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### Comparison of Outcome Measures in Mild Grade Between Different Groups in Persons Having Chronic Knee Osteoarthritis

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#### ABSTRACT

Knee osteoarthritis (OA) is a typical ongoing joint sickness prompting torment and loss of actual capability, bringing about diminished personal satisfaction. A total of 51 individuals were enrolled in the study after signing consent form. Out of which, 40 individuals diagnosed as chronic knee OA completed the whole interventional program which lasted for 4 weeks and the data for them was analyzed statistically. From the 40 individuals, 20 who were not using knee sleeve previously were assigned to group A which were only given strengthening exercises. In mild grade, the group A had sample size (n) = 15. Group B had a sample size of n = 14. On the first day (table 6) pain on VAS was recorded with mean±SD in group A was 3.73±0.45 and in group B was 3.85±0.36 which showed no significant difference in both the groups. This reveals that the baseline of pain in mild sub group was of similar intensity. After the 4 weeks of strengthening exercises, the mean±SD group A was 0.33±0.47 and in group B was 0.14±0.36 (table 7). When the two groups A and B were compared statistically, this also showed no significant difference in both the groups. Neoprene knee sleeve with patella relief has helped to reduce pain in individuals with chronic knee OA. Neoprene knee sleeve with patella relief has also helped to improve proprioception in mild grade of chronic knee OA at 30° and 45°. Neoprene knee sleeve with patella relief has also helped to improve the function assessed by KOOS in overall grade and also in mild grade of chronic knee OA. Neoprene knee sleeve with patella relief could not add any extra effect to improve balance in individuals with chronic knee OA. Strengthening exercises given in both the group has improved balance but no additional effect of neoprene knee sleeve with patella relief is seen in group B (overall group B as well as the subgroups- mild grade of chronic knee OA. In the exercises group (A) only strengthening exercises were given. These exercises have helped to reduce pain, improve proprioception, balance and functional activity.

**Keywords:** knee osteoarthritis, Exercises, Mild grade, Neoprene knee orthosis

#### INTRODUCTION

Knee osteoarthritis (OA) is a typical ongoing joint sickness prompting torment and loss of actual capability, bringing about diminished personal satisfaction [1]. Around 33% of individuals with knee OA will encounter movement to further developed infection [2], which is the main sign for knee-substitution medical procedure. In western nations, the Age-Normalized Frequency Rates for complete knee substitution are roughly 150 for each 100,000 man years [3]. In any case, most of patients don't advance and are overseen in essential

wellbeing care. Clinical rules advocate non-drug medicines as first-line treatment for knee OA [4-6]. These incorporate data, exercise, and weight reduction, and are liked for their expected irrelevant unfavorable impacts while as yet having pertinent clinical viability. Notwithstanding this, both over-the-counter and recommended torment diminishing pharmacologic specialists (analgesics and calming specialists) are broadly and all the more usually involved medicines for knee OA in essential medical services [7]. Albeit these are liked for their simplicity of use and portion subordinate agony alleviating impact [8], they likewise have portion subordinate antagonistic

impacts [9-11]. After the utilization of pain relieving specialists, pharmacologic relief from discomfort is by all accounts related with expanded joint burdens, which might possibly bring about infection movement [12, 13]. Joint stacking plays a focal part in side effects and sickness movement [14], and treatments focusing on mechanical burden are consequently liable to find lasting success in the administration of knee OA. During the position period of strolling, high loads are applied to the average knee compartment [15]. Some proof shows that the outside top knee-adduction second (KAM) has a critical connection to in vivo estimation of average compartment load [15], and significant clinical results, including radiographic OA seriousness [16] and knee torment [17]. One review showed that the KAM drive may be more delicate in separating between the OA seriousness level than the pinnacle KAM [18]. A clever report showed that the consolidated pinnacle knee second from every one of the three planes (Knee File) is sufficiently delicate to recognize torment levels [19]. With pharmacologic and biomechanical medicines, the joint burden is amiable to clinically pertinent change [19-23]. The knee record is affected by the utilitarian arrangement of the storage compartment, pelvis, and lower-appendage fragments concerning the knee during development and the ground-response force created. In this way, almost certainly, intercessions, like neuromuscular activity, focusing on the proficiency of lower-appendage development and muscle-actuation examples can be viable in further developing powerful knee-joint stacking [14, 24], while intercessions giving relief from discomfort through pharmacologically intervened pathways might be related with an expansion in knee-joint burden [12, 13].

#### ***Exercise as treatment in knee injury and knee OA***

NeuroMuscular Activity (NEMEX) incorporates activities to further develop balance, muscle initiation, utilitarian arrangement, and useful joint steadiness. Not at all like regular strength preparing, neuromuscular activity tends to the nature of development and underlines joint control in every one of the three planes. It significantly affects knee useful execution, knee biomechanics, and muscle-enactment examples of the encompassing knee muscular build [25, 26]. Neuromuscular activity increments useful knee security and, in pilot studies, can possibly lessen knee-joint loads and further develop ligament framework quality in those in danger or with gentle sickness [27-29] yet not in those with malaligned knees and further developed illness [30]. Neuromuscular activity is utilized successfully for counteraction and restoration of front cruciate tendon injury [31-33] recovery in patients with a meniscal tear regardless of the mix of meniscectomy [34, 35] and in patients with moderate to extreme OA before complete joint substitution [36, 37]. Regardless of its utilization in different circumstances and in more-extreme phases of OA, just a single report has researched the impact of this exercise structure in beginning phases of knee OA: an uncontrolled pilot study comprising of 13 patients with gentle knee OA [27] that came about in a  $-0.8$  Nm/kg (95% CI,  $-0.04$  to  $-0.16$ ) decrease (14%) in top KAM during one-leg ascend following two months of neuromuscular activity.

#### ***Pharmacologic pain relief and joint load in knee OA***

Torment is an instrument that assists with safeguarding harmed endlessly tissue in danger of harm. In sound subjects,

tentatively prompted knee torment has been displayed to imitate adjusted stride development methodologies found in patients with gentle knee OA (that is, decreased first pinnacle KAM and sagittal plane minutes were seen) [38]. Studies have shown that pharmacologically started relief from discomfort in knee OA is related with expanded loads in KAM and sagittal knee minutes [12, 17, 32, 39, 40]. Hence, pharmacologic help with discomfort, by wiping out the defensive component of the actual aggravation might be negative for knee-joint designs by expanding knee-joint burden. The most well-known pharmacologic relief from discomfort utilized in the administration of knee OA is acetaminophen and nonsteroidal calming drugs (NSAIDs). The aggravation easing impact seen from acetaminophen and NSAIDs is similar with the aggravation alleviating impact from a low portion (under 12 meetings) of activity [41, 42].

#### ***RESEARCH HYPOTHESIS***

There is no effect of neoprene knee orthosis as an adjunct to exercises on proprioception, balance and functional activity in persons with chronic knee OA.

#### ***MATERIALS & METHODS***

***MATERIALS USED AND EQUIPMENT:*** Plinth with pillow, Weighing machine Goniometer, Measuring tape and Marker, Neoprene knee sleeve with patella relief and plastic hinges used by 20 individuals with chronic knee OA, Computerized isokinetic System – Biodex 4 Pro

***STUDY DESIGN:*** Interventional design. (A comparative study involving 2 groups).

***SAMPLE SIZE:*** Total 51 individuals diagnosed as OA of knee were referred from the outpatient department of the institute for this study and assigned into 2 groups after signing the consent form. Out of which, 11 individuals withdrew from the study. 40 individuals have completed the whole interventional program. All individuals had radiographs anterior- posterior view of their knees.

