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NARRATIVE REVIEW

Knee Pain in India: Types, Diagnosis and Multimodal Treatment- *A narrative review of classification, diagnosis and conventional, procedural, traditional and complementary treatment with a proposed care pathway for Indian settings*

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ABSTRACT

Background: Knee pain is a symptom with a broad differential diagnosis that includes osteoarthritis (OA), patellofemoral pain, meniscal and ligament injury, tendinopathy, bursitis, crystal and inflammatory arthritis, infection and referred pain. In India, the burden is shaped by population ageing, overweight and obesity, occupational and domestic loading, previous injury, uneven access to rehabilitation and widespread use of plural systems of care.

Scope and approach: This narrative review summarises clinically useful classifications, diagnostic principles and treatment options for Indian practice. It draws on Government of India guidance, peer-reviewed epidemiological studies, major international guidelines and selected randomised trials and meta-analyses. It is not a systematic review and does not pool effect estimates.

Key points: Diagnosis starts with a structured history and examination and an early search for red flags (infection, fracture, vascular or neurological compromise, malignancy). Weight-bearing radiographs are appropriate when OA is suspected and imaging will change management; magnetic resonance imaging (MRI), ultrasound, laboratory tests and synovial-fluid analysis answer specific clinical questions rather than serving as routine tests. For chronic knee OA, education, progressive strengthening and aerobic exercise, weight management where appropriate and self-management form the foundation of care. Topical non-steroidal anti-inflammatory drugs (NSAIDs) are generally preferred before oral NSAIDs, which need individual gastrointestinal, renal, hepatic and cardiovascular risk assessment. Injections and surgery have selective indications and should not displace core conservative care. Ayurveda, Yoga, Unani, Siddha, acupuncture and homoeopathy are appraised with explicit attention to the quality and limits of the evidence: traditional use or popularity is not proof of efficacy or disease modification.

Conclusion: A cause-specific, affordable, culturally responsive and multidisciplinary pathway, linking primary care, physiotherapy, orthopaedics and rheumatology, is proposed for India.

Keywords: Knee pain; knee osteoarthritis; India; diagnosis; physiotherapy; exercise; analgesics; Ayurveda; Yoga; complementary therapies; arthroplasty

Key messages for clinicians

- Knee pain is a symptom: seek a cause rather than defaulting to “OA” on the basis of age or an X-ray.
- Screen for red flags first: a hot swollen knee, trauma with inability to bear weight, a locked knee, neurovascular compromise or unexplained night pain needs urgent assessment.
- For chronic knee OA, education, exercise and weight management are the foundation; medicines and procedures are adjuncts.
- Prefer topical NSAIDs before oral NSAIDs; assess gastrointestinal, renal, cardiovascular and hepatic risk before any oral NSAID.
- Avoid routine hyaluronic acid, glucosamine/chondroitin, arthroscopic debridement for uncomplicated OA and long-term opioids; discuss platelet-rich plasma (PRP) and stem-cell products as uncertain.
- Ask about traditional and herbal products; support safe use, check product quality and never let them delay diagnosis or effective care.

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1. Introduction

Knee pain is a symptom rather than a single diagnosis. It can arise from intra-articular structures, peri-articular soft tissues, bone, referred pain, or systemic inflammatory and infectious disease. Its effects extend beyond pain to walking, stair climbing, squatting, kneeling, work, sleep and independence. In India these consequences may be especially important for people whose livelihoods involve prolonged standing, floor-level work, agricultural activity, manual labour or frequent stair climbing, and for whom a loss of mobility can mean a loss of income.

Osteoarthritis is the leading contributor to chronic knee pain in older adults, but a diagnosis of OA should not be assumed merely because a person is older or has radiographic change [1,2]. The Government of India's Standard Treatment Guidelines (STG) for Management of Osteoarthritis Knee (2017) provide a national framework for diagnosis, imaging, non-operative care and referral. The guideline expressly excludes acute infection, acute trauma, inflammatory arthropathies and crystal arthritis from its OA pathway; these conditions need separate assessment [3].

The aim of this review is threefold: (i). to describe the burden and Indian context of knee pain and knee OA; (ii). to provide a practical classification, diagnostic approach and red-flag framework; and (iii). to appraise conventional, procedural, traditional and complementary treatments against the available evidence and to propose a pathway suited to Indian health-care settings.

2. Review approach and scope

This is a narrative, clinically oriented review rather than a systematic review or a formal guideline. Sources were selected for relevance and verifiability, giving priority to Government of India guidance, peer-reviewed epidemiological studies, recognised clinical practice guidelines, Cochrane reviews and meta-analyses, and randomised trials that have shaped current recommendations (Table 1). The review does not claim exhaustive database coverage, formal risk-of-bias assessment or pooled treatment-effect estimates. The evidence cut-off is 6 November 2026. Guideline positions and regulatory status may change, so readers should consult current versions before applying any recommendation.

Table 1. Hierarchy of sources used in this review and how each was used.

Source type	Examples cited	Use in this review
National guidance	Government of India STG for knee OA [3]	Anchors the Indian diagnostic and treatment framework; scope limits are stated explicitly
International guidelines	NICE NG226, AAOS, ACR/Arthritis Foundation, OARSI [4–7]	Cross-checks recommendations; differences between guidelines are noted
Systematic reviews and meta-analyses	Cochrane reviews; Indian prevalence meta-analyses [8–11]	Burden estimates; summary effect direction for interventions
Randomised trials and large cohorts	Landmark trials of exercise, weight loss, injections, arthroscopy and arthroplasty [12–15]	Illustrate the strength and limits of the evidence base
Narrative reviews and consensus statements	Clinical reviews, patellofemoral pain terminology [1,2,16]	Clinical description, classification and diagnostic principles

3. Burden and Indian context

3.1 Global and national burden

Osteoarthritis is among the most common musculoskeletal conditions worldwide; the Global Burden of Disease (GBD) 2021 analysis estimated that about 595 million people were living with OA in 2020, with the knee the most frequently affected site [17]. A GBD 2019 analysis for India estimated that the number of people living with OA of any site rose from 23.46 million in 1990 to 62.35 million in 2019 (about a 2.7-fold increase), that knee OA was the most common site and that burden was consistently higher in women (Figure 1) [18]. These are all-site OA estimates and must not be reported as knee-only counts.

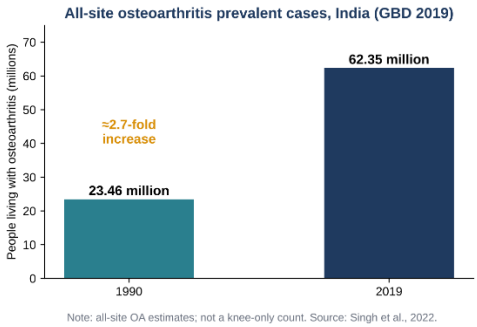


Figure 1. Estimated all-site osteoarthritis burden in India, 1990 *vs* 2019. This is not a knee-OA-only count [18].

3.2 Prevalence estimates from Indian studies

A 2025 systematic review and meta-analysis of 16 population-based Indian studies estimated pooled knee OA prevalence at 20.24% (95% CI 11.90–30.13), with substantial heterogeneity and evidence of publication bias [10]. A separate 2025 meta-analysis among older adults included 5,029 participants from 14 studies and estimated prevalence at 47% (95% CI 38.4–55.8; $I^2 = 97.1\%$) [11]. These estimates reflect different populations, case definitions and study designs and are not directly comparable (Table 2, Figure 2). They indicate a substantial burden but do not establish a single definitive national prevalence. Earlier community studies had also reported sizeable prevalence with associations with age, female sex and body weight [19].

