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EFFECTIVENESS OF KINESIO TAPING IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS - A PROSPECTIVE STUDY

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Abstract:

Background: Knee osteoarthritis (OA) joint disease most commonly occurs in the elderly population, and it causes significant pain and functional limitations. Manual therapy, physical therapy modalities, taping techniques, patient education and therapeutic exercises, orthosis, and more recently, extracorporeal shock wave therapy (ESWT) are all used to treat knee OA. Kinesio taping (KT) is a therapeutic technique used to treat knee OA.

Material and methods: This is a prospective study, non-probable sampling technique conducted in the Department of Orthopaedics**,** Sree Mookambika Institute of Medical Sciences, Kulasekharam from June 2023 to December 2023 for a period of 6 months, the study participants which include patient aged >40 and <70 years with Osteoarthritis knee population; Grade 0, I and II Osteoarthritis knee (Kellerman and Lawrence classification) with symptoms for more than 3 months according to the ACR clinical classification criteria and pain score of more than 4 cm on 10 cm visual analog scale (VAS) will be included in this study and exclude the patient with aged < 40 years Grade III and IV- Osteoarthritis knee (Kellerman and Lawrence classification), Active infection in the knee, Secondary Osteoarthritis, Previous knee surgery, Previous intra-articular knee injection.

Results: Mean VAS score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 7.5±2, 7.0±1.5, 5.6±1.4 and 4.5±1.5 respectively and mean total WOMAC score of 30 patients at at pre-procedural, 6 weeks ,3 months and 6 months follow up are 74±8.3, 65±8.1, 60± 7.5 55±12.2 respectively. Which shows a significant reduced in pain and improvement in the functional outcome.

Conclusion:
KT (kinesio tape) was found to improve pain and physical functioning of subjects with early knee osteoarthritis. The results of this study showed significant kinesio tape effects in the WOMAC subscales: pain, stiffness, and physical function and VAS score. This technique is recommended for early osteoarthritis not for the late stages. This technique is cost effective and easily available. WOMAC and VAS score are useful tool in assessing the Knee functional outcome
Key words: osteoarthritis (OA), Kinesio taping (KT), Western Ontario and McMaster University Osteoarthritis Index (WOMAC), Visual Analogy Score (VAS)

Introduction:

Knee osteoarthritis (OA) joint disease most commonly occurs in the elderly population, and it causes significant pain and functional limitations [1, 2]. Reduced quadriceps muscular strength, decreased mobility, and loss of functional ability, all of which result in proprioception deficits, are among the existing predisposing factors [3, 4].

The patient presents with pain, swelling, stiffness, deformity, decreased range of motion and disability, which significantly affect the quality of life. The knee is the most common joint that is affected in the Indian population with Osteoarthritis and plays an important role in weight bearing and mobility. Knee Osteoarthritis is the leading cause of chronic disability.

Manual therapy, physical therapy modalities, taping techniques, patient education and therapeutic exercises, orthosis, and, more recently, extracorporeal shock wave therapy (ESWT) are all used to treat knee OA [5, 6]

Kinesio taping (KT) is a therapeutic technique commonly used to treat knee OA [7]. KT is a high-stretch elastic adhesive material that allows the treated area to have free mobility [8]. Physical therapists (PTs) preferred the KT technique for knee OA rehabilitation due to its positive effects, such as increased quadriceps torque and pain management, as well as negative effects, such as decreased muscular performance and motor function [7, 9]. Because of its strong adherence, KT can be applied directly to the skin and left on for several days. The treatment is

patient friendly and reasonably easy to use in day-to-day life due to the low risk of skin irritation [10]. It was reported that using KT for 4 weeks reduced pain during the day, when people are more active, and resulted in a considerable reduction in the use of analgesic [11]. However, because of a scarcity of research studies, little is known about the impact on clinically relevant symptoms or the underlying physiological changes that may cause adverse consequences. As a result, the use and benefits of Kinesio taping are still hotly debated [12]. Aim of the study to know the effectiveness the use of kinesio taping there will be reduced pain and improvement in the functional outcome of OA knee.