***Group A:*** consisting of 20 individuals (mean age $\pm$ SD of  $54.05\pm 6.51$ , BMI =  $27.9\pm 2.88$ ) diagnosed with OA of knee who were not using knee sleeve were assigned in this group to give only strengthening exercises for knee flexors and extensors; hip abductors and ankle plantar flexors using isokinetic dynamometer for 3 times a week, for 4 weeks.

Group B consisting of 20 individuals (mean age  $\pm$ SD of  $55.6\pm 5.07$ , BMI =  $26.3\pm 6.6$ ) who were using knee sleeve prior to the study, for not more than 2 weeks during their activities of daily living involving standing & walking, were also given strengthening exercises for knee flexors and extensors; hip abductors and ankle plantar flexors 3 times a week, for 4 weeks.

#### ***SELECTION CRITERIA***

##### ***Inclusion Criteria***

- Individuals diagnosed as OA of knee involving medial compartment within the age group of 40-60 yrs including both the sexes.
- Individuals not under any therapeutic intervention for the last 6 months. Kellgren- Lawrence grade of I, II, and III.
- Individuals having pain on VAS  $\leq 4$

- Individuals who were using knee sleeve for minimum of 2 weeks were assigned to group B.
- Individuals who were not using knee sleeve were assigned to group A.

#### Exclusion criteria

- Individuals with KL grade IV,
- Lateral compartment knee OA,
- Previous knee operations, injury or fracture(s) to the lower limb bones,
- Limb length discrepancy,
- Individuals with neurological involvement,
- Individuals with any known metabolic or vascular conditions and all musculoskeletal condition other than primary OA of knee joint.

## METHODOLOGY

Title and synopsis were approved by the Ethics committee and the University. Following this, data collection was started. Subjects were selected according to the selection criteria by convenience sampling technique and the selected subjects

were explained about the detailed procedure of the study and after which written informed consent was taken from them. Subjective and objective evaluation was carried out according to the Performa.

The individuals wore comfortable clothing. Each and every test was done in the same place without any disturbance. The room was well lighted and ventilated.

## RESULTS AND DISCUSSION

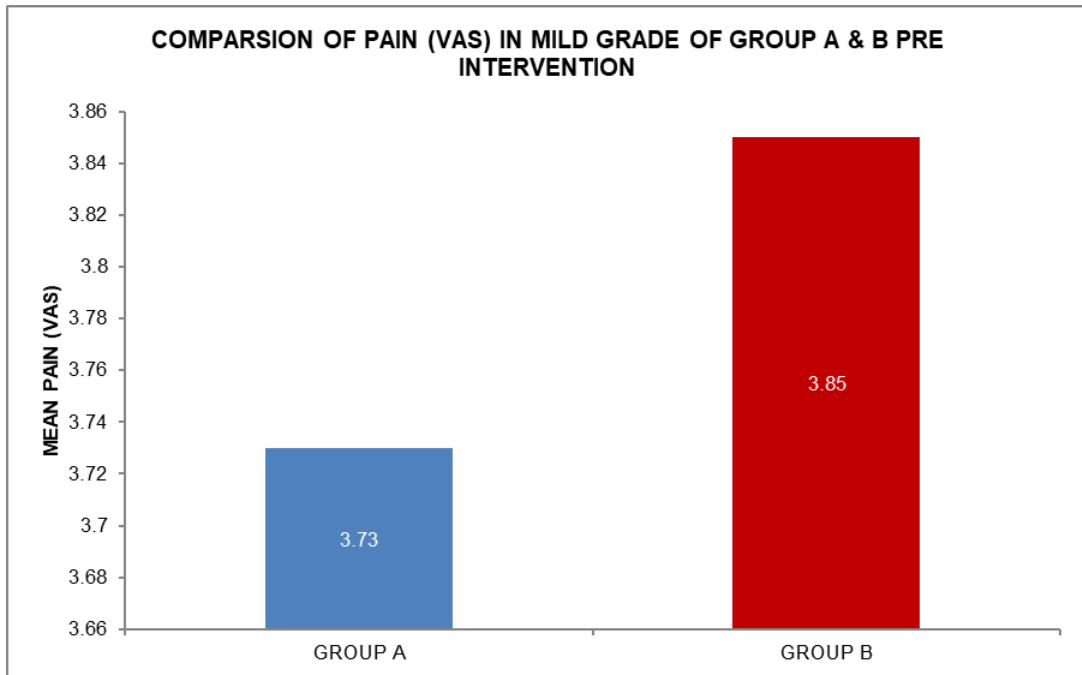
A total of 51 individuals were enrolled in the study after signing consent form. Out of which, 40 individuals diagnosed as chronic knee OA completed the whole interventional program which lasted for 4 weeks and the data for them was analyzed statistically. From the 40 individuals, 20 who were not using knee sleeve previously were assigned to group A which were only given strengthening exercises. The remaining 20 in group B who were using neoprene knee sleeve with patella relief and plastic hinges prior to the study, for minimum of 2 weeks during standing and walking, were also given strengthening exercises 3 times a week, for 4 weeks. Individuals with severe knee OA (Kellgren- Lawrence grade IV) were not considered for the study.

**Table 1: Comparison Of Outcome Measures (Pain, Proprioception, Function & Nce) In Mild Grade Between Group A & B Before The Intervention**

PARAMETERS		GROUP A (N = 15)	GROUP B (N = 14)	t or z VALUE	p-VALUE p<0.05	SIGNIFICANCE
		MEAN±SD	MEAN±SD			
PAIN (VAS)		3.73±0.45	3.85±0.36	*-0.808	0.419	NS
PROPRIOCEPTION (ERROR SCORE)	30° KNEEFLEXION	2.26±1.399	4.70±2.834	2.979	0.006	S
	45° KNEEFLEXION	3.32±2.621	6.2±4.183	2.238	0.033	S
	70° KNEEFLEXION	8.132±4.683	6.20±3.686	1.224	0.231	NS
SEBT (cm)	ANTERIOR EXCURSION	22.7±5.62	25.2±5.08	1.475	0.148	NS
	MEDIAL EXCURSION	20.8±6.06	24.9±6.17	2.120	0.040	S
	POSTERIOREXCURSION	18.96±5.59	21.68±5.97	1.490	0.144	NS
	LATERAL EXCURSION	14.25±3.91	16.92±3.554	2.259	0.029	S
KOOS (%)	PAIN	62.3±13.187	71.14±10.12	*-2.040	0.041	S
	SYMPTOMS	83.36±3.096	77.56±3.821	*-3.608	0.000	S
	ADL	83.14±9.472	78.69±9.139	*1.845	0.065	NS
	QOL	64.79±14.04	59.04±3.853	*1.005	0.315	NS

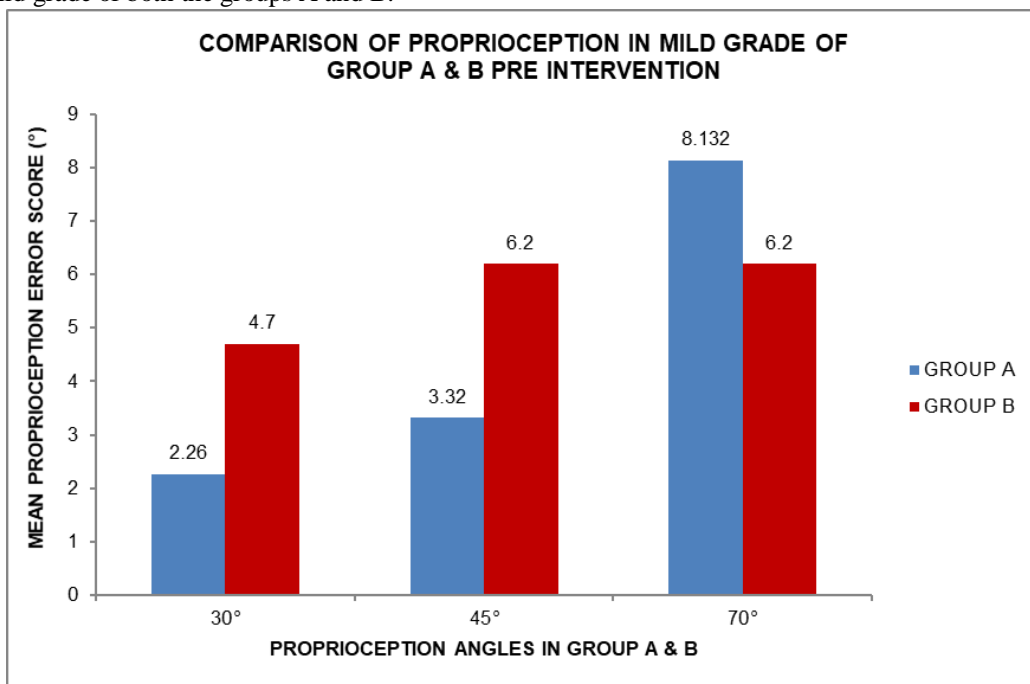
\* Indicates z- value for non parametric data. S = significant and NS = not significant