Table 2. Comparison of the two Indian pooled prevalence estimates cited in this review.

Feature	Hazra et al., 2025 [10]	Daniel et al., 2025 [11]
Population	Population-based Indian studies	Elderly persons in India
Number of studies	16	14
Participants	Not reproduced here	5,029
Pooled prevalence (95% CI)	20.24% (11.90–30.13)	47% (38.4–55.8)
Heterogeneity	Substantial	$I^2 = 97.1\%$
Other reported features	Evidence of publication bias	Very high between-study variability
Interpretation	Lower estimate; broader population and definitions	Higher estimate; older population; not comparable with the first

Values are reproduced from the cited abstracts. "Not reproduced here" indicates that the figure was not used in this review, not that it is unavailable.

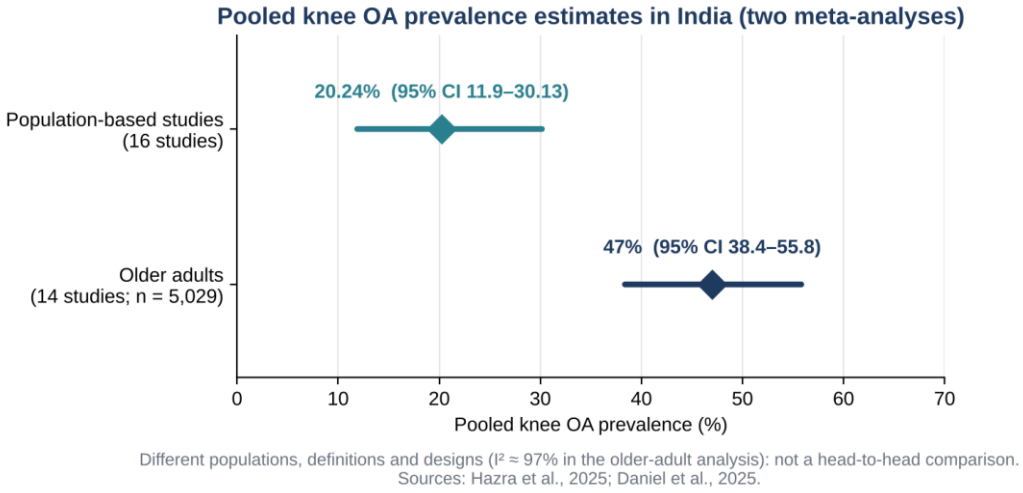


Figure 2. Published pooled prevalence estimates from two different Indian study populations; not a head-to-head comparison [10,11].

3.3 Risk factors and contextual drivers in India

Established risk factors for knee OA include increasing age, female sex, obesity, previous knee injury and occupational or recreational joint loading [1,2]. Several features of Indian life may amplify these risks or complicate management (Table 3, Figure 3). Body-weight thresholds also matter: Indian consensus guidance defines overweight at a body mass index (BMI) of 23 kg/m² or more and obesity at 25 kg/m² or more, lower than Western cut-offs, so counselling should use population-appropriate thresholds [20]. Much of the evidence on floor-level activity and knee symptoms is observational, so these exposures should be described as plausible contributors rather than proven causes.

Table 3. Risk factors and contextual issues relevant to knee pain in India.

Domain	Examples	Clinical or public-health implication
Demography	Population ageing; higher burden in women [18]	Rising demand for chronic-disease care; sex-sensitive services
Body weight	Overweight and obesity, with lower BMI thresholds for Asian Indians [20]	Weight management is a core intervention; use appropriate cut-offs; avoid shame-based counselling
Occupational and domestic loading	Prolonged standing, agricultural and manual work, repeated squatting, kneeling or floor-level tasks, frequent stair climbing	Ergonomic advice; activity pacing; tailor exercise to the person's actual daily tasks
Injury and sport	Previous ligament or meniscal injury; delayed rehabilitation	Early assessment and structured rehabilitation after injury
Access and affordability	Limited physiotherapy outside cities; out-of-pocket costs; delayed presentation	Tele-rehabilitation, community group exercise, low-cost home programmes
Health beliefs and care-seeking	Plural systems of care; self-medication; expectation of injections or imaging	Respectful discussion; evidence-based information in local languages; safe-use counselling
Regional differential diagnoses	Tuberculous arthritis, post-chikungunya arthropathy and metabolic bone disease should be considered in endemic settings	Do not label every chronic knee pain as OA; investigate atypical, inflammatory or constitutional features

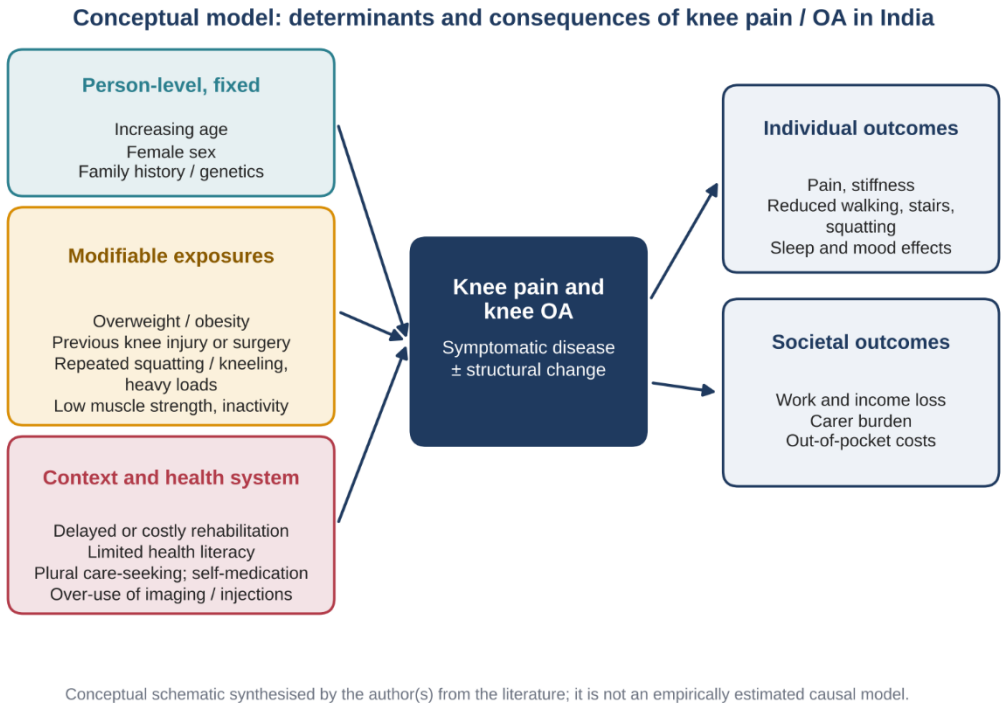


Figure 3. Conceptual model of determinants and consequences of knee pain and knee OA in India. This is a conceptual synthesis, not an empirically estimated model.

4. Types and causes of knee pain

A practical classification groups causes by the tissue involved (Figure 4, Table 4). Patellofemoral pain, for example, is defined as pain around or behind the patella provoked by loaded flexed-knee activities such as squatting, stair climbing or running [16]. Anterior knee pain has a wide differential beyond patellofemoral pain, including tendinopathy, fat-pad syndromes and bursitis [21]. Magnetic resonance imaging frequently shows degenerative meniscal tears in older adults with and without symptoms, so imaging findings must be interpreted against the clinical picture [22].

