International Journal of Yoga, Physiotherapy and Physical Education
ISSN: 2456-5067
Impact Factor: RJIF 5.24
www.sportsjournal.in
Volume 3; Issue 1; January 2018; Page No. 129-133

Effectiveness of theraband® exercises on elderly individuals with osteoarthritis of knee

[1] Akshara Parmar, [2] Pradnya Nishad, [3] Dr. Nupoor Kulkarni, [4] Dr Sarita Shevatekar
[1, 2] BPTh, Department of Community Physiotherapy, Dr APJ Abdul Kalam College of Physiotherapy, PIMS, Loni, Ahmednagar, Maharashtra, India
[3, 4] Assistant Professor, Department of Community Physiotherapy, Dr. APJ Abdul Kalam College of Physiotherapy, PIMS, Loni, Ahmednagar, Maharashtra, India

Abstract
Osteoarthritis (OA) of knee is the most common problem in elderly individuals. Pain and physical functioning related problems results in decline in health and social service. Physical therapy intervention is effective in minimizing the pain and improving physical functioning in the elderly individual for OA of knee. Objective was to find out the effectiveness of Theraband® exercises along with Conventional Treatment (CT) in the elderly individuals. 40 participants were involved. Group A was given CT and Group B was given Theraband® exercises along with CT for 6 weeks and 5 times sit to stand, WOMAC and VAS were assessed pre and post intervention then Data analysis was done. In results unpaired t test showed statistically significant improvement in the Group B as compared to Group A. Conclusion was that Theraband® exercises along with conventional treatment was more effective in improving ROM and physical functioning than conventional treatment alone in elder individuals with OA of knee.

Keywords: theraband® exercises, conventional treatment, elderly individuals, OA of knee

1. Introduction
Various health problems and change in socio economic status adversely affect an individual's way of life during old age. Osteoarthritis (OA) is the most common type of arthritis in elderly individuals. OA is a degenerative musculoskeletal disorder in which there are degenerative changes affecting cartilage commonly and which is associated with major morbidity, and is one of the most common causes of functional limitation and dependency [1].

OA of the knee is mainly disabling due to symptoms such as pain, stiffness, and paresis. Moreover, restricted joint range of motion (ROM) is associated with abnormal posture and may aggravate disability [1].

In India the prevalence of OA of the knee is higher with females than males, and is mainly seen above 40 years of age in females and 45 years of age in males. 33% of persons 63 to 94 years of age are affected by osteoarthritis of the knee, which often limited with the ability to stand up from a chair, stand comfortably, walk, and use stair [4].

There are two types of OA of knee, primary OA and secondary OA. Primary OA is due to an alteration of the articular tissues internally within themselves whereas secondary OA are common in people with fracture or previous injury of knee joint. In many patient, pain increases in humid and cold weather [2].

Symptoms may include OA of knee are joint pain, tenderness, stiffness, effusion, decreased movement secondary to pain, muscle weakness, ligament laxity, and radiological changes such as loss of joint space and osteophytes. Activities like walking, squatting and stair climbing are affected mainly [3].

As there is no cure for OA of knee, treatments is focus on reducing physical and psychological disability; such treatments include patient education, physical activity, weight reduction and the use of assistive or orthotic device [2].

Major musculoskeletal repercussions of knee OA is muscle weakness, especially quadriceps muscle. The strength discrepancy in the population with OA is 15%-18% at the beginning of the disease grade I knee OA, 24% in individuals with grade II knee OA (according to the Kellgren & Lawrence grading scale for knee OA), and 38% in individuals with grade IV knee OA. Quadriceps muscle acts as a shock absorber in the knee joint that is why its weakness is to reduce functional capacity, predisposes the knee to structural damage [4].

Research shows that even later in life, there is potential for physical, mental, and social growth and development. Ageing is a significant part of all human societies reflecting the biological changes that occur, but also reflecting cultural and societal conventions [5].

Physiotherapy has been shown progressive improvement physical function, decrease pain, and delay the need for surgical intervention in advanced cases of OA[2]. Most victorious physiotherapy approaches include exercises to strengthen the Quadriceps. Short wave diathermy, stretching exercises; isometric exercises are given as conventional intervention for OA of knee clients.

Effectiveness of Theraband® exercises is for restoring muscle and joint functions, for building strength and conditioning. Resistance-bands exercises are hassle free because they can be used easily anywhere, unlike other resistance equipment but give the same benefits [6].

