medicines by
physiotherapists and podiatrists**

Published, 2016, Carey

The aim of this study was to evaluate the effectiveness and efficiency of physiotherapist and podiatrist (PP) independent prescribing in England. The researchers conducted a literature review, a survey of 85 trainee PP-independent prescribers (56 physiotherapists, 29 podiatrists), and a comparative case study with economic analysis across 14 case sites in 11 locations. For this latter part, the researchers observed 474 patient consultations (222 physiotherapist) and interviewed 14 PPs and 11 team members. They also conducted a survey with 315 patients.

They found 87 articles relating to medicine management by physiotherapists or podiatrists, but there was a lack of empirical evidence. Ninety-four percent of the PP-independent prescribers surveyed recommended medicines and 84% reported weekly activity. They indicated they would independently prescribe a mean of 11 items per week. Physiotherapists were generally prescribing in areas of musculoskeletal services, orthopaedics, respiratory and pain management. Twenty-four percent of patient consultations involved medicine management and predominant physiotherapy activity was pain/movement control. Most patients agreed that PPs should be able to prescribe medicine, although 23% would prefer a doctor to prescribe. No safety issues were detected directly resulting from PP independent prescribing. The researchers concluded that PP-independent prescribing is acceptable to most patients and is developing in line with original policy intentions to improve care across a range of services, by advanced practitioners who regularly engage in medicines management.

Carey N, Evaluation of independent prescribing of medicines by physiotherapists and podiatrists.

<https://drive.google.com/file/d/0ByzROGnhBXE-RUxVMTBUOEwyaFU/edit>

STUDY 11 (HS&DR 08/1203/031) PUBLISHED

Enhanced or extended roles for Allied Health Professionals in the NHS

Published, 2004, McPherson

This study looked at extended scope practice (ESP) in five allied health professional (AHP) groups (physiotherapy, radiography, paramedics, occupational therapy, speech and language therapy). The researchers defined ESP as "AHP activity including some aspect of enhancement or substitution". They conducted a systematic review and found 22 relevant articles for data extraction (five of these studies on physiotherapy) and 333 were used for descriptive information (144 on physiotherapy). They found that despite the introduction of extended scope role across all of the professional groups, evidence about the actual impact of these roles was lacking. Reports tended to focus on satisfaction surveys, position papers, or were audits (especially in physiotherapy studies). There were very few high quality trials or qualitative studies. The most frequent type of ESP reported was a form of non-invasive assessment of patients. Physiotherapists would often carry out invasive treatment, acting in the place of junior doctors, and may include requesting and interpreting investigations, forming a diagnosis and planning patient management. Although ESP is considered a good strategy, the researchers found that at the time of this report there was a lack of high quality evidence. The researchers recommended that more evaluation of patient health outcomes is needed.

McPherson K, Kersteen, P, George S, Lattimer V, Ellis B, Brenton A et al. Extended Roles for Allied Health Professionals in the NHS. Report for the National Co-ordinating Centre for NHS Service Delivery and Organisation R & D (NCCSDO). 2004 Feb (revised July 2004).

<https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/081203031>

STUDY 12 (08/1808/237) PUBLISHED

Allied Health Professionals and Management: An Ethnographic Study

Published, 2013, Petchey

This study was an ethnographic study of allied health professionals in management and leadership roles. Different professions were examined, but two out of the four study sites (one acute, one community trust) involved physiotherapist leaders. Methods used were observational and qualitative, including range of interviews, focus groups and shadowing of clinical leads. Researchers identified a number of themes from this observational work. One was the problematic nature of identity in the hybrid role of clinician-manager and representing different professional groups. There were different management styles observed, associated with gender and professional values, sometimes at odds with a traditional heroic model of leadership. Researchers observed problematic transitions from management to leadership in part because of these tensions. They also noted the emotional labour involved and how it was not possible to separate the management from the clinical in these frontline management roles.

Petchey R, Hughes J, Pinder R, Needle J, Partington J, Sims D. Allied health professionals and management. Final report. NIHR Service Delivery and Organisation programme; 2012.

<https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/081808237/#/>

STUDY 13 (RP-PG-0707-10131) PUBLISHED

Vocational advice service to improve outcomes in patients with musculoskeletal pain in primary care

Published, 2017, Foster/ Wynne-Jones

The Study of Work and Pain (SWAP) trial evaluated the effect of introducing a brief, vocational advice service into primary care to provide occupational support for adults with musculoskeletal (MSK) pain. The research took place in six general practices, and participants (aged 18-70 years) were eligible if they consulted their GP with MSK pain, were in paid employment and struggling with work or absent from work less than six months. Three hundred and thirty eight participants were recruited and randomised to either the control group of best current care (n=180) or the intervention group which comprised best current care plus the offer of the new vocational advice service (158). Practices in the intervention group could refer their patients to a vocational advisor (VA) embedded within the practice to provide a case-managed stepped intervention to address obstacles to working with MSK pain. The VAs were MSK physiotherapists, they completed a four-day training course and had follow-up mentoring support from the study team. The primary outcome was the number of days off work over four months and participants were followed up at four and 12 months. The results showed that participants in the intervention group had fewer days work absence compared with the control arm (mean 9.3 days versus 14.4 days). They calculated that the net social benefit of the intervention compared with current was £733 (£748 gain (work absence) versus £15 loss (health care costs)). The researchers concluded that a vocational advice service in primary care was beneficial, leading to reduced work absence and cost savings.

Wynne-Jones G, Artus M, Bishop A, Lawton S, Lewis M, Jowett S, et al. 2017. Effectiveness and costs of a vocational advice service to improve outcomes in patients with musculoskeletal pain in primary care: A cluster randomised trial (SWAP trial ISRCTN 52269669). Pain. 2017 Oct.

https://journals.lww.com/pain/Fulltext/2018/01000/Effectiveness_and_costs_of_a_vocational_advice.17.aspx

STUDY 14 (HTA 02/35/02) PUBLISHED

Managing Injuries of the Neck Trial (MINT): a randomised controlled trial of treatments for whiplash injuries

Published, 2012, Lamb

This study evaluated the clinical and cost-effectiveness of a stepped care approach over a 12-month period after an acute whiplash injury. The researchers ran two linked randomised controlled trials. In Step 1, emergency departments (EDs) were randomised to usual care advice (UCA) or the Whiplash Book Advice (WBA)/active management approach. In Step 2, participants were randomised to either a single advice session from a physiotherapist or a physiotherapist package of up to six sessions. Twelve NHS trusts in England involving 15 EDs took part. The WBA was a psycho-educational intervention, where ED staff emphasised key messages and provided the patient with The Whiplash Book. Participants who attended EDs with acute whiplash injury were eligible for Step 1, and participants who had attended EDs and had persistent symptoms three weeks later were eligible for Step 2. The primary outcome was the Neck Disability Index (NDI). The researchers recruited 3851 patients in Step 1; 1598 patients received UCA and 2253 received WBA. 599 patients were randomised for Step 2. The researchers found that the WBA and active management was no more effective than usual care in reducing disability associated with neck injuries. The physiotherapy package had a modest effect on neck injury over a single session in the first six weeks and a significant reduction in the number of work days lost at four month follow up. However, the researchers concluded that the physiotherapy package was not cost-effective from an NHS perspective.

Lamb S, Williams M, Williamson E, Gates S, Withers E. Managing Injuries of the Neck Trial (MINT): a randomised controlled trial of treatments for whiplash injuries. Health Technology Assessment. 2012. 16(49).

<https://doi.org/10.3310/hta16490>

STUDY 15 (01/75/01 HTA) PUBLISHED

A multicentred randomised controlled trial of a primary-care based cognitive behavioural programme for low back pain. The Back Skills Training (BeST) trial

Published, 2010, Lamb

This study evaluated the clinical effectiveness of active management (AM) in general practice compared to AM plus a group-based cognitive behavioural approach (CBA) for subacute and chronic low back pain (LBP). The researchers recruited participants from 56 general practices. 701 participants (mean age 54 year, 420 female) were randomised to receive either AM alone (233) or AM plus CBA (468). The researchers trained 19 therapists to deliver the CBA intervention (14 physiotherapists, 2 occupational therapists, one nurse, one clinical psychologist and one health psychologist). The manualised intervention was tailored for LBP, designed to target unhelpful beliefs about pain and activity, and promote engagement in leisure, physical and occupational activity. Each group consisted of about eight participants. Participants attended an initial individual assessment, and then invited to six group sessions. Outcome data at 12 months was available for 85% of participants. CBA had a range of benefits compared to AM alone. For example, CBA resulted in twice as much improvement as AM. At 12 months, 60% of the AM+CBA group compared to 31% of the AM group reported some or complete recovery. The mean cost of attending a CBA course was £187 per participant. Results from interviews with participants indicated that they enjoyed the CBA sessions, which provided them with reassurance and an environment in which they could learn from each other. Overall, the study found that group-based cognitive behavioural therapy for LBP was clinically and cost-effective and could be implemented within the NHS.

The NIHR-funded Oxford CLAHRC has funded the development

of a refined, web-based training package and an implementation/service evaluation project across the UK, with the aim of speeding up translation. The training is a 10 hour module, accredited by various professional bodies. The project is still open, but as of April 2018, there were 1270 therapists signed up for training, 744 who had commenced, and 462 who had finished training. In terms of patient outcomes, results of the programme are being tracked by 36 NHS hospitals, and 628 NHS patients are contributing to the on-going evaluation. The programme can be delivered by nurses, physiotherapists or occupational therapists.

The study has been replicated in the United States and now features in a number of international low back pain guidelines. There is an independent economic evaluation in the US, confirming the original cost-effectiveness estimates.

Lamb S, Lall R, Hansen Z, Castelnovo E, Withers E, Nichols V, et al. A multicentred randomised controlled trial of a primary-care based cognitive behavioural programme for low back pain. The Back Skills Training (BeST) trial.

Health Technol Assess. 2010 Aug;14(41):1-253, iii-iv. doi: 10.3310/hta14410.

