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Yoga Therapy as a Complementary Approach in the Management of Knee Osteoarthritis

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Abstract

Knee osteoarthritis (OA) is a degenerative joint disorder that significantly impairs mobility, quality of life, and functional independence, particularly among older adults. Conventional treatments, including pharmacological agents and surgical interventions, are often accompanied by side effects and economic burdens. Yoga, a holistic mind-body practice rooted in Indian philosophy, has emerged as a complementary therapy for musculoskeletal disorders. This narrative review evaluates existing literature on the efficacy of yoga in the management of knee OA, focusing on its impact on pain relief, joint function, muscle strength, and psychological well-being. The findings suggest that yoga can be an effective adjunct to standard care, offering physical and psychosocial benefits with minimal adverse effects. However, variability in study design and yoga protocols underscores the need for more rigorous randomized controlled trials (RCTs) to validate its clinical utility.

Keywords: Yoga, Knee Osteoarthritis, Joint Pain, and Physical Functioning.

1. Introduction

Knee osteoarthritis (KOA) is a slowly progressive disease of the knee joint, often occurring in older adults, and is associated with considerable pain, stiffness, and limitations in movement [1]. Being the most common joint disorder worldwide, KOA greatly affects physical functioning and overall quality of life, especially in women and older individuals [2]. The worldwide prevalence of KOA is increasing swiftly due to the expanding elderly population and the rising rates of obesity [3]. Standard treatment approaches for KOA involve medications, physical therapy, and surgical procedures. However, prolonged use of drugs can cause side effects, and surgery is generally considered only in advanced stages. Consequently, there is growing attention toward non-pharmacological options like yoga, which provides benefits for physical health, mental well-being, and emotional balance [4]. Rooted in ancient Indian philosophy, yoga combines physical postures, breathing practices, and meditation, and is gaining recognition for its therapeutic value in supporting musculoskeletal health, including the management of KOA [5].

Prevalence of Knee Osteoarthritis

KOA impacts a large segment of the global population, especially the elderly. In India, studies have shown a 28.7% prevalence of radiologically confirmed KOA, with higher occurrence in women (31.6%), individuals with obesity, and people leading sedentary lifestyles [1]. In the United States, around 33.6% of adults aged 65 and above are affected by KOA, with a higher prevalence observed in women and African American populations [2]. Worldwide, KOA affects about 3.3%–3.6% of the population, ranking as the 11th leading cause of disability based on years lived with disability (YLDs) and accounting for approximately 18.9 million YLDs globally [3]. As the global population ages and life expectancy continues to increase, the incidence of KOA is expected to grow substantially in the coming decades [6].

Pathophysiology and Clinical Impact of Knee Osteoarthritis

KOA is characterized by the gradual breakdown of articular cartilage, sclerosis of the subchondral bone, formation of osteophytes, and inflammation of the synovium [1]. It is now regarded as a whole-organ disease that involves mechanical stress, biochemical imbalances, oxidative stress, and chronic low-grade inflammation [2, 6]. Risk factors for KOA include age, obesity, female sex, joint injury, genetic predisposition, and metabolic disorders [4]. Clinically, KOA presents with joint pain, swelling, crepitus, morning stiffness, decreased mobility, and functional decline [1]. These symptoms often make it difficult to perform daily activities such as walking, climbing stairs, and standing for long periods [5]. In later stages, joint deformity and muscle atrophy may develop. KOA also has psychological effects, including anxiety, depression, social withdrawal, and reduced self-efficacy [3].

Yoga and Musculoskeletal Health

Yoga offers a comprehensive therapeutic approach that combines physical activity, breath control, and mindfulness practices. It is increasingly recognized as a safe and effective complementary therapy for chronic musculoskeletal conditions like KOA [4]. Research shows that yoga improves joint flexibility, strengthens muscles, enhances balance, and increases proprioception, while also reducing stress and supporting mental health [5]. The practice of physical postures (asanas) activates muscles isometrically, providing better support to the knee joint. Breathing exercises (pranayama) promote relaxation, decrease sympathetic nervous system activity, and encourage psychological well-being. Meditation and mindfulness techniques help improve pain perception and reduce symptoms of anxiety and depression [6, 7]. Evidence also indicates that, compared to other forms of exercise, yoga may offer greater benefits in decreasing stiffness and improving quality of life in people with KOA [6].

