

expectations regarding the outcome of treatment and personal life. The structured overview of reasons can be used by healthcare providers when counselling patients to support informed shared-decision making. Ultimately this may lead to optimized treatment choices. We will use these results as input for the development of a questionnaire assessing patients' individual considerations to choose specific treatment options.

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A RANDOMISED CONTROLLED TRIAL TO INVESTIGATE WALKING 6,000 STEPS PER DAY ON PAIN AND FUNCTION IN KNEE OSTEOARTHRITIS PROGRESSION: THE WALKOUT STUDY

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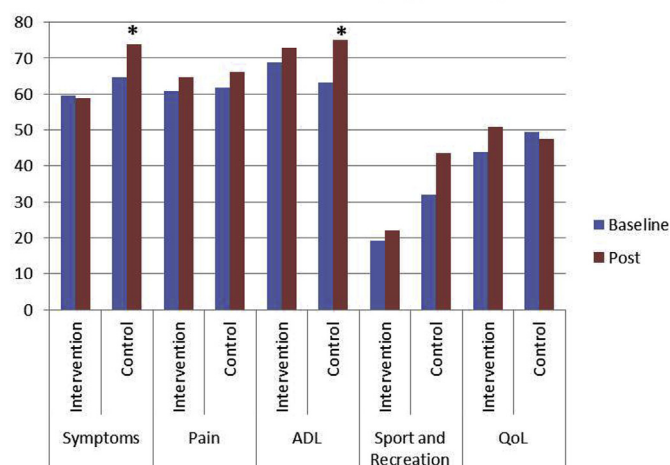
Purpose: An estimated 6 million people in the UK have knee osteoarthritis (kOA), which can cause significant pain and disability. With an increasingly elderly population in the UK, the individual and socioeconomic burden of kOA is likely to be significant in the coming decades. There is increasing interest in the use of physical activity as therapy for kOA to decrease pain and improve functionality instead of pharmacological or surgical interventions. The aim of this study was to evaluate the effectiveness of walking at least 6,000 steps per day on the symptoms of knee osteoarthritis in comparison with current UK Department of Health (DoH) physical activity guidelines.

Methods: Sedentary participants with knee pain over 45 years were recruited by community advertisement, screened for eligibility and invited for assessment. Assessment consisted of medical history, physical examination, questionnaire on knee symptoms and general health and five functional tests (OARSI). Participants were allocated by concealed block randomisation into control group (UK DoH guidelines) or intervention group (6,000 walking steps) for 12 weeks. The intervention group was provided with pedometer and diary to record daily steps. A short form IPAQ was completed at mid-point in both groups. Functional tests and questionnaire were repeated at 12 weeks. The primary outcome measure was KOOS Activities of Daily Living (ADL). Secondary outcomes were the other KOOS scores, a visual analogue score (VAS) for knee pain, Oxford Knee Score (OKS), SF36 (general health survey) and functional knee tests. Statistical analysis of baseline data, post-intervention and change were analysed (intention to treat analyses) using parametric or non-parametric tests as appropriate to the data.

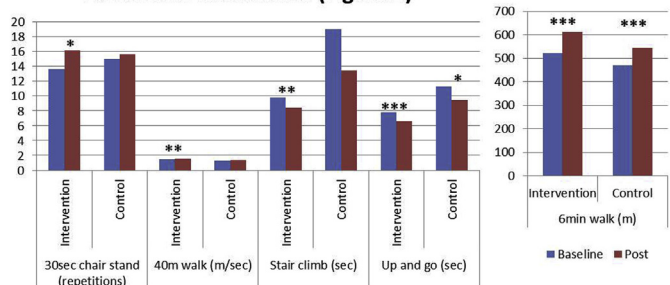
Results: 106 responses to advert: 17 were excluded due to ineligibility, 8 declined participation, 29 did not respond any further; 52 participants currently enrolled, 23 have completed final assessment and are presented. There were no statistically significant differences between groups at baseline (age, BMI, gender, previous injury, % both knees, % sedentary occupation, % diagnosed by GP, sitting time, walking/moderate/vigorous physical activity MET minutes) ($p > 0.05$). No statistical differences in KOOS scores were observed between baseline and post intervention except for KOOS ADL and symptoms in the control group ($p = 0.003$ and 0.020 respectively). See Figure 1. A higher (less pain) VAS score and improved OKS were both observed in the intervention group (both $p = 0.020$). No statistical significance in SF36 scores were observed in either the Physical or Mental Health Summary ($p > 0.05$). All functional test results were improved in the intervention group between baseline and post intervention (30 sec chair stand $p = 0.020$; 40 m walk $p = 0.001$; stair climb $p = 0.002$; up and go $p = 0.0008$; 6 minute walk $p < 0.0001$) (see Figure 2). Statistically significant improvements in the control group were seen in 'up and go' ($p = 0.050$) and '6minute walk' ($p = 0.0008$). Change in outcome scores between baseline and post-intervention were not statistically significantly different between the two protocol groups ($p > 0.05$).

