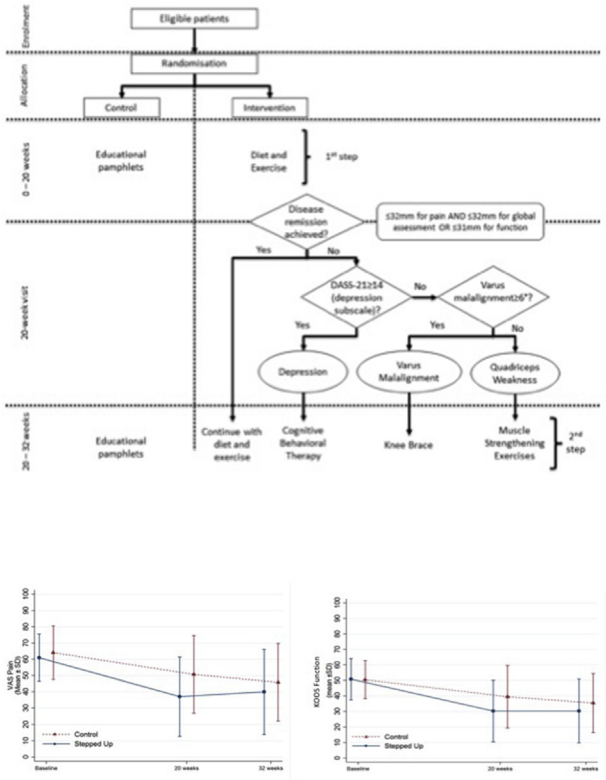
12.15% [95% CI (−2.71, 27.12; $P = 0.12$)]. Considering the higher dropout rate in the Control group (20%) compared to the Intervention group (6%), and imputing the missing observations at week 32 as "Not in remission", changes the remission rate to 36.78% for the intervention, and 21.43% for the control group. That alters the mean difference to 15.35% ($P = 0.027$). Significant difference between groups (control n = 76, intervention n = 82) was achieved in change of pain − 10.8 (95% CI 4.0, 17.7), and function − 10.1 (95% CI 4.7, 15.6) from baseline to 20-weeks. While this significant difference in change between groups was maintained for function from 20 to 32-weeks (control n = 67, intervention n = 82), 6.2 (95% CI 0.35, 12.1), the difference in pain was not significant − 3.5 (95% CI −4.4, 11.5). Interestingly, 4 participants in the control group have undergone total knee arthroplasty during the study, compared to no participants from the intervention group.

Conclusions: Although the rate of disease remission was higher for the stepped care approach strategy, it fell slightly short of statistical significance on ITT analysis. The intervention significantly improved KOOS function scores for the duration of the study, while pain decreased significantly at the first study follow-up but became non-significant at the final follow up (Fig. 2). These results are encouraging, and further research using a stepped care approach for the management of OA should be considered.



444

A CLINICAL ASSESSMENT TOOL TO IMPROVE THE USE OF PAIN RELIEVING TREATMENTS IN KNEE OSTEOARTHRITIS

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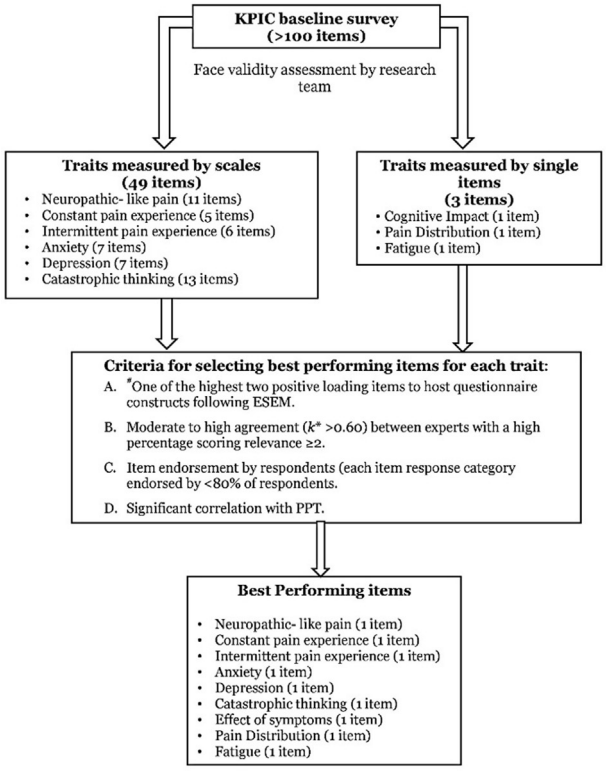
Purpose: Approximately 1 in 4 individuals in the UK over the age of 55 experience knee pain (KP), predominantly due to osteoarthritis (OA). Following treatment targeted at the affected knee, pain relief is reported in only 60%–80% of individuals with painful knee OA. This suggests that mechanisms occurring within the central nervous system (central mechanisms) also influence the KP experience. Although reduced pressure pain detection thresholds (PPTs) at sites distal to the affected joint can indicate central mechanisms, application of PPTs to clinical practice and population-based studies is limited. A feasible, validated questionnaire-based tool to help identify people with KP who may benefit more from centrally acting treatments could prove useful. This study aimed to develop a self-report scale which represents traits associated with central mechanisms in people with KP.

