

Treatment of knee pain in older adults in primary care: development of an evidence-based model of care

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Objective. To develop a stepped model of care for the treatment of knee pain in older adults in primary care based on recommended interventions.

Methods. A systematic search was undertaken to identify interventions recommended for knee osteoarthritis or knee pain in clinical guidelines and systematic reviews. Following this, a nominal group consensus exercise was conducted with members of the Primary Care Rheumatology Society to allocate the interventions to a stepped model of care.

Results. Twenty-seven recommended interventions were identified from 77 publications following the systematic search. A four-step model of care incorporating these interventions was developed through the consensus exercise. Step 1 comprised ten interventions that should be offered to all older adults with knee pain, but could also be provided through self-care. These included exercise, weight loss, paracetamol and written information. Steps 2 and 3 comprised 10 and 6 interventions, respectively, to be considered for people with persisting pain and disability. These included pharmacological interventions such as non-steroidal anti-inflammatory drugs in step 2 and intra-articular corticosteroids in step 3, and non-pharmacological interventions such as physiotherapy in step 2 and occupational therapy in step 3. Step 4 was referral for surgery.

Conclusions. Previous evidence-based guidelines for the treatment of knee problems have been developed in secondary care. A systematic search for recommended interventions, and a consensus exercise, has now enabled an evidence-based and practical model of care for knee pain in older adults to be developed for use in primary care.

KEY WORDS: Knee osteoarthritis, Knee pain, Treatment, Primary care, Model of care, Consensus exercise.

Background

Knee pain is a common complaint in older adults. Estimates of self-reported annual prevalence range from 33% (pain on most days for one month or longer) [1] to 47% (pain in or around the knee in the last year) [2]. It is also a common problem presenting in primary care, with estimates of the proportion of older adults with knee pain consulting their general practitioner (GP) in a 1-yr period about the problem ranging from 16% [in adults with symptomatic knee osteoarthritis (OA)] [3] to 33% (in adults with self-reported knee pain) [2].

Most knee pain in older adults is attributed to OA, a term that is applied both to a specific pathological disease of the joint identified by typical radiographic features and to the clinical syndrome of pain and stiffness in the joint. Not all painful older knees show radiographic changes of OA, although recent evidence suggests some 70% of older adults with knee pain will have such changes on X-ray [4]. Knee pain, rather than knee OA, is the problem that presents in primary care and guidance on the management of the symptom, rather than the pathology is the requirement in this setting [5]. Whilst evidence-based guidance for the management of knee OA has been developed, for example by the European League Against Rheumatism [6], no guidelines for the management of knee pain in primary care exist. Further, guidance for knee OA has mainly been developed by secondary care clinicians and the only

comprehensive guideline for knee OA in primary care in the UK is not evidence-based [7].

One model for the treatment of chronic conditions, when a range of interventions is available, is 'stepped care' [8, 9]. Step 1 represents interventions to be tried initially, and interventions in higher steps are reserved for those whose condition is not controlled by lower-step treatments. In musculoskeletal medicine a stepped-care model has been advocated for low back pain [10]. Such a model provides a potential framework for the treatment of knee pain in older adults in primary care.

The objective of our study was to develop an evidence-based stepped model of care for the treatment of knee pain in adults aged 50 yrs and over in primary care by (i) conducting a systematic search for clinical guidelines and systematic reviews to identify interventions recommended for knee OA and knee pain in this age group, and (ii) undertaking a consensus exercise with primary care practitioners to assign the interventions to appropriate steps of care.

Methods

Systematic search to identify recommended interventions

Clinical guidelines [11] and systematic reviews of interventions for knee OA or knee pain in older adults, rather than original studies, were the target of the search for recommended interventions.

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Guidelines and reviews, rather than primary studies, were targeted as this is an extensively reviewed area, and it was felt these would be the sources of guidance sought by primary care practitioners. Guidelines and systematic reviews relating to knee OA were included, as they are an appropriate source of guidance for the treatment of knee pain in the older adult: knee OA is the commonest underlying pathology, and there are only a limited number of other pathologies causing knee pain in this age group.