**A.) Pain** using VAS is compared in both the in **mild grade of group A and B preintervention**



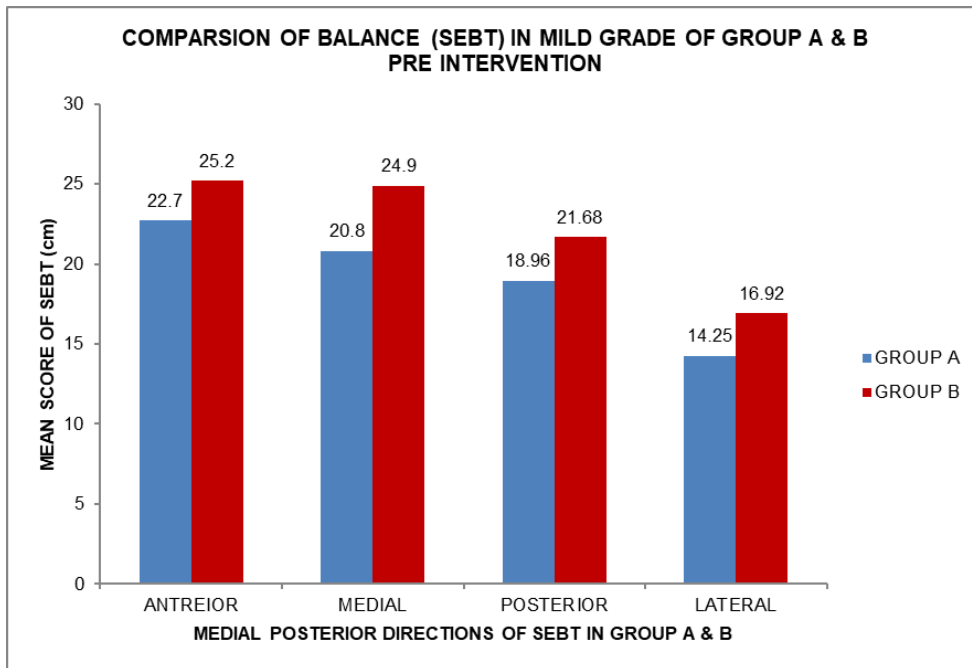
The above graph compares pain in mild grade of chronic knee OA in group A and B on the first day. There is no significant difference between group A and B with value > 0.05.

**B.) Proprioception** (using error score) is assessed using isokinetic dynamometer pre intervention in mild grade of both the groups A and B.



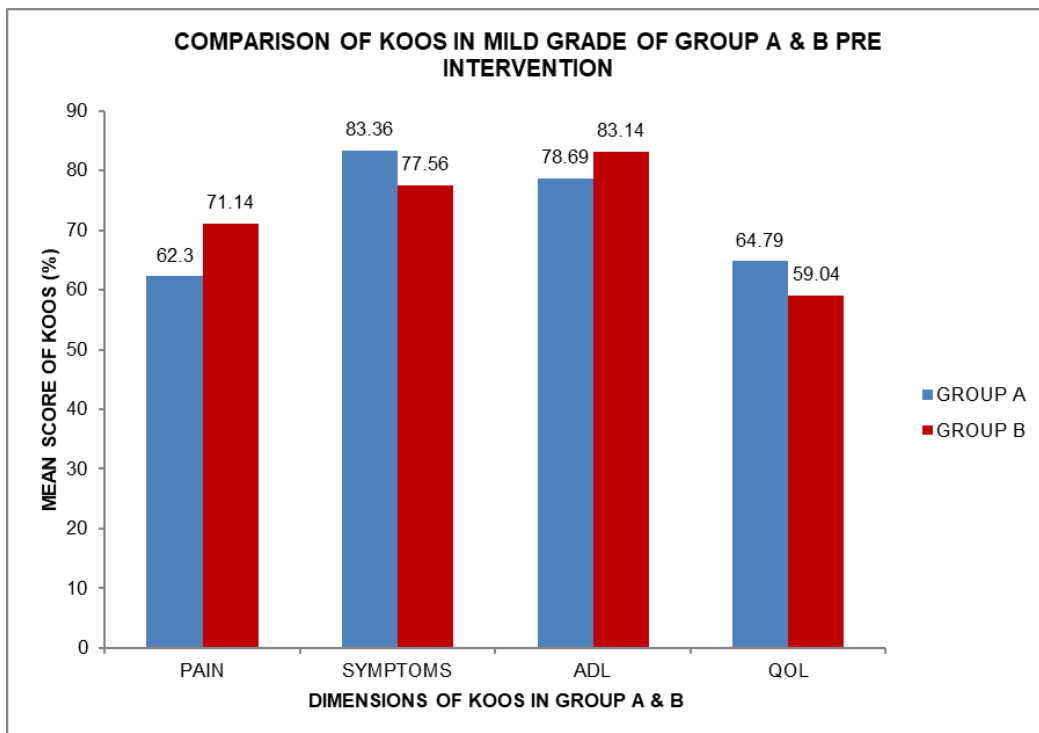
Above graph compares proprioception by means of error score at 30°, 45° and 70° of knee flexion in both the group A and B of mild chronic knee OA on post intervention. Results show that there is significant difference between the group A and B at 30° and 45° with group A with better score. At 70° of knee flexion, the angles pre intervention was not significant between group A and B.

**C.) Balance** is assessed by Star Excursion Test pre intervention in **mild grade of both the groups A and B**. 4 directions- anterior, posterior, medial and lateral excursions were measured using measuring tape.



The above graph shows comparison of balance in mild grade of chronic knee OA between group A and B pre intervention. There is a significant difference with group B better than group A at medial- lateral directions whereas no significant difference seen between group A and B at anterior – posterior directions.

**D.) Functional activity** is assessed by Knee injury and Osteoarthritis Outcome Score (KOOS) pre intervention in mild grade of both the group A and B. The dimensions are Pain, Other Disease-Specific Symptoms, ADL Function and knee-related Quality of Life. Being non- parametric data, non parametric tests, Mann Whitney Test (Wilcoxon Rank Sum Test) is used to analyze the data.