<https://www.journalslibrary.nihr.ac.uk/hta/hta14410/>

<https://www.clahrc-oxford.nihr.ac.uk/impact/the-best-treatment-for-low-back-pain>

STUDY 16 (PB-PG-1112-29055) ONGOING

A randomised controlled trial of brief physiotherapy informed by Acceptance and Commitment Therapy for chronic low back pain: the PACT study

Godfrey

The aim of this randomised controlled trial is to evaluate the efficacy of the Physiotherapy informed by Acceptance and Commitment Therapy (PACT) on functioning in patients with chronic low back pain (CLBP). The researchers are comparing PACT with usual care in three NHS hospital trusts. They aim to recruit 240 patients referred to physiotherapy with CLBP, who are over 18 years and have had CLBP for more than 12 weeks. Patients will be randomised to the intervention or control group and followed up at three and 12 months. Results of the trial are expected soon.

Godfrey E, Galea Holmes M, Wileman V, McCracken L, Norton S, Moss-Morris R, et al. Physiotherapy informed by Acceptance and Commitment Therapy (PACT): protocol for a randomised controlled trial of PACT versus usual physiotherapy care for adults with chronic low back pain. BMJ Open. 2016. 6:e011548.

<http://bmjopen.bmj.com/content/6/6/e011548>

STUDY 17 (RP-PG-0407-10386) PUBLISHED

Clinical osteoarthritis and joint pain in older people: optimal management in primary care

Hay, Dziedzic, Foster, Peat, van der Windt, Croft et al.

This programme of research aimed to investigate how to prioritise osteoarthritis (OA) care among patients, health professionals and Primary Care Trusts and how to make OA interventions more available and more effective. The research had multiple work streams, including three randomised trials with details of each study below (17 a-c). In addition, an initial workstream carried out analysis including a meta-analysis on effectiveness of primary care treatments; secondary analysis of cohort data identifying predictors of poor long-term outcome; and health economic modelling estimating cost-effectiveness of strategies for implementing optimal primary care for OA.

Hay E, Dziedzic K, Foster N, Peat G, van der Windt, Croft P, et al. Clinical osteoarthritis and joint pain in older people: optimal management in primary care.

<https://www.journalslibrary.nihr.ac.uk/programmes/pgfar/RP-PG-0407-10386/#/>

STUDY 17A (RP-PG-0407-10386) PUBLISHED (INTERIM)

Improving the Effectiveness of Exercise Therapy for Adults with Knee Osteoarthritis: A Pragmatic Randomised Controlled Trial (BEEP trial)

Interim publications, Foster

This trial evaluated the effectiveness of two physiotherapy-led exercise interventions compared with usual physiotherapy care for pain and function in older adults with knee pain. The randomised controlled trial recruited patients from 65 general practices and five NHS physiotherapy services in England. Participants were eligible if they were over 45 years, with knee pain and/or stiffness in one or both knees, and met the clinical diagnosis of knee osteoarthritis (OA). Five-hundred and fourteen adults were randomised to receive individually tailored exercise (ITE), targeted exercise adherence (TEA), or usual physiotherapy care (UC) for knee pain. ITE consisted of an individualised, supervised and progressed lower limb exercise programme of six to eight treatment sessions over 12 weeks. TEA supported the transition from lower limb exercise to general physical activity in 8-10 sessions over six months. UC consisted of up to four sessions of advice and exercise over 12 weeks. All sessions were delivered by physiotherapists. The primary outcomes were self-reported pain and physical function at 6 months, with various secondary outcomes measured at baseline, three, six, nine and 18 months. The researchers found that there were no clinically or statistically significant differences between the groups at six months. Overall, participants in all three groups improved and the benefits of treatment remained at 18 months. The researchers concluded that tailored or enhanced exercise programmes are no better than usual care physiotherapy comprising of up to four sessions of advice and exercise. The health economic analysis confirmed that usual physiotherapy care is likely to be the most cost-effective option for the NHS.

Kigozi J, Jowett S, Nicholls E, Tooth S, Hay E, Foster N and the BEEP trial team. Cost-utility Analysis of Interventions to Improve Effectiveness of Exercise Therapy for Adults with Knee Osteoarthritis: the BEEP Trial. *Rheumatology Advances in Practice* (in press). 2018.

<https://www.keele.ac.uk/kctu/ourresearch/beep/>

STUDY 17B PUBLISHED

Managing Osteoarthritis in Consultations Study (MOSAICS)

Published, 2018, Dziedzic

This two-arm cluster-randomised controlled trial with baseline health survey aimed to determine the effectiveness and cost-effectiveness of a model osteoarthritis (OA) consultation compared with usual care, on physical function and uptake of NICE OA recommendations. MOSAICS also determined the effect of the model consultation on recorded quality of care for clinical OA in general practice. 525 adults ≥ 45 years consulting for peripheral joint pain participated in the cluster trial. Four intervention practices delivered the model osteoarthritis consultation to patients consulting with peripheral joint pain ($n=288$); four control practices continued usual care ($n=237$). The trial found that whilst uptake of core NICE recommendations was increased, there was no evidence of benefit of this intervention on the primary outcome of physical functioning at 6 months. The authors concluded that implementing NICE guidelines using a model OA consultation in primary care does not appear to lead to increased costs, but health outcomes remain very similar to usual care. Even though the intervention seems to reduce the demand for orthopaedic surgery, overall it is unlikely to be cost-effective. The intervention did not improve all aspects of care but increased core NICE recommendations of written advice on OA, exercise and weight management.

Dziedzic K, Healey E, Porcheret M, Afolabi E, Lewis M, Morden A. Implementing core NICE guidelines for osteoarthritis in primary

care with a model consultation (MOSAICS): a cluster randomised controlled trial. *Osteoarthritis Cartilage*. 2018 Jan. 26(1):43-53.

<https://www.sciencedirect.com/science/article/pii/S106345841731244X?via%3Dihub>

STUDY 17C PUBLISHED

Prompting primary care practitioners to routinely assess and manage anxiety and depression in patients consulting with osteoarthritis

Published, 2017, Peat /Mallen

This randomised trial looked at the extent to which treating co-morbid anxiety and depression can improve osteoarthritis (OA) outcomes. For this, the researchers evaluated whether prompting GPs to routinely assess and manage anxiety and depression in patients with OA improves pain outcomes. The study involved 45 GP surgeries. In the intervention arm, patients aged over 45 years consulting with OA received point-of-care anxiety and depression screening by a GP, prompted by an automated electronic template. The template consisted of five questions and signposted GPs to follow NICE guidelines for anxiety, depression and OA and was supported by a brief training package. The primary outcome was patient-reported current pain intensity after the consultation and at three, six and 12 months follow-up. Templates were completed for 2,042 patients (1,339 in the control arm and 703 in the intervention arm), and 1,412 returned questionnaires. Overall, participants in the intervention arm had significantly higher average pain intensity outcomes. Anxiety and depression did not reduce following the intervention. The researchers concluded that there was no benefit on pain outcomes when GPs routinely screened for and managed comorbid anxiety and depression.

Mallen C, Nicholl B, Lewis M, Bartlam B, Green D, Jowett S, et al. The effects of implementing a point-of-care electronic template to prompt routine anxiety and depression screening in patients consulting for osteoarthritis (the Primary Care Osteoarthritis Trial): A cluster randomised trial in primary care. *PLoS Medicine*. 2017 Apr. 14(4): e1002273.

<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002273>

STUDY 18 (HTA 94/39/14) PUBLISHED

A randomised controlled trial of intensive physiotherapy vs a home-based exercise treatment programme in knee osteoarthritis

Published, 2004, McCarthy

This randomised clinical trial evaluated the effectiveness and cost of a home-based exercise programme with structured classes. The researchers recruited 214 patients, who were randomly assigned to the home-based exercise programme or to home exercises supported with class exercise. The home exercise programme aimed to increase lower limb strength, endurance and improve balance. The classes consisted of twice-weekly knee exercises over eight weeks delivered by a physiotherapist. The main outcome was assessment of locomotor function, walking pain and self-reported disability. Patient assessment was made before and after the treatment, and at 6 and 12 month follow-ups. Both groups were compliant with the home-based exercises. The researchers found that participants in the home-based and classes group had significantly greater improvement in locomotor function and a decrease in pain while walking at follow-ups. This groups of patients also had significant improvements in balance, strength, and physical and pain scores. The researchers assessed the home-based and class exercise group to be cost-effective although there was some uncertainty around this estimation. They concluded that an eight week classed-based programme alongside home exercises produced significant improvements. Further studies should look at the implementation of home-based exercise programmes in primary care.

McCarthy C, Mills P, Pullen R, Richardson G, Hawkins N. Supplementation of a home-based exercise programme with a class-based programme for people with osteoarthritis of the knees: a randomised controlled trial and health economic analysis. *Health Technology Assessment*. 2004. 8(46).