Materials and Methods: This is a prospective study, non-probable sampling technique Conducted in the Department of Orthopaedics**,** Sree Mookambika Institute of Medical Sciences, Kulasekharam from June 2023 to December 2023 for a period of 6 months, the study participants which include patient aged >40 and <70 years with Osteoarthritis knee population**.,** Grade 0, I and II Osteoarthritis knee (Kellerman and Lawrence classification) with symptoms for more than 3 months according to the ACR clinical classification criteria and pain score of more than 4 cm on 10 cm Visual Analogy Score (VAS) will be included in this study And exclude the patient with aged < 40 years Grade III and IV- Osteoarthritis knee (Kellerman and Lawrence classification), Active infection in the knee, Secondary Osteoarthritis, Previous knee surgery, Previous intra-articular knee injection.

Study procedure:

Kinesio taping technique:

The professionally trained physical therapist or orthopaedic surgeon applied Kinesio taping twice a week for the entire 6-week study period. The patient is in a supine position with full knee flexion. Before application, the skin surface was cleaned. This technique involved the use of two Y-cut strips and two I-cut strips. On the two Y-cut strips, the following effects and procedures were used: one to increase anterior thigh muscle function (“paper of” tension), and the other to lower the risk of knee joint effusion. The initial Y-cut strip of one end was placed on the rectus femoris muscle following the split ends passed through the medial and lateral sides of the patella and ended in the tibial tuberosity. The other Y-cut strip was placed just below the tibial tuberosity following the split ends, which passed through the medial and lateral sides of the patella and ended in the vastus medialis and lateralis muscles. The two Y-cut strips were tensioned at 0% for the first 5 cm, 10–15% for the middle area, and 0% for the last 2 cm. The adhesive is activated using the KT technique after each application. Two I-cut strips were

applied one over the other on the patellar tendon toward the medial and lateral collateral ligaments to increase the mechanoreceptor stimulation, improve proprioception, and stabilize the knee. The subject was positioned in the supine position with the knee completely fixed. The first I-cut strip was applied directly to the inferior border of the patellar tendon with 100% tension following the adhesive tape was activated. Then the knee was extended to 20–30 degrees, with 75% of the tension applied until the tape reached the medial and lateral collateral ligaments, which was followed by adhesive activation. Finally, the subject was then instructed to extend the knee completely and direct the I-cut strip (about 10 cm) ends toward the posterolateral sides of the thigh with 0% tension and adhesive activation. Following that, the second strip was applied in the same method of application as the first, but it was applied lower and only covered half of the first [13,14].

Data collection methods including settings and periodicity

The Western Ontario and McMaster University Osteoarthritis Index (WOMAC) and the 10 cm Visual Analogy Score (VAS)will be used to assess the response to treatment at various intervals. The WOMAC will be used as a self-administered test consisting of a 24-item questionnaire divided into three subscales which measure pain (5 items, score range 0-20), stiffness (2 items, score range 0–8), and physical function (17 items, score range 0-68) [17]. The three normalized subscale values will be summed to provide the normalized WOMAC-total score in the range of 0 (best score) to 96 (worst score). With the use of WOMAC, a lower score represented a better outcome.

The VAS, which also will be administrated by the patient, ranged from 0 to 10 cm, with lower numbers representing less pain and higher numbers representing more pain. All the three measurements will be used at the time of enrolment in the study before application of the tape and then the VAS will be measured again at six weeks, three months and six months follow-up while the WOMAC will also be measured at four weeks, three months and six month.

