Functional Performance in Patients with Knee Osteoarthritis after Isometric versus Isotonic Training

Ibrahim Magdy Elnaggar, Ph.D.,* Hoda M. Mohammad, PT.D..**
*Faculty of Physical Therapy, Cairo University.
**Faculty of Physical Therapy, Misr University for Science and Technology.

ABSTRACT

Purpose: *The purpose of this study was to compare between the effect of isometric versus isotonic training on the functional performance of patients with knee osteoarthritis.* ***Subjects:*** *Forty patients diagnosed as osteoarthritis of the knee joint participated in this study.* ***Methods:*** *Patients were distributed randomly into 2 experimental groups, group (A) which consisted of 20 patients with mean age of 57.45 (± 4.26) years. This group was treated by isometric exercise program. The second group (group B) consisted of 20 patients with mean age of 59.25 (± 3.68) years. This group was treated by isotonic exercise program. Each patient in both groups received 18 treatment sessions, 3 sessions per week for 6 weeks using Thera-Band elastic band. Patients were evaluated just before and after the end of the study by using the pain intensity scale, the universal standard goniometer and Cincinnati rating system for assessment of functional ability. Results: Regarding within groups differences in the isometric group and isotonic group, there was significant increase of knee joint flexion and functional ability with significant reduction of pain intensity. Comparison between groups after treatment revealed no significant difference between groups.* ***Conclusion:*** *The results of the present study support the efficacy of isometric training program and the isotonic training program using Thera-Band elastic band for patients with knee OA as a successful method to reduce knee joint pain, increase knee flexion and improve functional ability.*

Keywords: *Knee osteoarthritis, pain, isometric training, isotonic training, functional performance.*

INTRODUCTION

Osteoarthritis (OA) is a common chronic progressive degenerative joint disorder among adults of unknown cause characterised by gradual loss of articular cartilage[20,46] with the knee joint most frequently affected[14]. It is the extremely prevalent rheumatic disease in the society and is a major cause of disability. In the west, OA is considered second only to cardiovascular diseases[20]. It ranks fourth in health impact in women and eighth in men in the western world[42]. Approximately one third of persons 63 to 94 years of age has OA of the knee, that typically limits ambulation and the ability to stand, walk comfortably and use stairs[11]. OA is classified into two groups. Primary OA which can be localised or generalised, the latter is more commonly found in post menopausal women. Secondary OA has an underlying cause, such as trauma, obesity or inflammatory arthritis[20].

Patients are usually over the age of 50 and they often report pain and stiffness in the affected joint, which is exacerbated with activity and relieved by rest[4,20]. Early morning stiffness, if present is less than 30 minutes. Joint tenderness and crepitus on movement may also be present. Patients also complain of muscle weakness as well as reduced physical functioning. Ultimately, these lead to a loss of independence and a reduction in quality of life[4,30]. Ekdahl et al.[12] found that 80% of patients with knee osteoarthritis reported problems related to muscular function as

muscle endurance, balance and coordination. Beals et al.[3] added that patients with OA have reduced aerobic capacity.

Pain in the affected joint is the most common symptom of OA and contributes to significant declines in functional ability including getting up off the floor and going up and down stairs[34,37]. Pain is often one of the most immediate and important symptoms to the patient, who describes it as being worse at night due to raised pressure in subchondral bone. Pain is often increased by movement[53]. Van Baar et al.[53] found that the combination of joint pain, stiffness and possible effusion in the knees will often cause patients to limit their activities, and a consequent loss of end of range of movement is common. This is usually correctable with appropriate instructions, but as the osteophytosis progresses a residual permanent lack of range may develop. There was observed decline in the leg strength, particularly in the quadriceps of knee affected with OA as well as the quadriceps of the contralateral knee that is asymptomatic for OA[44]. Slemenda et al.[50] found that stronger quadriceps muscles reduced the risk of developing radiographic knee osteoarthritis.

The relationship between joint pain and decline in muscle strength is more complex because of joint pain contributing to muscle atrophy and muscle weakness surrounding the joint[26,49]. The belief that a decline in quadriceps strength is a contributing factor to pain and disability associated with osteoarthritis of the knee has led clinicians to advocate quadriceps strengthening exercises[33].

