

A Review of the Role of Manual Therapy in the Treatment of Patients with Knee Osteoarthritis

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ABSTRACT

Background:

One of the most destructive forms of arthritis is knee osteoarthritis (KOA) that leads to disability because of pain in elderly individuals and also increases utilization of health care among them. Through improving local circulation and joint flexibility, and relaxation of muscles, massage therapy is capable of relieving painful musculoskeletal conditions. Therefore, it may be beneficial for treatment of KOA. Moreover, the successfulness of exercise therapy in treatment of KOA broadly is proved and required to be reviewed more. Through a comprehensive review, the present study is aimed to investigate the role of massage therapy on knee osteoarthritis.

Method:

A literature search was carried out using the five most well-known databases of Europe PubMed, PubMed, EMBASE, MEDLINE, and Google Scholar from 2010 to 2020. All the articles were searched in English with the main subject of massage therapy on knee osteoarthritis. During the search from all 284 searched, articles 189 deleted due to the subject similarity and finally, 82 article were chosen to be included in the research inclusion criteria.

Results:

Manual therapy is an effective treatment option in the management of KOA patients. It could be used alone or in combination with other available types of therapies.

Conclusion:

The present study provides a general set of information about manual therapy and its effectiveness in the management of KOA patients.

KEYWORDS

Osteoarthritis, Knee Osteoarthritis, Massage, Manual Therapy.

Introduction

Osteoarthritis (OA) one of the joint diseases that mainly induced from happening a breakdown in the underlying bone and joint cartilage that would result in severe pain, disability, and deterioration of function. OA is more common among middle-aged and elderly individuals in the world [1,2]. The dynamic process OA involves an imbalance in tissue homeostasis with cartilage, subchondral bone, synovial fluid, and other joint structures and tissues that with advancing age become more prevalent [3]. In accordance with the reports of the agency of National Center for Health Statistics, OA is defined as a chronic disease that restricts the physical activity of individuals and also more restrictive than heart, lung, and diabetes diseases [4].

Osteoarthritis is mainly common in the knee area and particularly individuals older than 65 suffer from this disease in the world. Its conventional therapies are such as non-pharmacological measures (massage and manual therapy), medication, and surgical procedures (when the disease is chronic and acute) [5]. Treatment of OA is very costly, for instance in a study by Ong et al [6], it was reported that during a period of 4.5 years, the treatment cost of knee OA was about 4200 \$ for each person.

Knee osteoarthritis is a very disabling disease that not only limits the ability of walking but also affects the spine, hands, and feet exactly with the same process of joint destruction. In the endpoint of the OA disease, the joint cartilage will be damaged completely and there will be a need for replacement of the joint [7]. The most prevalent symptoms of patients with KOA are such as pain, physical dysfunction, and stiffness that restrict their ability to move easily and affect the quality of their life [8].

Nowadays, the main therapeutic options for KOA are such as improving health education about this disease, pharmacological and non-pharmacological treatments, and the final choice is surgery [9]. Treatment of KOA with drugs just could be effective in the reduction of pain and inflammation mainly in patients with primary levels of KOA [10]. Anyway, utilization of drugs for long periods of time could cause a variety of side effects such as gastrointestinal complications, renal and hepatic toxicity [11]. Moreover, treatment of KOA with medical or surgical options is very costly, and some patients may not be capable of affording that [12]. So, finding a safer and more cost-effective alternative treatment for KOA patients is very crucial for the reduction of the patient's distress.

Manual therapy as a non-pharmacologic intervention is widely applied for treatment of musculoskeletal disorders. In this kind of therapy, clinicians or patients just use their hands for controlling the pain and improvement of their body function. Massage is one of the most popular types of manual therapy that could be used as a complementary and alternative therapy [13]. Massage therapy could decrease the symptoms and improve KOA by improving local circulation to the affected joint, reduce the pain, improves the muscular system of the damaged site of the body, and improves joint flexibility. In various painful musculoskeletal disorders, massage therapy could be an effective therapeutic option [14,15].

