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Effect of McKenzie's Approach on Functional Mobility in Bilateral Knee Osteoarthritis

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ABSTRACT

BACKGROUND- *Osteoarthritis (OA) is an degenerative disorder of joint causing pain varying degrees of functional limitation and reduced quality of life.There are various treatment strateges used to treat OA and found to be effective but Mckenzie is one such approach which is based on directional preference of pain and has been apllied on spine and found to effective in reducing symptom but not on knee.so the present study was done to find the effect of Mckenzies approach on functional mobility in subjects with bilateral knee osteoarthritis*

OBJECTIVES- *1)To study the effect of Mckenzie's approach on pain and functional mobility in bilateral knee osteoarthritis.*

2)To study the effect of conventional physiotherapy on pain and functional mobility in bilateral knee osteoarthritis

3)To compare the effect of Mckenzie's approach and conventional physiotherapy on pain and functional mobility in bilateral knee osteoarthritis.

MATERIAL AND METHOD:*64 subjects diagnosed as OA were selected as subjects. Subjects were divided in 2 groups,32 in each group. Group A received Mckenzie group of exercises while group B received conventional group of exercises.pre and post assesemnent of pain. disability and functional mobility was taken by visual analogue scale (VAS) , WOMAC, stand up and g*

o test , step length and stride length respectively.

RESULT: *McKenzie's approach have extremely significant result in reducing pain ,disability, improving functional mobility and walking endurance with post interventional score 2.56±0.84 for VAS, post interventional score 34.1±8.67 for WOMAC, post interventional score 8.89±1.10 for STAND UP AND GO TEST respectively but have considerable significant improvment in gait parameters post interventional score 64.06±8.17 for step length and post intervention score 8.89±1.10 respectively than conventional exercises*

CONCLUSION: *Mckenzie exericises has significant effect on functional mobility in subjects with bilateral knee Osteoarthiritis as with gait parameters.*

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KEYWORDS: *Osteoarthritis, McKenzie, Conventional, Directional Preference, Functional Mobility, Pain.*

I. INTRODUCTION:

Osteoarthritis (OA) is an degenerative disorder of joint which leads to changes such as pain , reduced space ,along with it there is focal loss of articular cartilage.[1]

The occurrence of osteoarthritis increases with increasing age while females are more prone than men.This is due to many factors such as wider pelvis, hypermobility, or hormonal factor such as decreases in estrogen level age as age advances [2,3]

The Changes in radiograph of osteoarthritis are seen more as age increases ,ie at the age of 40 or more, people are more symptomatic with changes on X ray. [4]

Pain during weight bearing activities , tenderness, limitation of knee movement, crepitus, occasional effusion, and variable degrees of local Inflammation are the clinical characteristics of knee OA.[5]

There are many soft tissue changes at knee joint such as decrease in strength of quadriceps muscle ,decreases in saggital range of motion, and increases in soft tissue contracture. These changes collectively leads to joint pain, worsening of symptoms on acitivity especially on weight bearing and stiffness mainly at rest .[6,7]

This results into decrease in physical functioning of an individual and leads to progression of disability.[8]

The diagnosis of knee osteoarthritis can be made by Plane radiography ,MRI imaging,laboratory findings.

The classification of OA knee radiographic ally was found in 1959 which is now commonly used as kellgrance and Lawrence classification[9]

Physical therapy has a wide role in treating OA such as strengthening and stretching execises along with it many therapeutic modality such as transcutanious electrical nerve stimulator(TENS) hot moist pack, short wave diathermy(SWD),ultrasond have proved to reduce pain and increase in functional mobility.[10]

Some people find difficult to perform various exercise due to pain so this study was done to find out an painfree form of exercise.

Mckenzie is one of the physical therapy approach invented by Robin Mckenzie in year 1981 in new Zealand mainly for the treatment of spine and extremities.They categorized disorders in the form of various syndromes.[11]

Where Knee osteoarthritis falls under derangement syndrome of mckenzie. Treatment in McKenzie is based upon on the directional preference of the patient .Directional preference is the direction in the which patient experience reduction or centralization of symptoms such as pain. .

Mckenzie exercises according to previous literature was found to be effective in reducing pain but no research was done to find its effect on functional mobility on knee This set of exercises are effective and have been used on spine but due to paucity in literature on knee this has been used on lesser extent in day to day practice.There is also very few literature which tells us whether exercising according to directional preference ie in painfree direction has an effect on pain and functional mobility.