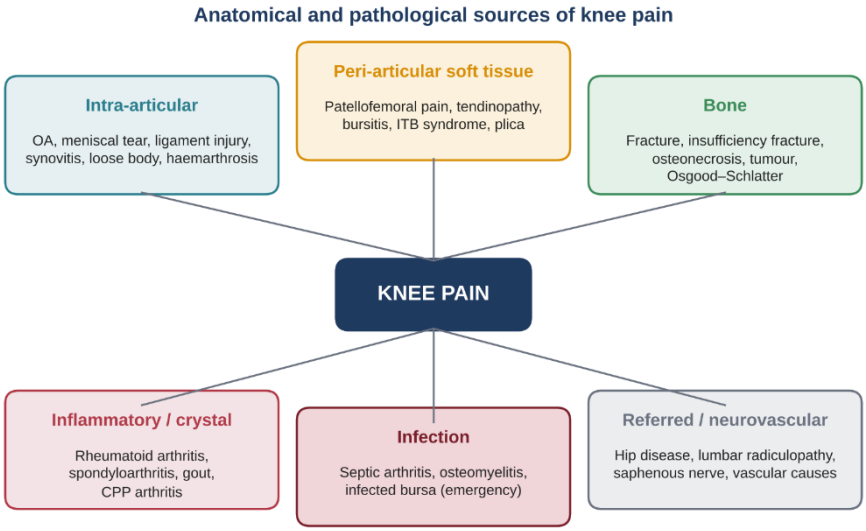


Figure 4. Anatomical and pathological sources of knee pain.

Table 4. Principal categories of knee pain, typical features and key considerations.

Category	Typical features / clues	Important considerations
Osteoarthritis (OA)	Gradual, activity-related pain; brief morning or post-rest stiffness; crepitus; reduced movement; bony enlargement	Common in middle-aged and older adults; radiographic severity and symptoms may not match [1]
Patellofemoral pain	Anterior or peripatellar pain with stairs, squatting, running or prolonged sitting [16]	Assess patellar tracking, hip and quadriceps strength and training load
Meniscal injury	Joint-line pain, twisting mechanism, effusion; catching or true locking may occur	Degenerative meniscal findings are common on MRI in older adults and may be incidental [22]
Ligament injury	Acute trauma, instability or giving-way; rapid swelling may follow ACL injury	Assess mechanism, stability and associated fracture or meniscal injury
Tendinopathy	Focal tendon pain, often load-related, e.g. patellar or quadriceps tendon [21]	Usually diagnosed clinically; ultrasound can help if uncertainty persists
Bursitis	Localised superficial swelling and tenderness, e.g. prepatellar or pes anserine	Consider infection if hot, red, febrile or rapidly worsening
Inflammatory / crystal arthritis	Marked swelling, warmth, prolonged stiffness, episodic attacks or multiple joints	Rheumatoid arthritis, spondyloarthritis, gout and CPP crystal arthritis need cause-specific work-up [23]
Infection	Acute hot swollen joint, severe pain with movement; fever may or may not be present [24]	Emergency: urgent aspiration, cultures and specialist-directed antimicrobial therapy. Consider tuberculosis in chronic monoarthritis
Fracture / bone pathology	Trauma, inability to bear weight, focal bony tenderness; sometimes night or rest pain	Urgent imaging and referral when fracture, tumour or insufficiency fracture is suspected
Referred pain	Knee symptoms with hip or lumbar symptoms; knee examination may be unremarkable	Examine hip, spine and neurovascular system

Table 5. Differential diagnosis by site of knee pain.

Site	Common causes	Less common but important
Anterior	Patellofemoral pain; patellar or quadriceps tendinopathy; prepatellar bursitis; patellofemoral OA	Fat-pad impingement; Osgood–Schlatter and Sinding-Larsen–Johansson in adolescents; patellar fracture; septic bursitis
Medial	Medial meniscal tear or degeneration; medial compartment OA; pes anserine pain syndrome; MCL sprain	Medial plica; spontaneous osteonecrosis; stress fracture of the medial tibial plateau
Lateral	Lateral meniscal tear; lateral compartment OA; iliotibial band syndrome; LCL sprain	Popliteus tendinopathy; proximal tibiofibular joint disorder; common peroneal nerve irritation
Posterior	Popliteal (Baker) cyst; hamstring or gastrocnemius tendinopathy; posterior meniscal pathology	Posterior cruciate ligament injury; deep-vein thrombosis; popliteal artery pathology (emergency)
Diffuse / non-localised	OA; inflammatory or crystal arthritis; effusion of any cause	Infection; tumour; referred pain from hip or spine; metabolic bone disease

Table 6. Age-related patterns in the differential diagnosis of knee pain (indicative, not exclusive).

Age group	More likely causes	Particular cautions
Children and adolescents	Osgood–Schlatter disease; patellar instability; patellofemoral pain; osteochondritis dissecans	Hip pathology (e.g. slipped capital femoral epiphysis) can present as knee pain; bone tumour or infection
Young adults	Patellofemoral pain; ligament and meniscal injury; tendinopathy; inflammatory arthritis (e.g. spondyloarthritis)	Post-injury instability; early post-traumatic OA; systemic inflammatory disease
Middle-aged adults	Degenerative meniscal pathology; early OA; tendinopathy; bursitis; gout	Overlap of incidental imaging findings with symptoms [22]
Older adults	OA; CPP arthritis; insufficiency fracture; osteonecrosis; septic arthritis	Polypharmacy and comorbidity affect analgesic choice; falls risk; atypical infection presentation

5. Clinical assessment and diagnosis

5.1 History

- **Onset and duration:** Sudden or gradual; acute, subacute or chronic; progression and previous episodes.
- **Location:** Anterior, medial, lateral, posterior, joint-line or diffuse; unilateral or bilateral.
- **Mechanism and loading:** Fall, twisting, sport, repetitive squatting or kneeling, prolonged standing, walking or occupational load.
- **Associated symptoms:** Swelling, warmth, redness, fever, morning stiffness, locking, catching, instability, night pain, weakness and restricted movement.
- **Functional impact:** Walking distance, stairs, chair rise, squatting, floor sitting, toilet use, sleep, work and activities of daily living.
- **Risk context:** Age, body weight, prior injury or surgery, diabetes, kidney or cardiovascular disease, anticoagulants, infection risk and all current medicines, including herbal and traditional products.

5.2 Examination

Observe gait, alignment, swelling, erythema, quadriceps wasting and the ability to bear weight. Compare both knees. Assess temperature, effusion, joint-line and peri-articular tenderness, active and passive range of motion, crepitus, patellar mobility, the extensor mechanism, ligament stability and meniscal signs where appropriate. Examine the hip, lumbar spine, distal pulses, sensation and motor function when indicated. No single provocative manoeuvre should be interpreted in isolation; the accuracy of individual tests varies with examiner, timing after injury and the presence of pain or guarding (Table 7).

Table 7. Common examination components and their purpose.