Conclusions: Increasing physical activity reduces pain and improves perceived and actual physical functionality in participants. The walking group saw greatest improvement, but the control group (which had a wider repertoire of 'permitted' physical activities, including walking) also benefited. This suggests people can tailor their daily physical activity to their personal preferences which is likely to be necessary for long term maintenance. The important take home message for people with knee osteoarthritis is that being active should reduce knee pain and improve function.

KOOS Results (Figure 1)



Functional Test Results (Figure 2)



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A MIXED METHODS STUDY OF KNEE CONFIDENCE AND SELF-EFFICACY: PERCEPTIONS OF KNEE OSTEOARTHRITIS PATIENTS FROM THE GOOD LIFE WITH OSTEOARTHRITIS IN DENMARK INITIATIVE

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Purpose: The Good Life with osteoArthritis in Denmark (GLA:D) Initiative is an evidence-based treatment programme for patients with knee and hip osteoarthritis (OA). It incorporates training physiotherapists to deliver care in accordance with the clinical guidelines by educating patients on their condition and by delivering supervised neuromuscular exercises to relieve pain and improve function. The importance of self-efficacy, and confidence in exercise, to exercise adherence has not been reported for the GLA:D population. In addition, worse knee confidence in people with knee OA is associated with higher pain and greater perceived knee instability. The aims of this study were to investigate the association between knee confidence and self-efficacy in patients with knee OA in the GLA:D registry; and to explore patients' perception of their experiences with the GLA:D programme, and whether confidence and self-efficacy has a role to play in continuing with the GLA:D exercises in the long-term.

Methods: This study used a mixed methods design. Patients with knee OA who were offered at least two educational sessions and six weeks of GLA:D exercise programme between January–March 2015 were identified from the GLA:D registry ($n = 484$) and sent an online survey. Ordinal regression analyses were performed. Knee confidence, assessed using the Knee injury and Osteoarthritis Outcomes Score (KOOS; quality

of life subscale, question 3), was the dependent variable and self-reported measures for exercise self-efficacy; arthritis self-efficacy; multidimensional outcomes expectations for exercise; and KOOS pain and activities of daily living (ADL) were the independent variables. Knee confidence score ranged from 0–4 with 0 indicating higher knee confidence. The independent variables ranged from 0–10 or 0–100 with 0 indicating worse symptoms or confidence. Subsequently, semi-structured interviews ($n = 4$) were used to explore patients' perceived confidence and adherence to the GLA:D exercises. Interviews were transcribed verbatim, and analysed using interpretative phenomenological analysis.

Results: 200 patients (41.3%) responded to the survey. At 7–10 months following treatment initiation, 9.5% of patients were not at all troubled by lack of knee confidence; 39.5% were mildly troubled; 31.5% were moderately troubled; 15.5% were severely troubled; and 4% were extremely troubled. Patients with higher arthritis self-efficacy score were more likely to have higher knee confidence (odds ratio [OR] = 0.76; 95% confidence interval [CI] 0.63, 0.93; $P = 0.007$). Patients with higher KOOS ADL score were more likely to have higher knee confidence, although this association was small (OR = 0.96; 95% CI 0.93, 0.99; $P = 0.006$). No association was found between knee confidence and exercise self-efficacy (OR = 1.00; 95% CI 0.99, 1.01; $P = 0.90$). Patients reflected on seeing great improvements in their confidence, pain and mobility with the programme. They felt their symptoms got worse if they did not keep up with the exercises. Patients reflected on the importance of continued contact with their physiotherapist after the 6-week programme for further motivation and reassurance. One of the barriers that discouraged patients from continuing with the exercises in the long-term was the cost for additional GLA:D exercise classes with their physiotherapist.