RESULTS:

The mean age of our study is 58 % Majority of the patients were between 61-70 years of age.(Figure 1)

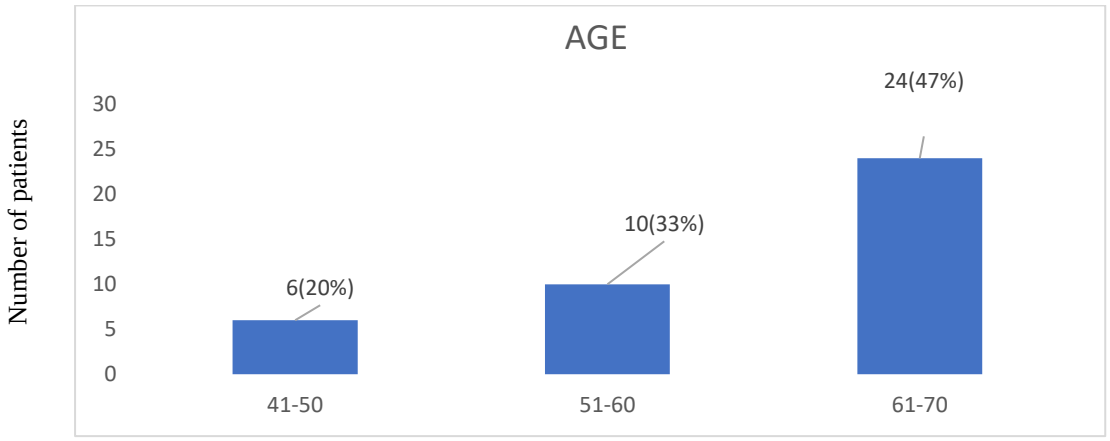

Figure 1: Age of the patients

In our study we had female predominance with 19 (63%) female patients and 11(37%) male patients. (Figure 2)

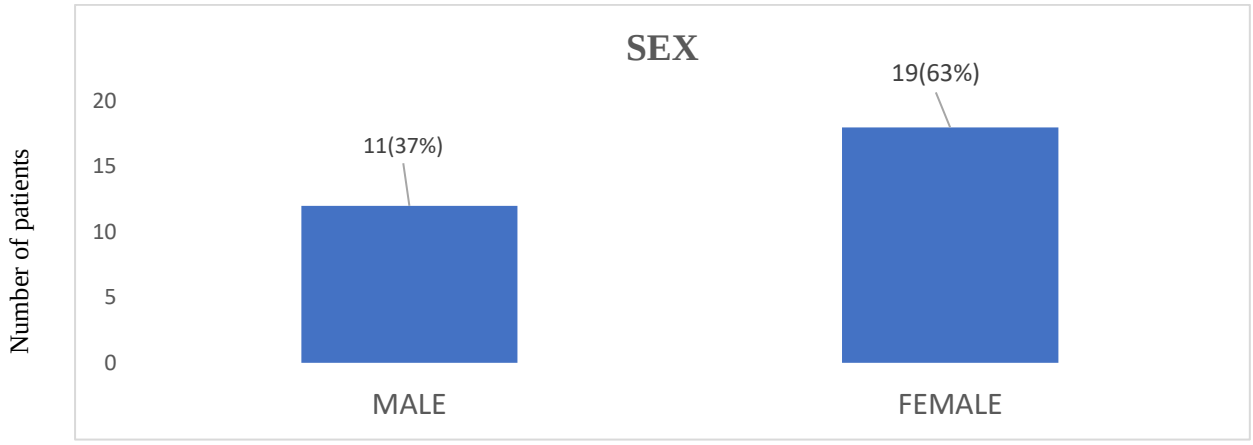

Figure:2 Sex of the patients

In our study we had a mean BMI of 26.1±2.7. 12 patients (40%) had a BMI between 21-25 , 15 patients (50%) had a BMI between 26-30 and 3 patients (10%) had BMI more than 30. (Figure 3)