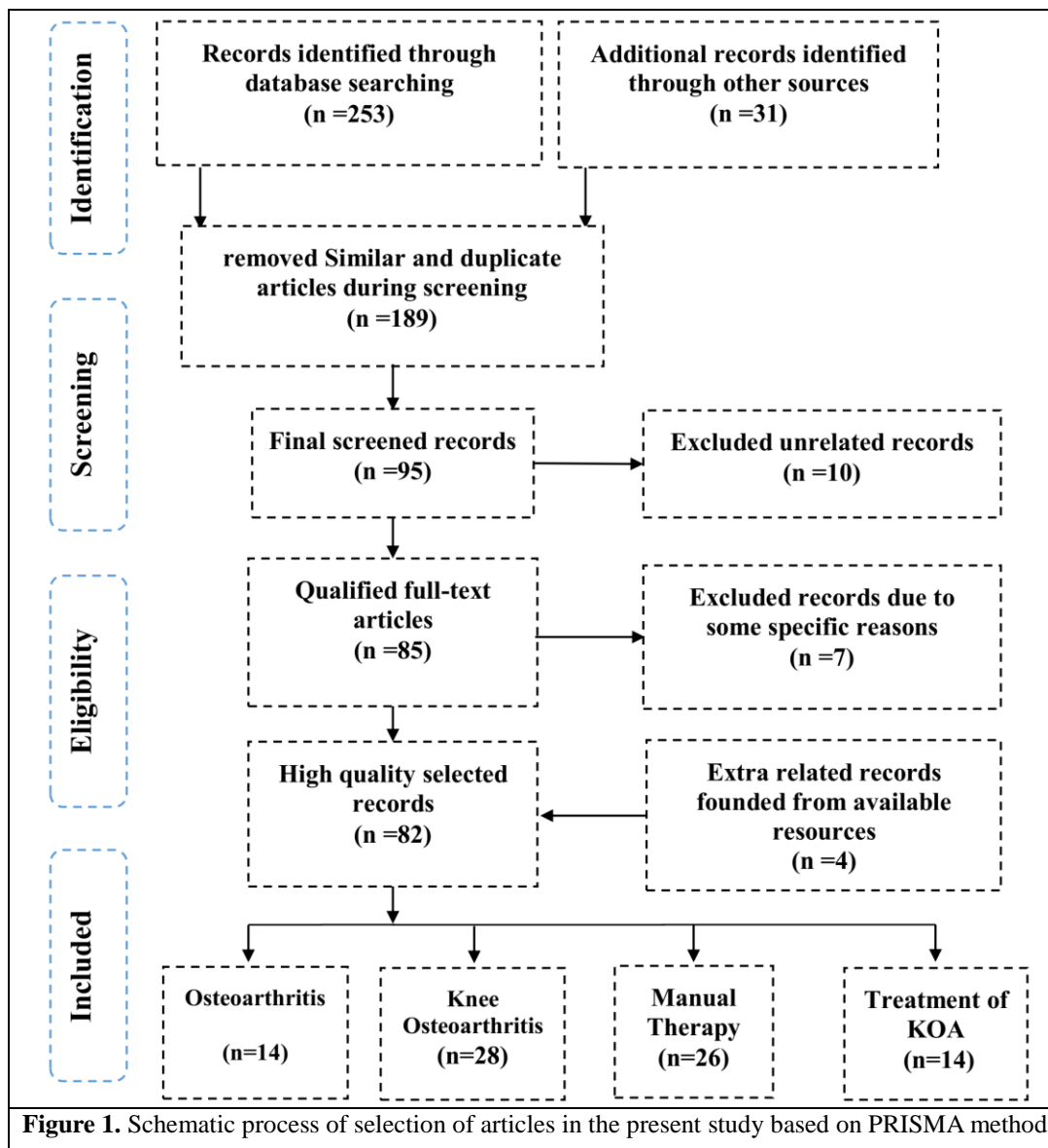
In some studies, it has been reported that applying manual therapy reduces the rate of pain, improves physical function, and alleviates stiffness [16]. French et al [17] showed that although manual therapy could be effective in KOA treatment, its application may not be better than placebo or medication for diminishing the pain.

Despite the fact that there is not adequate evidence regarding the effectiveness of massage therapy, few studies reported that musculoskeletal and rheumatologically conditions could be treated with massage frequently [18,19]. In a similar way, there is adequate evidence about the effectiveness of massage therapy in fibromyalgia and chronic nonspecific pain of back, while this evidence for effectiveness of massage therapy in knee osteoarthritis is not high [20].