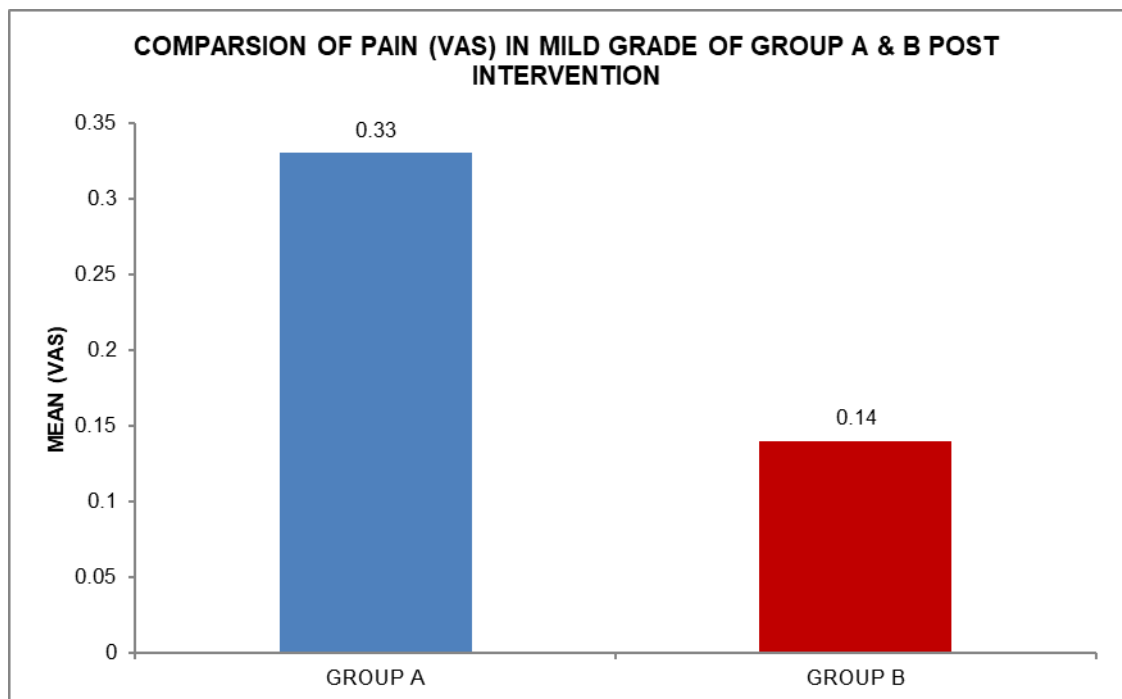
Above graph shows comparison of KOOS between group A and B in mild grade of knee OA. Pain and symptoms show significant difference between the groups with pain better in group B and symptoms better in group A. ADL and QOL show no significant difference between the groups.

**Fig 1: Compares the outcome compares the outcome measures of pain, proprioception, balance and functional activity in mild grade of group A and B before the start of intervention using unpaired t test. Pain and KOOS, being nonparametric data, the non parametric test (Mann Whitney U Test) is used.**

**Table 2: Comparison Of Outcome Measures (Pain, Proprioception, Function & Balance) In Mild Grade Between Group A & B Post Intervention**

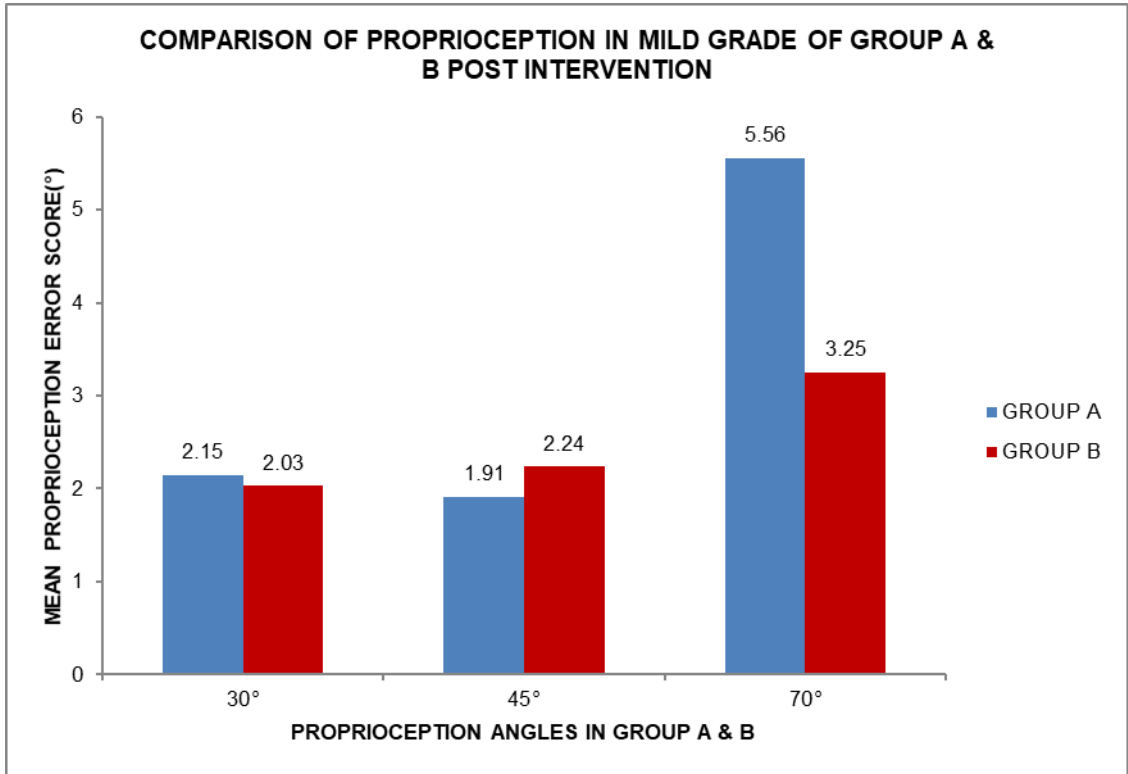
PARAMETERS		GROUP A (N = 15)	GROUP B (N = 14)	t / z VALUE	p-VALUE p<0.05	SIGNIFICANCE
		MEAN±SD	MEAN±SD			
PAIN (VAS)		0.33±0.487	0.14±0.36	*-1.717	0.239	NS
PROPRIOCEPTION (ERROR SCORE)	30° KNEEFLEXION	2.15±1.78	2.03±1.42	0.194	0.847	NS
	45° KNEEFLEXION	1.91±1.68	2.24±1.28	0.925	0.362	NS
	70° KNEEFLEXION	5.56±3.67	3.25±2.27	1.882	0.070	NS
SEBT (cm)	ANTERIOR EXCURSION	24.27±5.64	27.96±5.80	1.746	0.092	NS
	MEDIAL EXCURSION	22.66±5.96	26.7±6.470	1.504	0.144	NS
	POSTERIOREXCURSION	20.8±5.450	24.10±5.60	1.609	0.119	NS
	LATERAL EXCURSION	15.56±3.89	19.5±4.766	2.480	0.0197	S
KOOS (%)	PAIN	85.4±11.89	93.33±6.52	*-2.302	0.021	S
	SYMPTOMS	94.81±1.78	96.02±1.40	*-1.441	0.149	NS
	ADL	94.47±2.20	94.72±5.25	*-1.3334	0.182	NS
	QOL	83.8±6.54	81.6±8.750	*-0.068	0.946	NS

A.) Pain using VAS is compared in both the in mild grade of group A and B on post intervention after 4 weeks of intervention.