Applied physical therapy for OA mainly consists of cold, heat, ultrasound and shortwave therapy, instruction in joint use and maintenance of range of motion, supplying patients with canes or orthotic devices, and therapeutic exercises to prevent muscle atrophy[9]. In patients with light to moderate OA of the knees, regular strengthening exercise is possible and leads to improvement in muscle strength, endurance, and speed[15]. The strength which declines among older adults can be reversed through regular resistance training programs[6,41]. These programs have shown relatively large rapid improvements in strength[39]. Most research continues to evaluate the use of exercise as a treatment to alleviate symptoms of the disease[4].

Three basic types of therapeutic exercises exist: isotonic, isometric, and isokinetic[43]. Interventions that use either isometric or isotonic resistance training positively impact the symptoms of OA[17]. Isometric exercise might be the most appropriate for home maintenance because it requires no or minimal apparatus and it is easy to learn. It is simple, inexpensive, and rapidly improve strength. Furthermore, isometric exercise causes the least intraarticular inflammation, pressure, and bone destruction than any type of exercise[43], and it does not stress the joint over the functional range of motion[31]. It was interesting to note that isometric training of the quadriceps alone reduced knee pain towards the end of the treatment period of 4 weeks[8]. Although functional ability requires movement of the joint over a functional range, isometric training improves muscle strength only at the joint angle at which the training takes place. This specificity of training principle may limit how much isometric training can affect performance of functional tasks beyond the joint angle prescribed in the isometric training[31].

Marks et al.[32] described the effect of mid-range isometric strengthening of the quadriceps in treatment of knee OA. Following a 6-week period of training there was an improvement in quadriceps torque and clinical status. In addition to that, there was

also a significant reduction in pain with improvement of walking. Similarly, in another study by Marks[33] the mid-range isometric strengthening exercises of the quadriceps proved useful in the rehabilitation of patients with knee OA who were unable to exercise their weakened quadriceps at other angles due to pain or swelling.

Isotonic resistance training correlates with improved knee strength[31], increased neuromuscular performance[18], and improved performance of selected functional tasks among OA patients[13]. Hoffmann et al.[22] reported that the effectiveness is proved only for aerobic and isotonic strengthening exercises in cases of osteoarthritis of hip or knee. Häkkinen et al.[19] reported slight increase of joint damage following an isotonic exercise programme in a well designed, randomized, controlled trial for 2 years. Although isotonic resistance training improves strength and function over the training range of motion, the joint is being loaded while it is moved, which may result in pain among OA patients[51].

In a study conducted by Petrella[45] 3 isotonic strengthening exercises and 3 range of motion exercises were performed 3-5 times per week. There was a statistically significant improvement in pain and function in the exercise group, relative to the control group, and there was also an improvement in the time needed to ascend and descend stairs and in pain severity during stair climbing.

McGibbon et al.[36] studied strength training in community dwelling elderly subjects, many of whom had knee impairment presumably due to knee OA and/or hip pain. These investigators compared isotonic strength training with functional training. Isotonic strength training used elastic resistance bands with progressive increases in resistance. Functional training was given in the form of exercises that simulated ADL. Strength and walking speed were improved significantly in both groups of isotonic and functional training.

Damush and Damush[10] reported that 8-week resistance training program, which used elastic bands as the mode of resistance, resulted in 14% to 26% improvement in strength among community-dwelling older women. It might therefore be reasonable to expect that OA patients who undergo isotonic resistance training using Thera-Band elastic bands will show decline in knee pain and improvement in functional ability[51].

McCartney et al.[35] and Meulman et al.[39] reported that by using elastic resistance devices, older adults can gain strength similar to the gains achieved by more traditional modes of resistance training over a period of 14 to 16 weeks of training. Kerbs et al.[29] concluded that elastic resistance training among elders with functional limitations produced moderate gains in strength along with improvement of gait characteristics.