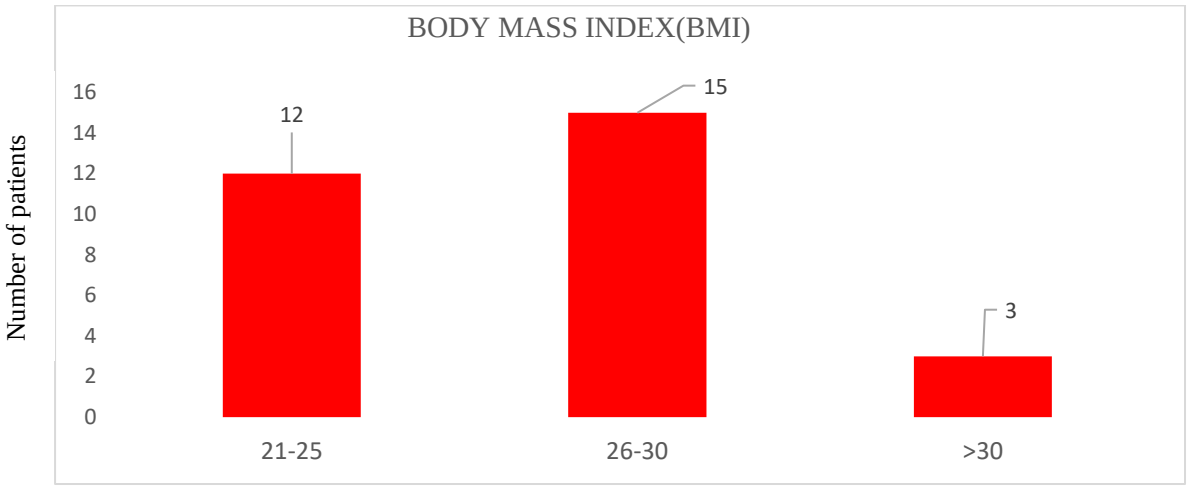

Figure 3: BMI of the patients

Out of 30 patients, 16 patients (53.33%) had right sided osteoarthritis knee and 14 patients (46.77%) has left sided osteoarthritis knee. (Figure 4)

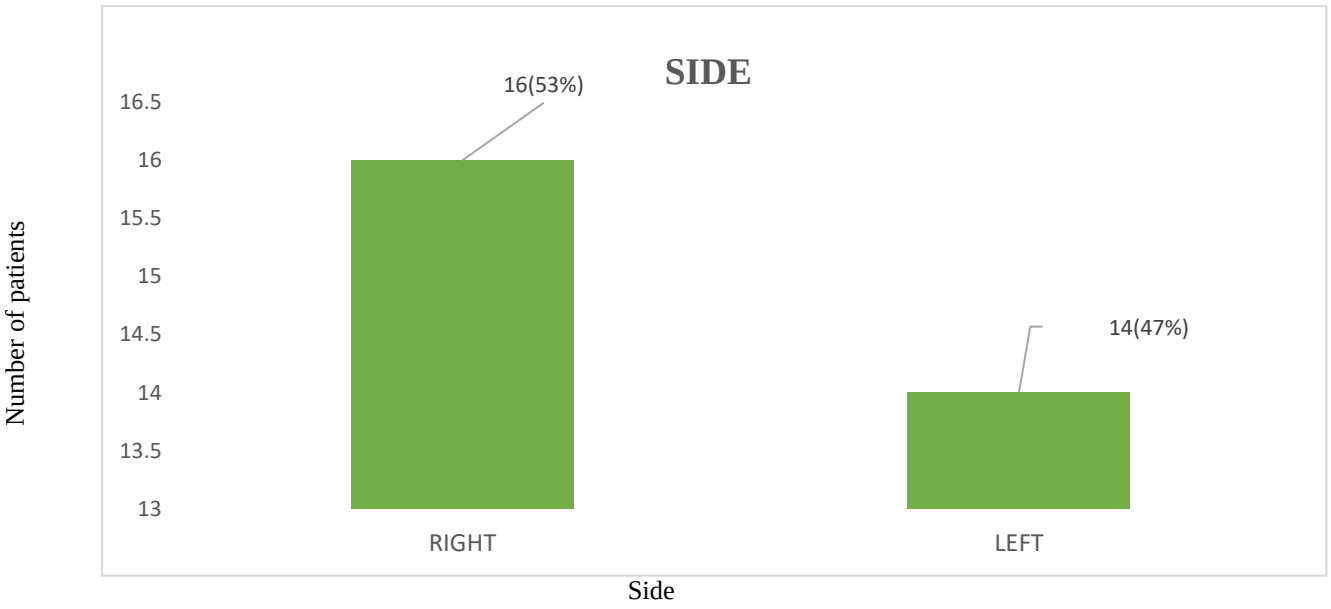

Figure 4: Side involved in the patients.

