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Comparision of effectivenes of isometrics to resistance training on pain and disabiltiy in patients with oa kneee age group (45 -55 YRS)

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Abstract
Background: Isometric and dynamic resistance training are the best form of exercises and are found to improve muscle strength, functional ability and reduces pain in patients with OA of knee. The aim of the study is to compare the effectiveness of isometric and dynamic resistance training when combined with Maitland mobilization to find out the best combination of treatment among the two groups.
Methodology: Patients screened for Osteoarthritis of the Knee randomly assigned into 2 groups; each group consists of 15 patients. All the data regarding patient's disease and symptoms will be collected and thorough examination of the patient will be done. Pain and functional ability of patients will be checked before and after each treatment. To measure pain, VAS scale and WOMAC scale for functional abilities will be used.
Conclusion: The study concludes that there is a significant difference in comparison between the isometric and resisted exercises.

Keywords: osteoarthritis, VAS scale, knee joint, resistance training, isometric exercise

Introduction

Osteoarthritis (OA) is a non-inflammatory, degenerative disorder of joints characterized by progressive deterioration of articular cartilage and formation of new bone (osteophytes) [1]. It is the most common rheumatologic disease which affects more than 80% of the population above 55 years and is responsible for a huge burden of pain and physical disability. It mainly affects weight-bearing joints of the body, particularly knee joint. In India, OA of knee affects around one in four Indians and is more prevalent than that of hip, probably because people use to squat and sit cross-legged most commonly [2].

A wide variety of treatments are available for osteoarthritis of the knee including education, hydrotherapy, footwear and walking aids, other rehabilitation measures, physical therapy (SWD, UST, TENS, galvanic current, exercises etc), systemic drug therapy, intra-articular drug therapy and surgery [3]. Recently, it was found that isometric resistance training improves functional ability and reduces knee joint pain with patients of knee osteoarthritis [4]. But the role of specific exercises and physical therapy for the treatment of osteoarthritis knee joint is not clear [5]. Therefore, this study was designed to see the effects of specific exercise therapy on osteoarthritis of the knee to improve the patient's condition [4].

The clinical features of knee osteoarthritis include chronic pain accompanied by muscle weakness and joint instability, associated with physical dependence and decreased quality of life leading to sleep disturbances, depression, physical inactivity, obesity, social isolation [5].

The quadriceps muscle plays an important role in mobility and stability of knee joint [6]. It is made up of 4 different muscles; rectus femoris, vastus medialis, vastus intermedius and vastus lateralis which forms a thick tendon [7]. Contraction of quadriceps muscles pulls the patella upwards and extends the knee [8].

Rehabilitation treatment is based on strengthening, isometric and isokinetic exercises aimed at reducing pain, increasing the range of motion and muscle strength, the latter being essential in the short and long terms [9].

Isometric exercise promotes the development of mechanical work and in it, the amount of force exerted is equal to the amount of resistance, so the results are slow to appear [10]. On the other hand, isokinetic exercise promotes joint mobility, by stimulating remodeling and repair [11].

Many researchers have reported that various forms of low resisted training increases the muscle strength through neuromuscular mechanisms [12]. Some authors have reported the clinical effectiveness of muscle strengthening exercises in patients with OA knee and have suggested that the exercise should not include heavy joint because the symptoms may aggravate [13].

Although numerous researchers have reported that muscle strength training leads to increased range of motion, muscle strength, and functional ability for patients with knee Osteoarthritis; many unanswered questions still exist regarding the optimal exercise regimen [1]

The purpose of this study was to investigate the differences in knee pain and functional abilities in subjects who receive either isometric or resisted training for quadriceps [17, 18].

Need of Study

Many studies have been conducted to know which treatment is best for reducing pain and disability in OA knee. Pain is the most common symptom of OA and results in significant decline in functional ability.

Investigators have observed significant decrease in strength of lower limb muscles, particularly quadriceps of the knees affected with OA [5]. This reduced strength among older adults can be reversed through regular resistance training to weak muscles.