<https://doi.org/10.3310/hta8460>

STUDY 19 (HTA 13/180/16 – COCHRANE REVIEW) PUBLISHED

Physiotherapy for the management of anterior knee pain

Published, 2015, Handoll

This review evaluated the benefits and harms of exercise therapy aimed at reducing knee pain and improving knee function for people with patellofemoral pain syndrome (PFPS). PFPS is a common knee problem, particularly affecting adolescents and young people and often referred to as anterior knee pain. Pain is often felt when load is put on the muscle that extend the leg for example when climbing stairs, squatting or running. The researchers identified 31 randomised and quasi-randomised trials involving 1,690 participants with PFPS. Most trials were assessed to be at high risk of bias, and there was considerable variation between studies for example in patient characteristics, diagnostic criteria and exercise therapy. They found that there was consistent evidence that exercise therapy for PFPS results in a clinically significant reduction in pain and improvement in functional ability (in trials comparing exercise therapy with no treatment). Hip plus knee exercises may provide a clinically important reduction in pain during activity compared to knee exercises only. However, the researchers caution that the evidence was of low quality and there is not enough evidence to determine the best form of exercise therapy. They recommend high quality randomised controlled trials are needed with standardised diagnostic criteria and outcome measures.

van der Heijden R, Lankhorst N, van Linschoten R, Bierma-Zeinstra SMA, van Middelkoop M. Exercise for treating patellofemoral pain syndrome. *Cochrane Database of Systematic Reviews*. 2015. Issue 1 <http://cochranelibrary-wiley.com/doi/10.1002/14651858.CD010387.pub2/abstract;jsessionid=337301D10B5D80DD7C019EA990485BCE.f02t01>

STUDY 20 (HTA 16/160/03) ONGOING

PROvision of braces for Patients with knee OsteoArthritis (PRO OA)

Due to publish 2023, Peat

A trial is planned to compare best primary care with and without use of a knee brace for people with knee osteoarthritis. Both groups will receive best primary care consisting of one treatment session with a physiotherapist with education about knee osteoarthritis and the benefits of exercise/ physical activity and weight loss, simple self-help advice on pain management and a lower limb home exercise program with written information. Half will also receive either a patellofemoral, tibiofemoral unloading, or neutral stabilising brace with follow-up checks to assess adherence. The primary outcome will be knee-related pain, function and quality of life after six months. This trial starting later in 2018 aims to recruit 434 participants over 24 months.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/1616003/#/>

STUDY 21 (PB-PG-0107-10612) PUBLISHED

Individualising exercise for knee osteoarthritis: developing an evidence-based impairment-targeted intervention

Published, 2016, Wood / Peat

This study tested the feasibility and effectiveness of an impairment-targeted approach to exercise for patients with knee pain and osteoarthritis. The intervention consisted of an individually tailored exercise programme specifically for a patient's

level of strength, flexibility and balance. The exercises were taught by a physiotherapist and a research nurse took measurements at baseline, six weeks and 12 weeks. The exercise targeted physical impairments of weak quadriceps, reduced knee flexion range of motion and poor balance. Participants would therefore receive one to three different types of exercises depending on their impairment. The researchers recruited 58 adults over 56 years (mean age 68.7 years, 62% female) with knee pain attributable to osteoarthritis. All participants received a 12-week home exercise programme, tailored to their impairments. A physiotherapist made six home visits alternated with six telephone calls, to support adherence. The researchers found that participants had a significant change in quadriceps isometric strength, although there were no changes in knee range of motion or single-leg balance time. The researchers concluded that the tailored exercise programme was associated with modest improvements in self-reported pain and function. Further research is needed to evaluate the clinical and cost-effectiveness of such tailored intervention programmes.

Wood et al. Impairment-targeted exercises for older adults with knee pain: a proof-of-principle study (TargET-Knee-Pain). *BMC Musculoskeletal Disorders*. 2016 Jan. 17(47).

<https://bmcmusculoskeletaldisord.biomedcentral.com/articles/10.1186/s12891-016-0899-9>

STUDY 22 (PB-PG-0614-34021) ONGOING

A feasibility and pilot trial of the effectiveness of exercise therapy and orthotics in the treatment of plantar heel pain. (Treatments of Exercise AnD Orthotics for plaNtar heel pain: The TREADON pilot feasibility trial)

Due to publish 2018, Roddy / Chesterton

This is a feasibility and pilot trial to evaluate a personalised exercise programme and shoe insoles for adults with plantar heel pain (pain under the heel) in primary care. The researchers aim to recruit 80 participants, from 12 general practices, over nine months. Participants will be randomly assigned to one of four interventions: high quality self-management advice (SMA) booklet (the control condition); SMA and shoe insoles (prefabricated foot orthoses) used for a minimum of four hours a day; SMA and individuals exercise programme; SMA and a combination of exercise and shoe insoles. The exercise and foot insoles interventions will consist of six treatment sessions over 12 weeks with support from podiatrists or physiotherapists. The results will be used to inform a larger trial.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22Chesterton+L%22+gid:%22PB-PG-0614-34021%22+ga:%22DH/NIHR%22>

STUDY 23 (HTA 10/98/05) PUBLISHED

The effects of a comprehensive physiotherapy intervention for adults with joint hypermobility

Published, 2016, Palmer

This study developed and evaluated a physiotherapy intervention for adults with joint hypermobility syndrome (JHS). JHS is a heritable disorder associated with laxity and pain in multiple joints, often called 'double-jointed'. The researchers undertook four focus groups with patients (n=25, over 18 years) and health professionals (n=16) on their experiences of physiotherapy for JHS. Overall, the researchers found that a long-term holistic approach to treatment is needed, rather than just a focus on the joints in isolation. The focus group information was used by clinicians, researchers and patient research partners to develop a physiotherapy intervention. After refinement based on physiotherapists' and patients' feedback, a pilot randomised controlled trial (RCT) was conducted to compare advice alone with advice and physiotherapy. Twenty-nine participants (over 16 years) took part in the pilot trial. Advice consisted of a one-off session and additional advice booklets, and the additional physiotherapy intervention comprised of six

30-minute sessions over four months. The physiotherapy aimed to increase patients' physical activity through better understanding and skills to manage their condition and was supported by a patient handbook. The researchers concluded that both the advice and physiotherapy interventions were rated positively, although the advice needs more refinement. They indicated that a full RCT is feasible.

Palmer S, Cramp F, Clark E, Lewis R, Brookes S, Hollingworth W, et al. The feasibility of a randomised controlled trial of physiotherapy for adults with joint hypermobility syndrome. *Health Technology Assessment*. 2016. 20(47).

<https://doi.org/10.3310/hta20470>

STUDY 24 (PTC-RP-PG-0213-20002) ONGOING

Better Outcomes for Older people with Spinal Trouble (BOOST)

Due to publish 2020, Lamb

This programme of research will refine and evaluate an intervention for low back pain (LBP) in older people who have neurogenic claudication (leg pain and/or tingling) due to lumbar spinal stenosis (narrowing of spinal canal). The researchers will initially run a feasibility study involving approximately 11 GP practices and 50-118 patients to test a physiotherapy intervention. Results will inform a full randomised controlled trial involving a minimum of 355 patients. They will also develop a prognostic tool to identify what factors of LBP lead to poor outcomes, based on 1,000 patients. They will also seek GP views on how they manage LBP in older patients.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22Lamb+S%22+gid:%22PTC-RP-PG-0213-20002%22+ga:%22DH/NIHR%22>

STUDY 25 (HTA 07/32/05) PUBLISHED

Strengthening and stretching for people with Rheumatoid Arthritis of the Hands (SARAH): The clinical and cost-effectiveness of an exercise programme over and above usual care.

Published, 2015, Lamb/Williams

This randomised controlled trial evaluated the effectiveness of adding an exercise programme for hands and upper limbs alongside standard care for patients with rheumatoid arthritis (RA). The study took part in 17 NHS trusts in England. Participants (over 18 years) were included if they had pain and dysfunction of the hands and/or wrists and been on medication for at least three months. The researchers recruited 490 patients; 244 received usual care and 246 received the exercise programme. The exercise programme consisted of six sessions of strengthening and stretching exercises with a hand therapist, daily home exercises and strategies to maximise adherence. Usual care consisted of joint protection education and general exercise advice. The primary outcome was the Michigan Hand outcome Questionnaire overall hand function score at 12 months. Outcomes were available for 89% of participants at 12 months (222 usual care, 216 intervention). There was a significant difference in hand function in favour of the exercise programme at four and 12 months. There were no significant differences in pain scores or adverse events. Qualitative results indicated the exercise programme was acceptable and the therapist was key in enabling the patient to develop a consistent routine. The researchers concluded that the exercise programme was both clinically and cost-effective.

Williams M, Williamson E, Heine P, Nichols V, Glover M, Dritsaki M, et al. Strengthening And stretching for Rheumatoid Arthritis of the Hand (SARAH). A randomised controlled trial and economic evaluation. *Health Technology Assessment*. 2015. 19(19).

<https://doi.org/10.3310/hta19190>

This project is currently in an implementation phase. The researchers have developed an online training package for physiotherapists and are in the process of developing an on-line

package which will take the intervention direct to the patient. They are testing to ensure that therapists and patients can replicate the intervention with similar effect to the original HTA trial. There are currently 710 therapists registered on the training website, and so far, 366 have completed their training. The implementation study has been launched in 12 NHS trusts and 34 patients have enrolled so far. The researchers are aiming to recruit approximately 300. They have published a number of additional studies that include a Cochrane systematic review and several implementation papers. The NICE guidance updated on the basis of this trial recommend hand exercises for RA.

<https://www.clahrc-oxford.nihr.ac.uk/research/self-directed-and-supervised-exercise-treatments-for-rheumatoid-arthritis-of-the-hand>

STUDY 26 (HTA 15/165/04) ONGOING

Feasibility and multi-centre clinical trial of gait rehabilitation in patients with recently diagnosed rheumatoid arthritis: the Gait Rehabilitation in Early Arthritis Trial [GREAT]

Due to publish 2022, Steultjens

This randomised controlled trial will evaluate a supervised gait rehabilitation programme for adults with rheumatoid arthritis (RA) who have foot and/or ankle pain and/or synovitis. The researchers aim to recruit 550 participants over 18 years who have a diagnosis of RA with less than 2 years disease duration. Participants will be randomly allocated to receive either usual care or usual care plus a supervised gait rehabilitation of two to six 1:1 treatment sessions over 12 weeks delivered by NHS physiotherapists or podiatrists. The intervention will include supported home-based gait rehabilitation and a psychological component to promote positive behaviour change. This will be supplemented with telephone-based sessions. Outcomes will be collected at three, six and 12 months from baseline.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/1516504>

STUDY 27 (HTA 09/13/02) PUBLISHED

Management of frozen shoulder: a systematic review and decision analytic model

Published, 2012, McDaid/Maund

This systematic review evaluated the clinical effectiveness and cost-effectiveness of treatments for primary frozen shoulder. The main outcomes were pain, range of movement, function and disability, quality of life and adverse events. The researchers identified 31 clinical effectiveness studies, which evaluated a range of treatments including steroid injection, sodium hyaluronate, supervised neglect, physical therapy (mainly physiotherapy), acupuncture, manipulation under anaesthesia, distension and capsular release. The researchers indicated that many of the studies were at a high risk of bias and had a small number of participants. They were unable to pool data for a meta-analysis due to differences in interventions and comparators. There were no studies looking at patient views about treatments. The researchers found that there was limited evidence on the clinical effectiveness of treatments. There was little evidence related to stage of condition, treatment pathways, and impact on quality of life. No conclusions could be made about the cost-effectiveness of different treatments due to the limited evidence.