According to Kallgren grading of osteoarthritis knee, 16 patients (53%) had grade-I osteoarthritis knee and 14 patients (57%) had grade II osteoarthritis knee. (Figure 5)

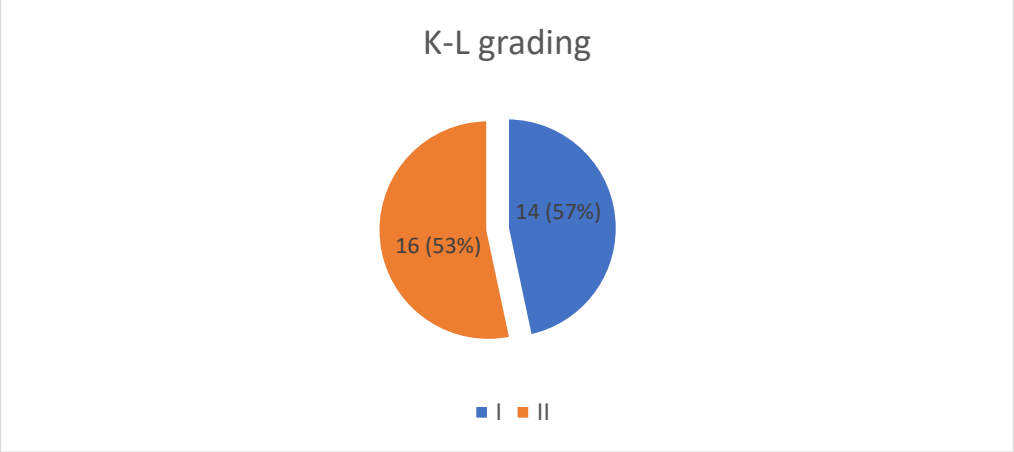

Figure 5: K-L grading of osteoarthritis in the patients

Mean VAS score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 7.5±2, 7.0±1.5, 5.6±1.4 and 4.5±1.5 respectively. (Figure 6)

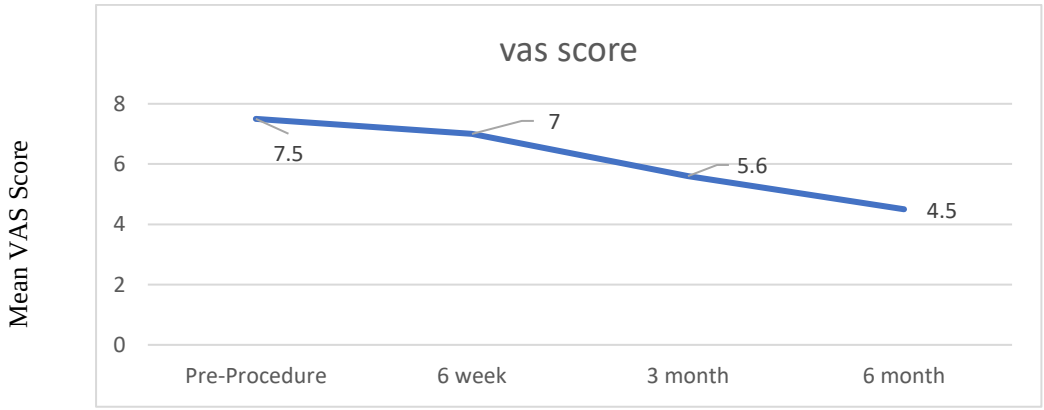

Figure 6: Mean VAS score of patients during follow up.

