

Recommended Lifestyle Modification for Elderly Patients with Knee Osteoarthritis

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ABSTRACT

Osteoarthritis (OA) is a common degenerative joint condition, notably affecting the knee and significantly impacting individuals' quality of life through pain, stiffness, and reduced mobility. Yoga, as an adjunct therapy, offers a holistic approach to managing knee OA by incorporating gentle stretches, strengthening exercises, and mindfulness techniques to enhance flexibility, strength, balance, and relaxation. This structured yoga module includes warm-up, stretching, strengthening, balance, and cool-down exercises, each tailored to improve joint health and alleviate symptoms. Ayurvedic treatments, such as Janu Basti and herbal remedies, complement yoga by providing deep nourishment, reducing inflammation, and improving joint function. Naturopathic treatments, including dietary changes, herbal supplements, physical therapies, and hot and cold compresses, further support symptom management and overall well-being. The combined approach of yoga, Ayurveda, and naturopathy offers a comprehensive strategy for managing knee osteoarthritis, promoting improved joint health, reduced symptoms, and enhanced quality of life.

Keywords: Ayurvedic Treatments, Joint Health, Knee Osteoarthritis, Naturopathic Treatments, Yoga Therapy

1. INTRODUCTION

Osteoarthritis (OA) is a prevalent degenerative joint condition that affects a large number of individuals globally, with the knee being one of the most commonly affected joints [1,2]. The hallmark symptoms of knee osteoarthritis include pain, stiffness, and reduced mobility, all of which can significantly impact a person's quality of life [3]. In the context of managing knee osteoarthritis, yoga serves as a valuable adjunct therapy [4,5]. Yoga encompasses a variety of practices that can benefit individuals with knee OA. These practices typically include gentle stretches, strengthening exercises, and mindfulness techniques [5,6]. Gentle stretches in yoga help improve flexibility and reduce stiffness in the

joints, targeting specific areas around the knee joint such as the quadriceps, hamstrings, calves, and hips [6]. Strengthening exercises engage muscles supporting the knee joint, including the quadriceps, hamstrings, glutes, and core muscles, improving joint stability and overall function [7]. Additionally, yoga emphasizes mindfulness and breath awareness, promoting relaxation and mental well-being, which can help manage pain and reduce stress levels associated with knee osteoarthritis [7,6]. A structured yoga practice for knee osteoarthritis may combine these elements tailored to the individual's needs and abilities, offering a holistic approach to managing symptoms and improving overall joint health and quality of life [5,6]. This

module provides a structured yoga practice aimed at alleviating symptoms and improving overall joint health.

2. Objectives

2.1 To reduce pain and inflammation in the knee joint

Physical activity guidance, weight management advice, and joint protection strategies would be included to promote joint health and reduce stress on the knees. Additionally, self-care techniques like heat or cold therapy and stress management practices would be integrated to empower patients to manage their symptoms effectively, aiming for improved overall well-being and functional independence.

2.2 To improve flexibility and strength around the knee

Strength training exercises targeting key muscles like the quadriceps and hamstrings are also included to support the knee joint, improve stability, and decrease the risk of falls. The module guides exercise modifications, encourages low-impact activities, and highlights the importance of consistency in performing these exercises to achieve long-term benefits and enhance the overall quality of life for patients with knee osteoarthritis.

2.3 To enhance balance and proprioception

The module includes targeted exercises like standing on one leg and balance board activities to improve balance, strengthen related muscles, and reduce the risk of falls. Additionally, proprioception-enhancing exercises on unstable surfaces challenge joint position sense and coordination, enhancing overall stability. Functional movement training is integrated to improve daily task performance safely. The module also educates on fall prevention strategies and emphasizes regular assessment to track progress and adjust interventions, ultimately aiming to enhance the quality of life by reducing fall risks and improving functional independence in this population.

2.4 To promote relaxation and reduce stress, which can exacerbate pain

Coping strategies, including cognitive-behavioural techniques, are taught to help patients reframe negative thoughts about pain and improve their coping skills. Education on the mind-body connection helps patients understand how stress and emotional factors can influence pain perception, enabling them to recognize and address stressors that may worsen their symptoms. Relaxation response training, using methods like guided imagery, counteracts the physiological effects of stress and promotes pain relief. By taking a holistic approach that addresses both physical and psychological aspects of pain, the module aims to enhance overall well-being, improve pain management outcomes, and empower elderly knee osteoarthritis patients to better cope with their condition, ultimately leading to an improved quality of life.