Search strategies. Publications were retrieved by a computerized search of MEDLINE, EMBASE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Allied and Complementary Medicine Database (AMED) and British Nursing Index (BNI). Potentially relevant reviews or guidelines were identified using combinations of the search terms; knee, pain, OA, management, guidance, recommendation, guideline, review, treatment. Internet guideline or review sites [The Cochrane Library, Centre for Reviews and Dissemination (York), Clinical Evidence, Bandolier, National Institute for Health and Clinical Excellence, Scottish Intercollegiate Guidelines Network, National Electronic Library for Health, National Guideline Clearing House (USA), New Zealand Guidelines Group] as well as three other internet sites [Agency for Healthcare Research and Quality (USA), American Academy of Orthopaedic Surgeons, Canadian Medical Association] were searched for potentially relevant publications. Citations of full-text publications obtained for evaluation were searched for other potentially relevant papers.

Selection of relevant guidelines and reviews.

Inclusion criteria. (i) English language (ii) published in the last 10 yrs (search date May 2004) (iii) was a clinical guideline, or included guidance or recommendations (based on a systematic identification of the evidence), for the management of knee OA or knee pain in older adults, or was a systematic review of an intervention(s) for the management of knee OA or knee pain in older adults.

Exclusion criteria. (i) was an original study; or that it was related to: (ii) anterior knee pain or patellofemoral syndrome, (iii) knee pain only in the young (aged < 50 yrs), (iv) the assessment or investigation of knee problems, (v) only *in vitro* research, (vi) operative or perioperative details of surgical procedures on the knee, (vii) rare conditions that would not normally present in primary care and (viii) complementary medicine other than acupuncture or symptomatic slow-acting drugs for OA. [This last exclusion was applied (a) in order to keep the number of potential interventions to a reasonable size, (b) because the size of the evidence base for complementary therapies other than those included is relatively small for OA, and (c) the availability, accessibility and uptake of many of these therapies in primary care is unclear and very variable]. Interventions could be self-care or professional care.

The inclusion and exclusion criteria were applied by one author (MP), with the two other authors also applying the criteria on the first 200 titles and first 100 abstracts to assess reliability. Full-text publications were obtained where necessary for further evaluation to ensure that the inclusion and exclusion criteria were satisfied.

Data extraction. A standardized methodology and extraction sheet was used to list all interventions discussed in each included publication, and to record whether the intervention was recommended for use. Recommendations were graded from +2 (strongly recommended) through 0 (no definite recommendation, equivocal recommendation) to -2 (recommendation strongly against use). In grading the strength of the recommendation the level of evidence behind the recommendation

was not assessed, simply the final recommendation made in the paper.

Compilation of the list of recommended interventions. An intervention was included in the list of recommended interventions if a score of +1 or +2 was recorded from at least one guideline or review, provided there were no conflicting recommendations from other guidelines or reviews. A consensus group (MP, PC and KJ) met to review and clarify all the recommendations and agree inclusion, if there were conflicting recommendations, based on the weight of recommendations provided in the relevant reviews.

Development of the model of care

The model of care assumes that any 'red-flag' clinical features and diagnoses for serious causes of knee pain in this age group have been identified, and that the condition being treated is regarded by the clinician as being 'clinical OA' of the knee, regardless of whether there is radiographic evidence or not.

Members of the Primary Care Rheumatology (PCR) Society—a group consisting principally of GPs plus some physiotherapists and nurses with an interest in musculoskeletal problems—were identified as appropriate experts to undertake a nominal group consensus exercise [12, 13]. The aim of this exercise was to develop a model of how the interventions identified from the search could be used in practice in primary care for people aged ≥ 50 yrs with knee pain. The basis of the model of care was that it should be applicable to all degrees of knee pain seen in primary care in older adults, and would cover both self-care and professional care. A stepped-care model would allow the order of use of the interventions to be recommended: interventions in step 1 would be offered initially to all older adults with knee pain before trying interventions in higher steps for adults whose pain or disability persist.

The nominal group consensus exercise was undertaken by delegates to the annual PCR Society conference. During the initial plenary session, delegates were presented with the results of the systematic search and with the methodology for developing a stepped-care model for the treatment of knee pain in primary care (Box 1). Delegates were first asked individually to allocate each intervention to one of the steps in the model of care (round 1). The combined results were then presented in four consecutive workshops (the nominal groups). Discussion focused on interventions for which there had been less than 66% consensus on step allocation. Delegates individually re-allocated interventions to the model of care after the workshops (round 2).