In massage therapy the bodies soft tissues are manipulated or touched by hand for improving the body comfort, so it's one of the most effective alternative and complementary medicine therapy techniques. The comparison of massage therapy with other therapeutic options like surgery, clarify that it has more advantages due to its higher level of safety, easy access and its low-cost [21]. In their study, for instance, Clarke et al [22] reported that in 2012 more than 15 million Americans used massage therapy for the treatment of their knee osteoarthritis. Additionally, some other studies have demonstrated that massage therapy could be an effective therapeutic option that reduces pain, and stiffness and improve the functional status of KOA patients [23,24]. In this regard, the present review aimed to investigate the role of massage therapy as an effective and safe option for patients who have been diagnosed with knee osteoarthritis.

Method

Through searching various databases of MEDLINE, EMBASE, PubMed, Europe PubMed, and Google Scholar, a lot of articles from 2010 to 2020 were selected to be downloaded by means of specific keywords of Osteoarthritis, Knee Osteoarthritis, Massage, and manual therapy. Considering knee osteoarthritis as the main subject, all the articles were searched in English. At first 253 articles were selected, after deleting 189 and 10 articles due to similarity and unrelated issues respectively, then 31 related articles were chosen to be included in the main inclusion criteria. Finally, 4 articles were added from other databases and the total number of articles reached 82. In our study nearly all related examinations without limitation of age, race, sex, economic level, and severity were included. Additionally, there were not any limitation in terms of kinds of massage, duration, frequency of massage, and the methods. As could be seen from figure (1), all the studies were chosen based on the PRISMA standard criteria.



Etiology and Pathogenesis

The factors such as ethnicity, gender, occupation, obesity, age, genetic factors, and hormonal status are the risk factors that are mainly associated with knee osteoarthritis morbidity. It's while the main pathogenesis of knee osteoarthritis is not clear yet. However, it has been agreed that the imbalance of catabolic and anabolic changes in subchondral bone, extracellular matrix, and chondrocytes induced from biological and biomechanical factors are the main factors that could cause KOA [25].

The risk of KOA will be increased significantly by acute and chronic injuries of knee. Additionally, the progression of OA is associated particularly with the synovitis severity. The joint anatomical abnormalities such as deformity of valgus and varus could developed KOA and functional incapacitation that is mainly due to imbalance distribution stress caused by anatomical changes. Other risk factors of KOA are ligamentous laxity and muscle weakness that both of them could be treated by exercise [24,26,27]

Epidemiology

Aging is one of the main impressive factors that increases the prevalence rate of KOA from 4-15% [28]. It's while the prevalence rate of KOA based on radiography imaging technique is higher, somehow in 80% of individuals older than 65 years KOA was detected by radiography, while only 60% of those had the real symptoms [29]. KOA is ranked as the 11th main causes of disability in the world and 25% of KOA patients will experience severe joint pain. Inflammation and lesions that mainly arose from muscle, tendon, and synovium ligament are the main causes of KOA [30].

Classification of Knee Osteoarthritis

According to the position of lesions, the classification and clinical characteristics of degenerative knee osteoarthritis are mentioned in table (1) [31]:

Table 1. Kellgren-Lawrence Classification of Osteoarthritis. In accordance with Kohn et al [21]

Grade	How could be detected	Description	Treatment
0	No joint space narrowing (JSN) or reactive changes	The health condition of the knee is normal (normal stage), and there is not any sign of OA in the knee and the function of the knee is not with pain or impairment.	For this stage, no treatment is required
1	Possible osteophytic lipping + doubtful JSN	A very small osteophyte could be seen in the joint. The person may experience any kinds of discomfort or pain.	Many clinicians believe that, when there is not any outward symptoms, there is no need to treatments.
2	Definite osteophytes + possible JSN	<ul style="list-style-type: none"> • Known as the mild stage of this disease. • Osteophytes will be appeared on X-rays images, while the space between the bones is normal. • The first real experience of pain will begin in this stage. • Tenderness will be experienced when bending or kneeling. 	<ul style="list-style-type: none"> • In this stage OA could be controlled to not be worsen. • Main treatment options are non-pharmacologic. Control your weight <ul style="list-style-type: none"> • Reduce it if you are overweighted • Appropriate exercise will help in pain reduction • Wear appropriate shoes to reduce the pressure on the knee
3	Moderate osteophytes + definite JSN + some sclerosis + possible bone end deformity	<ul style="list-style-type: none"> • This stage is classified as moderate OA • Articular cartilage will be damages obviously • Any activities of kneeling, bending, running, and walking is with pain • Joint stiffness and swelling is prevalent. 	<ul style="list-style-type: none"> • Corticosteroid (when nonpharmacological therapies was not effective) • Triamcinolone acetonide (Once a year) • Oxycodone and codeine could be used for reducing pain (short-term usage) • Viscosupplementation
4	Large osteophytes + marked JSN + severe sclerosis + definite bone end deformity	<ul style="list-style-type: none"> • This stage considered as severe. • The joint space between bones reduces dramatically • Articular cartilage is damaged completely • The joint is stiff and nearly immobile • The rate of pain while walking or moving is high 	<ul style="list-style-type: none"> • Osteotomy or bone realignment surgery (Elderly patients are not suitable for this surgery) • Arthroplasty or knee replacement (it has side effects such as blood clots and infections at the incision site)
Joint Space Narrowing (JSN): It is a major cause of chronic knee pain, and is recognized as a contributing factor to osteoarthritis.			