2.4.1 Precautions

- Consult with a healthcare provider: Before starting any new exercise regimen, especially if you have severe OA or other health conditions, it's essential to consult with a healthcare provider. They can assess your specific condition and provide personalized advice to ensure that the exercises are safe and appropriate for you.
- Avoid poses that cause pain or discomfort in the knees: It's crucial to listen to your body and avoid any yoga poses that cause pain or discomfort in your knees. Pain is a signal that something might be wrong, and pushing through it can lead to further injury. Modify or skip painful poses.
- Use props such as blocks, straps, and bolsters to modify poses as needed: Yoga props can help make poses more accessible and comfortable, reducing strain on the knees. Blocks can provide support and stability, straps can help with flexibility, and bolsters can offer cushioning and support in seated or lying poses.

3. Yoga Module Structure

This yoga module is specifically designed to support individuals with knee osteoarthritis

by incorporating a series of warm-up exercises, gentle stretches, and strengthening movements (Figure 1-6). The primary goal is to alleviate symptoms, improve joint health, and enhance overall well-being. Each section includes detailed instructions, purpose, and benefits to ensure a comprehensive approach.

3.1 Warm-up (10 minutes)

The warm-up section, lasting 10 minutes, begins with Seated Leg Extensions. This exercise involves sitting comfortably on a chair with your feet flat on the ground, slowly extending one leg until it is fully straightened, holding it for a few seconds,

and then lowering it back down. Repeating this movement 10 times for each leg helps to gently warm up the knee joints and improve flexibility, preparing the muscles and joints for more intensive activities. Following this, ankle pumps are performed by sitting with your legs extended in front of you and flexing and pointing your toes 10 times on each foot. This exercise improves blood circulation in the lower legs and feet, reducing stiffness and preparing the lower extremities for the upcoming stretches and strengthening exercises.

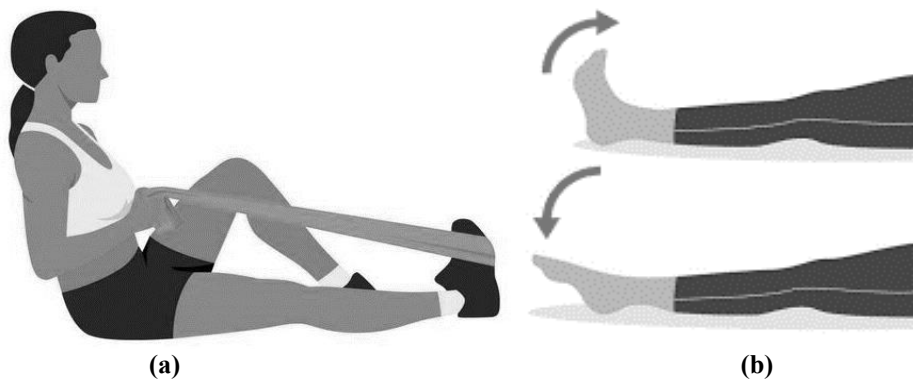


Figure 1. Postures of: (a) Seated Leg Extension; (b) Ankle Pumps.

3.2 Gentle Stretching (15 minutes)

The gentle stretching section, lasting 15 minutes, begins with the Standing Forward Bend (Uttanasana). In this pose, you stand with your feet hip-width apart and slowly bend forward from your hips, allowing your head and arms to hang down naturally. If necessary, bending your knees slightly to avoid strain. Holding this pose for 1-2 minutes provides a gentle stretch along your back and hamstrings, promoting flexibility

and relieving tension. Next, the Reclined Hand-to-Big-Toe Pose (Supta Padangusthasana) involves lying on your back, raising one leg towards the ceiling, and holding your big toe with your hand or using a strap around your foot if needed. Holding this pose for 1-2 minutes on each side stretches the hamstrings and calves, improving flexibility and reducing tightness in the lower body.



Figure 2. Postures of: (a) Standing Forward Bend (Uttanasana); (b) Reclined Hand-to-Big-Toe Pose (Supta Padangusthasana).