Component / test	Purpose	Cautions
Inspection and gait	Alignment (varus/valgus), swelling, wasting, antalgic gait	Compare sides; observe weight-bearing and non-weight-bearing posture
Palpation for warmth, effusion, tenderness	Identify inflammation, effusion and the structure involved	Warmth with effusion and severe pain should trigger the red-flag pathway
Effusion tests (patellar tap, bulge sign)	Detect intra-articular fluid	Small effusions are easily missed; sensitivity varies
Range of motion	Quantify flexion and extension deficit; detect mechanical block	A true locked knee (cannot extend) differs from pain-limited movement
Lachman, anterior and posterior drawer, pivot shift	Anterior and posterior cruciate ligament integrity	Lachman is generally the most useful ACL test in the acute setting; guarding reduces accuracy
Valgus and varus stress	Medial and lateral collateral ligament integrity	Test at 0° and 30° of flexion
Joint-line tenderness, McMurray, Thessaly	Meniscal pathology	Interpret as a cluster; degenerative tears are often asymptomatic
Patellar grind, apprehension, tracking	Patellofemoral pain and instability	Assess hip and quadriceps strength alongside
Hip and lumbar spine examination; neurovascular check	Exclude referred pain and vascular or neurological compromise	Essential when knee findings are minimal

5.3 Clinical diagnosis of knee osteoarthritis

For typical OA, diagnosis is often clinical. The Indian guideline describes persistent pain that worsens with use, commonly in people aged 45 years or older, with morning stiffness of no more than 30 minutes [3]; NICE similarly supports a clinical diagnosis without imaging in people aged 45 or older with activity-related joint pain and either no morning stiffness or stiffness lasting 30 minutes or less [4]. The older American College of Rheumatology clinical classification criteria combine knee pain with additional features (Table 8) [25]. These criteria support, but do not replace, clinical judgement and exclusion of other causes.

Table 8. Clinical features used to support a diagnosis of knee OA.

Source	Features
Government of India STG (2017) [3]	Persistent pain worsened by use; commonly age ≥45 years; morning stiffness ≤30 minutes. Acute infection, acute trauma, inflammatory arthropathy and crystal arthritis are outside the pathway
NICE NG226 (2022) [4]	Age ≥45 years; activity-related joint pain; no morning joint-related stiffness or stiffness ≤30 minutes; clinical diagnosis without imaging if typical
ACR clinical classification criteria (1986) [25]	Knee pain plus at least 3 of 6: age >50 years; stiffness <30 minutes; crepitus; bony tenderness; bony enlargement; no palpable warmth

Radiographs may show osteophytes, joint-space narrowing, subchondral sclerosis and deformity. The Kellgren–Lawrence (KL) scale grades radiographic severity from 0 to 4 (Table 9); it should support, not replace, clinical assessment, because radiographic severity correlates only loosely with symptoms [3,26].

Table 9. Kellgren–Lawrence radiographic grading of knee OA.

Grade	Description (classical radiographic features)
0	No radiographic features of OA
1	Doubtful joint-space narrowing and possible osteophytic lipping
2	Definite osteophytes and possible joint-space narrowing (“mild” OA)
3	Moderate multiple osteophytes, definite joint-space narrowing, some sclerosis and possible deformity of bone contour
4	Large osteophytes, marked joint-space narrowing, severe sclerosis and definite bone deformity

Adapted from Kellgren and Lawrence [26]. Grades 2 and above are commonly used to define radiographic OA in epidemiological studies.

5.4 Investigations

Table 10. Investigations in knee pain: when useful and cautions.

Investigation	When useful	Cautions
Plain radiographs (weight-bearing)	Suspected OA when diagnosis is uncertain, symptoms are atypical, or imaging will change management; weight-bearing views help assess joint space. In acute injury, decision rules such as the Ottawa knee rules help to select who needs radiographs [27]	Do not image every uncomplicated case; radiographic changes may be asymptomatic
MRI	Persistent unexplained pain; suspected internal derangement or occult bone/cartilage pathology when the result will alter care	Not routine for typical OA; incidental degenerative findings are common [22]
Ultrasound	Effusion, superficial bursitis, tendon pathology or image-guided aspiration and injection	Operator dependent; does not replace clinical assessment
Blood tests	When inflammatory, infectious or systemic disease is suspected (e.g. complete blood count, ESR/CRP, targeted serology, uric acid)	No blood test confirms ordinary OA; order according to the differential
Joint aspiration and synovial-fluid analysis	Acute unexplained effusion; suspected septic or crystal arthritis. Request cell count, Gram stain and culture, and crystal analysis [24]	Do not delay urgent care. A very high white-cell count raises suspicion of infection but overlaps with crystal and inflammatory arthritis

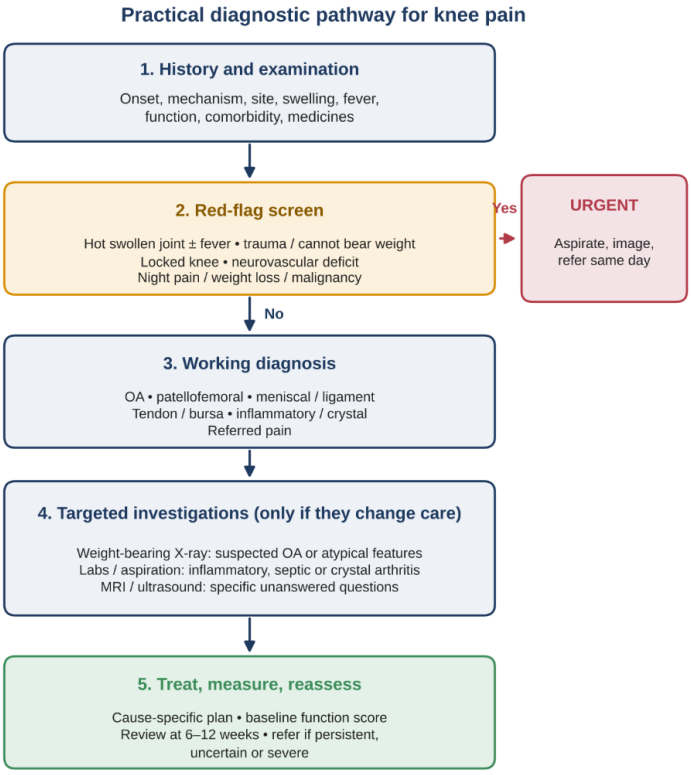


Figure 5. Practical diagnostic pathway for knee pain, adapted conceptually from Indian standard treatment guidance and clinical diagnostic principles [3,21].

6. Red flags requiring urgent assessment

Red flags should be sought in every new presentation, and again whenever a chronic knee suddenly changes (Table 11). In many Indian settings first contact is with primary-care clinicians, pharmacists or

traditional practitioners; training these first-contact providers to recognise and refer red flags may be one of the highest-yield interventions for patient safety.

Table 11. Red flags, possible causes and recommended action.

Red flag	Possible diagnosis	Recommended action
Hot, acutely swollen, very painful knee, with or without fever or systemic illness	Septic arthritis; acute crystal arthritis; haemarthrosis [24]	Same-day assessment; aspirate before antibiotics where feasible; urgent specialist input. Fever may be absent
Significant trauma, deformity, inability to bear weight or focal bony tenderness	Fracture or major structural injury [27]	Imaging; immobilise; orthopaedic referral
Acute locked knee (true mechanical block), rapidly expanding effusion or gross instability	Displaced meniscal tear; loose body; major ligament injury	Prompt orthopaedic assessment
New neurovascular deficit, cold or pale foot, absent distal pulses	Vascular injury; compartment syndrome; nerve injury	Emergency assessment
Unexplained persistent night pain, weight loss, mass or history of malignancy	Bone tumour; metastasis; infection (including tuberculosis)	Investigate promptly; imaging; specialist referral
Chronic monoarthritis with low-grade fever, weight loss or contact history	Tuberculous arthritis; chronic infection	Aspiration and microbiological work-up; specialist referral
Calf swelling and tenderness, especially after immobility or surgery	Deep-vein thrombosis (can mimic posterior knee pain)	Urgent assessment according to local pathway

7. Treatment: A multimodal, cause-specific approach

Treatment should target the cause, severity, functional goals, comorbidities, patient preference and affordability. For chronic knee OA, education, exercise and weight management are foundational; medicines and procedures are adjuncts rather than substitutes. The Indian guideline supports self-management, local muscle strengthening, weight reduction for overweight and obese people, suitable footwear, walking aids when needed and selective use of topical treatments [3]. NICE, AAOS, ACR and OARSI guidance similarly emphasise exercise and risk-adjusted pharmacological treatment [4,6,7,28]. Figure 6 summarises a stepped framework; it is a framework, not a patient-specific prescription.