Clinical Symptoms

The main clinical symptom of KOA is joint pain that mostly seen in elderly and wrinkly individuals and would be manifested by the recurrent pain of knee joint [32]. Walking and gaining weight aggravates joint pain and could be relieved by rest. One of the main symptoms of KOA, is local tenderness. In some patients, KOA will be experienced as stiffness in the morning that will last about half an hour. After progression of KOA, with any activity of the joint articular cartilage will be destroyed, articular surface will be roughed, bony crepitus (sense) may occur, and knee joint would be swollen. Moreover, when the patient's condition aggravates, the joint will be deformed [33].

Knowledge of KOA

To improve the awareness of patients about the natural progression of the disease, they should be educated about KOA. In this regard, patients should be educated about available therapies, their main purposes, treatment side effects for decreasing subsequent psychological burdens. The life quality of KOA patients could be improved significantly by strengthening self-management. In this regard, emphasizing on the co-participation of patients and doctors is essential for management of chronic care in KOA patients.

Therefore, patients should be educated about the main etiology of disease, about how to prevent the disease and its treatment [34].

Prevention of KOA

Further damages to the joints could be prevented by paying attention to the prevention methods of these damages. To prevent these damages, a lot of changes such as avoiding crawling and stairclimbing for long periods of time should be occurred. In this regard, providing a combination of various exercises should be prepared for decreasing the lasting time and frequencies of pain. In their study, Ferreira et al [35] reported that changes in the weather like getting cold and warm and also damp may increase the pain in KOA patients. Additionally, decreasing excessive loads on the knee and lowering the levels of BMI to under 25 in KOA patients are crucial in reduction of the risk of joint degeneration [36]. Aiming to prevent muscular atrophy and activate cartilage metabolism, KOA patients should walk under the condition of electronic monitoring. To detect a precise etiology of KOA and also its prognosis, a close communication between the health care staff is demanded. Patients should be informed about the main purposes of different therapeutic options, their curative effect and rehabilitation measures of various treatments [37].

Available Treatment Options

The main objectives of treatment of KOA are relieving stiffness and pain, improvement of the life quality and the joint physical function and stopping the progression of the disease [38,39].

Pharmacological Treatment

The main objective of using pharmacological therapy is to decrease the level of pain in KOA patient, diminishing the inflammatory response of the joint and also improving its function and the life quality of the patient. It should be noted that the utilization of pharmacological agents is restricted to short-term periods.

So, there is not a clear perspective regarding to long-term usage of these agents in management of KOA. The commonly used drugs for treatment of KOA are reviewed as demonstrated in Table (2) [40].