3.3 Strengthening (15 minutes)

The strengthening section, lasting 15 minutes, starts with the Bridge Pose (Setu Bandhasana). In this pose, you lie on your back with your knees bent and feet hip-width apart, then lift your hips towards the ceiling while squeezing your glutes and engaging your core muscles. Holding this position for 30 seconds to 1 minute and repeating it 3 times helps to strengthen the glutes, lower back, and hamstrings, and also opens up the

chest and improves spinal flexibility. Following this, the Chair Pose (Utkatasana) is performed by standing with your feet together, bending your knees, and lowering your hips as if sitting back into an imaginary chair, while extending your arms overhead. Holding this position for 30 seconds to 1 minute and repeating it 3 times strengthens the thighs, glutes, and core muscles, enhancing balance and stability.

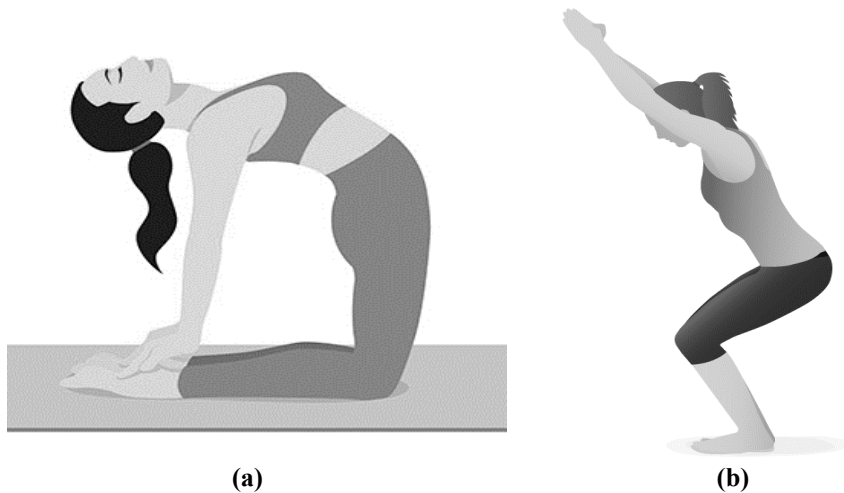


Figure 3. Postures of: (a) Bridge Pose (Setu Bandhasana); (b) Chair Pose (Utkatasana).

3.4 Balance and Proprioception (10 minutes)

In the balance and proprioception segment, Tree Pose (Vrikshasana) is introduced, where individuals stand on one leg and place the sole of the other foot on the inner thigh or calf, avoiding the knee. This pose is held for one minute on each side, with hands in a

prayer position at the chest or overhead. Warrior III (Virabhadrasana III) follows, starting from a standing position where one leans forward, lifting one leg back and extending the arms forward or to the sides for balance. This pose is held for 30 seconds to one minute on each side, challenging and improving stability.

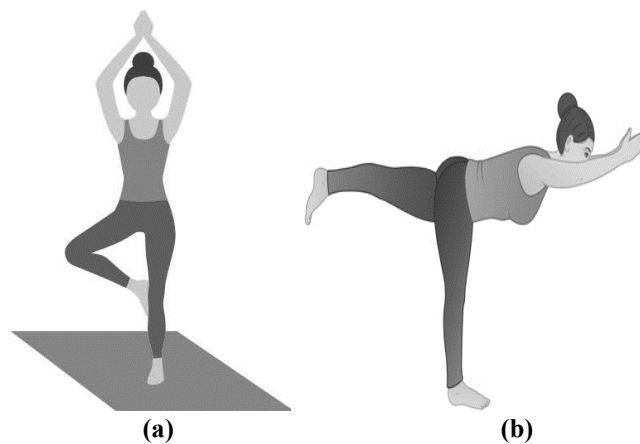


Figure 4. Postures of: (a) Tree Pose (Vrikshasana); (b) Warrior III (Virabhadrasana III).

3.5 Cool Down and Relaxation (10 minutes)

The cool-down and relaxation phase features Legs-Up-The-Wall Pose (Viparita Karani), where participants sit close to a wall and swing their legs up while lying down, relaxing in this position for five to ten

minutes. This is complemented by the Corpse Pose (Savasana), where individuals lie flat on their backs with arms by their sides and palms facing up, focusing on their breath for another five to ten minutes to achieve deep relaxation.