Methods: *Participants*: 9506 individuals completed the Knee Pain and related health In the Community (KPIC) baseline survey. 2152 participants reporting KP were included in this study. 322 individuals with current KP and 98 with no pain undertook PPT assessment at the proximal tibia, distal to the index knee. *Questionnaires*: The KPIC baseline survey included self-report questionnaires for pain catastrophizing (Pain Catastrophizing Scale), pain patterns (ICOAP), neuropathic-like pain (modified pain DETECT), quality of life (SF-12), and mental health (Hospital Anxiety and Depression Scale). Also included were individual questions addressing the presence and onset of KP, pain severity, risk factors for KP and/or OA, fatigue, cognitive impact, pain distribution (Manikin), sleep. *Item Selection*: Items related to central mechanisms were selected according to predefined criteria (See Fig. 1): (i) strength of association to constructs measured by the host scale, using exploratory structural equation modelling (ESEM); (ii) expert opinion on relevance to central mechanisms (inter-rater agreement $k^* \geq 0.60$); (iii) adequate targeting indicated by <80% of respondents selecting each response category, (iv) strength of association with PPT. *Validation*: A 'central mechanisms' factor was sought by factor analysis of the selected items. PPT variance explained by the derived factor, or by scales from which items originated, were compared. *Questionnaire Rewriting*: The selected items were rewritten and standardized for inclusion within the developing scale.

Results: *Item Selection*: 8 pain-related traits of anxiety, depression, catastrophizing, neuropathic- like pain, fatigue, sleep disturbance, pain distribution and cognitive impact were found to be significantly

FIGURE 1. Flow chart showing the item selection process across traits.



ESEM = Exploratory Structural Equation Modelling. # Only relevant for items originating from established questionnaires measuring specific traits.

associated with PPT in people with KP. Individual items selected to represent each of these 8 traits displayed: (i) the strongest association to constructs identified following ESEM analysis (item loading = 0.82–1.08, $P < 0.05$); (ii) high face validity based on expert opinion; (iii) adequate targeting of each response category; and (iv) significant negative association with PPT at a site distal to the index knee (spearman's correlation, *rho* = −0.13 to −0.23, $P < 0.05$). *Validation*: Together, these 8 items (Cronbach's alpha $\alpha = 0.80$), loaded onto a single construct interpreted as "central mechanisms" which explained a greater variation in PPT ($R^2 = 0.17$, $P < 0.001$), better than any individual scale from which items originated ($R^2 = 0.10–0.13$, $P < 0.05$). *Questionnaire Rewriting*: The selected items were revised and rewritten into a standardized format for inclusion within the Central Aspects of Pain in the Knee (CAP-Knee) Scale.

Conclusions: These data demonstrate that 8 self-report traits might be associated with a PPT index for central mechanisms in people with KP. Future work should determine the ability of the CAP-Knee Scale to identify subgroups of people who might benefit from centrally-targeted treatments. Paper and/or electronic use of the CAP-Knee Scale may provide cost- and time- saving benefits within clinical and research settings.

445
IS FRAILTY ASSOCIATED WITH ADVERSE EVENTS AFTER TOTAL JOINT ARTHROPLASTY?

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Purpose: Total joint arthroplasty is the definitive treatment for end stage osteoarthritis. Over the next few decades, the aging population will result in a dramatic increase in the number of older osteoarthritis patients undergoing joint replacement. However whether frailty, rather than chronologic age, is a risk factor for poor outcomes after arthroplasty surgery is unknown. This is important as frailty-unlike age- is potentially modifiable. The purpose of this study is to evaluate the association of frailty with short term adverse events in older patients undergoing elective arthroplasty.

Methods: Community-dwelling patients >65 yo scheduled for elective total knee (TKA) or hip (THA) arthroplasty were recruited from a musculoskeletal specialty hospital. All patients were medically approved for surgery. Preoperative frailty was defined as at least 3/7 frailty characteristics based on the Fried frailty phenotype and a composite frailty score previously validated in surgical populations (Table 1). Pre-operatively subjects completed the PROMIS-29, SF-12, Depression Screening (CES-D 10), Katz Index of Independence in Activities of Daily Living (ADL), and Hip/Knee Injury and Osteoarthritis Outcome Score (HOOS/KOOS). Grip strength was measured and normalized by age and gender. Adverse events were obtained from medical records and by phone 30 days post-discharge. Stepwise multivariable logistic regressions were performed to ascertain if frailty, or any of its individual components, was independent risk factors for short-term adverse events (AEs).