Current Management strategies and limitations

Management of knee osteoarthritis (KOA) generally involves a combination of pharmacological, non-pharmacological, and surgical strategies. Initial treatments commonly include analgesics, nonsteroidal anti-inflammatory drugs (NSAIDs), intra-articular corticosteroid injections, and physical therapy [7]. While these methods can alleviate symptoms, their effectiveness often declines over time, and prolonged use may lead to gastrointestinal, renal, or cardiovascular complications [8]. Surgical procedures such as total knee arthroplasty are typically reserved for severe cases but carry potential risks, including infection and prosthetic failure, and may not be appropriate for patients with advanced age or multiple comorbidities [9]. Non-pharmacological interventions such as aerobic exercise, resistance training, weight control, and

physiotherapy are strongly endorsed by clinical guidelines. However, participation in these programs can be hindered by pain, restricted mobility, and reduced motivation, particularly in older adults [10]. These challenges underscore the importance of accessible, low-impact, and holistic approaches like yoga, which address both the physical and psychological components of KOA management [11].

Review of Key Studies on Yoga and KOA

Several studies have investigated the effects of yoga on individuals with KOA. Evidence from a systematic review and meta-analysis indicates that yoga can significantly reduce pain, enhance physical function, and decrease stiffness when compared to control groups [7]. In one study, a 12-week yoga intervention led to notable improvements in walking time, balance, and muscle strength among elderly participants with KOA [8]. Yoga has also been associated with enhanced quality of life, reduced stress levels, and improved mood in older adults living with KOA [9]. Among different forms, chair yoga has gained attention as a safe and effective option for older individuals who may find traditional floor-based yoga challenging. Yao et al. (2023) reported that chair yoga notably improved functional fitness and daily activity scores in older Taiwanese women with KOA, emphasizing both its cultural adaptability and clinical utility [12]. While these outcomes are encouraging, variations in intervention protocols, study durations, and participant demographics limit the broader applicability of findings. Furthermore, issues such as small sample sizes and insufficient blinding or randomization highlight the need for more well-designed, large-scale trials to establish the effectiveness of yoga in KOA management [11].

Yoga Practices Beneficial for KOA

Certain yoga practices have been found especially helpful for individuals with KOA. Gentle postures such as the seated mountain pose, cat–cow stretch, uttanasana, hero pose, and tree pose, often modified into chair-based versions, are commonly used to ensure safety and accessibility for older adults [12]. These movements are designed to strengthen muscles, enhance balance, and improve joint flexibility while minimizing mechanical strain on the knees. A well-structured yoga session for KOA typically incorporates pranayama (breathing exercises) and guided relaxation to help regulate pain perception and stress responses. The slow, mindful pace of these practices can reduce fear of falling and foster greater body awareness and control [13]. In one example, Yao et al. implemented a 12-week chair yoga program consisting of twice-weekly 110-minute sessions that included breathwork, seated and standing poses, and balance-focused activities. Participants experienced significant gains in upper and lower limb strength, flexibility, balance, and daily living activity scores [12].

Mechanisms Behind Yoga's Effect on KOA

The benefits of yoga for KOA extend across both physiological and psychosocial domains. On a physical level, yoga enhances proprioception, strengthens muscles, improves joint flexibility, and refines neuromuscular coordination, collectively contributing to better joint stability and reduced pain [14]. It also supports improved circulation and alleviates stiffness, particularly through isometric muscle activation during static poses [8]. From a psychological perspective, yoga helps alleviate stress, anxiety, and depression by stimulating the parasympathetic nervous system and suppressing overactivity of the hypothalamic–pituitary–adrenal (HPA) axis [15]. This neuroendocrine regulation may reduce systemic inflammation, which is known to play a role in KOA progression. Consistent yoga practice is also associated with increased endorphin release, which can elevate mood and enhance pain tolerance [16].

Furthermore, the mind–body integration fostered by yoga strengthens self-efficacy and body awareness, promoting sustained engagement in physical activity and healthier lifestyle choices, key elements in the long-term management of chronic conditions [7].

2. Conclusion

Yoga therapy emerges as a promising, low-risk, and cost-effective complementary approach for managing knee osteoarthritis, especially in older adults. Findings from various studies, including randomized controlled trials and quasi-experimental designs, highlight yoga's effectiveness in alleviating pain, improving joint mobility, and enhancing physical function and quality of life. Chair yoga serves as an inclusive adaptation for individuals with limited mobility, thereby broadening accessibility. Although current evidence is encouraging, there remains a need for high-quality, large-scale randomized trials to establish standardized practice guidelines and assess long-term outcomes. Incorporating yoga into multidisciplinary KOA management plans has the potential to enhance patient outcomes, lower healthcare expenditures, and improve adherence to rehabilitation programs.

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