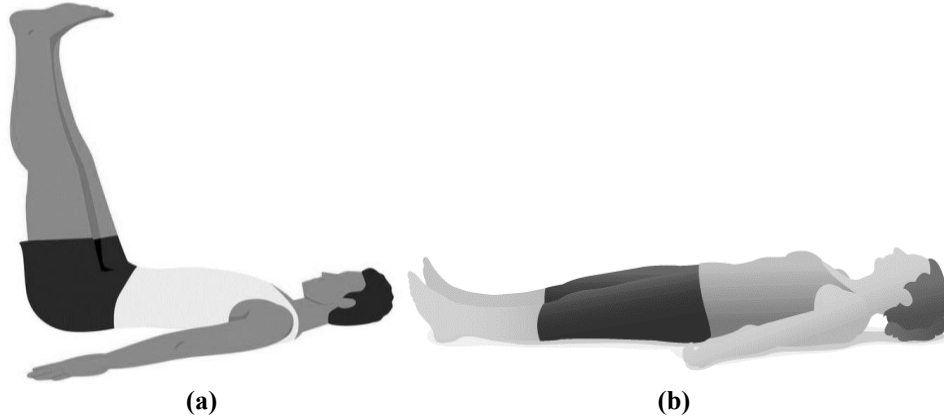


Figure 5. Postures of: (a) Legs-Up-The-Wall Pose (Viparita Karani); (b) Corpse Pose (Savasana).

3.6 Breathing and Mindfulness Practices

Breathing and mindfulness practices are integral throughout the session, with diaphragmatic breathing encouraged to enhance relaxation and oxygenate the muscles. The module concludes with a ten-minute mindfulness meditation, where participants focus on body sensations and breath to promote mental clarity and reduce stress. This comprehensive approach ensures a holistic improvement in the quality of life for those suffering from knee osteoarthritis. This module is designed to be gentle yet effective, focusing on the specific needs of individuals with knee osteoarthritis. The

combination of warm-up, stretching, and strengthening exercises helps to reduce pain and stiffness in the knee joints, enhances the flexibility of muscles and tendons around the knees, builds muscle support around the knee joint, promotes better blood flow to aid in healing, and reducing inflammation, and can lead to improved mood, reduced stress levels, and enhanced overall physical health. By following this detailed yoga module, individuals with knee osteoarthritis can work towards improving their joint health, reducing symptoms, and enhancing their quality of life.

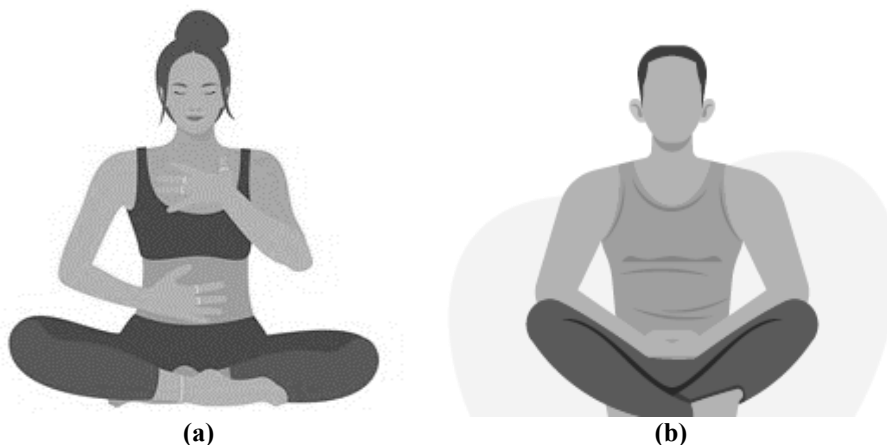


Figure 6. Postures of: (a) Diaphragmatic Breathing; (b) Mindfulness meditation.

4. Ayurvedic Treatments for Knee Osteoarthritis

Ayurveda, an ancient holistic healing system, offers a comprehensive approach to managing knee osteoarthritis. One of the key treatments is Janu Basti, which involves using warm medicated oil to nourish the knee joint, reduce pain and stiffness, improve circulation, and enhance joint health [8]. Additionally, Panchakarma therapies like Virechana, Basti, and Nasya aim to detoxify the body and balance doshas, aiding in inflammation reduction and joint function improvement [9]. Herbal formulations such as Ashwagandha, Guggulu, Turmeric, Shallaki, and Ginger possess anti-inflammatory and analgesic properties beneficial for knee osteoarthritis management [10]. Dietary adjustments focusing on anti-inflammatory foods, lifestyle changes including gentle exercises and weight management, Ayurvedic oils for massage, and mind-body practices like meditation and Pranayama are also integral parts of Ayurvedic treatment strategies [11].