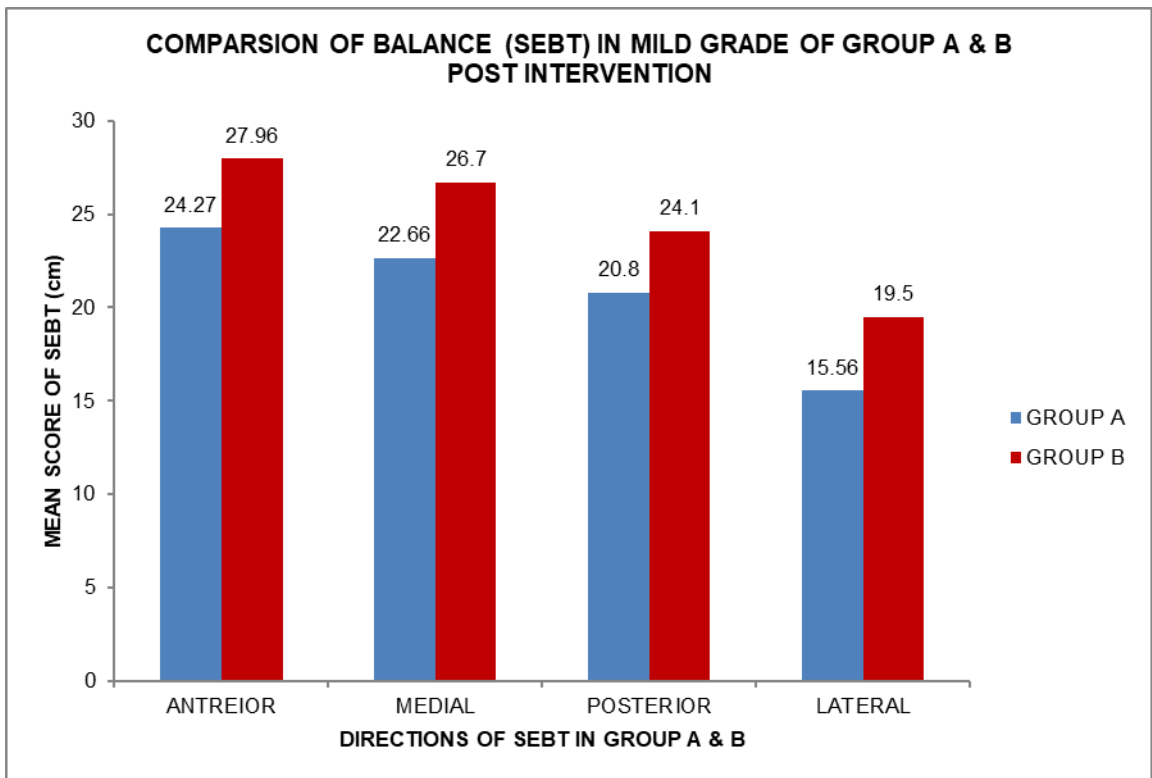
The above graph compares pain in mild grade of knee OA group A and B after the intervention of 4 weeks. There is no significant difference seen between group A and B, p value > 0.05. Thus, supporting the null hypothesis.

B.) **Proprioception** (using error score) is assessed using isokinetic dynamometer on post intervention in both the groups A and B.



Above graphs compares proprioception by means of error score at 30°, 45° and 70° of knee flexion in both the group A and B of mild grade of knee OA on post intervention. Results show that there is no significant difference between the group A and B at all the angles on post intervention. Thus, supporting the null hypothesis.

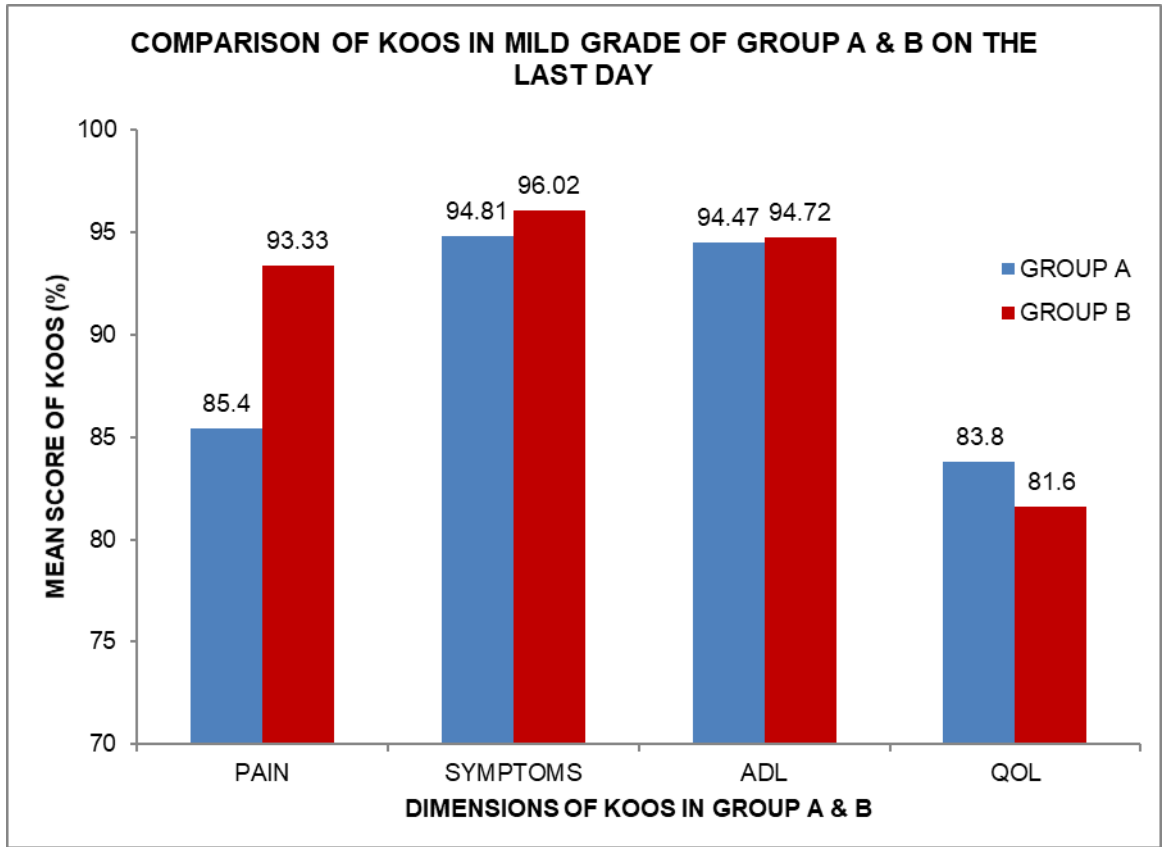
**C.) Balance** is assessed by Star Excursion Test on post intervention **in both the groups A and B**. 4 directions- anterior, posterior, medial and lateral excursions were measured using measuring tape.



Above graph shows comparison of balance in mild grade of knee OA between both the groups A and B on post intervention. Anterior, posterior and medial directions have shown no significant difference between the group A and B with pvalue>0.05, supporting the

null hypothesis. Whereas lateral direction show significant difference with group B better than A with p value < 0.05.

**D.) Functional activity** is assessed by Knee injury and Osteoarthritis Outcome Score (KOOS) on post intervention in mild grade of both the group A and B. The dimensions are Pain, Other Disease-Specific Symptoms, ADL Function and knee-related Quality of Life. Being non- parametric data, non parametric tests. Mann Whitney Test (Wilcoxon Rank Sum Test) is used to analyze the data.



Above graph compares KOOS in mild grade of knee OA between the group A and B. Pain shows significant improvement, post intervention in group B, showing that knee sleeve helped in group B of mild grade, rejecting the null hypothesis. The symptoms, ADL and QOL show no significant difference between the group A and B, supporting the null hypothesis.

**Fig 2 :** Compares the outcome measures of pain, proprioception, balance and functional activity in mild grade of group A and B post intervention using unpaired t test. Pain and KOOS, being nonparametric data, the non parametric test (Mann Whitney U Test) is used.