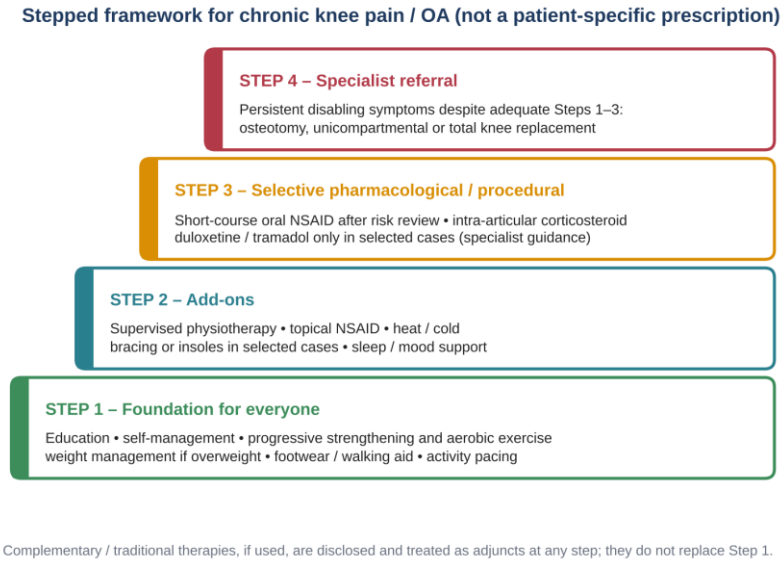


Figure 6. Stepped treatment framework for chronic knee pain and knee OA.

7.1 Lifestyle and self-management

- **Weight management:** For people with overweight or obesity, a sustained reduction in body weight reduces knee loading and improves symptoms; in a randomised trial, combined diet and exercise produced greater improvements in pain than either alone [12]. Counselling should be

non-judgemental, use Indian BMI thresholds [20] and respect cultural and economic realities of diet.

- **Activity pacing:** Temporarily reduce repeated high-load aggravating tasks, then progressively rebuild tolerance rather than advising prolonged rest.
- **Footwear and aids:** Comfortable supportive footwear; a walking stick held in the hand opposite the affected knee may reduce load and improve confidence when needed [3].
- **Education:** Explain that OA is manageable and does not inevitably lead to surgery; agree measurable goals such as walking duration or chair-rise ability.
- **Daily-life adaptation:** Discuss practical alternatives for floor sitting, squatting toilets and stairs where these provoke symptoms, without making patients abandon culturally important activities unnecessarily.

7.2 Physiotherapy and exercise

Progressive exercise is a core intervention across age groups and levels of OA severity. A Cochrane review found that land-based therapeutic exercise reduces knee pain and improves physical function in people with knee OA [8]. Programmes commonly combine quadriceps and hip strengthening, range-of-motion work, balance and neuromuscular training and low-impact aerobic activity such as walking, cycling or aquatic exercise (Table 12). Structured national programmes such as Good Life with osteoArthritis in Denmark combine education with supervised neuromuscular exercise and provide a model for scalable delivery [29]. Start at a tolerable level and progress according to pain response and function (Table 13). Supervised physiotherapy can improve technique, adherence and confidence, particularly after injury, in marked weakness or when movement is limited. Manual therapy may be considered only as an adjunct to exercise, not as a stand-alone cure [3,4,28]. Where specialist services are scarce, real-time tele-rehabilitation has been reported to be comparable to standard care for musculoskeletal conditions [30].

Table 12. Exercise and physical modalities for knee OA.

Modality	Potential role	Practical notes
Strengthening	Quadriceps, hip abductors and extensors, calf; functional capacity [8]	Individualise dose; progress gradually; avoid sharp escalating pain
Aerobic exercise	Walking, stationary cycling, swimming or aquatic exercise	Low-impact options may be better tolerated initially
Neuromuscular and balance training	Stability, coordination and fall-risk reduction [29]	Useful in older adults and after injury
Stretching and mobility	Address selected restrictions and maintain range	Avoid forceful painful stretching
Thermotherapy	Heat for stiffness; cold for short-term relief after activity or acute flare	Adjunct only; protect skin and avoid in impaired sensation
TENS / electrotherapy	May provide short-term symptom relief in selected patients	Not a replacement for active rehabilitation; guideline positions vary, and NICE advises against routine offer [4]

Table 13. Illustrative starter exercise programme for chronic knee OA (to be individualised by a clinician or physiotherapist).

Component	Examples	Illustrative starting dose and progression
Lower-limb strengthening	Sit-to-stand from a chair; mini-squats to a comfortable depth; straight-leg raise; step-ups; bridging; side-lying hip abduction	2–3 sessions per week; 1–3 sets of 8–12 repetitions; add resistance or depth gradually
Aerobic activity	Brisk walking; stationary cycling; water-based exercise	Build towards regular moderate-intensity activity on most days, starting with short bouts
Balance and neuromuscular	Tandem stance; single-leg stance near a support; controlled stepping	Several times per week; progress by reducing support or adding movement
Mobility	Heel slides; gentle hamstring and calf stretches	Daily, within a comfortable range
Self-monitoring	Pain scale during and 24 hours after exercise; weekly walking time	Mild temporary soreness is acceptable; persistent worsening prompts dose reduction and review

Illustrative only. Doses are typical starting principles and should be adapted to symptoms, comorbidity and supervision available.

7.3 Medicines

For knee OA, topical NSAIDs are generally preferred before oral NSAIDs because systemic exposure is lower; a Cochrane review found that some topical NSAIDs provide pain relief in chronic musculoskeletal conditions, with mainly mild local adverse effects [4,9]. If oral NSAIDs are considered, a network meta-analysis supports their efficacy over placebo and paracetamol but shows differences between agents and a need to balance benefit against harm [31]. Use the lowest effective dose for the shortest appropriate duration and assess gastrointestinal bleeding or ulcer risk, kidney function, blood pressure, cardiovascular disease, liver disease, pregnancy status and interacting medicines (Table 14). Gastroprotection may be required.

Paracetamol has limited evidence of benefit in OA: A meta-analysis found only a small, clinically unimportant effect on pain and function [32], and NICE does not recommend it routinely [4]. Opioids are generally avoided for chronic OA because of modest benefit and risks including sedation, falls, dependence and constipation [4,6]. Topical capsaicin may be considered in selected cases [6]. Glucosamine and chondroitin are not recommended as routine OA treatments in the Indian guideline [3], and NICE also advises against glucosamine [4]. Supplements should not be promoted as cartilage-regenerating therapies without credible clinical evidence. Medicines must be prescribed by a qualified clinician after individual assessment.

Table 14. Medicines in knee OA: Role and safety considerations.