Maund E, Craig D, Suekarran S, Neilson A, Wright K et al. Management of frozen shoulder: a systematic review and cost-effectiveness analysis. *Health Technology Assessment*. 2012. 16(11).

<https://doi.org/10.3310/hta16110>

STUDY 28 (13/26/01 HTA) ONGOING

Multi-centre randomised controlled trial with economic evaluation and nested qualitative study comparing early structured

physiotherapy versus manipulation under anaesthesia versus arthroscopic capsular release for patients referred to secondary care with a frozen shoulder (UK FROST)

Due to publish 2019, Rangan

This study will compare early structured physiotherapy, manipulation under anaesthesia supplemented with a steroid injection, or keyhole surgery with manipulation under anaesthesia for treating frozen shoulder. The early structured physiotherapy intervention will be delivered over a 12 week period. The researchers will measure participants' pain, function and general wellbeing at three, six and 12 months following their entry into the trial. They will also ask participants and healthcare professionals about their experiences and views on treatments. The researchers aim to recruit 500 participants from 25 UK NHS hospitals, who are over 18 years old and have a clinical diagnosis of frozen shoulder. Participants in the physiotherapy intervention who do not improve after 12 weeks will be referred and assessed for surgical intervention. The researchers will also conduct an economic evaluation.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/132601/#/>

STUDY 29 (PB-PG-1207-15064) PUBLISHED (INTERIM)

Improving outcomes for patients with shoulder impingement: a randomised trial

Interim publication, 2015, Foster/Roddy

This randomised controlled trial tested ways to optimise outcomes for shoulder impingement syndrome (SIS) from the two most common treatments: exercise and corticosteroid injection. The SUPPORT trial investigated whether patients' pain and function over 12 months improve if tailored exercise is delivered by a physiotherapist rather than a standard exercise leaflet, and the corticosteroid is injected with ultrasound (US) guidance rather than no US-guidance. The researchers recruited 256 participants (48% male, mean age 54 years, 64 per group), and randomised them to one of four treatment groups (US-guided injection and physiotherapist-led exercise, US-guided injection and exercise leaflet, unguided injection and physiotherapist-led exercise or unguided injection and exercise leaflet). The primary outcome was the Shoulder Pain and Disability Index. Physiotherapist-led exercise resulted in superior pain and function scores than the exercise leaflet at the primary time-point of six months (but not at six weeks or 12 months). The physiotherapist-led exercise group were significantly more satisfied with treatment at six weeks and six months and reported greater exercise adherence at six weeks and six months than the leaflet group. US-guided injection did not result in superior pain and function scores than usual unguided injection at any time-point. The researchers concluded patients with SIS should access a physiotherapist-led exercise programme and that US-guidance does not provide better outcomes than usual palpation-guided injection.

Roddy E, Ogollah R, Zwierska I, Datta P, Hall A, Hay E, et al. Randomised controlled trial testing physiotherapy-led exercise and ultrasound-guided corticosteroid injection for subacromial impingement syndrome: the SUPPORT trial. *Physiotherapy*. 2015 May. 101(1):e403–e404.

<http://dx.doi.org/10.1016/j.physio.2015.03.632>

STUDY 30 (HTA 15/26/06) ONGOING

Clinical and cost-effectiveness of progressive exercise compared to best practice advice, with or without corticosteroid injection, for the treatment of rotator cuff disorders: a 2x2 factorial randomised controlled trial (The GRASP trial)

Due to publish 2020, Lamb

This randomised controlled trial is comparing the clinical and cost-effectiveness of different treatments for rotator cuff disorders.

The researchers aim to recruit 704 participants over 18 years who have a new episode of shoulder pain attributable to a rotator cuff disorder (tendonitis, impingement syndrome, tendinopathy, tear) and are not currently receiving physiotherapy or considered for surgery. Participants will be randomly allocated to one of four treatment groups: progressive exercise (up to six sessions); best practice advice (one session); progressive exercise and corticosteroid injection; or best practice advice and corticosteroid injection. The primary outcome is the shoulder pain and disability index score at 12 months.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/152606>

STUDY 31 (SCHOOL FOR PRIMARY CARE RESEARCH - PROJECT NO.253) ONGOING/INTERIM RESULTS

Comparative Effectiveness of Treatment Options for Subacromial Shoulder Conditions: A Network Meta-Analysis (CETOSS)

Due to publish 2018, van der Windt

This network meta-analysis aimed to combine direct and indirect evidence about treatment for adults with subacromial shoulder conditions (SSC) to determine the most effective treatment strategy. The researchers identified 142 trials of 21 different treatments for SSCs. Effectiveness of treatment options for relieving pain and improving function were summarised in comparison to each other, and treatment options were ranked based on their effectiveness at short (<6 weeks), medium (up to three months) and long (>6 months) follow up times. There was large variation between trials and trials often had small sample sizes. Full results will be submitted for publication in Summer 2018.

van der Windt, Babatunde O, Ensor J, Littlewood C, Jordan J, Roddy E, et al. Comparative Effectiveness of Treatment Options for Subacromial Shoulder Conditions: A Network Meta-Analysis (CETOSS).

<https://www.globalevidencesummit.org/abstracts/comparative-effectiveness-treatment-options-subacromial-shoulder-conditions-network-meta>

STUDY 32 (RP-PG-0407-10070) PUBLISHED

Improving patients' experience and outcome of total joint replacement: the RESTORE programme

Published, 2016, Blom

This study explored the care and experiences of patients with osteoarthritis from being listed to have a total hip replacement (THR) or a total knee replacement (TKR) to the time after surgery.

In the Assessing Disability After Partial and Total joint replacement (ADAPT) study, recovery of patients (n=263) was measured over time. Ten percent of patients with THR and 30% with TKR showed no significant functional improvement. A systematic review found that moderate to severe long-term pain affects about 7-23% of patients after THR and 10-34% after TKR. Patients with worse psychological health, pain or disability before surgery are more likely to have a poor long-term recovery. In the Arthroplasty Pain EXperience (APEX) randomised controlled trials, patients receiving THR (n=322) and patients receiving TKR (n=316) were randomised to receive local anaesthetic injections during surgery or standard anaesthesia. Local anaesthetic injections had positive outcomes in patients with THR, with long-term pain reduced and the treatment cost-effective. In patients with TKR, a reduction in pain was not confirmed, probably due to the extensive pain control patients received during surgery. Some RCT patients (n=24) and health-care professionals (n=15) also took part in qualitative interviews, which found that further trials would be acceptable to patients. A further qualitative study interviewed patients (n=34) receiving THR or TKR before surgery, and two to four weeks, six and 12 months, afterwards. Patients described the importance of support throughout the joint replacement pathway.

Evidence from small RCTs suggests exercise or education before surgery and aids, home modifications and physiotherapy afterwards, might have short-term benefits. In the Activity orientated REhabilitation following kNee Arthroplasty (ARENA) study (124 eligible patients of whom 46 were randomised), group-based post-surgical physiotherapy was well received. Feasibility studies found that trials of occupational therapy before surgery and post-discharge group-based physiotherapy exercise are feasible and acceptable to patients.

The researchers concluded that different methods are needed to treat and assess hip and knee osteoarthritis, and that the potential interventions identified in the patient pathway deserve further study.

Blom A, Artz N, Beswick A, Burston A, Dieppe P, Elvers K, et al. Improving patients' experience and outcome of total joint replacement: the RESTORE programme. Programme Grants for Applied Research. 2016. 4(12)

<https://doi.org/10.3310/pgfar04120>

STUDY 33 (PB-PG-1013-32010) ONGOING

Effectiveness and cost-effectiveness of outpatient physiotherapy after knee replacement: A randomised controlled trial

Due to publish 2018/9, Wylde

This randomised controlled trial aims to evaluate the clinical and cost-effectiveness of a six week group-based outpatient physiotherapy intervention after knee replacement surgery. The researchers aim to recruit 256 patients waiting for knee surgery due to osteoarthritis from two orthopaedic centres. Patients will be randomly allocated to either usual care or intervention. Usual care comprises of a booklet about exercise and referral to physiotherapy if needed. The intervention group will receive usual care and invited to a group-based outpatient physiotherapy class starting six weeks after surgery. The primary outcome will be the Lower Extremity Function Scale at 12 months post-surgery.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22Wylde+V%22+gid:%22PB-PG-1013-32010%22+ga:%22DH/NIHR%22>

Protocol: Wylde V, Artz N, Marques E, et al. Effectiveness and cost-effectiveness of outpatient physiotherapy after knee replacement for osteoarthritis: study protocol for a randomised controlled trial. *Trials*, 2016, 17:289.