Theraband® can last for a long time with proper care and use, thus acting as a commercial way for rehabilitation. Theraband® has been tested in laboratory setting above 10,000 repetitions without any rupture. The color of the band

to be used depends on the capacity of the participant and the results to be achieved with the strengthening schedule. They used 3 progressive colors of Theraband® resistance (yellow, red, and green) in various combinations to provide an appropriate resistance level [7].

There are different outcome measures for assessing pain, physical functioning from which 5 times sit to stand test, WOMAC scale, VAS was used.

2. Material and Methods

Nature of the study was explained to the participant and written and informed consent about enrolment in the interventional study and maintaining adequate privacy and confidentiality was taken from all the patients included in the study 40 participants using convenient sampling were done. The participants were selected according to the inclusion and exclusion criteria. The selected participants were evaluated on 5 times sit to stand test, WOMAC scale and VAS. 5times sit to stand test is for assessing functional lower extremity strength, transitional movements, balance, and fall risk[8] and WOMAC scale for assessing pain, stiffness and physical function. The WOMAC questionnaire contains 17 questions regarding the degree of difficulty to perform daily activities, such as stair use, to assess the physical function of patients. Patients are asked to rank the degree of difficulty in the last 72 hours in a scale from 0 (none) to 4 (severe). The greater the score, the worse is the functioning[9]. Visual Analogue Scale (VAS) is another scale used which has a good quality of validity, reliability and test-retest reliability. The participants are asked to mark their pain on a 10 cm line (VAS) in answer to the question[10]. It was divided in two groups i.e. Group A and Group B. The subject in Group A was given Conventional treatment and in Group B was given conventional treatment along with Theraband® exercises for 6 weeks.

2.1 Group A: conventional treatment consists of shortwave diathermy, stretching exercises, and isometric exercises.

Shortwave diathermy

Continuous shortwave diathermy mode was given to the patient for 20 min/session, 3sessions/week for 6 weeks.

Flexibility: Calf, hamstring, quadriceps (15 sec hold and 5 repetitions)

Isometric exercises: Static Quadriceps, Static Hamstring, Pillow Press

2.2 Group B: Along with conventional treatment, Theraband® exercises were given.

Fig 1: Knee Flexion (PRONE)

Fig 2: Knee Extension (PRONE)

3. Data Analysis and Result

Analysis was done using INSTAT demo version. Data was collected and presented in tabular form and analysed by using the Paired "t" test and Unpaired "t" test to compare mean values.

Table 1: Comparison of mean of 5 times sit to stand test (5TSST) between CT and Theraband® exercises Group.

	Mean ±SD		't' value	'p' value	Result
5TSST	Pre	Post			
Group A	29.05±7.409	26.85±6.769	4.395	<0.0003	Extremely Significant
Group B	26.225±6.845	21.7±3.201	4.042	<0.0007	Extremely Significant
Group A v/s Group B	Group A Post	Group B Post	3.076	<0.0039	Statistically Significant
	26.85±6.769	21.7±3.201			

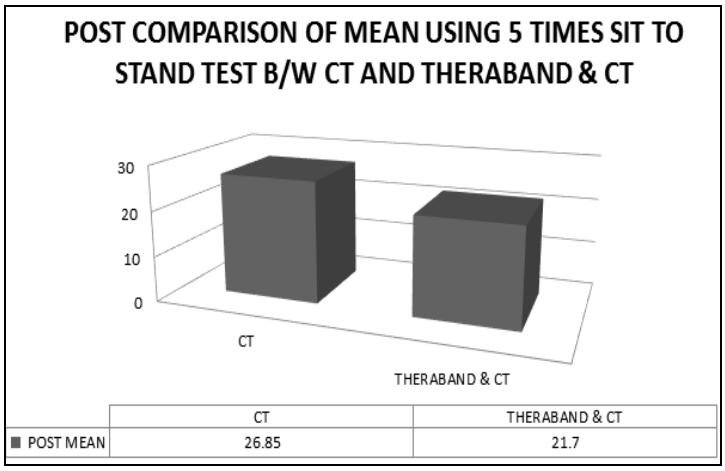

Fig 3: Represents comparison of mean in post intervention between Conventional treatment and theraband exercise along with conventional treatment using 5 times sit to stand test.

Result No 1. Result

Comparison of mean in post between Conventional treatment and Theraband® exercises along with conventional treatment using 5 times sit to stand test where t value is 3.076 and p value <0.0039 which is statistically significant with the help of unpaired "t" test.

Table 2: Comparison of mean of WOMAC scale between CT and Theraband® exercises Group.