Exercises helps in reducing pain and improve functional mobility so there is need to find out the superior exercise protocol which will help in reducing the symptoms and can be done at home bases and also which will help in reducing the socioeconomic burden on patients as well. People sometimes find it difficult to exercises due to pain and avoid doing so .McKenzie is one such treatment option which will help in reducing these problems with the help of exercises prescribed on the principal of directional preference ie the pain free direction. So this study was done to find out the effect of mckenzies approach verses conventional physiotherapy on pain and functional mobility in subjects having bilateral knee osteoarthritis which will help in adding the newer treatment approach.

II. MATERIAL AND METHODOLOGY AND PROCEDURE:

This was an experimental study . Subjects were selected by Consecutive sampling followed by simple random sampling after taking approval from institutional Ethical Committee. The study was conducted on 64 subjects of either gender aged between 45-60 years having grade 1 and grade 2 bilateral knee Osteoarthritis according to kellegrance and Lawrence scale.

Exclusion criteria include Recent fracture around knee, Open wound, Bone tumor, Elderly subjects with balance problems, Grade 3 obese individual with deformed knee, Fixed flexion deformity**.** All the subjects were briefed about the study and informed consent was taken.

Subjects were randomly allocated in two groups 32 in each group. Subjects in Group A were given Mckenzie exercises according to directional preference and Group B subjects were given conventional group of exercises. Pre and post interventional scoring for Pain ,functional mobility , walking endurance ,and gait parameters were taken by VAS ,WOMAC ,STAND UP AND GO TEST ,STRIDE LENGTH AND STEP LENGTH.

Intervention was given for 5 days per week for 4 weeks consecutively

EXERCISES: GROUP A

For Flexion Directional Preference	For Extension Directional Preference
1. Heel slides. 2. Prone knee bending. 3. Knee flexion in sitting with overpressure 4. Squatting. 5. Lunges . 6. Knee flexion in kneeling	1. Terminal knee extension. 2. High sitting knee extension. 3. Knee extension in sitting. 4. Knee extension in standing. 5. Step up and step down. 6. Sit to stand.

GROUP B:

1. Quadriceps isometric exercises.
2. Straight leg raise.
3. Side lying hip abduction.
4. Quadriceps isometric with plantar flexion and dorsiflexion.
5. High sitting knee extension.
6. Prone knee bending.

III. RESULT:

The discriptive statistical analysis of VAS, WOMAC, STAND UP AND GO TEST, STRIDE LENGTH AND STEP LENGTH with P value (P<0.0001), (P<0.0009), (P-0.0199), (P<0.0001), (P<0.0001) respectively are presented in tables below. There was significant improvement in pain reduction and functional mobility of the subjects post intervention in the experimental group than conventional. While improvement in gait parameter was seen more in the conventional group more than the experimental group.

TABLE 1: Pre and post interpretation of VAS

Groups	**Pre-interventional Mean ± SD**	**Post-interventional Mean ± SD**	**P Value**	**Inference**
Grup (A)	6.07+1.11	2.56+0.84	<0.0001	Extremely significant

Group (B)	5..91+1.006	3.759+1.40	<0.0001	Extremely significant

Visual analogue scale Paired t test was used for intra group comparison. . This showed that there was extremely significant difference of group A VAS score with (P<0.0001).

Similarly, Group B showed that there was extremely significant difference with score (P<0.0001). The comparison in both the groups by Paired t test showed more improvement in Group A.

- TABLE 2:Pre and post interpretation of WOMAC

Groups	**Pre-interventional Mean ± SD**	**Post-interventional Mean ± SD**	**P Value**	**Inference**
Group (A)	62.21+12.94	34.1+8.67	<0.0001	Extremely significant
Group (B)	61.46+8.43	42.46+10.15	<0.0001	Extremely significant

WOMAC score. of group A showed that there was extremely significant difference with (P<0.0001).

Similarly, Group B showed that there was extremely significant difference with score (P<0.0001). The comparison in both the groups by Paired t test showed more improvement in Group A.

- TABLE 3: Pre and post interpretation of STAND UP AND GO TEST

Groups	**Pre-interventional Mean ± SD**	**Post-interventional Mean ± SD**	**P Value**	**Inference**
Group (A)	11.63+1.78	8.89+1.10	<0.0001	Extremely significant
Group (B)	10.99+1.66	9.73+1.65	<0.0001	Extremely significant

Stand up and Go test score. of group A showed that there was extremely significant difference with (P<0.0001).

Similarly, Group B showed that there was extremely significant difference with score (P<0.0001). The comparison in both the groups by Paired t test showed more improvement in Group A.