<https://doi.org/10.1186/s13063-016-1418-x>

STUDY 34 (HTA 12/196/08) ONGOING

Community based Rehabilitation after Knee Arthroplasty (CORKA)

Due to publish 2020, Barker

This project aims to investigate rehabilitation after knee replacement (arthroplasty) for adults. The researchers will develop a method to identify patients at risk of poor outcomes. This will involve a systematic literature review and an online survey to identify key factors of poor outcomes. They will then look at data from a previous NIHR-funded study (COAST) to look at outcomes after lower limb joint replacement. The researchers will use this information to develop a screening tool to enable them to identify patients who are most at risk of poor outcomes after joint replacement. This will be used in their subsequent randomised controlled trial of a targeted multi-component rehabilitation intervention for patients assessed as at risk of poor outcomes. The intervention will be delivered in the patient's home, whilst the control group will attend an out-patient physiotherapy clinic of up to six sessions. Researchers will assess pain management as well as patient views and experiences.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/1219608>

STUDY 35 (14/140/63 HTA) ONGOING

The ACL SNNAP Trial: Anterior Cruciate Ligament Surgery Necessity in Non Acute Patients

Due to publish 2020/2021, Beard

This study compares non-surgical to surgical treatment for non-acute Anterior Cruciate Ligament Deficiency (ACLD) of the knee. Patients with ACLD are randomised to either a specific Anterior Cruciate Ligament (ACL) rehabilitation programme (with the option for later ACL reconstruction if required) or surgical ACL reconstruction. The researchers aim to recruit 320 patients from 30 NHS orthopaedic units, who have a non-acute unilateral symptomatic (unstable) ACL deficient knee. 98 patients have been recruited to date. Participants will be followed up at 18 months post randomisation. An initial pilot phase is now complete confirming feasibility of the main trial.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/1414063/#/>

<https://www.ndorms.ox.ac.uk/clinical-trials/current-trials-and-studies/snnap>

STUDY 36 (PB-PG-0407-13216) PUBLISHED

Evaluation of a specific physiotherapy programme following hip resurfacing arthroplasty – is it more effective at improving function and muscle strength than standard rehabilitation?

Published, 2013, Barker

This randomised controlled trial evaluated whether a tailored rehabilitation programme was more effective than standard practice at improving function in patients undergoing metal-on-metal hip resurfacing arthroplasty. The researchers recruited 80 men (median age 55.8 years) who had undergone hip resurfacing who were allocated to a tailored post-operative physiotherapy programme (n=40) or standard physiotherapy (n=40). The primary outcome, the Oxford Hip Score (OHS) was measured six, 16 and 52 weeks. At one year, the researchers found that the OHS of the intervention group was significantly higher than the control group. Other self-report measures showed significant improvements in the intervention group, for example hip range of motion, hip flexion and hip extension. The researchers concluded that the tailored physiotherapy programme had significant benefits for patients after hip resurfacing.

Barker K, Newman M, Hughes T, Sackley C, Pandit H, Kiran A, et al. Recovery of function following hip resurfacing arthroplasty: a randomized controlled trial comparing an accelerated versus standard physiotherapy rehabilitation programme. *Clinical Rehabilitation*. 2013 Apr. 27(9):771-784]

<http://journals.sagepub.com/doi/10.1177/0269215513478437>

STUDY 37 (HTA - 13/103/02) PUBLISHED

UK Full Randomised Controlled Trial of Arthroscopic Surgery for Hip Impingement versus best conventional Care (UK FASHIoN)

Published, 2018, Griffin

Femoroacetabular impingement syndrome is a common cause of hip pain in young adults. This study aimed to compare the effectiveness of hip arthroscopy with physiotherapist-led conservative care. Personalised hip therapy was designed through international consensus and delivered by musculoskeletal physiotherapists who had additional training in the approach. This was a pragmatic, multicentre (23 NHS hospitals), assessor-blinded randomised controlled trial. 171 participants received hip arthroscopy and 177 personalised hip therapy. The primary outcome was hip-related quality of life at 12 months, measured by the patient-reported International Hip Outcome Tool (iHOT-33). At 12 months, mean iHOT-33 scores improved from 39.2 (SD 20.9) to 58.8 (27.2) in the hip arthroscopy group, and from 35.6 (18.2) to 49.7 (25.5) in the personalised hip therapy group. In the primary analysis, the mean difference in iHOT-33 scores, adjusted

for impingement type, sex, baseline iHOT-33 score, and centre, was 6.8 (95% CI 1.7–12.0) in favour of hip arthroscopy ($p=0.0093$) exceeding the minimum clinically important difference (6.1 points). Both interventions improved hip-related quality of life, but hip arthroscopy led to a greater improvement than personalised hip therapy, and this difference was clinically significant. At 12 months, hip arthroscopy however was not found to be cost-effective compared with physiotherapist-led care. The mean cost of hip arthroscopy was £3042 versus a mean total cost of £155 per participant in the personalised hip therapy group (a mean of six physiotherapy sessions at average duration of 30 min). The adjusted incremental cost of hip arthroscopy compared with personalised hip therapy was £2372, with incremental QALYs of -0.015 (representing a net QALY loss). Personalised hip therapy was therefore more cost-effective than hip arthroscopy at 12 months. Further follow-up is planned at 2, 3, 5, and 10 years to see whether the benefits of hip arthroscopy are maintained and whether it is cost effective in the long term.

Griffin D, Dickenson E, Wall P, Achana F, Donovan J, Griffin J et al. Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): a multicentre randomised controlled trial. *The Lancet*, 2018; 391(10136): 2225–2235.

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)31202-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31202-9/fulltext)

STUDY 38 (PB-PG-0110-21158) PUBLISHED

Can Physiotherapy effectively treat patients with Lumbar Radicular Syndrome secondary to MRI demonstrable disc prolapse? A preliminary randomised trial of patients awaiting lumbar micro-discectomy

Published, 2014, *Newsome*

This feasibility trial aimed to evaluate the use of physiotherapy for patients with lumbar radicular syndrome. The researchers recruited 60 patients waiting for primary, unilateral, single level, lumbar micro-discectomy surgery. They were randomised to receive either a physiotherapy programme or usual care. The primary outcome was the number of patients who did not require surgery at the time of the consent clinic. The researchers found that at one week before surgery, 10% of patients in the control group and 17.2% of patients in the physiotherapy group did not require surgery. However, these results were not significant. Other outcome measures found that patients in the physiotherapy group had a greater (non-significant) improvement

Newsome R, Reddington M, Breakwell L, Chiverton N, Cole A, Michael A, Boote J, Dimairo. Can physiotherapy effectively treat patients with lumbar radicular syndrome secondary to MRI demonstrable disc prolapse? A preliminary randomised trial of patients awaiting lumbar micro-discectomy. *Orthopaedic Proceedings*. Published online 2014 Feb.

http://bjjprocs.boneandjoint.org.uk/content/96-B/SUPP_4/28

STUDY 39 (PB-PG-0110-19276) PUBLISHED

Impact of physiotherapy on sexual function of women with stress urinary incontinence and a comparison of electrical stimulation versus standard physiotherapy

Published, 2017, *Jha*

This study evaluated whether Pelvic Floor Muscle Training (PFMT) plus electric stimulation improves the sexual function of women with urinary incontinence compared to PFMT alone. PFMT aims to improve the strength and efficacy of pelvic floor contraction and is recommended by NICE as the first line of treatment for urinary incontinence. The study was conducted in a teaching hospital in England and included women with urinary incontinence and sexual dysfunction. The researchers recruited 114 women, and randomised 57 to the intervention and 57 to the control group. There was

outcome data on 56% of participants at follow-up (30 intervention, 34 control). Outcome measures included the Prolapse and Incontinence Sexual function Questionnaire (PISQ) physical function dimension at post-treatment (primary); other dimensions of PISQ, adverse events and cost-effectiveness. The researchers found that the control group had better PISQ score, with no difference between the groups in other measures. They concluded that physiotherapy is beneficial to improve overall sexual function in women with urinary incontinence, but no specific form of physiotherapy is beneficial over another.

Jha S, Walters S, Bortolami O, Dixon S, Alshreef A. Impact of pelvic floor muscle training on sexual function of women with urinary incontinence and a comparison of electrical stimulation versus standard treatment (IPSU trial): a randomised controlled trial. *Physiotherapy*. 2018 Mar. 104(1):91-97

<https://www.sciencedirect.com/science/article/pii/S0031940617300548?via%3Dihub>

STUDY 40 (HTA 11/71/03) ONGOING

Multicentre randomised trial of the effectiveness and cost-effectiveness of basic versus biofeedback-mediated intensive pelvic floor muscle training for female stress or mixed urinary incontinence (OPAL-Optimal PFMT for Adherence Long-term)

Due to publish 2019, *Hagen*

This study will evaluate the effectiveness and cost-effectiveness of basic pelvic floor muscle training (PFMT) versus biofeedback-mediated intensive PFMT where electrical sensors are used to receive information about body function. The researchers will recruit approximately 600 women over 18 who have a new episode of stress or mixed urinary incontinence (UI). Women will be randomised to receive either basic PFMT (six appointments at weeks 0,1,3,6,10,15, or intensive PFMT (same appointments as basic PFMT, with biofeedback at all appointments). Biofeedback will allow the women to identify and modify the action of their pelvic floor muscles. A vaginal probe measures electrical activity during muscle contraction which is displayed on a screen. The woman can then use this information to modify her technique. Both interventions will be delivered by a women's health physiotherapist or continence nurse. The primary outcome is UI severity at 24 months.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/117103>

STUDY 41 (HS&DR 14/04/02) ONGOING

Implementation of an evidence based pelvic floor muscle training intervention for women with pelvic organ prolapse (PROlapse and PFMT: implementing Evidence Locally - PROPEL)

Due to publish 2019, *Maxwell*

This project will investigate different models of delivery (using different staff skill mixes) to increase service provision of pelvic floor muscle training (PFMT) for women. The researchers will work with three UK NHS sites (Glasgow, Leicester and Caithness/Inverness), to determine how PFMT is to be delivered and to provide training to new groups of staff to deliver PFMT. This realist evaluation will look at how decisions are made, monitor day-to-day working practices around the implementation of new PFMT services and assist with service change where relevant. The researchers will observe service planning meetings and conduct interviews with staff and women who are referred to PFMT services. They aim to recruit 120 women who will receive PFMT and compare outcomes for women across the different delivery models. The researchers will also provide an economic evaluation of the different delivery models.