Medicine	Role	Key safety considerations
Topical NSAID (e.g. diclofenac gel)	Generally preferred first pharmacological option for knee OA [4,9]	Local skin reactions; avoid on broken skin; lower systemic exposure but not zero
Oral NSAID	Short-term, lowest effective dose after risk assessment [4,31]	Gastrointestinal bleeding, kidney injury, hypertension and cardiovascular events; interaction with anticoagulants, diuretics and ACE inhibitors/ARBs; consider gastroprotection; avoid in advanced kidney disease and late pregnancy
Paracetamol	Limited benefit; may be used short-term or occasionally [4,32]	Liver toxicity with overdose or heavy alcohol use; check combination products
Topical capsaicin	Conditional option in knee OA [6]	Burning on application; wash hands; avoid mucous membranes
Duloxetine	Conditional option in some guidelines for selected patients [6,7]	Nausea, dizziness, interactions; specialist guidance advised
Opioids (including tramadol)	Generally avoided for chronic OA; very limited, conditional use in some guidelines [4,6]	Sedation, falls, constipation, dependence; serotonin syndrome risk with tramadol and antidepressants
Glucosamine / chondroitin	Not recommended as routine treatment [3,4]	Cost without proven benefit; shellfish-derived products and glycaemic or anticoagulant interactions to be considered

7.4 Intra-articular and other procedures

Intra-articular corticosteroid injection may provide short-term relief in selected people with symptomatic OA, particularly when pain prevents participation in rehabilitation. It does not rebuild cartilage or cure OA: In a two-year randomised trial, repeated injections every three months did not improve pain compared with saline and were associated with greater cartilage volume loss [13]. Aseptic technique and exclusion of infection are essential. Hyaluronic-acid injections are not recommended for routine use by the Indian guideline and AAOS [3,28]; a meta-analysis found only small, clinically doubtful benefit with a risk of adverse events [33]. Evidence for platelet-rich plasma (PRP) is heterogeneous because preparations, doses and study methods vary, and a well-designed placebo-controlled trial found no significant benefit over saline for pain or cartilage volume at 12 months [34]; it should therefore be discussed as an evolving intervention with uncertainty, cost and the absence of proven disease modification made explicit. Stem-cell injections and unregulated regenerative products should not be presented as established standard care [6].

Table 15. Injectable and procedural options.

Option	Evidence / guideline position	Practical position
Intra-articular corticosteroid	Short-term relief in selected patients; repeated injection did not help pain and was linked to greater cartilage loss in one trial [4,13]	Selected adjunct; limit frequency; exclude infection first
Hyaluronic acid	Not recommended for routine use by Indian STG and AAOS; small, doubtful benefit in meta-analysis [3,28,33]	Generally avoid routine use
Platelet-rich plasma	Heterogeneous products and trials; no significant benefit over saline in RESTORE trial [34]	Uncertain; informed specialist discussion only; disclose cost
Stem-cell / unregulated regenerative products	Not established standard care [6]	Avoid outside regulated research settings
Arthroscopic lavage or debridement	No benefit over sham or physiotherapy in uncomplicated degenerative OA [14,35]	Not indicated; consider only for a distinct mechanical indication

7.5 Surgery

Surgical referral is appropriate when pain, stiffness and functional limitation substantially impair quality of life despite a reasonable trial of non-surgical treatment. Options depend on age, compartment involvement, alignment, activity, bone quality and comorbidity (Table 16). A randomised trial found that total knee replacement followed by non-surgical treatment gave greater pain relief and functional improvement than non-surgical treatment alone in selected patients, at the cost of more serious adverse events [15]. Arthroscopy is not a treatment for uncomplicated degenerative OA; randomised trials found no advantage over sham surgery or physiotherapy [14,35]. It may be considered for a distinct indication such as a true mechanically locked knee. Shared decision-making should include expected benefits, complications, rehabilitation, implant longevity and realistic functional goals, including how floor-level activities such as squatting or cross-legged sitting will be managed afterwards [3,28,36].

Table 16. Surgical options for symptomatic knee OA.

Procedure	Typical indication	Considerations
High tibial osteotomy (HTO)	Younger, active patient with predominantly single-compartment (usually medial) OA and malalignment	Joint-preserving; prolonged rehabilitation; may delay arthroplasty
Unicompartmental knee arthroplasty (UKA)	Advanced OA confined to one compartment with stable ligaments	Quicker recovery; higher revision rate than TKA in some registries; patient selection is critical
Total knee arthroplasty (TKA)	Advanced symptomatic OA with substantial disability despite adequate non-operative care [15]	Infection, venous thromboembolism, stiffness, persistent pain, revision; plan rehabilitation and discuss floor-level function
Arthroscopy	True mechanical locking or another distinct mechanical indication, not uncomplicated OA [14,35]	Does not treat degenerative OA pain

8. Traditional, complementary and integrative therapies in India

Patients in India may use Ayurveda, Yoga, Unani, Siddha, homoeopathy, massage, herbal preparations and acupuncture alongside biomedical care, and the World Health Organization encourages the integration of safe, evidence-based traditional medicine into health systems [37]. These practices should be discussed respectfully and transparently. A therapy's cultural importance, availability or popularity does not establish efficacy. The 2017 Government of India OA guideline expressly states that alternative therapies (Ayurvedic, Unani and homoeopathic medications), Yoga and Tai Chi were outside its scope [3]; this should not be misrepresented as endorsement or rejection.

The evidence differs by system (Table 17). A randomised equivalence trial of an Ayurvedic formulation reported symptom improvement comparable to glucosamine and celecoxib in knee OA, but glucosamine itself has limited efficacy and independent replication is needed [38]. Systematic reviews of turmeric and curcumin extracts report symptomatic benefit in small, heterogeneous trials of generally low certainty [39]. Product quality is a separate concern: An analysis of Ayurvedic medicines sold *via* the internet found detectable lead, mercury or arsenic in about one in five products sampled [40]. For Yoga, systematic reviews suggest benefit for pain and function, but trials are few and often of low quality [41]. Tai Chi was comparable to physical therapy in a randomised trial in knee OA [42]. For acupuncture, an individual-patient-data meta-analysis found small effects over sham and larger effects over no treatment, while a trial in older adults with chronic knee pain did not show clearly superior pain relief over sham [43,44]. For homoeopathy, a large comparative analysis found effects compatible with placebo and the Australian NHMRC concluded that there was no reliable evidence of effectiveness for any health condition [45,46].

Table 17. Traditional and complementary therapies: Potential use and evidence appraisal.

Therapy system	Potential use / patient interest	Evidence appraisal and safety position
Yoga	Gentle mobility, strengthening, balance, breathing and self-management	Systematic reviews suggest benefit for pain and function but trials are few and often low quality [41]. May be used as an adapted exercise option if poses are modified; avoid deep knee flexion or painful kneeling in symptomatic patients. Complements, not replaces, rehabilitation
Tai Chi	Low-impact balance and strength training	Comparable to physical therapy in one randomised trial [42]; outside the scope of the Indian STG [3]
Ayurveda	Traditional external applications, massage, fomentation and oral formulations	Trials vary in size, formulation and quality [38,39]. Product standardisation, contamination with heavy metals, herb–drug interactions and liver or kidney toxicity are concerns [40]. Use qualified practitioners and regulated products; do not claim cartilage regeneration
Unani / Siddha	Traditional formulations and local therapies	High-quality knee-OA trials and reproducible product data are limited. Check ingredients, quality, interactions and adverse effects; avoid delaying diagnosis or proven care
Homoeopathy	Some patients report use for pain or stiffness	No reliable high-quality evidence that homoeopathic products modify OA or relieve knee pain beyond placebo [45,46]. Must not replace diagnostic assessment or effective treatment
Acupuncture	May be sought for symptom relief	Guidelines differ; benefit appears modest or uncertain [4,6,43,44]. Use a trained practitioner with sterile single-use needles; do not substitute for exercise
Massage and manual therapies	May offer temporary comfort or relaxation	Use gently and only as an adjunct; avoid vigorous manipulation in acute injury, a hot swollen joint, suspected fracture or an inflammatory flare

Integrative care should follow five safeguards: (1). establish the diagnosis first; (2). disclose all medicines and supplements to every treating clinician; (3). avoid products with undisclosed ingredients or exaggerated cure claims; (4). monitor measurable outcomes and adverse effects; and (5). never delay urgent assessment for infection, fracture or rapidly progressive symptoms.