	Mean ±SD		't' value	'p' value	Result
WOMAC	Pre	Post			
Group A	60.3845±12.602	45.648±8.083	7.238	<0.0001	Extremely Significant
Group B	63.5265±13.311	28.5595±6.158	10.301	<0.0001	Extremely Significant
Group A v/s Group B	Group A Post	Group B Post	7.520	<0.0001	Extremely Significant
	45.648±8.083	28.559±6.158			

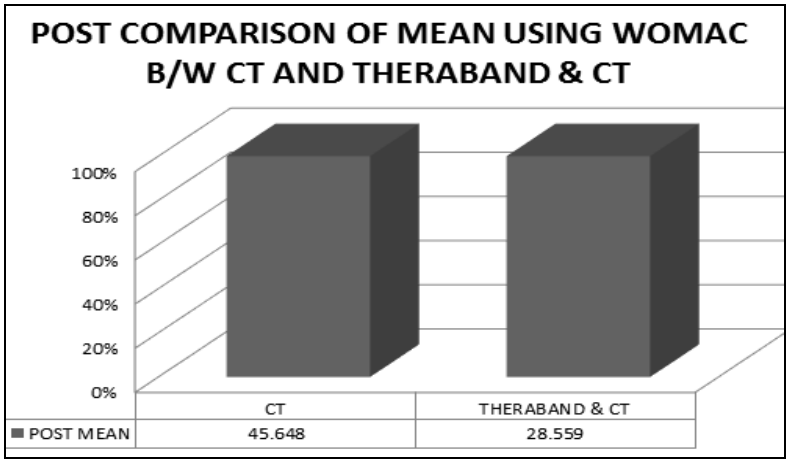

Fig 4: Represents comparison of mean in post intervention between Conventional treatment and Theraband® exercise along with conventional treatment using WOMAC.

Result No. 2: Comparison of mean in post between Conventional treatment and Theraband® exercises along with conventional treatment using WOMAC where t value is 7.520 and p value <0.0001 which is statistically significant with the help of unpaired "t" test.

Table 3: Comparison of mean of VAS between CT and Theraband® exercises Group.

	Mean ±SD		't' value	'p' value	Result
VAS	Pre	Post			
Group A	7.65±1.348	4.1±0.9119	12.439	<0.0001	Extremely Significant
Group B	7.5±1.318	2.9±1.119	12.113	<0.0001	Extremely Significant
Group A v/s Group B	Group A Post	Group B Post	3.717	<0.0006	Extremely Significant
	4.1±0.911	2.9±1.119			

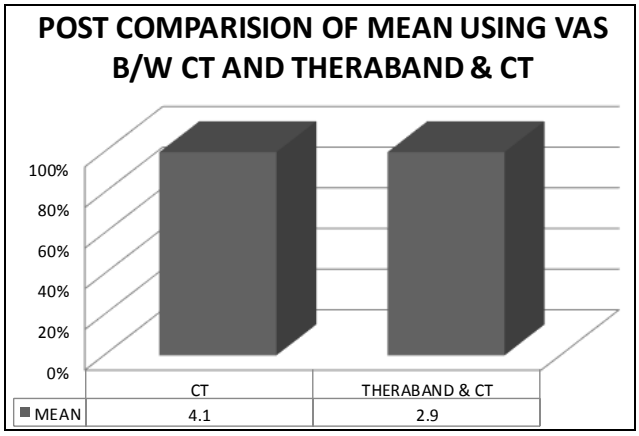

Fig 5: Represents comparison of mean in post intervention between Conventional treatment and Theraband® exercise along with conventional treatment using VAS

Result No. 3: Comparison of mean in post between Conventional treatment and Theraband® exercises along with conventional treatment using VAS where t value is 3.717 and p value 0.0006 which is statistically significant with the help of unpaired "t" test.

4. Discussion

The purpose of this study was to find out the effectiveness of conventional treatment and Theraband® exercises in the elderly individuals. In this study half of the participants were given only Conventional treatment (CT) and other half were given Theraband® exercises along with Conventional treatment. The effectiveness was then assessed by using the outcome measures 5 times sit to stand test, WOMAC and VAS at the end of training.

The present study showed that the intervention given to both the groups was effective in terms of physical functioning and reduce pain, irrespective to the treatment received which was Theraband® exercises or Conventional treatment (CT). However, Theraband® exercises along with CT showed more significant improvement as compared to the Conventional treatment in overall outcomes.

In this study conventional treatments included shortwave diathermy, stretching exercises, isometrics exercises. Shortwave diathermy is a deep heating modality which helps in reducing pain, muscle spasm and inflammation. It also helps in increase in blood flow, metabolism and range of motion and simultaneously improves the elasticity of connective tissue[13].