<https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/140402>

STUDY 42 (RP-PG-0514-20002) ONGOING

Antenatal Prophylactic Pelvic floor Exercises And Localisation (APPEAL) Programme

Due to publish 2021, MacArthur

The Antenatal Preventative Pelvic floor Exercises And Localisation (APPEAL) programme of research aims to prevent maternal health problems associated with pregnancy and childbirth-related urinary incontinence (UI). The researchers will first interview women and midwives about their views on pelvic floor muscle exercises (PFME). This will provide insight into the most effective way to assess PFME. The researchers will use this information to develop a motivational training programme and toolkit to enable midwives to help pregnant women to correctly and regularly perform PFME. They will then evaluate the implementation of the programme with a randomised controlled trial with midwifery teams. The researchers will assess women's UI, general health and quality of life at 10-12 weeks after birth.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22MacArthur+C%22+gid:%22RP-PG-0514-20002%22+ga:%22DH/NIHR%22>

STUDY 43 (HTA - 10/69/05) PUBLISHED

Evaluating Acupuncture and Standard care for pregnant women with BACK pain (EASE BACK): a feasibility and pilot study

Published, 2016, Foster

This feasibility trial tested the benefit of adding acupuncture to standard care for pregnancy-related back pain. The researchers first conducted a questionnaire survey of almost 500 physiotherapists across the UK, and held focus groups and interviews with 17 pregnant women, 15 midwives and 21 physiotherapists. They found that there was great variation in standard care; typical treatment consisted of two to four individual sessions of advice and exercise over six weeks. Acupuncture was reported by 24% of physiotherapists. Pregnant women were also keen to participate in a trial to determine the additional benefit of acupuncture. They used six identification methods to recruit and randomise 125 pregnant women to either standard care, standard care plus true acupuncture or standard care plus non-penetrating (sham) acupuncture. Standard care consisted of a self-management booklet and onward referral for one-to-one physiotherapy of two to four advice and exercise sessions if necessary. Acupuncture consisted of the booklet and six to eight treatments with a physiotherapist comprising true (penetrating) or non-penetrating acupuncture, along with advice and exercise. The average number of treatments was six for acupuncture groups. Seventy-four percent of participants were followed up at eight weeks, timed to be before women gave birth. Patient-reported outcomes of pain, function and quality of life favoured the addition of acupuncture. There were no serious adverse events on mothers or birth outcomes. The researchers concluded that a larger trial is feasible, and with a longer-term follow-up some improvements to retain participants would be needed.

Foster NE, Bishop A, Bartlam B, Ogollah R, Barlas P, Holden M, Ismail K, Jowett S, Kettle C, Kigozi J, Lewis M, Lloyd A, Waterfield J, Young J (2016). Evaluating Acupuncture and Standard care for pregnant women with Back pain (EASE Back): a feasibility study and pilot randomised trial. *Health Technology Assessment* 20:33:1-236. doi:10.3310/hta20330.

STUDY 44 (PB-PG-0610-22292) PUBLISHED

A pilot trial of group acupuncture for chronic knee pain

Published, 2016, White

This feasibility trial looked at the effect of acupuncture given in groups or individually for adults with severe knee pain attributable to osteoarthritis. The trial was based in seven general practices in Devon. The researchers randomised 60 participants (mean

age 60 years) to receive either a standard advice and exercise booklet, the booklet plus group acupuncture, or the booklet plus individual acupuncture. Both acupuncture groups received up to 10 treatments over 12 weeks from a physiotherapist. Seventy-seven percent of participants were followed up at 14 weeks. Most participants reported that they had a good overall experience of being in the trial and no serious adverse events were reported. Mean costs of acupuncture were £209 per person for group and £293 for individual acupuncture. Participants in the group acupuncture reported greater pain improvement than the other groups, but this was a small feasibility study so further testing is required to make robust comparisons. The researchers concluded that a future definitive trial of group acupuncture for severe knee pain is feasible.

White A, Tough L, Eyre V, Vickery J, Asprey A, Quinn C, et al. Western medical acupuncture in a group setting for knee osteoarthritis: results of a pilot randomised controlled trial. *BMC Pilot and Feasibility Studies*. 2016 Feb. 16(2):10.

<https://doi.org/10.1186/s40814-016-0051-5>

STUDY 45 (CLAHRC NORTH THAMES) PUBLISHED

Can a web-based approach support the rehabilitation of patients after knee injuries?

Published, 2017, Dunphy

The aim of this qualitative study was to evaluate the acceptability of an intervention in post anterior cruciate ligament (ACL) reconstruction rehabilitation. The TRAK intervention is a web-based tool developed to support knee rehabilitation, which provides individually tailored exercise programmes with videos, instructions and progress logs for each exercise, health information and an option to email a physiotherapist for additional support. The researchers recruited 24 participants (8 females, mean age 30 years) following an ACL reconstruction from a London NHS hospital. Participants were asked to use TRAK alongside face-to-face physiotherapy for 16 weeks. The researchers interviewed 17 participants who used TRAK for 16 weeks and four physiotherapists. The main themes arising from the participants were: experiences of using TRAK, personal characteristics for engagement, strengths and weaknesses of TRAK and attitudes to digital healthcare. They particularly liked the videos and found that TRAK increased their confidence and motivation for rehabilitation. The physiotherapists commented on potential benefits of TRAK, availability of computers, and the need for service providing organisations to support digital health tools in physiotherapy practice. The researchers concluded that this blended approach to rehabilitation appears to be beneficial in engaging participants.

Dunphy E, Hamilton F, Spasi I, Button K. Acceptability of a digital health intervention alongside physiotherapy to support patients following anterior cruciate ligament reconstruction. *BMC Musculoskeletal Disorders*. 2017. 18:471.

<https://bmcmusculoskeletaldisord.biomedcentral.com/articles/10.1186/s12891-017-1846-0>

STUDY 46 (PB-PG-1111-26080) PUBLISHED

Using an internet intervention to support self-management of low back pain in primary care: findings from a randomised controlled feasibility trial

(SupportBack)

Published, 2017, Geraghty

This project had previously developed an internet intervention 'SupportBack', designed for use in primary care. The intervention is designed to encourage patients with low back pain (LBP) to self-manage and remain active. SupportBack is a six week, tailored programme that comprises of focused goal setting, self-monitoring and tailored feedback to encourage physical activity uptake and

maintenance. The researchers originally explored the acceptability and feasibility of the intervention with 22 patients with low back pain in primary care. The intervention received positive feedback from the participants, with useful amendments suggested such as using the individual's current pain or activity level. Most of the participants said they would use a good online intervention for self-management of their condition. In this study, the researchers went on to test the SupportBack intervention in a feasibility trial. Patients with LBP (n=87) were recruited from 12 general practices in England to three arms of a randomised controlled trial: usual care; usual care plus an internet intervention; or usual care plus an internet intervention with additional physiotherapist telephone support. Adherence to the intervention was higher in the physiotherapist-supported arm, compared with the stand-alone internet intervention. The authors concluded that the SupportBack intervention is acceptable to patients with LBP presenting to primary care, and a future definitive randomised controlled trial is feasible to determine the clinical and cost-effectiveness of the SupportBack intervention.

Geraghty A, Stanford R, Stuart B, Little P, Roberts L, Foster N, et al. Using an internet intervention to support self-management of low back pain in primary care: findings from a randomised controlled feasibility trial (SupportBack). 2018 Mar. 8:1.

<http://dx.doi.org/10.1136/bmjopen-2017-016768>

STUDY 47 (HTA 16/111/78) ONGOING

Supporting self-management of low back pain with an internet intervention in primary care: A randomised controlled trial of clinical and cost-effectiveness (SupportBack 2)

Due to publish 2022, Geraghty

This randomised controlled trial is comparing the clinical and cost-effectiveness of an internet and physiotherapist intervention for low back pain (LBP). The researchers aim to recruit 806 adult participants who have LBP, from approximately 100 primary care practices in Wessex and West Midlands. The participants will be randomly allocated to one of three treatment groups: usual care and internet intervention; usual care, internet intervention and physiotherapist telephone support; usual care alone. "SupportBack" is an internet intervention comprising of a six week tailored programme focusing on goal setting, self-monitoring and tailored feedback to encourage physical activity. The physiotherapist telephone support consists of 3 brief calls. The primary outcome will be LBP-related disability measured at six weeks, and three, six and 12 months.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/1611178/#/>

STUDY 48 (PB-PG-0808-17039) PUBLISHED

Improving Patient Choice in Treating Low Back Pain (IMPACT - LBP)

Published, 2014, Underwood/Patel

This pilot randomised controlled trial evaluated a decision support package to help people choose between low back pain treatments. The research was conducted in a community physiotherapist service. Researchers recruited 148 participants (over 18) with non-specific low back pain referred for physiotherapy. Participants in the intervention arm received an information booklet prior to their first consultation and saw a physiotherapist who had been trained in enhanced skills of informed decision making. Participants in the control group received care as usual. The primary outcome was satisfaction with the treatment at four months. 114 participants had complete data (n=63 intervention; n= 51 control). The researchers found that 67% of participants in the control group were satisfied with their treatment, compared to 53% in the intervention group. They also found a clinically important detrimental effect of the intervention, as measured by the Roland Morris Disability Questionnaire. The researchers found the intervention not to be cost-effective. They concluded

that the decision support package may have a negative effect on clinical outcomes. Further research is needed to evaluate the use of decision support packages.

Patel S, Ngunjiri A, Hee S, Yang Y, Brown S, Friede et al. Primum non nocere: shared informed decision making in low back pain - a pilot cluster randomised trial. BMC Musculoskeletal Disorders. 2014 Aug. 15:282.

<https://bmcmusculoskeletaldisord.biomedcentral.com/articles/10.1186/1471-2474-15-282>

STUDY 49 (SRP 16/72/22) ONGOING

Interventions to improve adherence to exercise for chronic musculoskeletal pain in adults

Due to publish 2018, Jordan

This project is updating the 2010 Cochrane review (Jordan JL, Holden MA, Mason EEJ, Foster NE. Interventions to improve adherence to exercise for chronic musculoskeletal pain in adults. Cochrane Database of Systematic Reviews 2010, Issue 1. Art. No.: CD005956. DOI: 10.1002/14651858.CD005956.pub2.). The previous review of 42 trials found considerable uncertainty about effective ways to improve exercise adherence for chronic musculoskeletal pain. This review aims to update the search and include 30-40 additional trials.