Fisher et al.[15] used isometric in addition to isotonic training program lasting 16 weeks in a group of patients with knee OA. They reported that improvement in 15 meters walking time and functional performance was approximately 9 % for both groups after an 8 week intervention. After 16 weeks, improvement was approximately 12 and 25 % respectively.

In a study by Hurley[25] the effects of an exercise regime on quadriceps strength and proprioceptive acuity and disability in patients with knee OA were investigated. The exercises included isometric quadriceps contractions, isotonic knee exercises using therapeutic resistance bands, functional exercises and balance/coordination exercises. Following 5 weeks of training, he found that quadriceps strength, joint position sense, and functional performance time improved significantly in

the exercise group by 36.3, 12.9, and 13.7 % respectively. These values were significantly different compared with a control group who did not exercise.

Up till now, to our knowledge, only two studies compared between isometric and isotonic exercise training in treatment of knee OA. The first one was made by Huang et al.[23] who investigated the therapeutic effects of isotonic, isometric and isokinetic muscle-strengthening exercises on the functional status of patients with knee OA. They found that the treated groups had significant reduction of pain and disability, and a significant improvement in walking speed after treatment and in the follow-up period when compared with their initial status. No significant difference was found between groups. The second study was done by Topp et al.[51] who compared between the effects of isometric versus isotonic resistance training on knee pain and functional ability in patients with OA. They concluded that both isotonic or isometric resistance training improved functional ability and reduced knee joint pain severity with no significant difference between groups.

In our current study we are trying to confirm or negate the findings of Huang et al.[23] and Topp et al.[51] to clarify the superiority of one of these programs over the other in treatment of patients with knee osteoarthritis.

MATERIALS AND METHODS

1- Patients

Forty patients between the ages of 50 – 65 years diagnosed as unilateral primary knee osteoarthritis with duration of illness of 3 to 4 years participated in this study. Patients were distributed randomly into 2 experimental groups, group (A) which consisted of 20 patients (9 males and 11 females) with mean age of 57.45 (± 4.26) years. This group was treated by isometric exercise program. The second group (group B) consisted of 20 patients (7 males and 13 females) with mean age of 59.25 (± 3.68) years. This group was treated by isotonic exercise program.

Patients were excluded if they showed any contraindications for exercises, including a history of uncontrolled angina, cardiomyopathy severe enough to compromise cardiac function, electrolyte or metabolic disturbances, disabilities that prohibited resistance training of lower extremities, or if they were currently taking nitrates, digitalis, or phenothiazine. They were also excluded if they were currently participating in an organized exercise program. Subjects were also excluded from participation if they were found to have associated knee pain attributable to a cause other than OA. This study was conducted in the orthopaedic outpatient clinic of the faculty of physical therapy, Cairo University.

2- Patient Assessment

Patients were evaluated just before the study (pretreatment assessment), and after the end of the 6 weeks of the study (post treatment assessment). Assessment included the following:

1. Assessment of knee pain intensity: Knee pain intensity was assessed by using the pain intensity scale. This scale is 10 cm horizontal line which is graded from 0 to 10, where 0 = no pain and 10 = killing pain. The patient was instructed to choose a number on that line that best described his pain intensity[52].
2. Measurement of active knee flexion motion: This was measured by using the universal standard goniometer, from prone lying position. Measurements were done for 3 consecutive trials and the mean of the

three trials was chosen to be used later on for the purpose of data analysis.

3. Assessment of functional ability: This was done by using Cincinnati rating system, which is a valid and reliable tool for measuring functional disability in patients with knee osteoarthritis. The Cincinnati rating system consists of 6 questionnaire scales, the first one is called symptom rating scale which is used for assessment of pain, swelling, and knee giving way. The second scale is the patient perception scale which determines the knee condition. The third, fourth, and fifth scales are used as functional scales for the assessment of walking, stair climbing and squatting. The last one is called the occupational rating scale. Each one of these scales varies between ten which means normal knee and zero which means severe symptoms[2]. The overall assessment of functional ability is determined based on the sum of these different six scales with the maximum possible score of sixty which means quite normal subject.