The mean pain score based on WOMAC score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 17±1.7, 13±3, 10±2.4 and 7±2.3 respectively. (Figure 7)

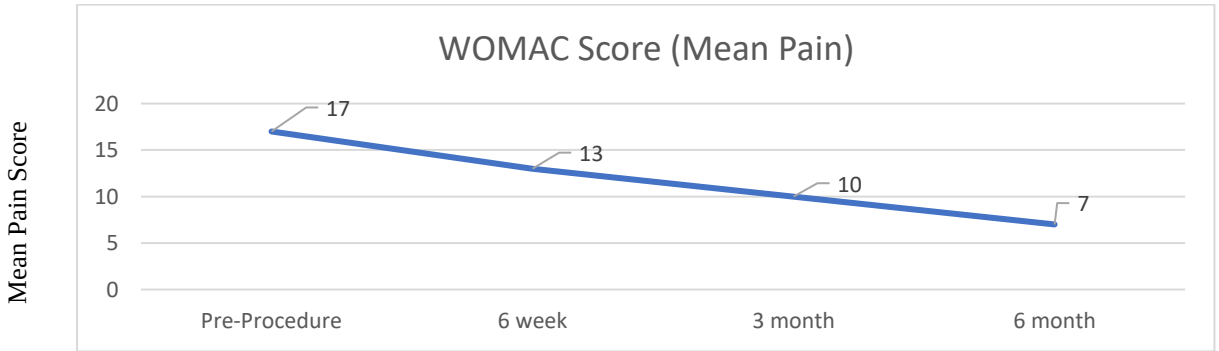

Figure 7: Mean Pain score in WOMAC score of patients during follow up.

The mean Function score based on WOMAC score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 50±4.3, 46±3.7, 43±5.7 and 40±7.1 respectively. (Figure 8)

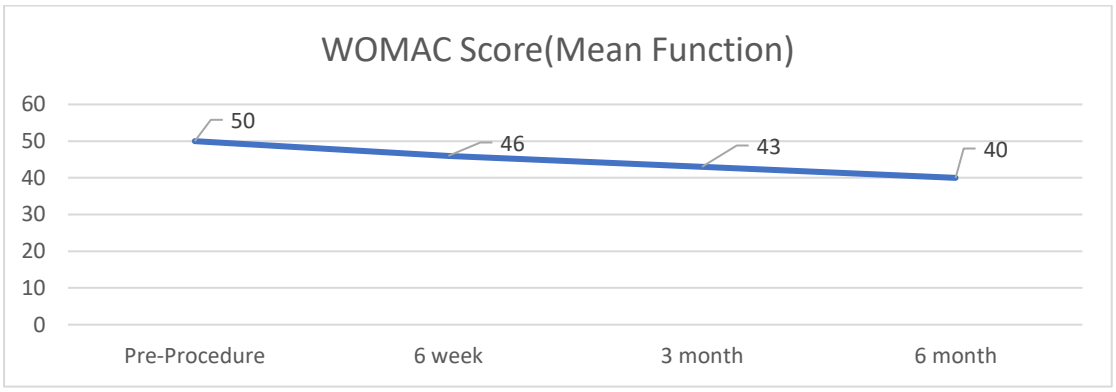

Figure 8: Mean Function score in WOMAC score of patients during follow up.