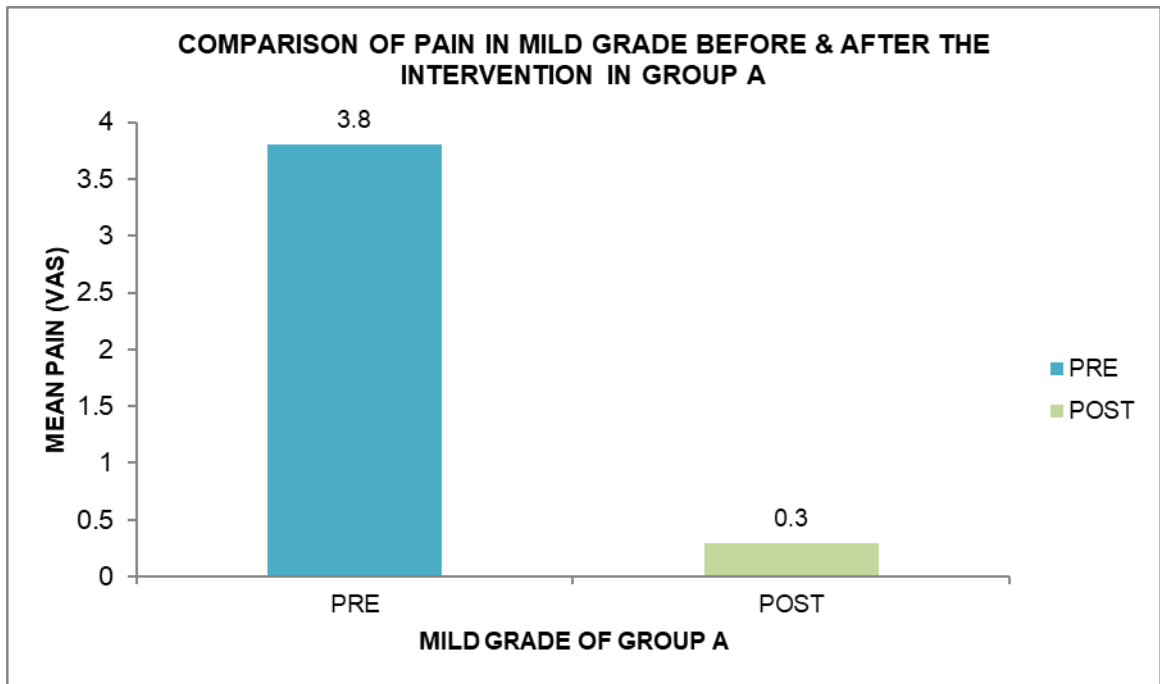
**Table 3: Comparison Of Outcome Measures (Pain, Proprioception, Function & Balance In Mild Grade In Group A Before & After The Intervention**

PARAMETERS	PRE	POST	t / z VALUE	p-VALUE p<0.05	SIGNIFICANCE	
	MEAN±SD	MEAN±SD				
PAIN (VAS)	3.73±0.45	0.33±0.487	*-3.520	0.000	S	
PROPRIOCEPTION (ERROR SCORE)	30° KNEEFLEXION	2.26±1.399	2.15±1.78	0.2198	0.8292	NS
	45° KNEEFLEXION	3.32±2.621	1.91±1.68	2.1594	0.0048	S
	70° KNEEFLEXION	8.132±4.683	5.56±3.67	4.4014	0.0001	S
SEBT (cm)	ANTERIOR EXCURSION	22.7±5.62	24.27±5.644	1.213	0.2450	NS
	MEDIAL EXCURSION	20.8±6.06	22.66±5.969	5.681	0.0001	S

	<b>POSTERIOREXCURSION</b>	18.96±5.59	20.8±5.450	6.29	0.0001	<b>S</b>
	<b>LATERAL EXCURSION</b>	14.25±3.91	15.56±3.899	8.671	0.0001	<b>S</b>
<b>KOOS (%)</b>	<b>PAIN</b>	62.3±13.187	85.4±11.89	*-3.428	0.001	<b>S</b>
	<b>SYMPTOMS</b>	83.36±3.096	94.81±1.78	*-3.421	0.001	<b>S</b>
	<b>ADL</b>	83.14±9.472	94.47±2.207	*-3.076	0.001	<b>S</b>
	<b>QOL</b>	64.79±14.04	83.8±6.54	*-3.245	0.001	<b>S</b>

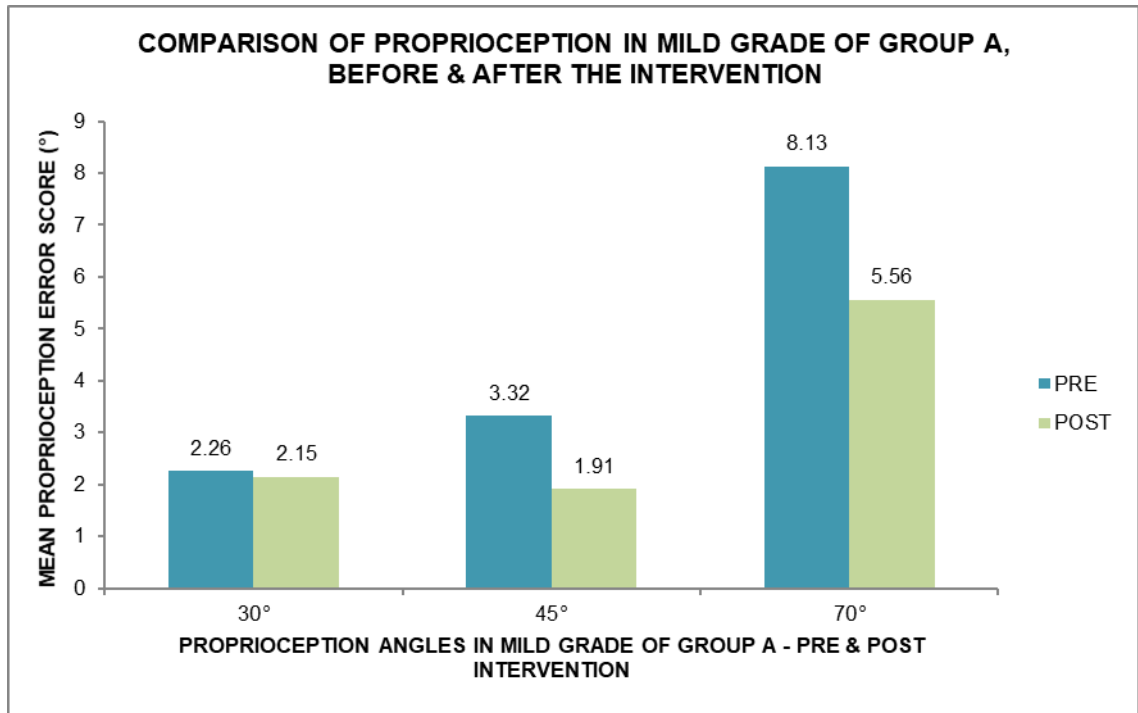
\* indicates z- value for non parametric data. S = significant and NS = notsignificant