3- Treatment Procedures

Patients were randomly assigned to two experimental treatment groups, isometric training group (group A) and isotonic training group (group B).

Each patient in both groups received 18 treatment sessions, 3 sessions per week for 6 weeks. In addition to the exercise program each patient was also given pulsed ultrasound for 5 minutes/session for the affected knee joint, in the supine lying position prior to exercises. Ultrasound was given with a frequency of 1 MHz and intensity of 1.5 W/cm².

Both resistance exercise programs trained 6 muscle groups of the leg (ankle dorsiflexors and plantarflexors, knee extensors and flexors, hip extensors and flexors). Both of the isometric and isotonic training protocols were based on the work of Haq et al.[20] and Topp et al.[51].

A- Protocol of isometric training program

The isometric exercise group was given all the resistance training exercises by using the standard isometric training technique with Thera-Band elastic band. Each exercise was done for 10 repetitions, 5 repetitions in 2 sets with 2 minutes rest in between. Another rest period was also given between exercises for 2-3 minutes. This technique required the patient to generate tension of the muscle without changing the joint angle. Patients generated this muscle tension for 5 seconds by using maximum resistance with Thera-Band elastic band. Patients performed all the isometric resistance training exercises unilaterally 3 times a week while positioning the targeted joint at a predetermined joint angles.

Training joint angles included 0˚ of dorsi- and plantar flexion when performing dorsiflexion and plantar flexion of the ankle from sitting position; 30˚, 60˚ and 90˚ of knee flexion when performing knee flexion and extension from sitting position; and 30˚, 60˚ and 90˚of hip flexion and extension when performing the hip resistance training exercises from supine position.

B- Protocol of Isotonic Training Program:

Patients of the isotonic training group performed 6 different isotonic exercises for ankle dorsiflexors and plantar flexors, knee flexors and extensors, as well as hip flexors and extensors by using Thera-Band elastic band. Each exercise of isotonic resistance training was done for 10 repetitions, 5 repetitions in 2 sets with 2 minutes rest in between. Another rest period was also given between exercises for 2-3 minutes. Patients performed all the isotonic resistance training

exercises unilaterally 3 times a week while contracting the muscles throughout the full range of motion using a Thera-Band elastic band of sufficient resistance.

RESULTS

1) General characteristics of patients:

There was no significant difference between the two treatment groups regarding age, weight, height, and duration of illness before treatment. In group (A) treated with isometric exercises the mean age was 57.45 (± 4.26) years, the mean weight was 78.50 (± 11.85) kg., the mean height was 159.70 (± 1.71) cm., and the mean duration of illness was 3.87 (± 1.03) years. In group (B) treated with the isotonic exercises, the mean age was 59.25 (± 3.68) years, the mean weight was 73.70 (± 6.75) kg., the mean height was 160.20 (± 6.85) cm. and the mean duration of illness was 3.62 (± 0.75) years (Table 1).

Table (1): Descriptive data of isometric and isotonic groups.

Variable	Isometric group	Isotonic group
	Mean (± SD)	Mean (± SD)
Age (years)	57.45 (± 4.26)	59.25 (± 3.68)
Weight (kg)	78.50 (± 11.85)	73.70 (± 6.75)
Height (cm)	159.70 (± 1.71)	160.20 (± 6.85)
Duration of illness (years)	3.87 (± 1.03)	3.62 (± 0.75)

The pretreatment mean of the knee flexion motion in the isometric group was 86.25 (± 11.09) degrees, and the mean pain intensity was 5.25 (± 1.50), while the mean functional ability was 36.25 (± 7.5). In the second group treated with isotonic exercises the pretreatment mean knee flexion was 87.5 (± 6.45) degrees, and the mean pain intensity was 6.75 (± 1.5), while the mean functional ability was 25 (± 10). There was no significant difference between the treatment groups before treatment regarding these variables (P > 0.05) as shown in table (2).

Table (2): Pretreatment comparison between isometric and isotonic exercise groups.