Results: 571 subjects enrolled (mean age 72.9, (range 65–94), 94.5% white, 62.2% female, 59.1% TKA, 40.9% THA). 8.1% were frail; (7.9% THA, 8.3% TKA). 15.6% (12.6% THA, 17.6% TKA) had difficulty with at least 1 Katz ADLs. Among patients who reached 30-day follow-up, 108/507 (21.3%) had 161 AEs and 34/507 (6.7%) had 53 severe AEs. Controlling for gender, age, and which joint was replaced, the only independent predictor of having a moderate adverse event was having Parkinson's disease (OR = 1.03; 95% CI 1.01–1.06). Our composite measure of frailty was an independent predictor of having a severe adverse event (OR = 3.10; 95% CI 1.05–9.20). For THA patients, PROMIS-29 Fatigue (OR = 1.07; 95% CI 1.02–1.13), and a history of stroke (OR = 15.9; 95% CI 1.27–198.8) were predictors of having a moderate adverse event. A higher number of frailty markers (OR = 3.84; 95% CI 1.29–11.5) was a predictor of having a severe adverse event. There were no predictors for patients undergoing TKA.

Conclusions: A surprising high number of medically cleared patients undergoing arthroplasty for osteoarthritis are frail. Frailty/number of frailty criteria were the *strongest* risk factors for short term severe adverse events among all TJA and THA. Whether frailty is associated with long-term adverse events, pain, or function, needs to be established in longitudinal trials.

Frailty characteristics	Total hip replacement (N = 215)	Total knee replacement (N = 311)	All* (N = 526)
Individual frailty characteristics, %			
Unintentional weight loss of ≥10l bs in last year	2.3	2.3	2.3
≥1 Dependency on the Katz ADL	12.6	17.6	15.6
Weakness (grip strength >1 SD below mean for age/gender	31.8	37.5	35.1
Anemia (pre-operative hematocrit <35%)	6.1	4.9	5.4
Poor nutrition (pre-operative albumin <3.4 g/dL)**	0	0	0
≥1 falls in past 6 months	15.0	13.8	14.3
Exhaustion (derived from CES-D 10 questions about effort and getting going)	25.4	19.3	21.8
Frail (≥3 characteristics), %	7.9	8.3	8.1

*Patients with complete chart review.
**359/526 (68.3%) patients had albumin recorded.

446
TRIAMCINOLONE ACETONIDE EXTENDED-RELEASE INJECTABLE SUSPENSION (TA-ER) PROVIDES CLINICALLY RELEVANT IMPROVEMENTS IN PAIN AND FUNCTION OF KNEE OSTEOARTHRITIS: A POOLED ANALYSIS OF 3 RANDOMIZED CLINICAL TRIALS EMPLOYING COMPOSITE ASSESSMENTS

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Purpose: Intra-articular (IA) injection of triamcinolone acetonide extended-release injectable suspension (TA-ER; formerly known as FX006) demonstrated clinically significant improvements in pain, stiffness and physical function through 12 weeks (wks) in patients with knee OA as assessed using: 1) the American Academy of Orthopaedic Surgeons (AAOS) Minimum Clinically Important Improvement (MCII) criteria; 2) response as defined by OMERACT-OARSI; and 3) response as defined by IMMPACT. Here, we utilized pooled data from 3 clinical trials and derived 2 novel composite measures (pain and function ± patient global assessments) in order to further characterize the treatment responses of TA-ER, standard TA crystalline suspension (TAcs) and saline-placebo in patients with knee OA.

Methods: In 3 Phase 2/3 double-blind, randomized, parallel-group, prospective trials (NCT01487161, NCT02116972, NCT02357459), patients with knee OA (Kellgren-Lawrence Grade 2 or 3, Average Daily Pain-intensity ≥5 to ≤9) were randomized to receive a single IA injection of TA-ER 32 mg, TAcs 40 mg or saline-placebo. Ultrasound guidance was not required for injections. The primary endpoint in all trials was pain at Wk 12 post-injection. In this pooled analysis of 3 trials, changes from baseline to Wks 4, 8 and 12 in WOMAC-A (pain), WOMAC-C (physical function) and Patient Global Impression of Change (PGIC) were used with a clinically relevant treatment response defined as: (1) "WOMAC-Responders" (patients with ≥50% reduction in WOMAC-A or WOMAC-C with no worsening in the other WOMAC subscale) and (2) "WOMAC + PGIC-Responders" ("WOMAC Responders" as described above plus PGIC scores = 1 or 2 [very much or much improved]). Treatment comparisons were completed using Chi-square tests.

Results: A total of 798 patients were included in the analysis (TA-ER N = 324; saline-placebo N = 262; TAcs N = 212). Baseline characteristics were similar across the TA-ER, saline-placebo and TAcs arms and were typical of an OA population (moderate to severe OA pain, predominately female, older, greater BMI). The proportion of "WOMAC-Responders" was significantly higher in the TA-ER group vs saline-placebo at all time points (Wk 4: 63.3% vs 31.5% [$P < .0001$]; Wk 8: 59.8% vs 31.3% [$P < .0001$]; Wk 12: 52.4% vs 35.3% [$P < .0001$]) and vs TAcs at all time points (Wk 4: 63.3% vs 53.1% [$P = 0.0188$]; Wk 8: 59.8% vs 47.8%