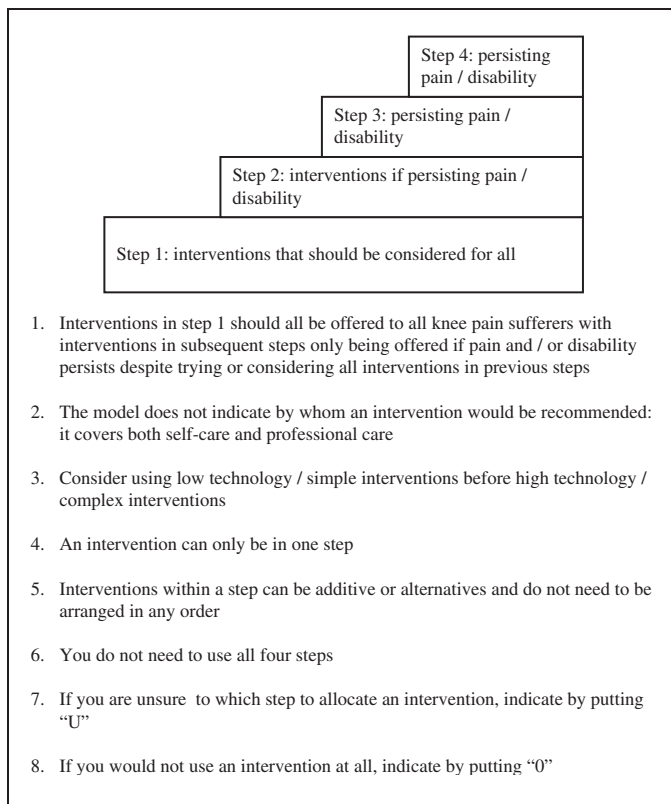
Following round 2, an intervention was assigned to a step in the model of care if there was a 50% or greater consensus for it to be in that step. If this was not achieved then allocations for lower steps were added to those for higher steps until a 50% cumulative consensus was reached. The basis of this was that if, for example, a delegate would use an intervention in step 1, then he or she would logically allow its use in a higher step, if not 'permitted' to use it in a lower step.

Results

Systematic search to identify recommended interventions

A total of 7255 potentially relevant publications were identified and 77 met the inclusion criteria (Fig. 1). Ten were Cochrane Reviews [14–23], 55 were other systematic reviews [24–78], one a health care needs assessment [79] and 11 were clinical guidelines [6, 80–89] (Table 1). Thirty-five interventions were discussed in the 77 publications included in the review, and 27 interventions, or groups of interventions, were included in the final list of recommendations for treating knee pain in adults aged ≥ 50 yrs

Box 1. Structure of model of care and instructions for allocating interventions to the model.



(Table 2). These ranged from common recommendations [exercise in 21 publications, non-steroidal anti-inflammatory drugs (NSAIDs) in 20 and paracetamol in 18] to those recommended by just one publication (diacerein, sleep advice).

Development of model of care

The list of recommended interventions identified in the systematic search was modified as follows to make it relevant for use in primary care and short enough (24 interventions) for the consensus exercise:

- avocado-soybean unsaponifiables, chondroitin, diacerein and glucosamine combined as 'symptomatic slow acting drugs for OA'
- arthroplasty, arthroscopy and osteotomy combined as surgical referral (the intervention in primary care);
- NSAIDs listed separately as (a) selective NSAIDs and (b) non-selective NSAIDs
- education, information and social support listed as (a) written information and (b) group education.

Thirty-five delegates (predominantly GPs) to the PCR Society conference completed the consensus exercise. Fourteen interventions failed to obtain a 66% consensus after round 1 and were discussed during the workshops. The results of the round 2 allocations are shown in Table 3. Seven interventions were assigned to a different step than in the round 1 results. After round 2, 16 of the 24 interventions were assigned on the basis of a simple majority (>50% of delegates allocating it to a step). Of the eight that were assigned by cumulative percentage, four (capsaicin, appliances, acupuncture and cognitive behaviour therapy) were assigned to the step nominated by the highest number of delegates, and four were assigned to either the step below (walking aids), the step above (group education and transcutaneous electrical nerve stimulation) or two steps above