Variable	Isometric	Isotonic	t-value	P-value
	Mean (± SD)	Mean (± SD)		
Pain intensity	5.25 (± 1.50)	6.75 (± 1.50)	1.41	P > 0.05
Functional ability	36.25 (± 7.50)	25 (± 10)	0.29	P > 0.05
Knee flexion	86.25 (± 11.09)	87.50 (± 6.45)	0.19	P > 0.05

2) Within groups differences

a. Within the isometric exercise group difference

In the isometric exercises group there was significant reduction of knee pain intensity between the pretreatment mean of 5.25 (± 1.50) and the posttreatment mean of 3.25 (± 0.96). There was also a significant increase of knee flexion, the pretreatment mean was 86.25 (± 11.09) degrees and the posttreatment mean was 110 (± 12.25) degrees. Regarding the functional ability, there was significant improvement between the pretreatment mean of 36.25 (± 7.50) and the posttreatment mean of 50 (± 11.55) as shown in table (3) and figure (1).

Table (3): Within the isometric exercise group differences.

Variable	Pre	Post	t-value	P
	Mean ± SD	Mean ± SD		Value
Pain intensity	5.25 (± 1.50)	3.25 (± 0.96)	4.88	P < 0.05
Functional ability	36.25 (± 7.50)	50 (± 11.55)	5.74	P < 0.01
Knee flexion	86.25 (± 11.09)	110 (± 12.25)	9.92	P < 0.01

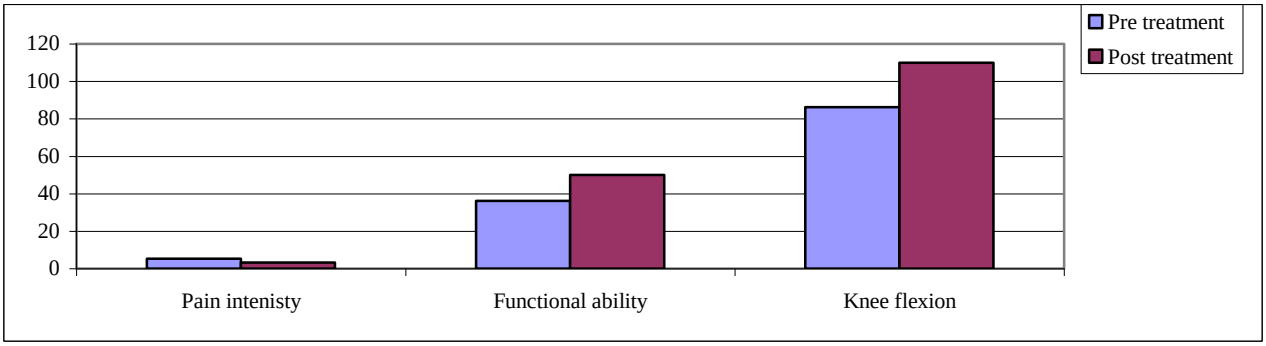

Fig. (1): Within the isometric exercise group difference.

b. Within the isotonic exercise group difference

In the isotonic exercises group, there was significant reduction of knee pain intensity between the pretreatment mean of 6.75 (± 1.5) and the posttreatment mean of 3.50 (± 1.29). There was also a significant increase of knee flexion, the pretreatment mean was 87.50 (± 6.45) degrees and the posttreatment mean was 115 (± 5.77) degrees. Regarding the functional ability, there was significant improvement between the pretreatment mean of 25 (± 10) and the posttreatment of 47.5 (± 12.58) as shown in table (4) and Figure (2).

Table (4): Within the isotonic exercise group difference.

Variable	Pre	Post	t-value	P-value
	Mean (± SD)	Mean (± SD)		
Pain intensity	6.75 (± 1.50)	3.50 (± 1.29)	3.80	P < 0.05
Functional ability	25 (± 10.00)	47.50 (± 12.58)	9.00	P < 0.05
Knee flexion	87.5 (± 6.45)	115 (± 5.77)	19.05	P< 0.001

