Yan L, Li D, Xing D, et al. Comparative efficacy and safety of exercise modalities in knee osteoarthritis: systematic review and network meta-analysis. *BMJ.* 2025;391:e085242. (PubMed)

Plain-English Summary for Clients

This study pulled together results from 217 clinical trials with over 15,000 people who had knee osteoarthritis. The researchers wanted to know which kinds of exercise work best for easing knee pain, improving walking, and making everyday life easier and more enjoyable.(ResearchGate)

They compared different exercise “families”:

- Aerobic exercise (like walking, cycling, swimming)
- Strength training
- Flexibility/stretching
- Mind–body exercise (like Tai Chi, yoga, Pilates)
- Neuromotor/balance work
- Mixed programs that combine several types

Overall, aerobic exercise came out as the most consistently helpful for reducing pain and improving function, walking ability, and quality of life, especially over the first 3 months or so. Strength training, mixed programs, mind–body exercise, and balance-focused training also helped, but aerobic work tended to give the broadest benefits across outcomes.

Importantly, across all these trials, exercise was generally safe. The researchers did not find more adverse events in exercise groups than in control groups, suggesting that, when appropriately prescribed and progressed, exercise is a low-risk option for people with knee osteoarthritis.(College of Nurses)

For a typical client with achy, stiff knees, this means that regular, low-impact aerobic movement (like purposeful walking or cycling), ideally combined with some strengthening and balance work, is a powerful, evidence-backed way to reduce pain, move better, and feel more confident in daily life.

Key Findings for Coaches

- **Population & scale:** 217 randomized controlled trials (RCTs), 15,684 participants with knee osteoarthritis (mostly middle-aged and older adults).
- **Design:** Systematic review with network meta-analysis (NMA), including head-to-head and indirect comparisons among aerobic, strengthening, flexibility, mind–body, neuromotor, mixed exercise, and non-exercise controls.
- **Follow-up windows:** Outcomes analyzed at short term (~4 weeks), mid-term (~12 weeks), and long term (~24 weeks); when exact timepoints were missing, adjacent windows were used.
- **Primary outcomes:** Pain, physical function, gait performance, and quality of life (QoL).
- **Aerobic exercise:** Moderate-certainty evidence that aerobic exercise produces large improvements vs control in short- and mid-term pain (SMD around −1.1), mid-term function, mid-term gait performance, and short-term QoL—ranking as the most beneficial overall modality.
- **Mind–body & neuromotor:** Mind–body exercise (e.g., Tai Chi, yoga) showed large short-term gains in function; neuromotor exercise showed large short-term improvements in gait.
- **Strengthening & mixed programs:** Both strengthening and mixed exercise demonstrated large improvements in mid-term function vs control with moderate-certainty evidence.
- **Safety:** No exercise category showed higher adverse event rates than control; exercise therapy overall appeared safe for people with knee OA.(College of Nurses)

Practical Coaching Takeaways

- **Anchor programs in aerobic work:** For clients with knee OA, make low-impact aerobic exercise (e.g., walking, cycling, pool walking, elliptical) the backbone of programming, especially when the primary goals are pain reduction and better function.

- **Layer strength and balance on top:** Add lower-body strengthening (e.g., chair squats, step-ups, leg press, hip abduction/extension) plus neuromotor/balance drills (e.g., tandem stance, step-overs, directional stepping) to further boost function and gait.

- **Use mind–body work strategically:** Consider Tai Chi, yoga, or Pilates-style work for clients who tolerate and enjoy it—these modes support function, body awareness, and confidence, and may be especially useful in earlier phases or for anxious movers.

- **Start low, progress slow:** Begin with low-to-moderate intensity and shorter bouts (e.g., 10–15 minutes of walking), then increase duration and frequency before intensity, guided by symptoms and recovery. This is especially important for older adults, deconditioned clients, or those with comorbid back pain or spinal fusion.

- **Prioritize low-impact, controlled patterns:** Avoid jumping, deep high-impact squats, or uncontrolled descents for painful knees. Emphasize controlled ROM, stable joint alignment, and pain-guided modification rather than “pushing through.”

- **Integrate with medical care:** Treat these findings as programming guidance, not prescriptions; coordinate with the client’s medical team around joint injections, surgery considerations, or significant structural disease.

How to Explain This to a Client

- “Researchers looked at over 15,000 people with knee arthritis and found that regular, low-impact cardio like walking or cycling tended to help the most with pain and everyday function.”

- “Strength work, balance drills, and things like Tai Chi or gentle yoga also helped, so we’ll build a mix that fits your body and your comfort level.”

- “We’ll start small, see how your knees respond, and gradually build up the time and intensity—no ‘bootcamp’ approach needed.”

- “The good news is that in all these studies, people doing exercise didn’t have more problems than those who didn’t, so when we plan it well, moving is a safe option, not a dangerous one.”

- “Our goal is that over the next few months, walking, stairs, and daily tasks feel easier and less scary for your knees.”

Limitations & Cautions

- **Heterogeneous protocols:** The 217 RCTs used many different exercise protocols (frequency, intensity, supervision), so we can't lift a single "perfect" program directly from this paper—only general principles.
- **Network meta-analysis caveats:** Many comparisons are indirect (e.g., A vs C inferred from A vs B and B vs C), which introduces uncertainty even with careful statistical methods.
- **Limited long-term data:** Most outcomes were assessed up to about 24 weeks; long-term sustainability and effects beyond that window are less certain.
- **Population specifics:** Participants were people diagnosed with knee OA who were able to take part in exercise trials; results may not generalize perfectly to those with severe disability, multiple uncontrolled comorbidities, or very advanced joint damage.
- **Scope of practice:** The study does not replace medical evaluation. Coaches should not promise joint "repair" or advise on medications, injections, or surgery decisions; instead, they should position exercise as a supportive, evidence-based part of a broader care plan.

Dictionary of Acronyms

- **OA – Osteoarthritis:** A common joint condition where cartilage breaks down, leading to pain, stiffness, and reduced function.
- **KOA – Knee Osteoarthritis:** Osteoarthritis that specifically affects the knee joint.
- **RCT – Randomized Controlled Trial:** A type of study where participants are randomly assigned to different interventions to fairly compare their effects.
- **NMA – Network Meta-Analysis:** A statistical method that compares multiple treatments at once, even when they haven't all been directly compared in the same study.
- **QoL – Quality of Life:** A measure of how someone feels about their overall health, daily activities, and well-being.

One-Sentence Bottom Line

For clients with knee osteoarthritis, build programs around low-impact aerobic exercise, then layer in strength, balance, and (optionally) mind–body work, because this combination has the strongest overall evidence for improving pain, function, walking, and quality of life with a good safety profile.