4.1 Janu Basti

Janu Basti is a traditional Ayurvedic therapy specifically designed to address knee joint issues, including osteoarthritis [12]. This therapeutic procedure involves creating a well of dough around the knee joint, which serves as a container for warm medicated oil, such as Mahanarayan oil or Ksheerabala oil [13]. The warmed oil is then poured into the well and kept at a comfortably warm temperature throughout the session, typically around 30 minutes [14]. As the oil cools down, it is replenished with freshly warmed oil to maintain its therapeutic benefits (Figure 7). The key benefits of Janu Basti lie in its ability to provide deep nourishment to the knee joint tissues, including the cartilage, ligaments, and muscles [15]. This nourishment aids in repairing damaged tissues and promoting overall joint health. Additionally, the anti-inflammatory and analgesic properties of the medicated oil help in reducing pain and discomfort associated with knee osteoarthritis. Janu Basti also contributes to

reducing stiffness in the knee joint, improving flexibility, and enhancing circulation in the area. These combined effects make Janu Basti a holistic and effective approach to managing knee osteoarthritis, offering not just symptom relief but also supporting the long-term health of the knee joint.

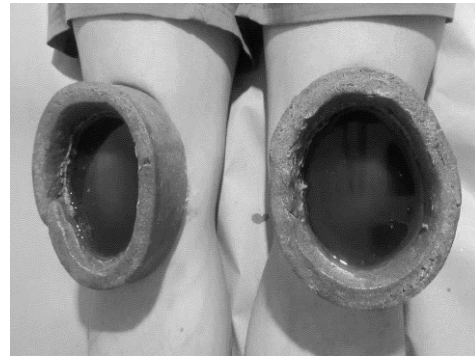


Figure 7. Janu Basti therapy.

Janu Basti offers a range of benefits to individuals suffering from knee osteoarthritis condition. One of its key advantages is the deep nourishment it provides to the knee joint, helping to improve its overall health and function. Additionally, Janu Basti is known for its ability to reduce pain and stiffness in the knee, providing relief to those experiencing discomfort due to osteoarthritis. Another significant benefit is its ability to improve circulation around the knee area, which can contribute to better mobility and reduced swelling. Overall, Janu Basti is a holistic approach that addresses multiple aspects of knee osteoarthritis, making it a valuable treatment option for managing this condition effectively.

4.2 Herbal Remedies

Herbal remedies are widely recognized for their therapeutic benefits in managing pain and inflammation, particularly in conditions like knee osteoarthritis. Ashwagandha (*Withania somnifera*) is esteemed for its anti-inflammatory properties, which contribute to reducing pain and inflammation in affected joints [16]. Shallaki (*Boswellia serrata*) is renowned for its dual action as an anti-inflammatory agent and pain reliever, making it a valuable addition to treatments

targeting joint-related issues [17]. Guggul (*Commiphora mukul*) is known for its ability to reduce swelling and pain, especially beneficial in conditions that involve inflammation of the joints and surrounding tissues [18]. When used in combination, these herbal remedies offer a holistic approach to managing symptoms, promoting joint health, and enhancing overall well-being. Integrating these herbs with lifestyle adjustments, such as maintaining a healthy diet and incorporating regular physical activity like yoga, can further optimize their therapeutic effects and support the long-term management of joint-related concerns [19,20].

5. Naturopathic Treatments for Knee Osteoarthritis

Naturopathic treatments for knee osteoarthritis encompass a multifaceted approach aimed at addressing the root causes and symptoms of the condition while promoting overall well-being. Dietary modifications form a cornerstone, emphasizing a balanced intake of nutrient-rich foods like fruits, vegetables, whole grains, and lean proteins, while avoiding processed foods and sugars that can exacerbate inflammation [21]. Herbal supplements like turmeric, ginger, and Boswellia are often utilized for their anti-inflammatory and pain-relieving properties [17]. Complementary physical therapies such as hydrotherapy, acupuncture, and chiropractic adjustments are employed to enhance joint mobility, alleviate pain, and improve overall joint health [19]. Mind-body techniques like meditation and mindfulness help manage stress, which can impact pain perception and quality of life [22]. Weight management strategies are emphasized to reduce strain on the knee joint, often accompanied by nutritional supplements like glucosamine and omega-3 fatty acids to support joint health [23]. Detoxification protocols may be recommended to eliminate toxins that contribute to inflammation. Low-impact exercises, hydrotherapy treatments, and mindfulness practices further aid in improving joint flexibility, strengthening

surrounding muscles, and providing pain relief [20]. These naturopathic approaches are tailored to individual needs and are often integrated with conventional medical treatments for comprehensive management of knee osteoarthritis, under the guidance of qualified healthcare providers.