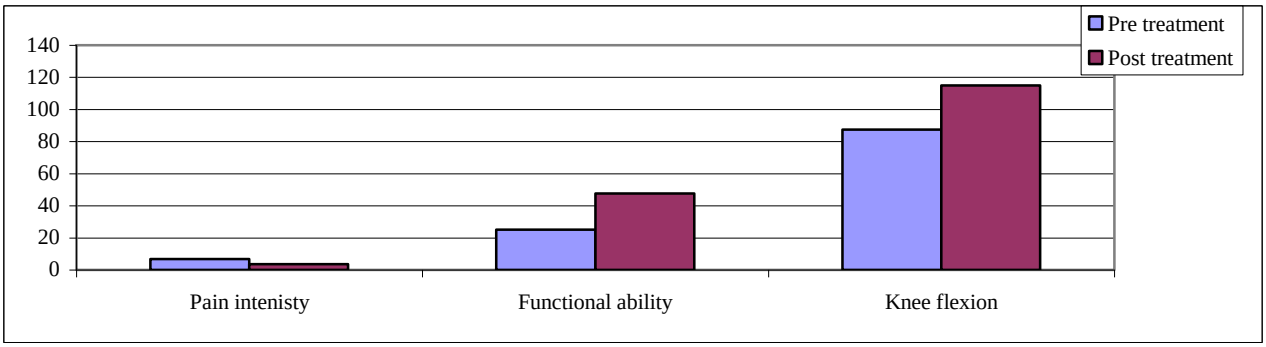

Fig. (2): Within the isotonic exercise group difference.

3) Comparison between groups posttreatment

Unpaired t-test showed that there was no significant difference of posttreatment knee pain intensity between the isometric exercises group and the isotonic exercises group. It was also found that there was no significant difference between the means of knee flexion in both groups. Regarding functional ability of the patients, no significant difference was found between the posttreatment mean of the isometric exercises group and the posttreatment mean of the isotonic exercises group. These findings are presented in table (5) and figure (3).

Table (5): Comparison between groups posttreatment.

Variable	Isometric	Isotonic	t-value	P-value
	Mean (± SD)	Mean (± SD)		
Pain intensity	3.25 (± 0.96)	3.50 (± 1.29)	0.31	P > 0.05
Functional ability	50 (± 11.55)	47.50 (±12.58)	1.80	P > 0.05
Knee flexion	110 (± 12.25)	115 (± 5.77)	0.73	P > 0.05

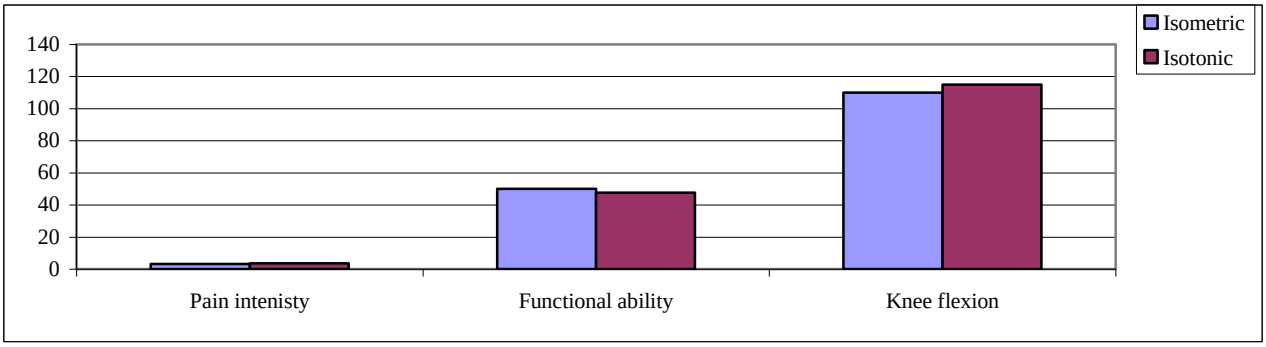

Fig. (3): Comparison between groups posttreatment.