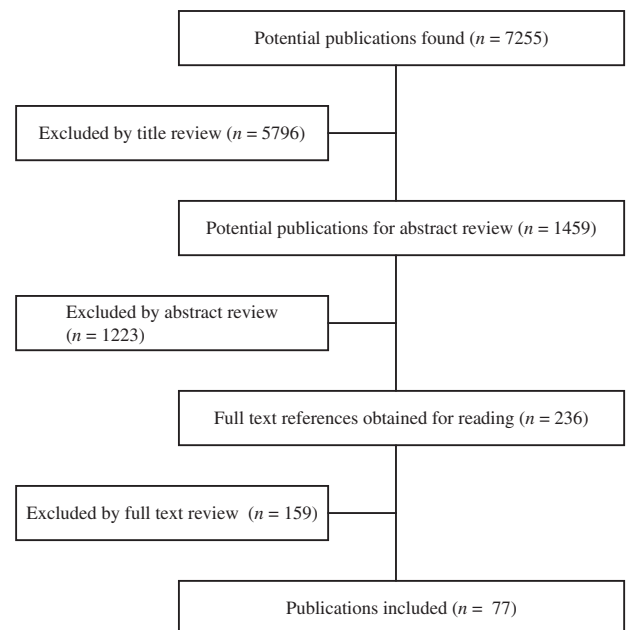


FIG. 1. Flow chart of process for identifying publications for inclusion in synthesis of recommended interventions for knee OA or knee pain.

(topical NSAIDs) the step with the highest allocation. The final consensus model of care for the treatment of knee pain in older adults is shown in Fig. 2.

Discussion

Principal findings

By combining a systematic search and synthesis of the literature with a consensus exercise, we have developed a practical evidence-based model of care for the treatment of knee pain in older adults in primary care. The interventions in step 1 are all accessible without the need to seek professional help, and so can be seen as forming the 'self-care step'. Some oral NSAIDs (step 2) and topical NSAIDs (step 3) can be purchased without prescription from the pharmacist and could also be described as self-care. Participants in the consensus exercise concluded that all interventions in step 1 should be considered, whereas steps 2 and 3 were seen by participants as providing a number of options for people with persisting pain or disability. Which of the interventions in these steps were used would depend on the preferences or characteristics of the patient (preference for non-pharmacological over pharmacological treatments, contra-indications due to comorbidity), characteristics of the knee pain (for example, wedges insoles for medial knee pain, appliances for knee instability), expertise of the practitioner (intra-articular injections) or local availability (group education or cognitive behavioural therapy). This refinement of the stepped model of care would allow the model of care to be tailored to the needs of the individual, an approach recommended in published guidance [6, 80].

Limitations of the study

As the systematic search was limited to papers published in English in the last 10 yrs and no search of the grey literature was performed, relevant papers may have been overlooked. However,