Table 2. Pharmacological Treatment used in patients with KOA. Derived in accordance with Zhang et al [41]

Type of medicine	Advantages	Adverse effects	Further information
Acetaminophen	Reduces the pain, has short-term effects	Hepatotoxicity and gastrointestinal symptoms	inflammatory effects and it shouldn't be used by patients allergic to acetaminophen [42,43].
NSAIDs	These agents are in the first line of treatment of KOA	Should not be used carefully in old patients and those with coagulative dysfunction, and hepatorenal impairment. Should not be used in patients with gastrointestinal perforation.	Patients should be evaluated before prescribing these drugs [44].
Opioids	useful in patients with moderate to severe acute and chronic pain	Vomiting, nausea, lethargy, dry mouth, constipation, dizziness, and depression due to the overdose	These agents used based on the individuality principles [45,46].
Glucosamine and Chondroitin Sulfate	Could be combined with nonsteroidal anti-inflammatory drugs and be used for treatment of osteoarthritis and	Skin response, headache, lethargy, and gastrointestinal discomfort	It shouldn't be use in patients allergic to shellfish. In patients who take anticoagulant, their usage should be with caution [47].
Glucocorticoid	Reduce acute pain and control the inflammation associated with KOA	Its prolonged use, aggravates the symptoms and damages the articular cartilage	Should not be used arbitrarily [48,49].
Vitamins	Vitamins E, C, and A are useful in treatment of KOA.	-	and bone mineralization, vitamin D could have treatment effects [50]

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)

Nonpharmaceutical Therapies

Through evaluation of individualized rehabilitation which includes various factors such as the local condition of soft tissue, degree of pain, muscle strength, and lower limb muscle, and the activity of knee joint and all should be implemented for KOA patients, a general treatment plan of rehabilitation can be formulated (Table 3). Implementation of physiotherapy for diseases of the knee joint may be capable of eliminating inflammation, decreasing stiffness and pain of the joint, improving the ability of daily activities and joint function, and improving the stability of joints and muscles [51,52]. Jomaa et al [53] reported that rehabilitation therapy can improve the activity of a joint and relieves its pain. In this regard, education of patients, decreasing BMI, and exercise are the most significant treatment programs that should be considered as the first-line choices.

Table 3. Nonpharmaceutical therapies for treatment of KOA. Derived in accordance with Dantas et al [52] and Ferreira et al [54]

No pharmaceutical therapies	Physiotherapeutic						Rehabilitation therapy		
Types	Ultrasound Wave therapy	Medium- and Low-Frequency Electric therapies	Ultrasound therapy	Shockwave therapy	Infrared Treatment and Magnetic therapy	Millimeter Wave therapy	Exercise therapy	Spa	Application of Walking Aids
Advantages	Decrease the pain of Knee	Useful in treatment of joint stiffness, muscular atrophy, adhesion, and chronic inflammation	Very effective in relieving knee pain and improves the function of knee joint	Reduction of knee pain and improving its function	Decrease the pain of knee and improve its function	Decrease the pain and improves the function of knee joint	It improves the function of Knee	It is an effective option in any ages	Decrease the knee pain
Limitation	Could not improve the function of knee	-	-	-	-	-	If done incorrectly, the complication will increase	-	Should be used with caution
Further information	In this type of treatment, microheat and tepid are selected	Through transcutaneous electrical neural stimulation, the pain could be controlled effectively	It could be used for treatment of adhesion and swelling of joint	For better outcomes use it in moderate energy	Chronic inflammation such as soft tissue inflammation of joints and arthritis could be treated by this method	-	It mainly consist of training of muscle strength, joint activity, body fitness, and walking	-	effectively decrease the knee load

Traditional Medicine

Since the treatment of KOA includes various options of pharmacologic and non-pharmacologic treatments, when the patients don't get an appropriate response to one specific treatment, other choices should be tested. One of these choices is traditional medicine that varies from place to place. As categorized in table (4), traditional medicine

includes different options such as needle knives, silver needles, internal thermal needles, acupuncture, and massage therapy that all are mentioned in detail [55].

Table 4. Traditional medicine used for treatment of KOA. Derived in accordance with Wang et al [56]

Traditional Medicine	Cupping therapy [56,57]	Acupuncture therapy [58]	Needle knives therapy [59]	Silver needles therapy [60]	Internal thermal needles therapy	Massage therapy
Advantages	It is capable of reduction of joint stiffness and pain and improvement of daily life quality.	An interesting nonpharmacological treatment for osteoarthritis and also decreasing severe pains.	Treats KOA effectively and improves the knee joint function	Effective in the treatment of joints chronic pain. Has analgesic and anti-inflammatory effects, relaxes muscle contracture, and improves the blood supply.	Effective in the treatment of joints chronic pain.	Improves the circulation, muscles will be relaxed, decrement of pain and swelling, improvement of the joint function
Limitation	Some patients may scare of it!	It has few side effects	-	-	-	It should be done under the supervision of an expert
Further information	Its combination with stabbing could be more effective.	Local acupoints and ashi points are the best choices for implementation of warm needle acupuncture	The site of insertion should be selected appropriately that is at the site of tender points or the junction of pain points	Performed once a week	It is similar to silver needles	Could be used in combination with other types of therapies