- TABLE 4: Pre and post interpretation of GAIT PARAMETERS

	Groups	**Pre-interventional Mean ± SD**	**Post-interventional Mean ± SD**	**P Value**	**Inference**
STEP LENGTH	Group (A)	41.71+15.46	64.06+8.17	<0.0001	Extremely significant
	Group (B)	42.90+11.39	51.93+9.86	<0.0001	Extremely significant
STRIDE LENGTH	Group (A)	68.34+17.55	82.89+1.10	<0.0001	Extremely significant
	Group (B)	77.02+16.31	94.15+13.92	<0.0001	Extremely significant

Comparison of step length and stride length between two groups showed that there was significant improvement in both the groups but Group B showed more improvement as compared to Group A.

IV. DISCUSSION:

Osteoarthritis is a chronic degenerative disorder of knee with pain,crepitus,tenderness and limiting functional mobility.

Keeping this in mind this study was conducted in the subjects between age group 45-65 years having Bilateral knee osteoarthritis to determine the effect of mckenzi's approach on fuctional mobility in bilateral knee osteoarthritis subjects.Out of which 21 were male subjects and 43 were female subjects. The present study contradicts finding of the previous literature that females are more affected than male in OA knee, this may be because of smaller sample size,smaller area of sample collection and specific inclusion criteria .

Subjects were analyzed and divided into two group 32 in each groups. Group A received McKenzie's group of exercises as per direction preference. while Group B and received conventional exercises.Treatment protocol was continued for 4 weeks.The study was carried out and the result for pain, fuctional mobility, walking endurance and gait parameters weredrawn by Visual Analogue Scale, WOMAC, standup and go test,stride length, step length respectively.

This study showed more reduction in pain and improvement in functional mobility in experimental group the reason for this might be that exercising in painless movement according to the mckenzie's principal of directional preference will help in reducing the friction between the joint which leads to degeneration of joint and improving the strength of the muscles supporting the knee joint leading to decrease in direct load on knee joint.

S.hasan (2015)[12] conducted a study on quadriceps femoris strength traning : effect of neuromuscular electrical stimulators vs isometric exercises in osteorthritis of knee stated that improvement in muscles strength will help in reducing the pain and disability

J.Pandya , H.parmar (2015)[13] conducted a study on effect of conventional physiotherapy in patients with knee OA stated that quadriceps muscle strength is reduced in subject with OA due to disuse atrophy secondary to joint pain quadriceps inhibition , delayed activation of quadriceps and impairment in proprioceptive activity. This can lead to limit activities of daily living and mobility so this can be improved by excercises.

R Rosedale(2014)[14] conducted a study on efficiency of exercise intervention as determined by the Mckenzie system of Mechanical diagnosis and therapy for knee osteoarthritis:A randomized controlled trial while this study stated that patients with knee OA who were priscribed exercises based on an MDT assessment had superior outcome compared to those of controlled group. Effect of the Mckenzie's Method of Mechanical Diagnosis and Therapy and Pain Releasing Phenomenon in Subjects with Dequervain's Tenosynovitis also studied and found effective.[15] Significant effect of Integrated Neuromuscular Inhibition Technique on iliotibial band tightness in osteoarthritis of knee[16]

But present study was done to see the effect of mckenzie's exercises on pain,functional ability along with walking endurance and gait parameters

In this study there was reduction in pain and improvement in fuctional mobility in both the groups due to increase in quadriceps muscles strength which leads to improvement in stability of the joint and reduction of symtoms such as pain reduction , improvement in walking endurance and functional mobility.

While there was extremely significant results in McKenzie group out of conventional group as mckenzie mainly focuses on directional preference for the treatment and exercisisng in painless movement of the joint this will help in reducing the derangement of joint by reducing the load anfd friction within the joint which will eventually lead in reducing the symtoms.

So this study states that mckenzie's approach can be used in subjects having bilateral knee osteoarthritis which will help in reducing pain of the subjects as pain is one of the limiting factor for activities ,improving functional mobility making subjects move freely and do there activities of daily living without any discomfort thus improving quality of life of subjects. These exercises will also make subjects perform exercises with ease as they perform it in painfree pattern. This exercise regime can also be used in routine clinical practice as well as home exercise protocol without hindering the socioeconomic status of an subject. As they are simple and comfortable..

V. .CONCLUSION:

Different approaches were used for the treatment of knee osteoarthritis for reducing pain and improving functional mobility but this study concluded that both conventional exercises as well as McKenzie's approach are effective in improving pain, functional mobility ,walking endurance ,and gait parameters. But mckenzies exercises are found to be more effective in reducing pain and improving functional mobility and walking endurance but has considerable effect on gait parameters such as stride length and step length than conventional exercise.

Thus it proved that mckenzies approach can be used for improving functional mobility in bilateral knee OA subjects.

CONFLICT OF INTEREST- NIL

ETHICAL CLEARANCE-Institutional Ethical Committee Of Krishna Institute Of Medical Sciences Deemed To Be University ,Karad.

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