TABLE 1. Publications included in synthesis of recommended interventions

Lead author/publisher	Year	Country of lead author/publisher	SR ^a or CG ^b	Interventions recommended	Interventions not recommended or inconclusive/no recommendation
Aggarwal A	2004	Canada	SR	i.a. hyaluronan	
Akai M	2002	Japan	SR		Electromagnetic field stimulation
Altman R	2000	USA	CG	Weight loss, education, exercise, walking aids, appliances, wedged insoles, physiotherapy, occupational therapy (OT), paracetamol, capsaicin, non-steroidal anti-inflammatory drugs (NSAIDs) (non-selective), i.a. hyaluronan, i.a. steroids, opioid analgesics, osteotomy, total knee replacement (TKR)	NSAIDs (topical), tidal irrigation, arthroscopy, glucosamine, chondroitin, pulsed electromagnetic field therapy, acupuncture, arthroscopy
American Academy of Orthopaedic Surgeons	2003	USA	SR	Education, exercise, weight loss, appliances, paracetamol, NSAIDs (selective and non-selective), opioid analgesics, i.a. hyaluronan, i.a. steroids, glucosamine, chondroitin, osteotomy, TKR, bicompartamental / unicompartmental knee replacement (BKR / UKR), arthroscopy, acupuncture	NSAIDs (topical), pulsed electromagnetic field therapy
American Geriatric Society Panel on Chronic Pain in Older Persons	1998	USA	CG	NSAIDs, paracetamol, opioid analgesics, education, cognitive behavioural therapy (CBT), exercise, thermotherapy, OT, physiotherapy	Antidepressants, acupuncture, transcutaneous electrical nerve stimulation (TENS)
American Geriatric Society Panel on Exercise and Osteoarthritis	2001	USA	CG	Exercise	
Arroll B	2004	NZ	SR	i.a. steroids	
Bandolier	2002	UK	SR		Arthroscopy
Bandolier	2002	UK	SR	Paracetamol	
Bandolier	2001	UK	SR	Glucosamine	
Barclay T	1998	USA	SR		Glucosamine
Belgrade M	2000	USA	SR	Acupuncture	
Bjordal J	2003	Norway	SR	Low-level laser therapy	
Brosseau L	2002	Canada	SR	Balneotherapy (bathing in thermal and mineral waters)	
Brosseau L	2004	Canada	SR		Low level laser therapy
Brosseau L	2004	Canada	SR	Exercise	
Brosseau L	2004	Canada	SR	Thermotherapy (heat and ice treatment)	
Callahan C	1994	USA	SR	TKR	
Callahan C	1995	USA	SR		UKR / BKR
Dawson J	2002	UK	SR	Education, NSAIDs, (selective and non-selective), paracetamol, osteotomy, TKR, self-management, walking aids, shoe insoles, appliances, methylsalicylate, i.a. steroids, arthroscopy, UKR, OT, physiotherapy, weight loss, opioid analgesia, i.a. hyaluronan, tidal irrigation	NSAIDs (topical), capsaicin, exercise, TENS, acupuncture,
de Brie R	1998	Netherlands	SR		Low level laser therapy
Deeks J	2002	UK	SR		Celecoxib (selective NSAID)
Delafuente J	2004	USA	SR	Paracetamol, NSAIDs (selective and non-selective)	
Eccles M	1998	UK	SR	Paracetamol, NSAIDs (non-selective), opioid analgesics	NSAIDs (topical)
Ernst E	1997	UK	SR		Acupuncture
Ernst E	2003	UK	SR	Avocado-soybean unsaponifiables (ASU)	
Espallargues M	2003	Spain	SR	i.a. hyaluronan	
Ezzo J	2001	USA	SR	Acupuncture	
Fransen M	2001	Australia	SR	Exercise	
Fransen M	2002	Australia	SR	Exercise	
Gam A	1995	Denmark	SR		Therapeutic ultrasound
Godwin M	2004	Canada	SR	i.a. steroids	
Gotzsche P	2004	Denmark	SR	NSAIDs (topical),	NSAIDs (selective and non-selective)

Evidence-based model of care for knee pain

^aSystematic review.

^bClinical guideline.

(Continued)

TABLE 1. Continued

Lead author/publisher	Year	Country of lead author/publisher	SR ^a or CG ^b	Interventions recommended	Interventions not recommended or inconclusive/no recommendation	
Holbrook M	2000	Canada	SR	Exercise, education, social support, paracetamol, NSAIDS (selective and non-selective), opioid analgesics, i.a. steroids, i.a. hyaluronan, capsaicin, TKR, OT, physiotherapy, walking aids	Weight loss, TENS, acupuncture, low-level laser treatment, therapeutic ultrasound, appliances, glucosamine, NSAIDs (topical)	
Hulme J	2001	Canada	SR	Education, exercise, insoles, appliances, weight loss, social support, paracetamol, NSAIDs (selective, non-selective and topical), opioid analgesics, glucosamine, chondroitin, diacerein, ASU, capsaicin, i.a. steroids, i.a. hyaluronan, UKR, TKR, walking aids	Electromagnetic field therapy	
Jordan K	2003	UK	CG		Low-level laser treatment, spa treatment, pulsed electromagnetic field treatment, therapeutic ultrasound, TENS, acupuncture, psychotropics, sex hormones (hormone replacement therapy), tidal irrigation, arthroscopy, osteotomy	
Kane R	2003	USA	SR	TKR	Exercise Acupuncture	
Kirwan J	1997	UK	SR	i.a. steroids, i.a. hyaluronan		
La Mantia K	1995	Canada	SR	Education, weight loss, thermotherapy, paracetamol, NSAIDS (selective and non-selective), glucosamine, chondroitin, opioid analgesics, capsaicin, TENS, CBT, sleep advice, exercise, appliances, i.a. steroids, i.a. hyaluronan, walking aids, physiotherapy, OT		
Lee J	2003	USA	CG			
Leeb B	2000	Austria	SR	Chondroitin	Short-wave diathermy Low-level laser treatment Therapeutic ultrasound Electrical muscle stimulation	
Lo G	2003	USA	SR	i.a. hyaluronan		
Markow M	2003	USA	SR	Acupuncture		
Marks R	1999	Canada	SR	Self-efficacy Laterally wedged foot orthotics (wedged insoles) Glucosamine, chondroitin Exercise Topical NSAIDs CBT and behavioural therapy Selective NSAIDs		
Marks R	1999	Canada	SR			
Marks R	2001	Canada	SR			
Marks R	2000	Canada	SR			
Marks R	2001	USA	SR			
Marks R	2004	USA	SR			
Mc Alindon T	2001	USA	SR			
Mc Carthy C	1999	UK	SR			
Moore R	1998	UK	SR			
Morley S	1999	UK	SR			
National Institute for Clinical Excellence	2001	UK	CG			
Osiri M	2000	Thailand	SR			TENS
Petrella R	2001	Canada	SR			Exercise
Philadelphia Panel	2001	USA	CG		Exercise, TENS	Thermotherapy, therapeutic ultrasound, electrical stimulation