5.1 Hot Compress

The procedure of applying a hot compress to the knee involves using a warm towel or a heating pad. This method aims to reduce stiffness in the knee joint while also improving blood flow to the area [24]. The warmth helps to relax the muscles and tissues around the knee, making movement easier and more comfortable.



Figure 8. Hot compress therapy.

5.1.1 Procedure

To perform this therapy, one would first heat a towel or a heating pad to a comfortable temperature, ensuring it is not too hot to avoid burns. The warm towel or heating pad is then gently applied to the knee, covering the entire joint area. It is recommended to keep the hot compress in place for about 4 minutes initially, as this duration is sufficient to promote relaxation and blood circulation without causing discomfort. This process can be repeated 4 to 5 times in a session, with breaks in between to allow the knee to cool down slightly before reapplying the hot compress (Figure 8). Therefore, this procedure is effective in providing temporary relief from knee stiffness, promoting better mobility, and supporting overall joint health.

5.2 Cold Compress

Using a cold compress is a simple yet effective method to alleviate symptoms associated with knee osteoarthritis. This approach involves applying a cold pack or ice wrapped in a towel directly to the affected knee area for about one minute (Figure 9). The cold temperature helps in reducing swelling by constricting blood vessels, which in turn decreases fluid build-up in the joint. Additionally, the cold sensation numbs pain receptors, providing immediate relief from discomfort. To maximize the benefits, it's recommended to repeat this process 4-5 times, allowing intervals between applications to prevent skin irritation or frostbite. Cold compress therapy can be integrated into a comprehensive treatment plan for knee osteoarthritis, complementing other modalities such as warm compresses, gentle exercises, and medication as part of a holistic approach in managing pain and improving joint function.



Figure 9. Cold compress therapy.

5.2.1 Frequency

Using hot and cold compresses alternately for knee osteoarthritis involves applying heat and cold therapy to the affected knee at different intervals. The frequency recommended is to alternate between hot and cold compresses, using each compress 2-3 times daily as needed [20]. Hot compresses, such as warm towels or heating pads, help to relax muscles, increase blood flow, and alleviate stiffness and pain in the knee joint [19]. On the other hand, cold compresses, like ice packs or cold gel packs, reduce inflammation, numb the area, and provide

pain relief. By alternating between hot and cold therapy, individuals can benefit from both the muscle-relaxing and anti-inflammatory effects, helping to manage pain and improve mobility in knee osteoarthritis.

5.2.2 Benefits

Using hot and cold compress therapy for knee osteoarthritis offers several benefits. Firstly, it helps to reduce pain and inflammation in the affected joint by altering the blood flow and reducing swelling. The application of cold compresses constricts blood vessels, thereby decreasing inflammation and numbing the area to provide immediate pain relief. On the other hand, hot compresses promote vasodilation, which increases blood flow to the area, delivering nutrients and oxygen to the tissues while flushing out toxins, thus aiding in reducing pain and inflammation over time. Secondly, this therapy improves circulation in the knee joint. Alternating between hot and cold stimulates blood flow, which is beneficial for tissue healing and overall joint health. Improved circulation also helps in reducing swelling and promoting better mobility. Lastly, using hot and cold compresses alternately helps decrease stiffness in the knee joint. Heat therapy relaxes muscles and soft tissues, making them more pliable and reducing stiffness, while cold therapy numbs the area and temporarily reduces stiffness, allowing for improved range of motion and flexibility. Overall, the combination of hot and cold compress therapy provides a comprehensive approach to managing knee osteoarthritis by addressing pain, inflammation, circulation, and stiffness effectively.

5.3 Epsom Salt Soaks

Epsom salt, chemically known as magnesium sulfate, is a popular remedy for various health and wellness purposes, including its use in Epsom salt soaks for knee osteoarthritis. When dissolved in warm water, Epsom salt releases magnesium and sulfate ions, which are believed to have therapeutic effects. The warm water itself

helps to relax muscles and improve circulation, while the magnesium from the Epsom salt may be absorbed through the skin, potentially providing benefits such as muscle relaxation, pain relief, and reduction in inflammation. The sulfate ions are thought to assist in detoxification processes and promote overall joint health. Epsom salt soaks are often recommended as a complementary therapy alongside other treatments for knee osteoarthritis to help alleviate pain, reduce stiffness, and improve joint mobility. It's essential to follow recommended guidelines for Epsom salt concentrations and soak durations to ensure safe and effective use.