Massage and Knee Pain

Knee Pain

Different studies have demonstrated that receiving massage therapy in patients with KOA, improves decreases their pain and improve their joint stiffness [23]. For instance, a follow-up study by Romanowski et al [61] revealed that applying Swedish massage as an optional treatment for about one hour weekly improves the overall health condition of the patients and relieves their pain. In another study by Qin et al [62] demonstrated that applying Chinese massage therapy could decrease the pain in KOA patients particularly in short-term purposes therapy. Despite there is not any evidence about the main mechanism of action of massage therapy, the Arthritis Foundation organization reveals that it may act through the increment of mood-boosting hormones like serotonin and diminishing the production of the stress hormone cortisol [9].

There are some therapeutic options for treatment of osteoarthritis confirmed by the Arthritis Foundation Organization [9,63] that their main focus is on massage. Massage therapy brings a wide range of potential health benefits to patients who suffer from KOA. Massage includes different types that are mentioned below:

- **Trigger Point**

In this type of massage therapy pain would be relieved in particular areas of the body by applying direct vibration or pressure on the trigger points.

- **Reiki**

As an alternative therapy, in Reiki massage, energy guided by a practitioner to the body for stimulating healing. In this method, the massage therapist touches your body very lightly, so it appears to be safe. Anyway, the effectiveness of this type of massage therapy has not been clarified yet [64].

- **Shiatsu**

Shiatsu is a type of Japanese massage that constructed based on the concepts of traditional Chinese medicine that uses the meridian system as its main technique of therapy. In this technique, using the fingers and palms, the motions are applied to the body with continuous and rhythmic pressure to specific points of the body. Besides, for individuals who want to be covered during their massage therapy, this technique is a good choice [65].

- **Swedish**

Swedish massage aims to improve body relaxation by releasing the tension of muscles. This technique is not as strong as deep tissue massage but is preferred by individuals interested in tension relief and relaxation more. In Swedish massage, the therapist applies long strokes with circular movements for relaxing the muscles, increasing oxygen flow, and reduction of soreness [66].

- **Zone Therapy**

In zone therapy, as a kind of alternative medical practice, the pressure applied to particular points of the feet and hands. The pressure will be applied to these points by finger and thumb and various techniques of hand massage without using lotion or oil. Zone therapy might be more beneficial for individuals who are sensitive to direct touch to their body parts while gives them acceptable relief to various parts of the body [67].

- **Traditional Iranian Massage**

One of the most effective types of traditional Iranian massage is the Kermanshahi style to improve the clinical symptoms of KOA. This massage is nearly like Swedish massage but there are some significant differences too. In Mahlouji Kermanshahi massages, the pressure is applied to the muscles through an oil supplement and muscle strengthening techniques are utilized too. It's while, in Swedish massage, the pressure is applied through vibration, tapotement, friction, and effleurage. Anyway, with this type of massage therapy, a considerable reduction in knee pain will be achieved [68].

Physical Therapy

Until 1990, scientists believed that joint damages could worsen due to exercise, and regeneration of cartilage will be facilitated by rest [67]. It's while, nowadays physicians and researchers believe that physical exercise could be an effective and safe treatment and frequently should be used. After clarifying the wide range of benefits of exercise therapy in treatment of KOA patients, long-term strategies of this type of therapy should be developed. For instance, massage therapy as an effective intervention for treatment of KOA is not identified appropriately yet [23]. Abbott et al [69] cited that the main objectives of physical therapy for treatment of KOA include: relief of pain, decrease the instability and deformity of joints, and improve their function.

Because of the increment of local blood circulation in the affected muscles, massage therapy is capable of improving the flexibility and tone of muscles and improves the threshold of pain due to endorphin release. Improving effectiveness of this type of therapy is depended on availability of a close interaction between the patients and the

therapist [70]. In their study, Whittaker et al [71] for treatment of one-third of KOA patients in more than four-fifths of sessions used massage therapy and unfortunately did not achieved sufficient outcomes. In our study, just a few randomized control trials (RCTs) was in line with the results presented by Whittaker et al [71]. Besides, some other RCTs reported that the therapeutic efficiency of manual therapy, myofascial release technique, and Swedish massage could not be confirmed easily and needs further investigation [17,72].