Puett D	1994	USA	SR	Exercise	Diathermy, capsaicin, low-level laser therapy, acupuncture, TENS, pulsed electromagnetic field therapy, therapeutic ultrasound
Richy F	2003	Belgium	SR	Glucosamine, chondroitin	
Robertson V	2001	Australia	SR		Therapeutic ultrasound
Robinson V	2001	Canada	SR		Therapeutic ultrasound
Ruane R	2002	UK	SR	Glucosamine	
Scott	2002	UK	SR	TKA, UKA, NSAIDs (non-selective and topical), paracetamol, capsaicin, exercise, i.a. steroids, i.a. hyaluronan, osteotomy, appliances, exercise	Education, glucosamine, chondroitin, insoles
Simon L	2002	USA	CG	Education, CBT, exercise, paracetamol, NSAIDs (selective and non-selective), i.a. steroids, i.a. hyaluronan, opioid analgesics, glucosamine, weight loss	
Superio-Cabuslay E	1996	USA	SR	Education	
Tannenbaum	1996	Canada	SR	Paracetamol, NSAIDs (selective and non-selective)	
The Chartered Society of Physiotherapy	2004	UK	CG	i.a. steroids	
Todd C	2002	USA	SR	Physiotherapy, OT, weight loss, education, exercise, walking aids, appliances, insoles, paracetamol, NSAIDs (selective and non-selective), opioid analgesics, i.a. steroids, capsaicin	Glucosamine, chondroitin, i.a. hyaluronan
Towheed T	1997	USA	SR	NSAIDs (selective and non-selective), paracetamol, capsaicin, i.a. hyaluronan, i.a. steroids	
Towheed T	1999	Canada	SR	Glucosamine	
Towheed T	2002	Canada	SR	Paracetamol	
van Baar M	1999	Netherlands	SR	Exercise	
Walker-Bone K	2000	UK	CG	Education, physiotherapy, appliances, diathermy, therapeutic ultrasound, TENS, acupuncture, OT, paracetamol, opioid analgesics, NSAIDs (topical, selective and non-selective), i.a. hyaluronan, capsaicin, i.a. steroids, glucosamine, chondroitin, exercise	Tidal irrigation
Wang C	2004	Taiwan	SR	i.a. hyaluronan	
Watson M	1996	UK	SR	NSAIDs (selective and non-selective)	
Wegman A	2002	Netherlands	SR	Paracetamol, NSAIDs	
Zhang W	1993	UK	SR	Capsaicin	

TABLE 2. Interventions included, or not included, in model of care and strength of recommendation in included guidelines and reviews

Intervention	Total number of guidelines or reviews discussing intervention	Number with strong or moderate recommendation	Equivocal /no recommendation	Not recommended
Interventions included in model				
Acupuncture	13	6	6	1
Appliances	8	8	0	0
Arthroplasty (uni/bi/total)	9	8	1	0
Arthroscopy	5	2	2	1
Avocado-soybean unsaponifiables	2	2	0	0
Capsaicin cream	11	9	2	0
Chondroitin	10	7	3	0
CBT ^a or self efficacy training	6	6	0	0
Compound and opioid analgesia	11	11	0	0
Diacerein	1	1	0	0
Education and social support	11	10	1	0
Exercise	21	19	2	0
Glucosamine	15	10	4	1
Intra-articular corticosteroid	15	15	0	0
Intra-articular hyaluronan	16	15	1	0
NSAIDs ^b (selective & non-selective)	20	18	2	0
Occupational therapy	7	7	0	0
Osteotomy	5	4	1	0
Paracetamol	18	18	0	0
Physiotherapy	7	7	0	0
Sleep advice	1	1	0	0
TENS ^c	9	4	5	0
Thermotherapy (heat & ice treatment)	4	3	1	0
Topical NSAIDs ^b	10	5	4	1
Walking aids	6	6	0	0
Wedge insoles	6	5	1	0
Weight loss	8	7	1	0
Interventions not included in model				
Electrical muscle stimulation	2	0	2	0
Low level laser treatment	7	1	6	0
Psychotropic medication	2	0	2	0
Pulsed electromagnetic field therapy and short wave diathermy	7	0	7	0
Sex hormones	1	0	1	0
Spa treatment (balneotherapy)	2	1	1	0
Therapeutic ultrasound	9	1	5	3
Tidal irrigation/lavage	4	1	3	0