5.3.1 Procedure

To prepare an Epsom salt soak for knee osteoarthritis, start by filling a bathtub with warm water. Then, dissolve 1-2 cups of Epsom salts into the bathwater, stirring well to ensure the salts are completely dissolved. The water temperature should be comfortably warm, not too hot to avoid scalding the skin. Once the Epsom salts are fully dissolved and the water is at the desired temperature, you can immerse the affected knee in the bath and soak for 20-30 minutes. During this time, gently move the knee joint to promote better absorption of the Epsom salt solution and to facilitate relaxation of the muscles and tissues around the knee. The warmth of the water, coupled with the magnesium and sulfate ions from the Epsom salts, helps to relax muscles, reduce pain and inflammation, and improve circulation in the knee joint. After the soak, pat the knee dry gently and avoid excessive rubbing. This procedure can be repeated regularly as part of a comprehensive approach to managing knee osteoarthritis symptoms.

5.3.2 Benefit

The magnesium content in Epsom salt plays a crucial role in offering therapeutic benefits for knee osteoarthritis. Magnesium is a mineral that is known to have anti-inflammatory properties. When dissolved in warm water during an Epsom salt soak,

magnesium ions are absorbed through the skin and may penetrate deep into tissues around the knee joint. This absorption process is believed to help reduce inflammation by inhibiting inflammatory pathways and reducing the production of inflammatory molecules. As a result, the inflammation in the knee joint may decrease, leading to reduced pain levels [25]. Additionally, magnesium is involved in muscle relaxation, which can further contribute to pain relief and improved mobility in individuals with knee osteoarthritis [26]. The combination of magnesium's anti-inflammatory effects and its role in muscle relaxation makes Epsom salt soaks a popular choice for managing symptoms associated with knee osteoarthritis [27].

5.4 Anti-inflammatory Diet

The anti-inflammatory diet focuses on reducing inflammation in the body, which is beneficial for conditions like knee osteoarthritis. It emphasizes foods rich in omega-3 fatty acids, such as fatty fish like salmon, mackerel, and sardines, as well as plant-based sources like flaxseeds and walnuts [28]. These omega-3 fatty acids have anti-inflammatory properties that can help alleviate joint pain and stiffness. Additionally, the diet includes plenty of fruits, vegetables, and whole grains, which are rich in antioxidants and fiber, further supporting the body's natural anti-inflammatory mechanisms [29]. On the other hand, processed foods, excessive sugar, and refined carbohydrates are avoided because they can contribute to inflammation and exacerbate symptoms. By following an anti-inflammatory diet, individuals can promote overall joint health, reduce pain and swelling, and improve their overall well-being [30].

5.5 Back foot Walking

Backfoot walking is a therapeutic exercise aimed at improving knee osteoarthritis symptoms by targeting specific objectives. Firstly, it focuses on enhancing knee joint stability and proprioception, which is the

body's ability to sense its position in space [31]. By engaging in backfoot walking, individuals can improve their awareness of joint movement and position, leading to better control and reduced risk of injury. Secondly, this exercise helps strengthen the muscles around the knee, including the quadriceps, hamstrings, and calf muscles [32]. Strengthening these muscles provides better support to the knee joint, reduces stress on the joint surfaces, and improves overall joint function [33]. Lastly, back foot walking contributes to enhancing balance and coordination, essential elements for maintaining mobility and preventing falls, especially in individuals with knee osteoarthritis who may experience balance difficulties. Incorporating backfoot walking into a rehabilitation or exercise program can be beneficial for managing knee osteoarthritis symptoms and improving overall joint health [34].

5.5.1 Procedure

The procedure of back foot walking for knee osteoarthritis involves specific steps designed to promote joint stability, muscle strengthening, and balance improvement. To begin, stand upright with feet hip-width apart and maintain a straight posture. Then, lift one foot slightly off the ground and balance on the other foot, ensuring the knee of the balancing leg remains slightly bent to activate the muscles around the knee. Next, take a step backward with the lifted foot, landing on the ball of the foot while keeping the heel slightly elevated. Shift your weight onto the back foot as you lower the heel to the ground, maintaining a controlled and steady movement. As you step backward, engage your core muscles for stability and keep the knee of the supporting leg aligned with your toes to prevent inward or outward collapsing. Repeat this stepping motion with alternating legs, focusing on maintaining a smooth and controlled movement throughout. Perform this exercise for a specified duration or number of repetitions as recommended by a healthcare professional or physical therapist, gradually increasing

intensity and difficulty as your strength and balance improve.