Conclusions: Patients are troubled by the lack of knee confidence after the GLA:D exercise programme; they reflected this was due to their negative experiences prior to entering the GLA:D programme. Arthritis self-efficacy and KOOS ADL were significantly associated with knee confidence, but no association was found with exercise self-efficacy. Patients from the interview reflected that maintaining contact with their physiotherapist was an important factor to motivate them to continue exercising.

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EFFECTS OF LOW LEVEL LASER THERAPY: A STUDY OF STATUS OF CARTILAGE, SUBCHONDRAL BONE AND GAIT ADAPTATION IN THE RAT ANTERIOR CRUCIATE LIGAMENT TRANSECTION MODEL OF OSTEOARTHRITIS

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Purpose: Osteoarthritis (OA) is a whole organ joint disease with high prevalence in knee joint. Such morbidity can lead to functional disability. OA is characterized by cartilage degradation, abnormal subchondral bone remodeling and synovitis. Cross-link was suggested between subchondral bone and cartilage in the pathogenesis of OA. The restoration of subchondral bone integrity may be associated with retardation of cartilage degradation. Low level laser therapy (LLLT) at red to near infrared wavelength has been reported to be osteogenic and chondroprotective in numerous in-vitro experimentation. Structure, form and function are interrelated. The study aimed to investigate that LLLT may restore the integrity of cartilage, subchondral bone and improvement of gait function *in vivo*. LLLT exhibits a dose dependent treatment effect. The effectiveness of two exposure regimes on the mentioned outcomes will also be studied.

Methods: Forty female Sprague-Dawley rats aged 3-month old were randomized into studied groups of non-operated control (CG), placebo LLLT (PG), 80-second LLLT (L80) and 800-second LLLT (L800). Anterior cruciate ligament transection (ACLT) was performed in the right knee joint of PG, L80 and L800 only and with 10-week free cage movement to establish OA changes. At 10 week post-ACLT, ten daily sessions of 80- and 800-second LLLT (50 mW, 820 nm) were given to L80 and L800, respectively on right knee joint for two weeks. At 12 week post-ACLT, all the rats were sacrificed after gait adaptation measurement using Cat-walk system. Right proximal tibiae were then harvested for subchondral bone density and micro-architecture measurements using micro-computed tomography, cartilage morphology and biomechanical properties were evaluated using ultrasound microscopy and micro-indentation,

respectively. Comparison among the groups for the outcome measurements were analysed by one-way ANOVA statistics.

Results: Firstly, microCT study of proximal tibial epiphysis showed that apparent trabecular bone mineral density (atBMD), bone volume fraction (BV/TV), trabecular number (Tb.N), and trabecular thickness (Tb.Th) were significantly lower in the PG compared with CG ($P < 0.05$). The findings revealed that there could be abnormal subchondral bone remodeling which may be associated with the joint instability induced by ACLT. In contrast, treatment groups with 800-second LLLT or 80-second LLLT showed that atBMD, BV/TV, and Tb.Th were significantly greater than PG ($P < 0.05$). The results indicated that LLLT could restore the loss of subchondral bone mineral density and micro-architecture in ACLT induced knee OA.

Secondly, morphology study showed that cartilage thickness in medial tibia was significantly increased in the L80 compared with PG ($P < 0.05$). However, cartilage roughness and cartilage integrated reflection coefficient in both medial and lateral tibia as well as cartilage thickness in lateral tibia did not show significant change either in the L80 or L800 groups compared with PG. Biomechanical properties of cartilage as revealed in its elastic modulus showed no significant different either in L80 or L800 groups compared with PG. These findings showed that LLLT could increase thickness of cartilage but no improvement of cartilage biomechanical property was found.

Thirdly, the ACLT also brought about changes in gait adaptation. Mechanical allodynia during ambulation in OA animals was shown in the PG groups with significant decrease in the percent paw area and increase in the percent swing duration of the right hind limb (OA right knee) ($P < 0.05$). The findings showed that LLLT treatment could reduce the mechanical allodynia and restore the normal ambulation.

Conclusions: Our results supported that LLLT could restore subchondral bone density and micro-architecture as well as cartilage thickness in the OA rat model. However, no effect of LLLT was observed in cartilage elastic modulus. These modifications may relate to the reduction of mechanical allodynia and normalization of gait function.