DISCUSSION

Osteoarthritis is and always has been considered one of the most common and disabling diseases. Therapeutic exercise is the most important intervention in OA. Inactivity due to pain of OA leads to reduction of muscle bulk surrounding the joint. Exercises are needed to build up muscle strength and endurance, improve flexibility and joint motion, and improve aerobic activity[20]. Therapeutic exercise that alters knee joint load could have an effect on OA, but whether this effect is positive or negative is unclear. Treatment of OA typically consists of some combination of different types of exercises as in the study done by Deyle et al.[11], and in the recommended exercises programme for knee OA made by the American Geriatrics Society[1]. Yet little data exist to demonstrate the benefits of each type of exercises. This highlights the need for specificity of exercise regimen.

Minor[40] mentioned that when we learned about exercises and arthritis, we were taught that people with arthritis should perform only isometric exercises; it was the safest thing to do. Investigators that use either isometric or isotonic resistance training positively impact the symptoms of OA[17]. Isometric exercise is suggested for initial strengthening in patients with OA[23]. Reduced joint movement may result in less pain during and after the resistance training. In contrast, isotonic resistance training improves the strength of the

trained muscle over the entire range of motion at which training takes place[31]. The old idea that isometric exercise is the correct exercise for people with arthritis is challenged by the study done by Topp, et al.[51] who compared both isometric and isotonic exercises.

A significant limitation of the studies on isometric resistance training is that the training took place at discrete joint angle, which may explain the limited improvement in functional ability[16,17]. In our current study, we used multiple joint angle isometric training. This may clarify the significant improvement in functional ability and the presence of non significant difference compared with the isotonic training.

Most studies have shown a direct relationship between increase in strength and pain reduction. Both isotonic and isometric resistance training reduced perceived knee joint pain but only the isotonic training reduced perceived functional limitations. The findings of our current study proved that both isometric and isotonic training reduced knee joint pain, and reduced the functional limitations. This difference in the effect of the isometric training may be due to our use of multiple joint angle training which nearly covered the joint range of motion.

Our results are consistent with previous investigators who have reported that exercise can reduce pain and increase the functional abilities of OA patients. The results of the interventions tested in the present study appear to have a greater percentage impact on improving functional measures and reducing pain during performance of these functional activities than the previous exercise interventions. The explanation for this finding may be that the present interventions were primarily resistance training and may have required a higher intensity training than the previous studies. In addition to that the similarity of training modes concerning repetitions and intensities of both programs may have improved the results.

The explanation of why the isometric group had no significant difference than the isotonic group may be due to the nature of isometric training which requires the patient to perform his maximum effort during maximum contraction against maximum resistance. This was repeated in various angles all over the range of motion. At the same time during isotonic training the patient may not perform the exercise with his maximum effort all over the range of motion. Both groups were examined during functional activities which need limited range of motions, while the interventions trained wide range of motions. This may explain the positive results.

Ettinger et al.[13] reported a modest 8% to 10% improvement in pain and functioning scores as a result of 18 months of aerobic or resistance exercises among their sample of knee OA patients. This modest significant effect of a long term exercise program, which included resistance training, was also reported by Røgind et al.[48] who found 20% reduction of pain and 10% to 15% decrease in time to complete various functional tasks including stair climbing.

Jette et al.[28] concluded that after 3 to 6 months of resistance training with elastic bands of varying resistance, lower extremity strength improved by 6% to 12%, gait improved 20%, and subjects reported 15% to 18% decrease in disability. Other previous studies[45,54] indicated that exercise seems to have a small to modest effect on joint pain and functional outcome measures with a more modest effect on self-perceived measures of functioning.

Our findings suggest that the exercise interventions used in the present study reduced pain and increased functional ability similar or

to a greater extent than the previously studied interventions[5,13,28,45,48,54]. As there was 20% and 35.50% reduction of pain in the isometric group and isotonic group respectively. Knee flexion was improved by 17.59% and 20.37%, and there was also 22.91% and 37.50% improvement in functional ability in isometric group and isotonic group respectively after only 6 weeks of training.

Reduction in muscle strength and proprioception, and abnormal gait patterns are well described in knee osteoarthritis[21,24,27,37]. Traditionally, exercise therapy for knee OA has centred on quadriceps strengthening. It may not be the optimal choice[4]. Muscles other than quadriceps may influence knee load as well[38]. Aspects of neuromuscular control, such as the timing and amplitude of muscle activity, are altered with OA. This has led to the recommendation that novel exercise programs designed to strengthen hip and ankle muscles or rectify impairments in neuromuscular control may be useful[7,38]. Therefore it is expected that exercising these muscles will decrease load on the knee joint as well as pain.