The mean stiffness score based on WOMAC score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 6.0±1.2, 5.2±1.4, 4.2±1.3 and 3.5±1 respectively. (Figure 9)

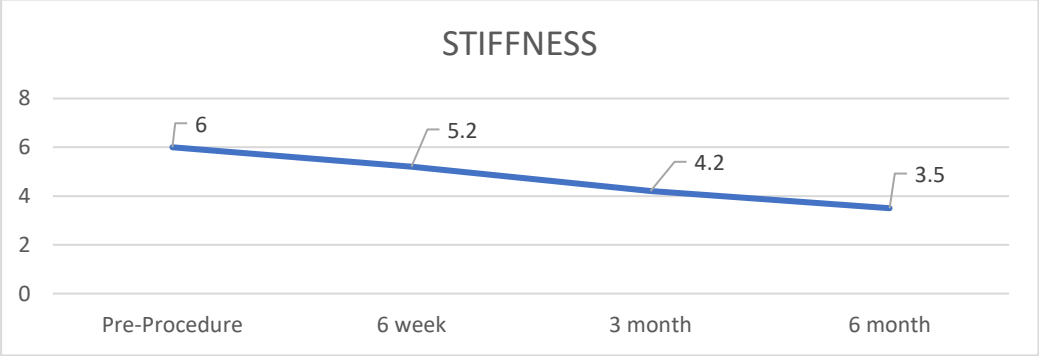

Figure 9: Mean Stiffness Score in WOMAC Score of patients during follow up.

In our study mean total WOMAC score of 30 patients at at pre-procedural, 6 weeks ,3 months and 6 months follow up are 74±8.3, 65±8.1, 60± 7.5 55±12.2 respectively. (Figure 10)

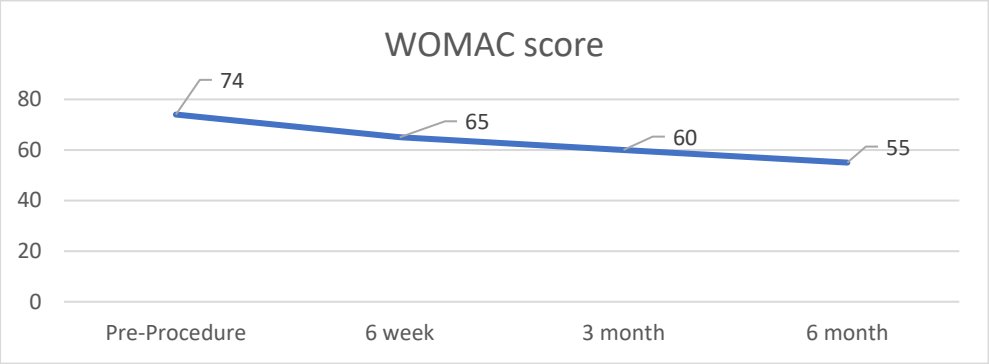

Figure 10: Mean WOMAC score of patients during follow up. l

DISCUSSION

In our study the mean age of the study population was is 58 years which was compared with a study done by K.M. Crossley et al **[15]**. in which the mean age is 56 years which is comparable with present study and a study by Anna Lina Rahlf et al. **[16]** which shows the mean age of 64.7 which is also nearly comparable with our present study. (Table 1)

STUDIES	**MEAN AGE**
K.M. Crossley et al. [15]	56 years
Anna Lina Rahlf et al. [16]	64.7
Present Study	58 years

Table 1: Comparison of age with other studies.

In our study we had female predominance with 63% female patients and 37 %male patients. Paola Castrogiovanni et al [17] done a study in which the results were 52% female patients and 49% male which also shows female predominance and a study done by. In Anna Lina Rahlf et al. **[16]** which revealed that, 51% were males and 49% female also shows female predominance, which is comparable with our present study. (Table 2)

Studies	**Female (%)**	**Male (%)**
Paola Castrogiovanni [17]	52	49

Anna Lina Rahlf et al. [16]	51	49
Present Study	63	37

Table 2: Comparison of sex with other studies.

In our present study we had a mean BMI of 26.1±2.7 which was compared with a study done by Shahul Hameed P K et al. [18] which revealed the mean BMI was 26.65 ± 2.85 and another study doner by Yago Tavares Pinheiro [19] Which shows the mean BMI in his study population was 28.2 ± 2.0 which is comparable with present study. (Table 3)

Studies	**BMI**
Shahul Hameed P K et al. [18]	26.65 ± 2.85
Yago Tavares Pinheiro et al. [19]	28.2 ± 2.0
Present Study	26.1±2.7

Table 3: Comparison of BMI with other studies.