9. Comparison of major treatment approaches

Table 18 compares interventions by guideline and evidence position, and Figure 7 gives a qualitative visual summary. The ordinal ratings in the figure were assigned by the author(s) from guideline statements and the trials cited in this review. They indicate relative strength and consistency of support for symptomatic knee OA, not effect sizes, and should be read alongside the underlying guidance. Table 19 lists the key studies behind several of the more contested positions.

Table 18. Comparison of major treatment approaches for knee OA.

Intervention	Evidence / guideline position	Place in care
Education and self-management	Consistently recommended [3,4,6]	Foundation
Progressive strengthening / aerobic exercise	Strongly recommended in major OA guidance; Cochrane evidence of benefit [4,6–8]	Foundation
Weight management if overweight/obese	Recommended; improves symptoms and function [4,6,12]	Foundation
Topical NSAIDs	Recommended for knee OA by NICE, ACR and AAOS; consider safety [4,6,9]	First-line pharmacological adjunct
Oral NSAIDs	Effective for many, but risk-dependent [4,31]	Short-term, lowest effective dose after assessment
Intra-articular corticosteroid	Can offer short-term relief in selected patients [4,13]	Selected adjunct
Hyaluronic acid	Not recommended for routine use by AAOS and the Indian STG [3,28,33]	Generally avoid routine use
PRP	Evidence heterogeneous; protocols vary; no benefit over saline in one large trial [34]	Uncertain; informed specialist discussion only
Ayurveda / Unani / Siddha products	Evidence limited and product-specific; safety and quality vary [38,40]	Not a substitute for standard care
Homoeopathy	No reliable evidence for disease modification or specific efficacy [45,46]	Not recommended as replacement therapy
Arthroplasty	Effective for selected advanced symptomatic OA after non-operative care [15]	Specialist option

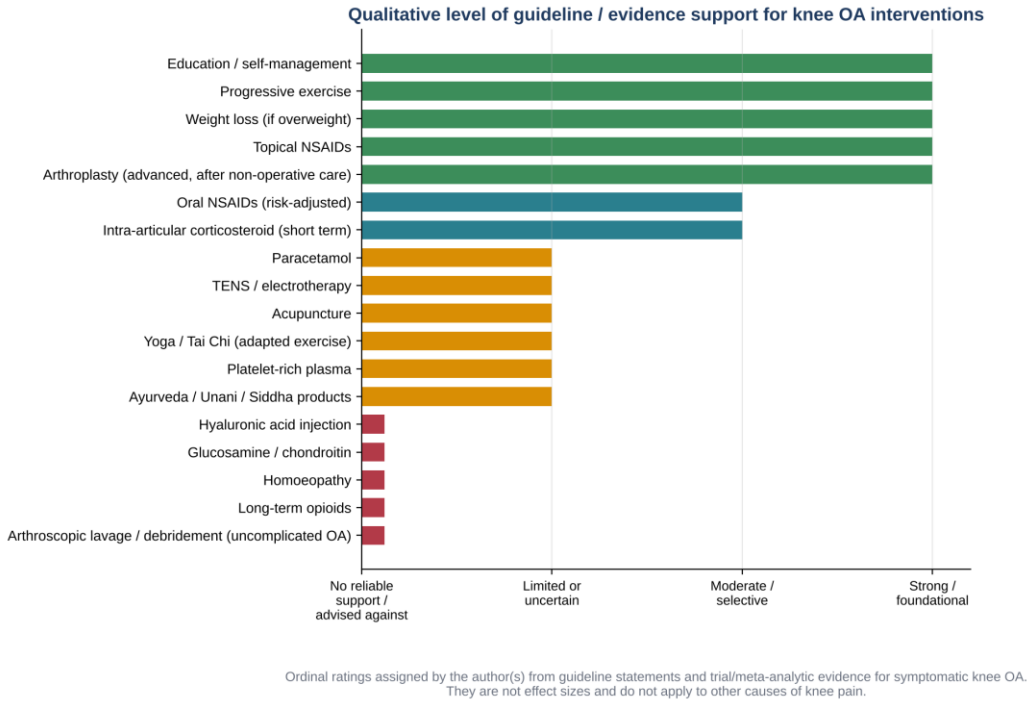


Figure 7. Qualitative level of guideline and evidence support for knee OA interventions (author-assigned ordinal ratings; not effect sizes).

Table 19. Key trials and meta-analyses informing contested treatment positions.

Study	Design	Main finding (summarised)	Implication
Fransen et al., 2015 [8]	Cochrane review, land-based exercise in knee OA	Reduced pain and improved physical function	Exercise is foundational
Messier et al., 2013 [12]	RCT, diet plus exercise in overweight or obese adults with knee OA	Combined diet and exercise improved pain more than either alone	Support weight-management plus exercise
Machado et al., 2015 [32]	Meta-analysis, paracetamol in OA	Small, clinically unimportant benefit	Do not rely on paracetamol for chronic OA
McAlindon et al., 2017 [13]	RCT, repeated triamcinolone vs saline for 2 years	No pain benefit vs saline; greater cartilage volume loss	Limit repeated corticosteroid injections
Rutjes et al., 2012 [33]	Meta-analysis, viscosupplementation	Small, clinically doubtful benefit; adverse-event concern	Avoid routine hyaluronic acid
Bennell et al., 2021 [34]	RCT, PRP vs saline (RESTORE)	No significant difference in pain or cartilage volume at 12 months	PRP remains uncertain
Moseley 2002 [14]**; Kirkley 2008** [35]	RCTs, arthroscopic surgery for OA	No advantage over sham surgery or physiotherapy	Avoid arthroscopy for uncomplicated OA
Skou et al., 2015 [15]	RCT, TKA plus non-surgical vs non-surgical care	Greater pain relief and function after TKA; more serious adverse events	Arthroplasty effective in selected advanced OA
Chopra et al., 2013 [38]	RCT, Ayurvedic formulation vs glucosamine and celecoxib	Comparable symptom improvement	Replication, product standardisation and safety data needed
Hinman et al., 2014 [44]	RCT, acupuncture for chronic knee pain in older adults	No clearly superior pain relief over sham	Benefit modest or uncertain

Summaries are brief and paraphrased; readers should consult the original publications for effect sizes and limitations.

10. Suggested care pathway for Indian settings

A practical pathway should connect primary care, physiotherapy, orthopaedics, rheumatology and emergency services (Figure 8, Table 20). Primary care can identify red flags, assess common OA and initiate education, exercise advice and safe analgesia. Physiotherapists can deliver progressive exercise and functional rehabilitation. Orthopaedic referral is appropriate for major injury, mechanical locking, deformity or advanced symptomatic OA. Rheumatology input is important for suspected inflammatory arthritis, recurrent unexplained effusions or diagnostic uncertainty. Tele-rehabilitation and community-based group exercise may improve access where specialist services are scarce, provided programmes are adapted to individual ability [30].