Regular resistance training may attenuate the impact and impulsive loads through the knee joint, not by only increasing the strength of the muscles surrounding the knee but also by increasing the sensitivity and coordination of the proprioceptors within the quadriceps muscle during walking and other weight bearing activities[51]. Improvements in muscle strength and proprioception gained from exercise programs may reduce the progression of osteoarthritis[47].

Topp et al.[51] reported that resistance training with Thera-Band elastic bands as the mode of resistance was selected for two reasons First, it was found that minimum weight on standard universal weight training machines was in excess of some of the subjects initial strength capacity. Another study among a sample of OA subjects indicated that the weight increments on the universal weight machines were too great to yield a smooth progression of training. The second reason, Thera-Band elastic bands were selected as the mode of resistance training permitted the subject to continue training if they were unable to attend the supervised classes. Elastic bands also provided progressive resistance to the muscle group over a functional range of motion.

In our current study we used Thera-Band elastic bands for the possibility to apply it for isometric training as well as for the isotonic training. It is easy, safe, and practical method of resistance training especially with the availability of different resistance.

We recommend to investigate the effect of using different types of isotonic resistance training by using manual weight, mechanical weight, Thera-Band elastic band or machine resistance in patients with knee osteoathritis.

In conclusion the results of the present study support the efficacy of isometric training program and the isotonic resistance training program using Thera-Band elastic band for patients with knee OA as a successful method to reduce knee joint pain, increase knee flexion range and improve functional ability.

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الملخص العربي

الأداء الوظيفي في مرضي الالتهاب المفصلي العظمي للركبة بعد التدريبات الثابتة مقارنة بالتدريبات الحركية

الهدف من هذه الدراسة هو مقارنة تأثير العلاج بالتمرينات الثابتة والتمرينات الحركية علي مدى حركة ثني مفصل الركبة وشدة الألم وكذلك الأداء الوظيفي في مرضى الالتهاب المفصلي العظمي . شارك في هذه الدراسة أربعون مريضا ، تم تقسيمهم عشوائياً إلي مجموعتين، مجموعة (أ) وقد تكونت من 20 مريضاً متوسط أعمارهم 57.45 (±4.26) عاماً تم علاجهم بالتمرينات العلاجية الثابتة عند زوايا محددة ، ومجموعة (ب) تكونت من 20 مريضاً متوسط أعمارهم 59.25 (±3.68) عاماً تم علاجهم بالتمرينات العلاجية الحركية . هذا وقد تم علاج كل مريض لمدة 18 جلسة بمعدل ثلاثة جلسات أسبوعيا لمدة ستة أسابيع باستخدام الشريط المطاطي المرن . تم تقييم المرضي قبل بدء تلقي العلاج مباشرة وبعد نهاية العلاج (بعد ستة أسابيع) وذلك باستخدام قياس المدى الحركي لمفصل الركبة ومقياس شدة الألم وكذلك باستخدام استبيان سينسيناتي لتقييم الأداء الوظيفي . بمقارنة النتائج في المجموعتين ثبت زيادة إحصائية واضحة في مدى حركة ثني مفصل الركبة وفي معدل الأداء الوظيفي مع تخفيف واضح في شدة الألم في كل مجموعة في نهاية العلاج . مقارنة النتائج بين المجموعتين في نهاية العلاج لم تثبت أي فرق إحصائي واضح في حركة ثني مفصل الركبة ومعدل الأداء الوظيفي وكذلك في تخفيف شدة الألم .
الخلاصة : يستخلص من نتائج البحث كفاءة كلا من برنامج التمرينات العلاجية الثابتة في زوايا محددة والحركية باستخدام الشريط المطاطي المرن في علاج حالات الالتهاب المفصلي العظمي للركبة لتخفيف الألم وزيادة معدل الأداء الوظيفي .