**A.) Pain** using VAS is compared in the in **mild grade of group A, before and after the intervention of 4 weeks.**



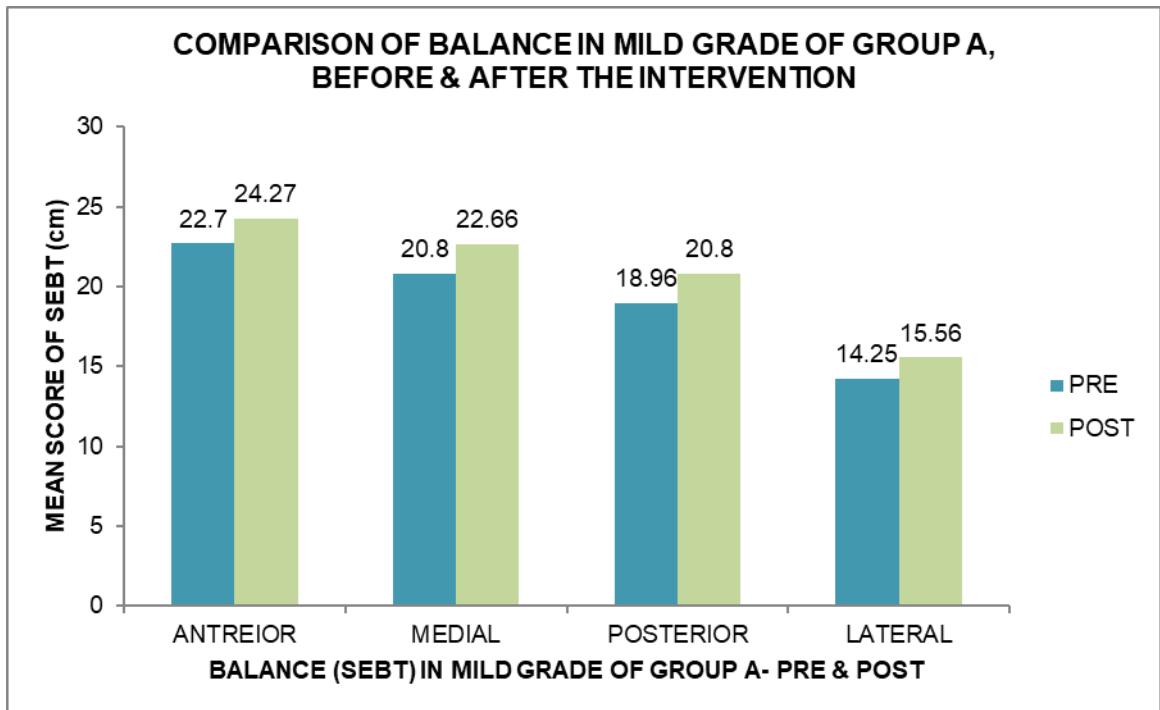
The above compares pain (VAS) in mild grade of group A, before and after the intervention of 4 weeks. Results show significant reduction in pain in group A of mild grade after 4 weeks of intervention with p value < 0.05.

**B.) Proprioception** (using error score) is assessed using isokinetic dynamometer before and after the intervention of 4 weeks in mild grade of group A.



The graph show comparison of proprioception (error score) at 3 angles (30°, 45° and 70°) in mild grade of group A, before and after 4 weeks of intervention which show significant improvement at the end of 4 weeks at 45° and 70° of knee flexion, p value being > 0.05. At 30° of knee flexion, no significant difference is seen.

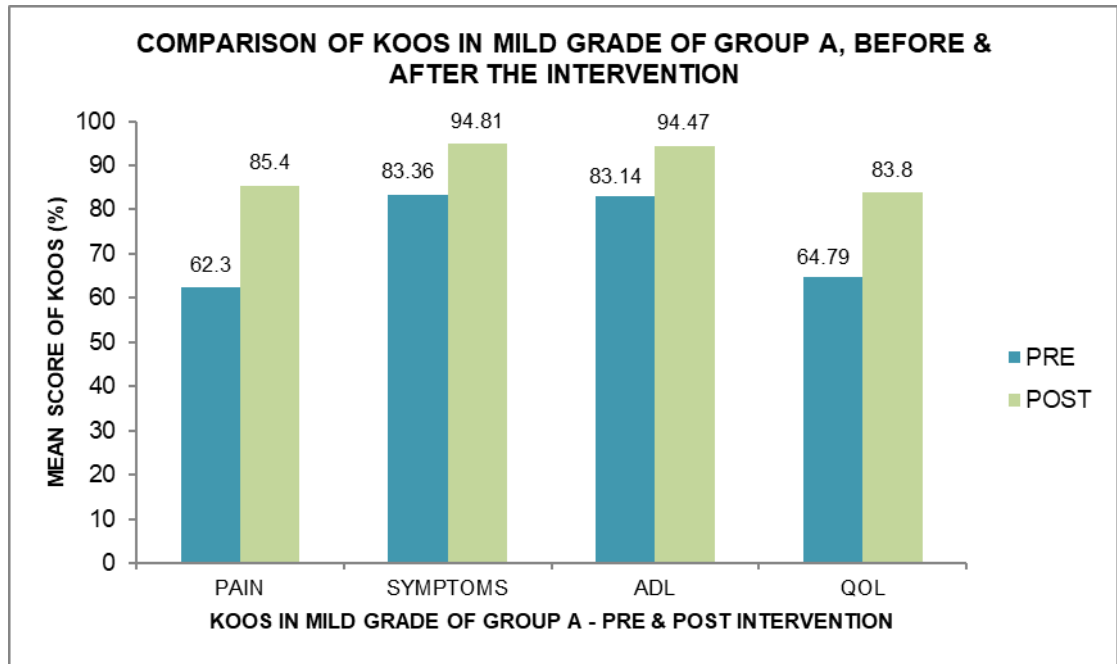
**C.) Balance** is assessed by Star Excursion Test **before and after the intervention of 4 weeks in mild grade of group A.** 4 directions- anterior, posterior, medial and or medial and lateral excursions were measured using measuring tape.



The above graph presents comparison of balance using SEBT in mild grade of group A, before and after the intervention of 4 weeks. This shows that balance is improved significantly in medial and lateral direction as well as posterior direction after the Intervention. No improvement seen in anterior direction.

**D.) Functional activity** is assessed by Knee injury and Osteoarthritis Outcome Score (KOOS) **before and after the intervention in group A of mild grade.** The dimensions are Pain, Other Disease-Specific Symptoms, ADL Function and knee-related Quality

of Life. Being non-parametric data, non parametric tests, Wilcoxon Matched pairs signed ranks test is used to analyze the data.



Above graph show comparison of KOOS in mild grades of group A, pre and post intervention. The dimensions of pain, symptoms, ADL and QOL were improved significantly after strengthening exercises with p value being 0.001.

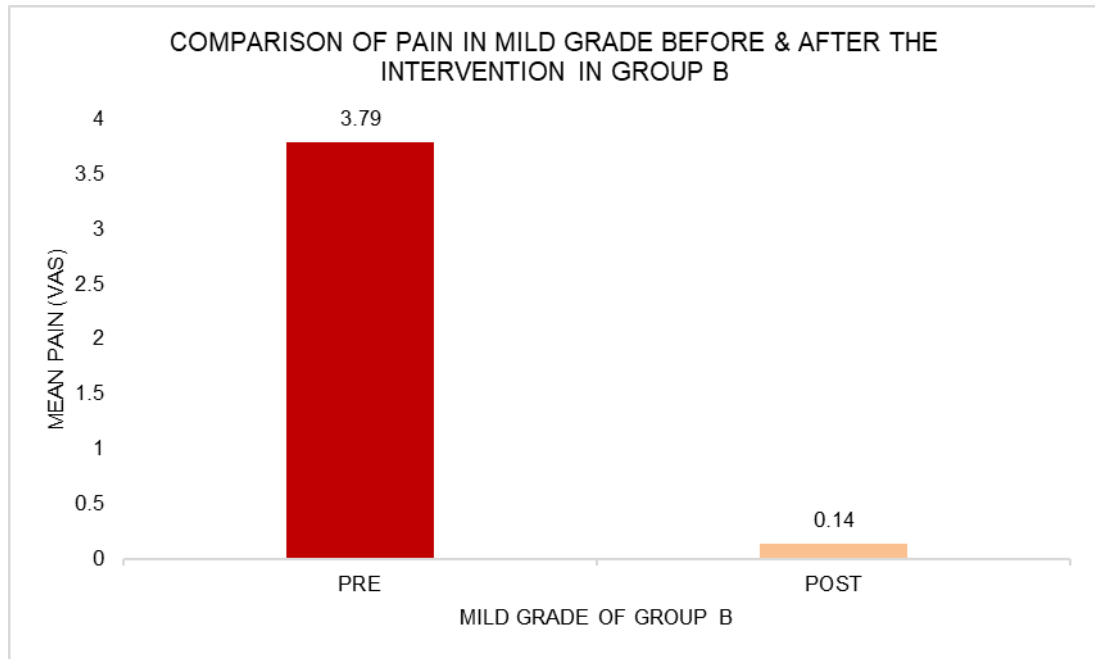
**Fig 3: Compares the outcome measures of pain, proprioception, balance and functional activity in mild grade of group A, before and after the intervention of 4 weeks using paired t test. Pain and KOOS, being nonparametric data, the non parametric test (Wilcoxon Matched pairs signed ranks test) is used.**