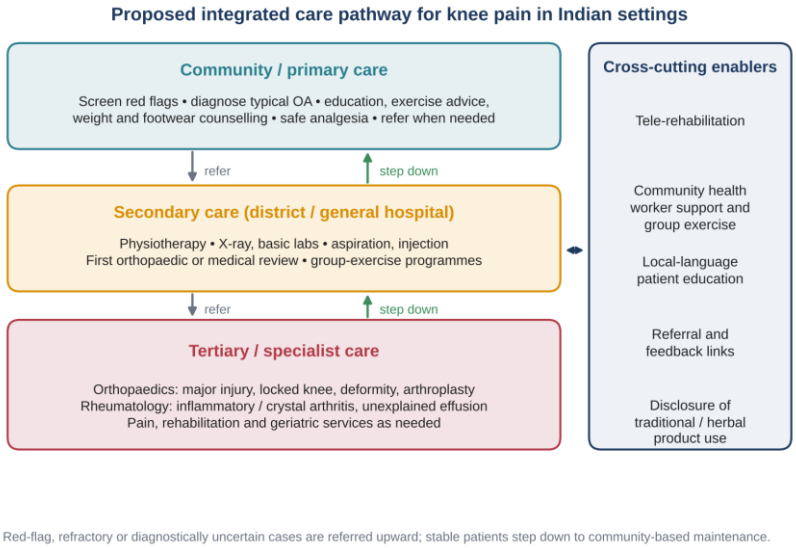


Figure 8. Proposed integrated care pathway for knee pain in Indian settings.

Table 20. Suggested roles by level of care.

Level	Core responsibilities	Referral triggers
Community and primary care	Red-flag screen; clinical diagnosis of typical OA; education; exercise and weight advice; footwear and aids; topical NSAIDs and safe analgesia; ask about traditional product use	Any red flag; atypical or inflammatory features; failure of 6–12 weeks of structured care; diagnostic uncertainty
Secondary care	Supervised physiotherapy; radiographs and basic laboratory tests; aspiration; intra-articular steroid in selected patients; group-exercise programmes	Mechanical locking; deformity; advanced symptomatic OA; suspected inflammatory arthritis
Tertiary and specialist care	Orthopaedic surgery (osteotomy, arthroplasty, complex injury); rheumatology (inflammatory and crystal arthritis); pain, rehabilitation and geriatric input	Return to community care with a written plan once stabilised

11. Prevention and public-health priorities

Prevention operates at several levels (Table 21). Because the main modifiable factors are weight, muscle strength, injury and loading, many priorities overlap with national strategies on non-communicable disease, healthy ageing and rehabilitation.

Table 21. Prevention and public-health priorities for knee pain and OA in India.

Level	Priority actions	Examples of delivery
Primary prevention	Lifelong physical activity and muscle strengthening; obesity prevention; workplace ergonomics; sports-injury prevention with progressive training and return-to-sport protocols	School and community programmes; workplace advice for agricultural and manual workers; coaching resources
Secondary prevention	Early recognition of symptoms; early education, exercise and weight management; avoidance of unsupervised long-term NSAID use and unregulated injectables or herbal products	Primary-care protocols; pharmacist counselling; local-language information
Tertiary prevention	Affordable physiotherapy; community maintenance exercise; appropriate referral for surgery; rehabilitation after arthroplasty	Tele-rehabilitation; district rehabilitation services; patient groups

Additional priorities include improving access to early assessment, affordable physiotherapy and evidence-based information in local languages, and discouraging unverified cure claims.

12. Research gaps

India needs prospective, representative, regionally diverse knee-pain and knee-OA surveillance using standardised definitions; better data on occupational exposures and sex-specific outcomes; pragmatic trials of low-cost community rehabilitation; and high-quality evaluations of traditional interventions using standardised products, transparent adverse-event reporting and clinically meaningful outcomes. Research should distinguish symptomatic disease from radiographic OA and report affordability, adherence, access and patient-reported function (Table 22).

Table 22. Priority research gaps and suggested designs.

Gap	Why it matters	Suggested approach
National knee-pain and OA surveillance	Prevalence estimates vary widely and use inconsistent definitions	Representative, multi-region cohorts using harmonised symptomatic and radiographic definitions
Occupational and floor-level exposures	Plausible but largely observational evidence; targets for prevention	Prospective cohorts with exposure measurement; ergonomic intervention trials
Community rehabilitation	Specialist services are scarce	Pragmatic trials of group and tele-delivered exercise with cost and adherence outcomes
Traditional interventions	Widespread use with heterogeneous evidence	Adequately powered, standardised-product trials with adverse-event and herb–drug interaction reporting
Sex-specific outcomes	Higher burden in women	Sex-disaggregated analyses; trials addressing barriers to care
Implementation and affordability	Guidelines may not be followed in practice	Health-systems and cost-effectiveness research; audit of prescribing and imaging patterns

13. Limitations

This narrative review is not a systematic review and may not capture every relevant trial or regional practice. Treatment recommendations are synthesised from Indian national guidance and selected international guidelines; local availability and regulatory status may change. Evidence for complementary therapies is especially heterogeneous, and the review does not infer efficacy from traditional use. The epidemiological estimates cited derive from different study populations and should not be combined into a single national rate. Figures that summarise evidence qualitatively reflect the author(s)' judgement and are not quantitative syntheses. Some sources (notably the Indian STG and the 2025 prevalence meta-analyses) were used as summarised by their abstracts or official documents, and readers should consult the originals for detail.

14. Conclusions

Knee pain in India requires a cause-specific diagnosis rather than an automatic label of osteoarthritis. A careful history and examination, selective investigations and prompt recognition of red flags are central to safe care. For chronic knee OA, education, progressive exercise, weight management when indicated and appropriate functional support form the foundation. Topical and carefully selected systemic medicines, injections and surgery have defined roles. Traditional and complementary approaches may be part of patient preference, but claims must match the evidence, product quality must be scrutinised and effective treatment must not be delayed. An affordable, multidisciplinary and culturally responsive model offers the best prospect of reducing disability and improving quality of life.

Declarations

Ethics approval and consent to participate: Not applicable. This narrative review did not involve human participants, identifiable personal data or animal experiments.

Consent for publication: Not applicable.

Availability of data and materials: No new datasets were generated or analysed for this narrative review. Information was derived from the cited published literature and official guidance. Figures and tables were prepared from the published values cited in their captions or, where stated, as qualitative syntheses by the author.

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Author contributions: Conceptualisation, writing draft, reviewing and editing of the manuscript.

Declaration by the author

I hereby declare that this manuscript is an original work, has not been published previously and is not under consideration for publication elsewhere. All sources have been acknowledged and cited. I have read and approved the final manuscript, take responsibility for its content and have disclosed all relevant interests and the use of AI-assisted tools. The tables and figures are original or are reproduced from published values with appropriate citation; no copyrighted material has been reproduced without permission.

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Abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
AAOS	American Academy of Orthopaedic Surgeons	MRI	Magnetic resonance imaging
ACL	Anterior cruciate ligament	NICE	National Institute for Health and Care Excellence
ACR	American College of Rheumatology	NSAID	Non-steroidal anti-inflammatory drug
CI	Confidence interval	OA	Osteoarthritis
CPP	Calcium pyrophosphate	OARSI	Osteoarthritis Research Society International
CRP / ESR	C-reactive protein / erythrocyte sedimentation rate	PRP	Platelet-rich plasma
GBD	Global Burden of Disease	STG	Standard Treatment Guidelines (Government of India)
HTO	High tibial osteotomy	TENS	Transcutaneous electrical nerve stimulation
KL	Kellgren–Lawrence	TKA / UKA	Total / unicompartmental knee arthroplasty
MCL / LCL	Medial / lateral collateral ligament	MoHFW	Ministry of Health and Family Welfare