^aCognitive behavioural therapy.

^bNon-steroidal anti-inflammatory drug.

^cTranscutaneous electrical nerve stimulation.

the rationale was to synthesize recommendations from guidelines and reviews that might be consulted by a primary care practitioner working in the UK. We did not evaluate the level of evidence behind the recommendations, which in the clinical guidelines varied from expert opinion to evidence from meta-analysis of randomized controlled trials. Our interest was the current perceived best treatment of knee pain in older adults, as represented by the recommendations of recent clinical guidelines and systematic reviews, not restricted to interventions with a strong evidence base of clinical trials to support or refute their use. Some of the interventions were included only with limited recommendations (for example, sleep advice) and may be removed in future from the model of care if further research and future guidelines suggest they are not effective after all.

We considered the members of the PCR Society an appropriate group of experts for the consensus exercise. A different group, such as GPs with less overt interest in musculoskeletal problems, may have produced a different model. Consensus was not easy to achieve. One-third of the interventions were assigned to a step in the model of care based on a 50% cumulative consensus rather than by a simple majority. Two factors accounted for this: (i) allocations for acupuncture, appliances, capsaicin, group education, transcutaneous electrical nerve stimulation and walking aids were equally distributed between two steps,

(ii) about a third of the delegates were 'unsure about' or 'would not use' cognitive behavioural therapy and topical NSAIDs. Although some of these interventions were assigned to the step most frequently designated for them, some were not. This was particularly an issue for topical NSAIDs, which were assigned to step 3 when the most frequent designation (by 27% of participants) was step 1.

Some complementary therapies will have been overlooked because of the exclusion criteria applied, and a more extensive review of the potential role of these treatments in the primary care management of joint pain in older people is needed and may result in additions to the model of care.

Comparison to previous guidelines

Guidelines [6, 80–85], which cover both pharmacological and non-pharmacological treatments, all stress the need to use interventions from both groups but do not, bar one [81], adopt a stepped care model. Suggestions are given as to the order of use of some interventions: education being described as 'integral' to management [6, 80], paracetamol the first line analgesic with NSAIDs and compound opioid analgesia for non-responsive pain [6, 80–85], topical treatments (NSAIDs and capsaicin) when systemic therapy

TABLE 3. Allocations of recommended interventions to steps of the model of care and final assignment in the model

Intervention	Percentage or cumulative percentage ^a of round 2 replies (n = 35) allocating intervention to:				
	Step 1	Step 2	Step 3	Step 4	Assigned step ^b
Weight loss	97.1				1
Paracetamol	97.1				1
Exercise	91.2				1
Written information	88.6				1
Restorative sleep advice	70.6				1
Thermotherapy	57.1				1
SYSADOA ^d	51.4				1
Non-selective NSAIDs ^e		82.9			2
Compound opioid analgesics		82.4			2
Physiotherapy		79.4			2
Wedged insoles		62.9			2
Selective NSAIDs ^e		60.0			2
Group education ^c	(42.9)	71.5			2
Capsaicin ^c	(14.7)	55.9			2
Acupuncture ^c	(5.9)	53.0			2
Appliances ^c	(8.6)	51.5			2
Walking aids ^c	(20.0)	51.4			2
i.a. hyaluronan			62.9		3
i.a. corticosteroid			62.9		3
Occupational therapy			55.9		3
TENS ^{c,f}		(48.6)	88.6		3
Topical NSAIDs ^{c,e}	(26.5)	(17.6)	64.7		3
Cognitive behavioural therapy ^c	(5.9)	(8.8)	50.0		3
Surgical referral				82.9	4

Numbers in brackets are percentage allocations for lower steps when intervention assigned by cumulative percentage.