Manual Therapy

As a non-pharmaceutical therapy, manual therapy consisted of various techniques that are used for management of OA patients [73]. In clinical practice, massage, manipulation, and joint mobilization are of the most common used therapies in western countries. Reviewing related clinical trials revealed that more than 95% of Irish physical therapists and about 65% of British therapists utilize manual therapy for treatment of KOA patients [74]. In our study, manual therapy was defined as moderate contact with bones, soft tissues, and joints with elbows, arms, and hands of massage therapist to improve the therapeutic effect of manual therapy. This therapy is one of the oldest options for treatment of musculoskeletal disorders in the world that has been used since ancient times.

In line with the results of our study, Xu et al [75] demonstrated that manual therapy is effective in diminishing pain, relieving stiffness, and improving physical function in KOA patients. They revealed that applying manual therapy less than four weeks could decrease the rate of pain, for about four weeks decrease the pain and stiffness, and when it duration last more than four weeks, the pain and stiffness will be reduced with improvement in the physical function. In accordance with the recommendation of National Institute for Health and Care Excellence (NICE) about treatment of KOA, stretching and manipulation were introduced to be key options in treatment of KOA. Besides, Royal Australian College of General Practitioners (RACP) have recommended that massage therapy is more effective with less side effects in comparison with pharmacological and surgical management [76]. All of these documents confirm that manual therapy is an effective option for treatment of KOA. Alkhawajah et al [77] conducted a similar study and revealed the same results and reported that manual therapy could relief the pain in KOA patients. Another study by Magnusson et al [78] reported different results and showed that manual therapy is not better than Meloxicam medication or placebo but is an effective option when compared with no intervention. Xu et al [75] reported that nearly all participants who underwent manual therapy did not reported significant side effects or adverse events associated with manual therapy and cited that manual therapy was safe.

Although massage therapy is not a safe therapeutic option for all conditions such as spinal manipulation, it has not shown any particular side effects in treatment of KOA patients [79]. There are just few studies that discussed the long-term effect of manual therapy on knee osteoarthritis. In the first study Zhang et al [80] demonstrated that manual therapy could be an effective choice for KOA. As the second study, Du [81] reported that the recurrence rate of disease in KOA patients after being treated with manual therapy is lower. Finally, Perlman et al [23] reported that, although manual therapy could be an effective option of treatment of KOA patients, further investigations demanded for investigating long term outcomes of manual therapy.

Aiming to fill the available gap between medication, manual and surgical therapies, there is a need for new treatment protocols that are not very complex or expensive. Multimodal approaches using combination of individualized manual therapy and exercise are capable of improving knee function and reduction of its pain in comparison with placebo therapy in both short and long term follow up [82]. In another similar clinical trial, it was reported that utilizing individualized manual therapy, clinic-based treatment, and home exercise program during a period of four weeks the knee pain decreased and its function improved. Another study revealed that using High-Velocity Low-Amplitude (HVLA) techniques was more beneficial than NSAIDs in the management of KOA patients that is mainly due to its lower side effects [83].

Conclusion

One of the main causes of disability in the world is knee osteoarthritis that seriously threatens the mental and physical health of people. Although pharmacological and surgical treatments are effective in diminishing the symptom of KOA patients, their side effects are their main disadvantage. One alternative and complementary therapy that is widely used for relieving pain in KOA patients is massage. Massage therapy is safe, beneficial, cost-effective,

and is easy to access. The scientific literature regarding knee diseases has confirmed that utilizing massage therapy is capable of decreasing knee pain, improving joint stiffness, and the functional status of KOA patients. Anyway, up to now, there has been a lack of adequate clinical evidence of the effectiveness of massage therapy for the treatment of KOA. So, here we tried to supply adequate precise information to health authorities, clinicians, physiotherapists, and patients. Despite all the mentioned advantages, our study faced some limitations. First of all, due to the diversity of available massage therapies, a lot of heterogeneity may happen. Then, because of the inclusion of just clinical trials published in English, the overall quality of the study may be affected. In this regard, it recommended to include further studies in other languages to enrich the content of studies and their comprehensiveness.

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