<https://www.journalslibrary.nihr.ac.uk/programmes/sr/167222>

STUDY 50 (HS&DR 08/1716/205) PUBLISHED

The role of allied health professionals in health promotion

Published, 2011, Petchey/Needle

This systematic review evaluated the evidence relating to the role of UK-based Allied Health Professionals (AHPs) in health promotion from 2000 to 2008. This includes art therapists, chiropodists/podiatrists, dietitians, occupational therapists, orthoptists, paramedics, physiotherapists, prosthetist, radiographers and speech and language therapists. The researchers included 141 articles. Over half were randomised controlled trials, 10% qualitative studies and very few economic evaluations. The researchers evaluated them to be of poor quality overall. Physiotherapists comprised of 29% AHPs, but were involved in 51% of studies. The main conditions targeted were back and neck pain (28%) arthritis/rheumatic disorder (14%) chronic pain, fibromyalgia and chronic fatigue syndrome (10%). Interventions were mainly individualistic advice and information giving. The main setting was hospital (61%), followed by primary care (12%) and community (12%). The biomedical model predominated in the hospital setting. The researchers found that health promotion is a routine component of AHP practice, although it is often poorly planned with minimal evaluation. The literature highlighted that physiotherapists and dietitians had better developed research capacity compared to other AHPs. The researchers recommended that it was important to develop HP capacity in a more systematic way.

Needle J, Petchey R, Benson J, Scriven A, Lawrenson J, Hilari K. The allied health professions and health promotion: a systematic literature review and narrative synthesis. Final report. NIHR Service Delivery and Organisation programme. 2011.

<https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/081716205>

STUDY 51 (HTA 13/25/20) ONGOING

A multi-centred RCT of an augmented exercise referral scheme using web-based behavioural support in individuals with metabolic, musculo-skeletal and mental health conditions

Due to publish 2019, Taylor

This randomised controlled trial is evaluating the use of an e-coach alongside an exercise referral scheme (ERS) for patients with a medical condition that would benefit from exercise. The

study has run in three ERS areas (Glasgow, Devon/Cornwall and West Midlands). At the point of exercise referral, patients were randomised to receive either standard ERS or standard ERS plus e-coach support. Medical conditions include obesity, hypertension, type 2 diabetes, osteoarthritis and depression. The standard ERS provided usual support of structured exercise or physical activity counselling. The e-coach is a bespoke online 7-step behavioural support system for patients, which provides additional support to encourage exercise maintenance and physical activity after 12 months, after patients have received an initial welcome pack to aid on-line registration, a pedometer and a fridge magnet. The primary outcome is the accelerometer recorded total minutes of moderate or vigorous physical activity (in at least 10 minute bouts) per week at 12 months.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/132520#/>

STUDY 52 (RP-PG-1210-12017) ONGOING

Development and preliminary testing of strategies to enhance routine physical activity in care homes

Due to publish 2018, Forster

This programme of research aims to develop strategies to increase physical activity levels of care home residents to improve their physical, psychological and social wellbeing. The researchers will first undertake observations and interviews in care homes to assess current levels of activity and how an intervention might be incorporated into daily life. They will test a range of outcome measures, including accelerometers, to find the best way of measuring the physical activity levels of the care home residents. After designing a physical activity implementation package using action research methods to refine and test approaches, the researchers will test the intervention in care homes in a feasibility study. Twelve care homes will be selected, and six will be randomly allocated to receive the intervention. They will look at outcomes such as physical function and mood. Results will be used to inform a future definitive trial.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22Forster+A%22+gid:%22RP-PG-1210-12017%22+ga:%22DH/NIHR%22>

STUDY 53 (PB-PG-0214-33067) ONGOING

Is it feasible to conduct a randomised controlled trial of pre-transplant exercise (prehabilitation) for multiple myeloma patients awaiting autologous stem cell transplantation? (PREeMPT study)

Due to publish 2018/9, Mawson

This study will test the feasibility of conducting a multi-centre randomised controlled trial of a pre-transplant mixed exercise programme for patients with multiple myeloma (blood cancer) awaiting autologous stem cell transplantation. The researchers will recruit patients awaiting their transplant. They will be assessed for the exercise capabilities and then receive an exercise booklet, advice and one session with a physiotherapist. Participants will be required to attend the gym for a minimum of six weeks. They will complete questionnaires and walking tests before and after their transplant. The researchers will also explore the patients' views and experiences of the prehabilitation programme. Results will be used to inform a definitive randomised controlled trial.

Keen C, Skilbeck J, Ross H, Smith L, Collins K, Dixey J, Walters S, Greenfield DM, Snowden JA, Mawson S. Is it feasible to conduct a randomised controlled trial of pretransplant exercise (prehabilitation) for patients with multiple myeloma awaiting autologous haematopoietic stem cell transplantation? Protocol for the PREeMPT study. *BMJ open*. 2018 Mar 1;8(3):e021333.

<http://bmjopen.bmj.com/content/8/3/e021333>

STUDY 54 (PB-PG-0613-31107) ONGOING

Development of a perioperative isometric-resistance exercise intervention programme (Basic Exercise Training To Enhance Recovery - BETTER) for patients undergoing elective abdominal and thoracic surgery for cancer

Due to publish 2018, Ali

This project is developing an isometric-resistance exercise programme for patients undergoing treatment for oesophageal and stomach cancer (upper GI cancer). Isometric-resistance (static) exercise may increase physical function in patients who have had surgical treatment for upper GI cancer, particularly benefiting their muscle and breathing functions. The researchers will determine the most effective format for a safe and simple exercise programme that can be performed in hospital and at home and how best to measure physical function outcomes. Views will be sought from patients, clinicians, physiotherapists, exercise specialists and nurses.

They will then conduct a pilot study to test their exercise programme, randomising 25 patients to receive the intervention alongside usual care and 25 patients to receive only usual care.

<https://europepmc.org/grantfinder/grantdetails?query=pi:%22Ali+H%22+gid:%22PB-PG-0613-31107%22+ga:%22DH/NIHR%22>

STUDY 55 (HTA 13/84/10) ONGOING

Exercise to prevent shoulder conditions in patients undergoing breast cancer treatment. The PRevention Of Shoulder Problems Study (PROSPER)

Due to publish 2019, Bruce

The aim of this randomised controlled feasibility trial is to evaluate early supervised exercise compared to usual care for women after breast cancer surgery. After an initial pilot trial, the researchers aims to recruit 350 women from 10-15 UK breast cancer centres in the UK. Eligible women are those who require surgery from primary breast cancer who are at risk of developing shoulder problems. Participants will be randomised to receive the intervention or usual care. The intervention is a physiotherapist-led supervised exercised programme. Participants will be offered three face-to-face sessions up to 16 weeks after surgery, with a further three sessions up to 12 months after surgery if needed. Usual care is a leaflet to encourage unsupervised exercise.

<https://www.journalslibrary.nihr.ac.uk/programmes/hta/138410>

NON-NIHR PROJECTS

STUDY A PUBLISHED

Self-referral to physiotherapy for musculoskeletal problems in primary care: stepping up the evidence

Published, 2017, Foster / Bishop

Funder: Chartered Society of Physiotherapy supported by NIHR infrastructure

This pilot randomised trial looked at the feasibility of adding a direct access pathway to physiotherapy compared with usual GP-led primary care for adults with musculoskeletal pain. The researchers randomised four general practices to provide GP-led care as usual or the addition of a direct access pathway to a musculoskeletal physiotherapist. They recruited 978 participants (intervention group n = 425, control group n = 553), and followed up 78% of patients at six months, and 71% at 12 months. All adult registered patients of the intervention general practices were mailed an information letter about the new direct access service. Ninety percent of the physiotherapy workload from the intervention practices was through the direct access pathway. No adverse effects were reported in either group. The researchers

indicated that clinical and cost outcomes were similar in both groups. They concluded that a definitive, non-inferiority, randomised controlled trial is feasible and will provide comparative data on clinical and cost-effectiveness.

Bishop A, Ogollah R, Jowett S, Kigozi J, Tooth S, Protheroe J, et al. STEMS pilot trial: a pilot cluster randomised controlled trial to investigate the addition of patient direct access to physiotherapy to usual GP-led primary care for adults with musculoskeletal pain. *BMJ Open*. 2017. 7(3):e012987.

<http://bmjopen.bmj.com/content/7/3/e012987>

STUDY B

Patient direct access to NHS musculoskeletal physiotherapy: what is the impact on patients, general practice and physiotherapy services? STEMS 2 study (active 2017-2019)

Annette Bishop

This study, building on the first pilot randomised controlled trial of direct access to physiotherapy, is specifically designed to investigate whether patient direct access to physiotherapy for adults with musculoskeletal pain can reduce GP musculoskeletal workload, provide a cost-effective alternative to GP-led care and meet the needs of patients with musculoskeletal conditions in primary care. Further details will be available on study design and methods.

Funder: Arthritis Research UK Chartered Society of Physiotherapy Charitable Trust & Arthritis Research UK, Pfizer Ltd, NIHR infrastructure, Project reference: 21406

<http://www.arthritisresearchuk.org/research/grant-tracker-items/2017/patient-direct-access-to-nhs-musculoskeletal-physiotherapy-what-is-the-impact-on-patients-general-pr.aspx>

STUDY C PUBLISHED

Improving the effectiveness of primary care for low back pain: The Subgrouping for Targeted Treatment (StarTBack) Trial

Elaine Hay/Jonathan Hill

Funder: Arthritis Research Campaign Project Grant 17741 with NIHR infrastructure

The researchers compared the clinical-effectiveness and cost-effectiveness of stratified primary care (intervention) with non-stratified current best practice (control), with low back pain patients in 10 GP practices. 851 participants were randomly assigned to intervention (stratified care based on the STarT Back tool identifying low, medium and high risk of persistent disability) or control group (usual primary care). The primary outcome was physical function. The results showed that physical function was significantly higher in the intervention group than in the control group at 4 months (primary time-point) and at 12 months. At 12 months, stratified care was associated with a mean increase in general health benefit and cost savings compared with the control group.