Isometric and dynamic resistance training are the best form of exercises and are found to improve muscle strength, functional ability and reduces pain in patients with OA of knee.

So, the aim of the study is to compare the effectiveness of isometric and dynamic resistance training when combined with Maitland mobilization to find out the best combination of treatment among the two groups.

Aims and Objectives

Aim: To find out the effect of isometrics versus resistance training in OA knee with age group (45-55yrs)

Objectives

1. To find decrease in pain using VAS scale in study group A.
2. To find decrease in pain using VAS scale in study group A.
3. To find improvement in functional ability using WOMAC score in study group A
4. To find improvement in functional ability using WOMAC score in study group B
5. Comparing the drop noted in VAS scores between Group A and Group B
6. Comparing the hike noted in WOMAC scores between Group A and Group B

Hypothesis

Alternate Hypothesis

There is a significant difference between the effects of isometric and resisted exercises on pain and functional ability in patients with OA knee.

Null Hypothesis

There is no significant difference between the effects of isometric and resisted exercises on pain and functional ability in patients with OA knee.

Material and Methodology

Type of study: Experimental study.

Tools used:

1. Thera-band.
2. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)
3. Visual Analog Scale (VAS).

Location: Private Hospital

Duration: 3 month.

Sample technique: Simple Random Sampling.

Sample size: 30

Outcome measures

1. Pain
2. Functional ability

Inclusion Criteria

1. Patients diagnosed as suffering from osteoarthritis of knee of tibio-femoral joint
2. Patients reporting mild to moderate knee joint pain.
3. Patients between the age groups of 40-60 years.

Exclusive Criteria:

1. Subjects who had previously undergone lower limb surgery.
2. Subjects having inflammatory or neurological conditions
3. Subjects having lower limb deformities.
4. Subjects suffering from osteoporosis or other systemic diseases

Procedure

Method of collection of data

40 patients with osteoarthritis of knee fulfilling inclusion criteria will be asked to sign the consent form for voluntary participation in my study

Methodology

Patients screened for Osteoarthritis of the Knee randomly assigned into 2 groups; each group consists of 15 patients. All the data regarding patient's disease and symptoms will be collected and thorough examination of the patient will be done. Pain and functional ability of patients will be checked before and after each treatment. To measure pain, VAS scale and WOMAC scale for functional abilities will be used.

GROUP A- 15 patients in group A will receive isometric training for 4 weeks.

GROUP B- 15 Patients in group B will receive resistance training using thera band for 4weeks.

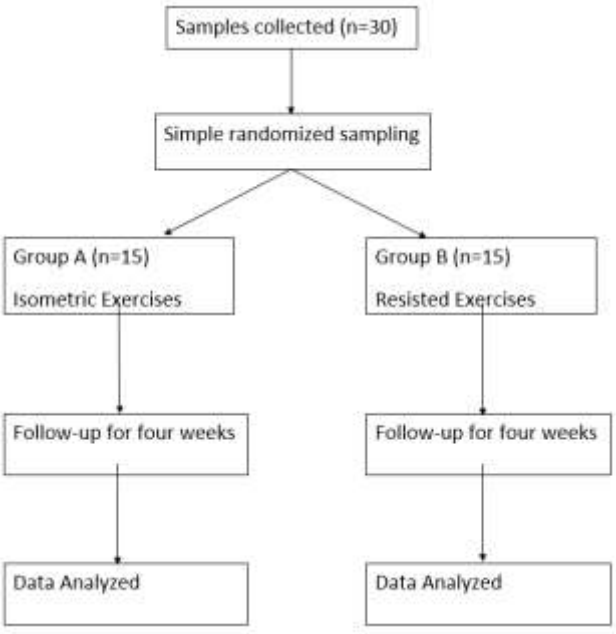

Fig 1

Table 1: Comparison of Womac Scores Pre and Post of Group B

Womac Scores	Mean	Standard Deviation	Significance
PRE	65.27	6.79	Significant
POST	70.71	7.44	

