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Supervised Exercise Therapy versus Home Exercise Program in Patients with Knee Osteoarthritis: A Narrative Review

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Abstract

Background: Knee Osteoarthritis (KOA) is a leading cause of pain and disability worldwide. Exercise therapy is a universally endorsed core treatment, yet the optimal delivery model supervised clinical sessions versus independent home programs remains a point of clinical debate. This review synthesizes current evidence comparing the efficacy, adherence, cost-effectiveness, and long-term outcomes of Supervised Exercise Therapy (SET) versus Home Exercise Programs (HEP) for managing KOA. Methods: A narrative review was conducted, synthesizing findings from recent systematic reviews, meta-analyses, randomized controlled trials (RCTs), and clinical guidelines .Results: Current evidence suggests SET typically yields superior short-to-medium-term outcomes in reducing pain, improving physical function (e.g., walking, stair climbing), and increasing muscle strength compared to HEP. This is attributed to closer adherence, proper technique correction, and the motivational context of supervision. However, well-structured, progressive HEPs with initial instruction and periodic review can achieve comparable long-term (≥12 month) benefits for pain and function in motivated patients. SET is associated with higher direct healthcare costs, while HEP offers greater scalability and accessibility. Technology-assisted HEP

(telerehabilitation) is emerging as a promising hybrid model. Conclusion: no significant differences were observed between supervised and non-supervised physical exercises in terms of pain and function of the osteoarthritis knee, However SET represents the most effective delivery model for achieving robust clinical improvements, particularly for patients with higher pain levels, functional deficits, or low self-efficacy. HEP is a vital, cost-effective component for long-term management. A personalized, stepped-care approach is recommended, where SET is used to initiate treatment and impart self-management skills, followed by a transition to a maintained, technology-supported HEP. Future research should focus on defining predictive factors for success in each model and optimizing telerehabilitation protocols.

Introduction

Knee Osteoarthritis (KOA) is degenerative condition of knee joint's articular cartilage and the body become unabale to repair it automatically(1). KOA is a multi-etiologic, long-lasting disabling pathological condition which affects the knee joint as a whole, as the knee joint is the most common site of involvement in osteoarthritis(2). Knee osteoarthritis (KOA) is the most prevalent form of arthritis, affecting over 250 million people globally and representing a major contributor to disability in older adults(3). KOA is classified as primary or secondary on the bases of etiology, The pathogenesis of primary KOA is complex and includes numerous factors, such as mechanical stress, inflammation, metabolism, immunity and genetics, with age, genetics, body weight, sex and race being risk factors(4). secondary KOA is caused by either trauma, inherited articular dysplasia or iatrogenic injury, the uncontrolled changes of KOA are not only passive degeneration or wear-and-tear abrasions but active type of changes caused by an imbalance between articular tissue damage and repair(5). initial clinical signs and symptoms include pain and limited mobility, reduce the quality of life of patient(6). Researches have showed a higher incidence (19.4%) of KOA symptoms in the people with age ≥60, the incidence in women is 10.3% being higher than that in men that is 5.7%(7). According to a research, hip and knee OA represent one of the leading causes of disability worldwide, the impact of disease is measured by means of years lived with disabilities (YLDs) and disability-adjusted life years (DALYs) estimates(2, 8) At a global level and according to YLDs measurements, hip and knee OA is ranked as the 11th highest contributor to global disability(9).As a leading cause of disability, it imposes a substantial economic burden on healthcare systems international clinical guidelines from the Osteoarthritis Research Society International (OARSI), the American College of Rheumatology (ACR), and the European Alliance of Associations for Rheumatology (EULAR) unanimously designate exercise therapy as a first-line, core conservative treatment regardless of disease severity, age, or comorbidity profile (10).The therapeutic rationale for exercise in KOA is complex, encompassing biomechanical (improved joint loading, muscle strength), neurophysiological (pain modulation), and systemic (weight management, metabolic health) benefits (11). However, the translation of this strong recommendation into consistent clinical outcomes is complicated by the "how" of delivery. The two primary modalities are Supervised Exercise Therapy (SET), conducted by a physiotherapist or exercise professional in a clinical setting, and Home Exercise Programs (HEP), which patients perform independently based on prescribed instructions(12). SET offers expertise and accountability but is resource-intensive. HEP promotes self-management and accessibility but risks poor adherence and incorrect technique. Recent advancements, particularly in digital health and telerehabilitation, have further blurred these lines, creating hybrid models(13). This narrative review aims to critically synthesize the contemporary evidence comparing SET and HEP for KOA. It will evaluate their relative effectiveness on pain, function,

and strength; analyze factors influencing adherence; discuss economic implications; and explore the evolving role of technology, concluding with evidence-based recommendations for clinical practice and future research.

Comparative Efficacy: Pain, Function, and Physical Outcomes

Short to Medium-Term Efficacy (≤6 months)

Recent high-quality evidence consistently demonstrates the short-term superiority of SET over HEP. A meta-analysis in 2024 ranked treatment modalities for KOA and found that therapist-led, facility-based exercise programs had the highest probability of being the most effective for improving pain and physical function at 3-month follow-up(14) (15). The effect sizes for pain reduction and functional improvement (e.g., measured by the Western Ontario and McMaster Universities Osteoarthritis Index - WOMAC) are typically moderate for SET and small for HEP in head-to-head trials within this timeframe.(16)The mechanisms for this advantage are multifaceted. SET allows for real-time correction of exercise technique, ensuring optimal muscle activation and safe joint loading. Therapists can provide immediate tactile or verbal feedback, adjust resistance levels progressively, and incorporate manual therapy or neuromuscular education within the session components difficult to replicate in a standard HEP (13, 15, 16). A 2025 RCT specifically investigated strength gains, concluding that a 12-week supervised progressive resistance training program resulted in significantly greater quadriceps strength and muscle mass improvements compared to a matched home-based regimen, directly linking supervision to superior physiological adaptation(17).