Hill J, Whitehurst D, Lewis M, Bryan S, Dunn K, Foster N, et al. Comparison of stratified primary care management for low back pain with current best practice: (STarT Back) a randomised controlled trial. *The Lancet*. 2011. 378(9802):1560-71.

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(11\)60937-9/abstract](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60937-9/abstract)

STUDY D PUBLISHED

Engaging with Quality in Primary Care, The Health Foundation Implementing evidence-based primary care for back pain. (IMPACT Back study)

Nadine Foster / Elaine Hay

Funder: Health Foundation with NIHR infrastructure

The researchers aimed to determine the effects of implementing risk-stratified care for low back pain in general practice on GP's clinical behaviour, patient outcomes, and costs. The IMPACT Back Study compared separate patient cohorts in a pre-intervention phase (six months of usual care) and a post-intervention phase (12 months of stratified care), and involved 64 GPs and linked NHS physiotherapy services and 922 patients. Stratified care entailed use of a risk stratification tool to classify patients into groups at low, medium, or high risk for persistent disability and provision of risk-matched treatment. The primary outcome was six-month change in physical disability. At six months follow-up, stratified care had a small but significant benefit compared to usual care overall for patients' physical function scores, and a large, clinically important difference for patients in the high risk group. Stratified care for back pain implemented in general practice leads to significant improvements in patient disability outcomes and a halving in time off work, without increasing healthcare costs. Wider implementation is recommended.

Foster N, Mullis R, Hill J, Lewis M, Whitehurst D, Doyle C, et al. Effect of stratified care for low back pain in family practice (IMPACT Back): a prospective population-based sequential comparison. *Annals of Family Medicine*. 2014. 12(2).

<http://www.annfam.org/content/12/2/102.long>

STUDY E

Individual patient data meta-analysis of trials investigating the effectiveness of exercise in patients with knee and hip osteoarthritis. (STEER OA) (active 2017-2019)

Nadine Foster / Mel Holden

Funder: Physiotherapy Research Foundation (PRF), (grant no PRF/16/A07) with NIHR School of Primary Care

Exercise is a recommended core treatment for people with knee and hip osteoarthritis (OA), however, the effects on pain and function are small to moderate. This may be due to insufficient targeting of exercise to subgroups of people who are most likely to respond and/or suboptimal content of exercise programmes. This study aims to identify subgroups of people with knee and hip OA that do/do not respond to exercise and to different types of exercise and identify mediators of the effect of therapeutic exercise for reducing pain and improving physical function. STEER OA is a systematic review and individual data meta-analysis of existing randomised trials and the results will facilitate better targeting of future exercise interventions.

Protocol: Holden MA, Burke DL, Runhaar J, et al and the OA Trial Bank. Subgrouping and TargetEd Exercise pROgrammes for knee and hip OsteoArthritis (STEER OA): A systematic review update and individual participant data meta-analysis protocol. *BMJ Open* 2017 Dec 22;7(12):e018971. doi: 10.1136/bmjopen-2017-018971

STUDY F PUBLISHED

Musculoskeletal Health Questionnaire (MSK-HQ). Patient reported outcome measure study

Jonathan Hill

Funder: Arthritis Research UK

This work developed and tested measures of musculoskeletal health which would be meaningful to patients and help in assessing outcomes of interventions. The work took place in different stages, from initial consensus workshop to identifying and testing fourteen constructs from a literature review and detailed qualitative research. These included disease-specific measures and dimensions such as pain, stiffness and fatigue which were important to those living with musculoskeletal problems. This questionnaire was then tested in use in different settings, from patients referred to orthopaedic surgery to community physiotherapy to rheumatology outpatient clinics. The use of this

measure will be helpful to quality improvement and assessing changes in patient outcome.

Hill JC, Kang S, Benedetto E, Myers H, Blackburn S, Smith S, et al. Development and initial cohort validation of the Arthritis Research UK Musculoskeletal Health Questionnaire (MSK-HQ) for use across musculoskeletal care pathways. *BMJ Open*. 2016. 6:e012331.

<http://bmjopen.bmj.com/content/6/8/e012331>

STUDY G PUBLISHED

Active exercise, education, and cognitive behavioral therapy for persistent disabling low back pain: a randomized controlled trial.

Published 2007, Johnson

Funder: Arthritis Research Campaign, Chesterfield, UK and the Epidemiology Unit at the University of Manchester, UK

This randomised controlled trial aimed to determine whether, among patients with persistent disabling low back pain (LBP), a group programme of exercise and education using a cognitive behavioural therapy (CBT) approach, reduced pain and disability over a subsequent 12-month period. It also investigated the cost-effectiveness of the intervention, and whether patient preference for type of treatment influences outcome. Patients 18 to 65 years of age, consulting with LBP in nine medical practices in East Cheshire, were recruited; those still reporting LBP three months after the initial consultation were randomized between the two trial arms. Both arms received an educational booklet and audio-cassette. The comparison arm (n=118) received no further intervention and continued with usual GP treatment. The active CBT intervention arm (n=116) received eight two-hour sessions delivered over a five-week period in groups of four to 10, by two physiotherapists. It was not possible to blind patients or staff to treatment allocation. Before randomisation, patients were asked about their treatment preference. The primary outcome measures were pain and disability. 196 patients (84%) completed follow-up 12 months after completion of the intervention. The intervention showed only a small and nonsignificant effect at reducing pain and disability. The cost of the intervention was low. Patients allocated to the intervention that had expressed a preference for it had clinically important reductions in pain and disability. The authors concluded that this patient preference effect warranted further investigation.

Johnson R, Jones G, Wiles N, Chaddock C, Potter R, Roberts C, et al. Active exercise, education, and cognitive behavioral therapy for persistent disabling low back pain: a randomized controlled trial. *Spine*. 2007 Jul. 32(15):1578-85.

<https://www.ncbi.nlm.nih.gov/pubmed/17621203>

STUDY H PUBLISHED

Clinical Effectiveness of a Rehabilitation Program Integrating Exercise, Self-Management, and Active Coping Strategies for Chronic Knee Pain: A Cluster Randomized Trial

Published 2007 and 2012, Hurley

Funder: Arthritis Research UK

Enabling Self-management and Coping with Arthritic Knee Pain through Exercise (ESCAPE-knee pain) is a rehabilitation programme for people with chronic joint pain that integrates education, self-management and coping strategies with an individual exercise programme. Participants receive 12 supervised sessions, twice weekly for six weeks. They are discharged with advice on continuing home exercises and a physical activity like walking. This randomised controlled trial compared the effectiveness of ESCAPE-knee pain, delivered either to individual participants (n=146) or to groups of eight participants (n= 132), with usual primary care (n=140). Participants aged 50 years or over, reporting knee pain for more than six months, were recruited from 54 inner-city primary care practices in London. The primary outcome was self-reported

functioning six months after completing rehabilitation. Those taking part in the ESCAPE programme had better functioning than those receiving usual care, and this was equally effective whether delivered individually or in a group.

Hurley M, Walsh N, Mitchell H, Pimm T, Patel A, Williamson, et al. Clinical Effectiveness of a Rehabilitation Program Integrating Exercise, Self-Management, and Active Coping Strategies for Chronic Knee Pain: A Cluster Randomized Trial. *Arthritis & Rheumatism (Arthritis Care & Research)*, American College of Rheumatology. 2007 Oct. 57(7):1211-1219. <https://doi.org/10.1002/art.22995>

A paper published five years later investigated the long-term (up to 30 months) clinical and cost-effectiveness of the ESCAPE-knee pain programme. Ninety percent of the original trial participants were assessed on at least one follow-up occasion and 68% at 30 months. During the 30-month observational period, all of the participants in the trial, regardless of which arm they were in, received whatever interventions their primary care physicians considered appropriate. ESCAPE-knee pain participants had large initial improvements in function, which declined over time. But 30 months after completing the programme, ESCAPE-knee pain participants still had better physical function and lower total health and social care costs. The authors concluded that ESCAPE-knee pain is an effective and efficient programme that could substantially improve the health, wellbeing, and independence of many people, while reducing health care costs.

Hurley M, Walsh N, Mitchell H, Nicholas J, Patel, A. Long-Term Outcomes and Costs of an Integrated Rehabilitation Program for Chronic Knee Pain: A Pragmatic, Cluster Randomized, Controlled Trial. *Arthritis Care & Research*. 2012 Feb. 64(2):238-247.

<https://doi.org/10.1002/acr.20642>

STUDY I PUBLISHED

The effectiveness of interventions aimed at increasing physical activity in adults with persistent musculoskeletal pain: a systematic review and meta-analysis

Published, 2017, Marley

Funder: Public Health Agency, HSC R&D Division through a Doctoral Fellowship awarded to J Marley

This systematic review investigated the effectiveness of interventions, and the components of those interventions, in improving physical activity levels in adults with chronic musculoskeletal pain. People with long-term musculoskeletal pain have increased risk of developing other health conditions and early-mortality compared to people without pain. Despite evidence supporting physical activity in reducing these risks, there had previously been limited review of evidence. This systematic review included 20 studies involving 3,441 participants. The authors concluded that although there was some evidence supporting the effectiveness of interventions in improving subjectively measured physical activity, the evidence was mostly based on low quality studies and the effects were small. They suggested that further research is needed to provide details of the components of interventions and to incorporate objective measures of physical activity.

Marley J, Tully M, Porter-Armstrong A, Bunting B, O'Hanlon J, Atkins L, et al. The effectiveness of interventions aimed at increasing physical activity in adults with persistent musculoskeletal pain: a systematic review and meta-analysis. *BMC Musculoskeletal Disorders*. 2017. 18:482.

<https://doi.org/10.1186/s12891-017-1836-2>

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