BY PAIRED t-TEST *P=0.0009

Table 2: Comparison of Pre And Post VAS Score at Rest of Group A and Group B

Vas Scores (At Rest) group A	Mean	Standard Deviation	Significance
PRE	5.13	O.92	Significant
POST	3.12	0.89	
Vas Scores (AT Rest) Group B	Mean	Standard Deviation	Significance
PRE	5.00	O.76	Significant
POST	2.73	0.70	

BY PAIRED t-TEST*P=0.0001

Table 3: Comparison of Pre and Post Vas Scores on Activity of Group A

Vas Scores (On Activity)	Mean	Standard Deviation	Significance
Pre	7.27	O.96	Significant
Post	4.36	4.36	

BY PAIRED t-TEST *P=O.0001

Table 4: Comparison of Pre and Post Vas Scores on Activity of Group B

Vas Scores (On Activity)	Mean	Standard Deviation	Significance
Pre	7.53	O.74	Signiicant
Post	4.54	0.52	

BY PAIRED t-TEST*P=0.0001

Table 5: Comparison Between Womac Score of Group A and Group B

Womac Scores	Mean	Standard Deviation	Significance
Group A	3.13	O.74	Significant
Group B	5.43	1.40	

BY UNPAIRED t-TEST *P=O.OOO1

Table 6: Comparison Between Vas Score at Rest of Group A and Group B

Vas Scores (AT Rest)	Mean	Standard Deviation	Significance
Group A	2	0.53	Not Significant
Group B	2.36	O.50	

BY UNPAIRED t-TEST P=0.0739

Table 7: Comparison Between Vas Score on Activity of Group A and Group B

Vas Scores (On Activity)	Mean	Standard Deviation	Significance
Group A	2.86	O.86	Not Significant
Group B	2.93	O.70	

BY UNPAIRED t-TEST P=0.7960

Discussion

Table 1 shows that there is significant increase in the WOMAC score from 65.27 to 70.71 post resisted exercises because resisted exercises

Table 2 shows that there is highly significant drop in VAS score at rest from 5.13 to 3.12 post isometric exercises in group A and table 6 shows that there is highly significant drop in VAS score on activity from 5 to 2.73 post isometric exercises in group A

Table 2 shows that there is highly significant drop in VAS scores at rest from 5 to 2.73 post resisted exercises in group A and table 7 shows that there is highly significant drop in VAS scores on activity from 7.53 to 4.54 post resisted exercises in group B

Table 5 shows that there is highly significant difference in WOMAC scores which are 3.13 for group A who received isometric exercises and 5.43 for group B who received resisted exercises as resisted exercises helps in increasing the muscle strength through neuromuscular mechanisms and thereby increases functional ability of the patients in OA knee joint.

Table 6 shows that there is no significant difference in VAS scores at rest between group A who received isometric exercises and group B who received resisted exercises because during resisted exercises joint is loaded and moved which results in pain and so ni significant difference in pain.

Table 7 shows that there is no significant difference in VAS scores on activity between group A who received isometric exercises and group B who received resisted exercises as joint is heavily loaded during resisted exercises and therefore it doesn't helps in significantly reducing pain.

This shows that the resisted exercises are more effective as compared to the isometric exercises in patients with OA knee, and more specifically it has its effect on improving the functional abilities rather than reducing the pain.

Conclusion

- The study concludes that there is a significant difference in comparison between the isometric and resisted exercises.
- Where in resisted exercises are more effective in improving functional abilities in patients with osteoarthritis of knee joint.

Clinical Implication

As it is found that Resisted exercises are more effective than isometric exercises, it is advisable to use resisted exercises instead of isometric exercises in routine clinical practice with an aim to increase the functional abilities in patients with osteoarthritis of the knee joint.

Limitations and Suggestions

Limitation

- The sample size used is small; therefore, this study cannot be generalized on the population.
- The ratio of male: female were not equally distributed in both the groups.
- Patients with bilateral OA knee were not taken into consideration.

Suggestions

- Similar study should be carried out in a larger population.
- Similar study comparing resisted versus isokinetic or Resisted versus eccentric exercises can be done.
- Even study including exercises for hamstrings instead of quadriceps muscle can be carried out.

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