In our present study the Osteoarthritis were classified based on Kallgren grading of osteoarthritis knee, 53% had grade-I osteoarthritis knee and 57% had grade II osteoarthritis knee. Which is compared with a study done K.M. Crossley et al. [15] which reviled 45% had grade-I osteoarthritis knee and 57% had grade II osteoarthritis knee. Which is comparable with our present study. (Table 4)

Studies	K-L Grade I(%)	K-L Grade II (%)
K.M. Crossley et al. [15]	45	55
Present Study	53	57

Table 4: Comparison of K-L Grading with other studies.

In our present study the Mean VAS score of 30 patients at pre-procedural and end of 6 months follow up are 7.5±2 and 4.5±1.5 respectively which is significantly reduced and the results were statistically significant with p valve of (<0.005). our study is compared with a study done by Shahul Hameed P K et al. [18] in his study the mean VAS score of Pre-procedural and end of 6 months follow up are 6.35 ± 1.23 and 3.10 ±1.12 respectively which is significantly reduced which is comparable with our present study, and a study done by Yago Tavares Pinheiro [19] which revealed the mean VAS score of Pre-procedural and end of 6 months follow up are 6.9± 1.5and 3.0 ±2.25 respectively which is significantly reduced which is comparable with our present study. (Table 5)

Studies	Mean VAS Score	
	Pre-procedure	End follow-up
Shahul Hameed P K et al. [18]	6.35 ± 1.23	3.10 ± 1.12
Yago Tavares Pinheiro [19]	6.9 ± 1.5	3.0 ± 2.5
Present study	7.5±2	4.5±1.5

Table 5: Comparison of Mean VAS score with other studies before and follow up.

In our present study the mean pain score based on WOMAC score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 17±1.7, 13±3, 10±2.4 and 7±2.3 respectively, and the mean stiffness score based on WOMAC score of 30 patients at pre-procedural, 6 weeks ,3 months and 6 months follow up are 6.0±1.2, 5.2±1.4, 4.2±1.3 and 3.5±1 respectively, which has statistically significant with p valve of (<0.005) which is compared with a study done by Shahul Hameed P K et al. [18]which showed that pre-procedural Mean pain score in WOMAC score was 10.15 ± 2.41 and at the end 6 months follow up Mean pain score in WOMAC score was 4.15 ± 1.39 which is comparable with our study and mean stiffness score in WOMAC score was 4.30 ± 1.75 at pre-procedural and the end of follow up result was 2.0 ± 0.92 which is comparable with our study. (Table 6)

Studies	Mean WOMAC Score	Mean WOMAC Score

	(PAIN)		(STIFFNESS)	
	Pre-procedure	End follow-up	Pre-procedure	End follow-up
Shahul Hameed P K et al. [18]	10.15 ± 2.41	4.15 ± 1.39	4.30 ± 1.75	2.0 ± 0.92
Present study	17±1.7	7±2.3	6.0±1.2	3.5±1

Table 6: Comparison of Mean Pain and Stiffness score in WOMAC score

In our study mean total WOMAC score of 30 patients at at pre-procedural and at the end of 6 months follow up was 74±8.3and 55±12.2 respectively which is compared with a study done by Yago Tavares Pinheiro [19] which shows mean WOMAC at pre- procedural was 41.4 ± 21.1 and at the end of follow up the mean total WOMAC was 26.3 ± 10.9 which is not comparable with present study.

Conflict of interest: nil

Conclusion:

KT (kinesio tape) was found to improve pain and physical functioning of subjects with early knee osteoarthritis. The results of this study showed significant kinesio tape effects in the WOMAC subscales: pain, stiffness, and physical function and VAS score. This technique is recommended for early osteoarthritis not for the late stages. WOMAC and VAS score are useful tool in assessing the Knee functional outcome.

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