5.5.2 Preparation

Preparation is crucial for back foot walking in knee osteoarthritis to ensure safety, comfort, and effectiveness. Firstly, choose a flat and even surface for walking to minimize the risk of tripping or stumbling, providing a stable environment for the exercise. Avoid uneven terrain or surfaces with obstacles that could compromise balance or cause injury. Secondly, wear comfortable and supportive footwear suitable for walking exercises. Choose shoes with cushioning and arch support to reduce impact on the joints and provide stability to the feet and ankles. Proper footwear also helps maintain proper alignment of the lower extremities during backfoot walking, enhancing the effectiveness of the exercise and reducing the risk of strain or discomfort. By preparing appropriately with a suitable walking surface and supportive footwear, individuals can optimize the benefits of backfoot walking for knee osteoarthritis rehabilitation and management.

5.6 Back Foot Walking Technique

The back foot walking technique is a deliberate and controlled movement aimed at improving knee osteoarthritis symptoms while promoting joint stability and balance. Start by walking backward slowly and carefully, paying attention to each step. Focus on placing the toes down first as you step backward, followed by lowering the heel gently to the ground. This sequence of movement helps distribute the impact more evenly and reduces stress on the joints, especially the knees. Keep your knees slightly bent throughout the exercise to further minimize impact and maintain a stable base of support. Additionally, swinging your arms naturally in coordination with your steps helps maintain balance and enhances the overall fluidity of the movement. By practicing the back foot walking technique with these key points in mind, individuals can effectively engage the

muscles around the knee, improve joint proprioception, and enhance overall joint health and mobility.

5.6.1 Duration and Frequency

The recommended duration and frequency for back foot walking in knee osteoarthritis rehabilitation typically involve starting with a manageable timeframe and gradually progressing to longer sessions as tolerance and comfort improve. Begin with 5-10 minutes of back foot walking daily, focusing on maintaining proper technique and paying attention to how your body responds to the exercise. During this initial period, it's essential to listen to your body's signals and avoid overexertion or excessive strain on the joints. As you become more accustomed to the exercise and feel comfortable with the movements, gradually increase the duration of back foot walking sessions. This progression can be done incrementally, adding a few minutes each week or as guided by a healthcare professional or physical therapist. By starting with a moderate duration and gradually building up over time, individuals can safely and effectively incorporate backfoot walking into their daily routine to support knee osteoarthritis management and improve joint function.

5.6.2 Precautions

Taking precautions while performing backfoot walking for knee osteoarthritis is essential to ensure safety and prevent potential injuries. First, ensure that the walking path is clear of obstacles or hazards that could cause trips or falls, creating a safe environment for the exercise. It's also advisable to consider having a companion nearby or using a support rail initially for added stability and confidence, especially if you're new to the exercise or have concerns about balance. Having support can help reduce the risk of accidents and provide assistance if needed. Additionally, listen to your body's signals during the exercise and stop immediately if you experience any pain, discomfort, or unusual sensations in your knees or joints. It's crucial to prioritize

comfort and safety, adjusting the intensity or duration of the exercise as necessary to avoid strain or exacerbating existing symptoms.

6. CONCLUSION

Combining yoga, Ayurveda, naturopathy, and backfoot walking presents a holistic and comprehensive approach to managing knee osteoarthritis. Yoga, with its gentle stretches, strengthening exercises, and mindfulness practices, helps alleviate pain and inflammation while improving joint flexibility and overall mobility. Ayurveda contributes with herbal formulations, dietary modifications, and detoxification procedures aimed at reducing inflammation, nourishing the joints, and restoring balance to the body. Naturopathy focuses on natural therapies like hydrotherapy, nutritional supplements, and lifestyle changes to support joint health and reduce discomfort. Back foot walking, a specialized technique that shifts body weight to the back foot while walking, can help alleviate pressure on the knees, improve gait mechanics, and reduce pain during movement. This integrative module not only targets the symptoms but also addresses the underlying factors contributing to knee osteoarthritis, aiming to enhance the quality of life for individuals managing this condition.

Declaration by Authors

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