^aIf no step allocated by 50% or more delegates, scores for lower steps were added to higher steps until a cumulative percentage of 50% or greater was reached.

^bInterventions assigned to step if percentage, or cumulative percentage, allocation 50% or greater.

^cAssigned to step by cumulative percentage.

^dSymptomatic slow-acting drugs for osteoarthritis.

^eNon-steroidal anti-inflammatory drug.

^fTranscutaneous electrical nerve stimulation.

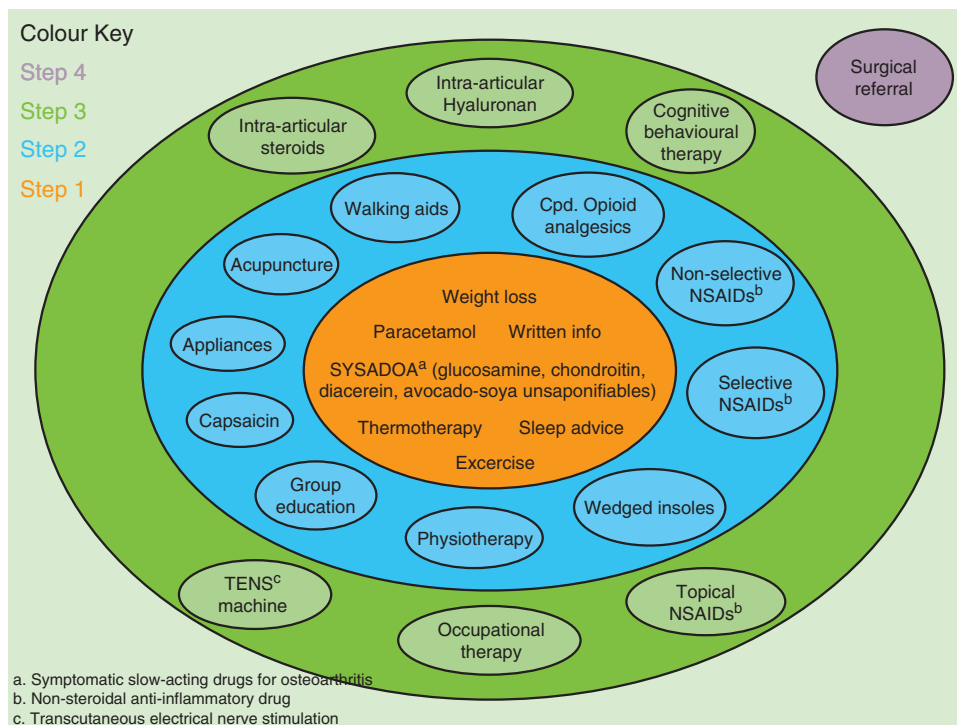


FIG. 2. Stepped model of care for the treatment of knee pain in adults aged ≥ 50 . Step 1—interventions to be offered to all knee pain sufferers (aged ≥ 50 yrs) Step 2/3/4—interventions to be considered if there is persisting pain or disability despite use of interventions from lower steps.

is not effective or tolerated [80]. Alternative models exist to a stepped-care model, and one used in knee OA previously is that of tailoring treatment to the individual, [6, 80] albeit with an ordered approach to the use of some treatments. This approach mirrors the refinement to our stepped-care model aforesaid.

Implications for research

We plan now to compare the model of care with current practice in a survey of interventions used by 200 older adults with self-reported knee pain. Further refinements to the model of care are likely to come from examination of the evidence behind recommended interventions, particularly those with low-level recommendation, and from consensus work with other professional groups. The methodology used in this study could be used in the development of models of care for other common problems seen in primary care such as hip or shoulder pain.

Conclusion

The combination, of a systematic search and synthesis of current literature and a consensus exercise, has enabled an evidence-based and practical model of care for knee pain in older adults to be developed. Further research will compare the model with current practice and could usefully assess its utility in practice.

Ethical approval

North Staffordshire Local Research Ethics Committee approved the study. LREC reference number: 04/Q2604/27 and participants' written consent was obtained according to the Declaration of Helsinki.

<i>Rheumatology</i>	Key message
	<ul style="list-style-type: none"> We have developed an evidence-based model of care for the treatment of knee pain in older adults in primary care: based on published recommendations and involving primary care practitioners in its development.

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