Stretching is commonly utilized to stretch the muscle and increase the ROM around the join and also to improve balance performance. Decrease in flexibility in the elderly also decreases in their ability to recover quickly from a perturbation. Lack of necessary range of motion (ROM) would decrease the effectiveness of hip and ankle strategies. If a person is unable to counteract a perturbation due to lack of flexibility and lack of appropriate ROM, the perturbation may result in fall[11].

Isometric exercise is the most appropriate and easy to understand by patients and can be easily and safely performed at home or when travelling because it requires no or minimal equipment. Further, isometric exercise causes the least inflammation and pressure. Isometric exercises are simple to perform and that rapidly improve strength.

However in comparison with conventional treatment, Theraband® exercises along with CT had more significant improvement in overall outcomes. It might be because, when using elastic resistance, an exercise becomes harder over the course of the movement. This makes the prime mover muscles work hardest in the contracted position by increasing metabolic stress and possibly leading to greater hypertrophy[12].

Theraband® exercises provides tactile stimuli to skin receptors & any movement of the resistance bandage on skin influence proprioceptive acuity & maximise cutaneous sensation around knee joint subsequently improving proprioception and self-efficacy during performance of daily activities. It has been shown effective at reducing pain and increasing function in patients with knee osteoarthritis[2].This is supported by a study done by Sayantika Dhar, Shabnam Agarwal showed that strengthening exercise protocol with the resistance band on knee is effective in reducing pain, disability and improving physical function in patients with OA knee.

Another study supporting this result was done by TF Chang, TH Liou, CH Chen, states that resistance exercise using elastic bands with four color combinations (yellow-red, red-red, red-green, and green-green) can significantly improve lower-extremity function with mild-to-moderate knee OA.

Similarly, Sundstrup *et al*. in their observed that the elastic band strength training program provided significant increase in electromyostimulation muscle activity of the different muscle groups. Chen *et al*. applied elastic band training program, and detected significant increase in strength performances.

5. Conclusion

The present study concluded that Theraband® exercises along with Conventional treatment were highly effective in improving the physical functioning and reducing pain in the elderly individuals with osteoarthritis of knee over conventional treatment alone.

6. Acknowledgement

Indeed, I am very glad to present this project as a part of my internship, I wish to express my sincere gratitude to all those who really helped me with it. And also thanks to elderly

individuals who co-operated and participated in this project.

7. References

1. Huang MH, Yang RC, Lee CL, Chen TW, Wang MC. Preliminary results of integrated therapy for patients with knee osteoarthritis. Arthritis Care & Research. 2005; 53(6):812-20.
2. Dhar S, Agarwal S. Effectiveness of an Elastic Band Exercise Protocol in Tri-Compartmental Osteoarthritis of the Knee. Indian Journal of Physiotherapy and Occupational Therapy. 2015; 9(2):177.
3. Shivani V. A comparative study of effects of a stationary cycle and motorized treadmill as an adjunct to conventional exercises in improving the functional status of patients with knee osteoarthritis. Ijcrr, 07(20):45-54.
4. Oliveira AM, Peccin MS, Silva KN, Teixeira LE, Trevisani VF. Impact of exercise on the functional capacity and pain of patients with knee osteoarthritis: a randomized clinical trial. Revista brasileira de reumatologia. 2012; 52(6):876-82.
5. Shevatekar S, Hande D, Kulkarni N. Index of severity of knee osteoarthritis of elderly females in rural area. IJAR. 2017; 3(3):155-8.
6. Joijode SG, Sams S. A study on effect of proprioceptive training in patients with osteoarthritis knee wearing elastic bandages. Indian Journal of Occupational Therapy, 2009, 41(2).
7. Phil Page. Novel Thera-Band exercise reduces pain and improves function in knee osteoarthritis, 2012.
8. Clinical Measurement of Sit-to-Stand Performance in People With Balance Disorders: Validity of Data for the Five-Times-Sit-to-Stand Test Physical Therapy, 2005.
9. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol. 1988; 15(12):1833-40.
10. Breivik H. Fifty years on the Visual Analogue Scale (VAS) for pain-intensity is still good for acute pain. But multidimensional assessment is needed for chronic pain. Scandinavian journal of pain. 2016; 11:150-2.
11. Reddy RS, Alahmari KA. Effect of lower extremity stretching exercises on balance in geriatric population. International journal of health sciences. 2016; 10(3):389.
12. Kim Christensen DC, DACRB C. Elastic Resistance Training.
13. Jan MH, Chai HM, Wang CL, Lin YF, Tsai LY. Effects of repetitive shortwave diathermy for reducing synovitis in patients with knee osteoarthritis: an ultrasonographic study. Physical therapy. 2006; 86(2):236-44.