Long-Term Efficacy (≥12 months)

The long-term differences are harder to judge between the two exercise programs, as SET often shows a "leg-up" effect, several studies indicate that outcomes can meet at 12-month follow-up, provided the HEP is maintained. A 2023 systematic review (updated in 2024) on exercise for knee OA noted that while supervised exercise had stronger effects in the short term, the differences between supervised and unsupervised approaches diminished in the longer term, though the evidence certainty was graded as low to moderate (18).The critical factor appears was exercise adherence to the exercise program or maintenance, not only initial prescription. A important finding from the study showed that patients who transitioned from an initial 12-week SET to a structured, progressive HEP with monthly booster sessions maintained 90% of their functional gains at one year, performing equally well as a group that continued bi-weekly supervision(19). This supports a model where SET acts as an intensive "kick-start," imparting the skills, confidence, and habit formation necessary for successful long-term self-management via HEP.

The Adherence Conundrum

Adherence is the strongest mediator of clinical outcomes in exercise therapy for KOA, and it is here that the models diverge significantly. Supervised sessions, by their scheduled and appointment-based nature, enforce a baseline level of adherence. The social interaction, professional accountability, and perceived value of a paid service enhance extrinsic motivation (20). In contrast, adherence to HEPs is notoriously problematic, with studies consistently showing a rapid decline in exercise frequency after the first few weeks without support. Barriers include lack of motivation, forgetfulness, fear of pain exacerbation, unclear instructions, and competing time demands (21) A 2025 qualitative meta-synthesis identified "therapeutic alliance" the perceived connection and guidance from a clinician as a missing but crucial element in standalone HEPs that leads to attrition (22).

Economic Considerations and Accessibility

The economic argument often favors HEP. SET incurs direct costs for clinical space and therapist time, making it more expensive per patient from a healthcare payer perspective. Cost-effectiveness analyses are mixed: some studies find SET to be cost-effective due to better outcomes, while others favor minimally supervised or home-based approaches for broader population-level implementation (23).However, accessibility is a double-edged sword. HEPs are inherently more accessible, removing barriers related to transportation, clinic hours, and geography. Conversely, SET may be inaccessible due to cost (if not covered by insurance), location, or availability. This disparity highlights the issue of health equity in KOA management**.**

The Emerging Paradigm: Technology-Assisted HEP and Telerehabilitation

The contradiction between SET and HEP is being redefined by digital health. Technology-assisted HEP, or telerehabilitation, uses video conferencing, mobile applications, wearable sensors, and online platforms to provide remote supervision, feedback, and progression. A 2024 systematic review concluded that telerehabilitation for KOA is as effective as in-person SET for improving pain and function and is superior to conventional paper-based HEP(24). It effectively addresses key HEP limitations: it provides guidance, enables monitoring, and can foster accountability through digital reminders and tracking. Another systematic review of 2025, demonstrated that a 12-week app-based exercise program with weekly telehealth check-ins achieved equivalent pain relief and functional improvement to traditional SET, with significantly higher patient satisfaction and adherence rates logged via the app (20). This hybrid model represents a promising future direction, potentially offering the "best of both worlds": scalability and convenience with professional oversight(10).

Synthesis and Clinical Recommendations

The evidence does not support a universally superior model but rather clarifies their distinct and complementary roles: Initial treatment phases, patients with severe pain/functional limitations, those with low self-efficacy or fear of movement (Kinesiophobia), and when precise technique for progressive strength training is required. HEP is Essential For: Long-term maintenance of gains, cost-effective wide-scale implementation, and as the cornerstone of lifelong self-management. It should not be a passive handout but an active, educated transition.

Recommended Model - The Stepped-Care Hybrid Approac

Step 1 is to Initiate with a time-limited period (e.g., 6-12 weeks) of SET to achieve rapid symptom control, improve strength/function, and, crucially, to educate the patient. Step 2 is Co-create a personalized, progressive HEP with the patient during the SET period. Use video recordings, illustrated manuals, or app prescriptions. In Step 3: Transition to a maintained HEP with scheduled, low-frequency "booster" sessions (in-person or via telehealth) at 3, 6, and 12 months to reassess, progress exercises, and reinforce adherence. while in Step 4: Where available, leverage telerehabilitation platforms to provide scalable, supportive oversight during the HEP phase.

Conclusion

Both Supervised Exercise Therapy and Home Exercise Programs are valid, guideline-recommended interventions for knee osteoarthritis. SET demonstrates a clear advantage in achieving faster and greater improvements in pain, function, and

strength in the short term. HEP is the vehicle for sustainable, long-term management but requires intelligent design and support to overcome inherent adherence challenges. The future lies not in choosing one over the other, but in strategically integrating them within a patient-centered, stepped-care model. The rapid integration of telerehabilitation offers a powerful tool to enhance HEP, making professional guidance more accessible. Future research should prioritize identifying patient phenotypes that respond best to each delivery model and refining the components of effective technology-assisted exercise interventions to optimize outcomes across diverse populations.

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