**Table 4: Comparison Of Outcome Measures (Pain, Proprioception Function & Balance) In Mild Grade In Group B Before & After The Intervention**

PARAMETERS		PRE	POST	t / z VALUE	p- VALUE p<0.05	SIGNIFICANCE
		MEAN±SD	MEAN±SD			
PAIN (VAS)		3.85±0.36	0.14±0.36	*-3.448	0.001	S
PROPRIOCEPTION (ERROR SCORE)	30° KNEEFLEXION	4.70±2.834	2.03±1.42	3.987	0.0015	S
	45° KNEEFLEXION	6.2±4.183	2.24±1.28	3.6189	0.0031	S
	70° KNEEFLEXION	6.20±3.686	3.25±2.27	2.739	0.0179	S
SEBT (cm)	ANTERIOR EXCURSION	25.2±5.08	27.96±5.806	4.255	0.0009	S
	MEDIAL EXCURSION	24.9±6.17	26.7±6.470	4.479	0.0006	S
	POSTERIOR EXCURSION	21.68±5.97	24.10±5.60	3.680	0.0028	S
	LATERAL EXCURSION	16.92±3.554	19.5±4.766	4.880	0.0003	S
KOOS (%)	PAIN	71.14±10.12	93.33±6.523	*-3.307	0.001	S
	SYMPTOMS	77.56±3.821	96.02±1.405	*-3.314	0.001	S
	ADL	78.69±9.139	94.72±5.256	*-3.301	0.001	S
	QOL	59.04±3.853	81.6±8.750	*-3.346	0.001	S

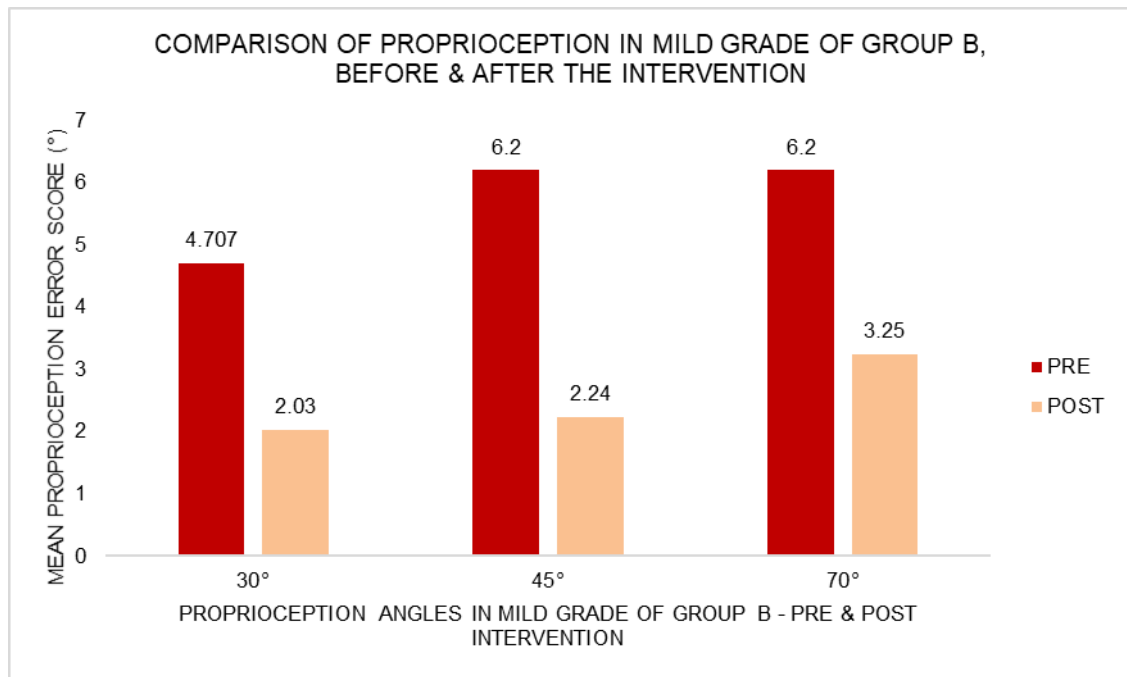
\* indicates z- value for non parametric data. S = significant and NS = notsignificant

A.) Pain using VAS is compared in the in group A, before and after theintervention of 4 weeks.



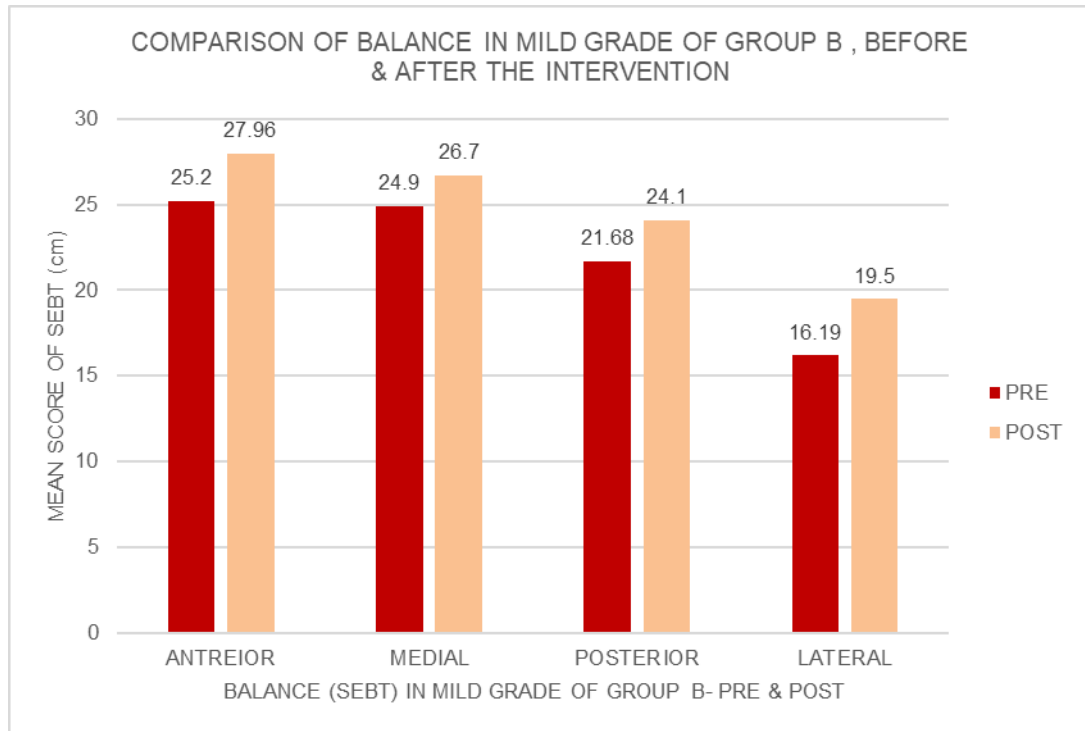
The above graph shows pain (VAS) in mild grade of group B, before and after the intervention of 4 weeks. Results show significant reduction in pain in group B after 4 weeks of intervention with p value < 0.05

**B.) Proprioception** (using error score) is assessed using isokinetic dynamometer **before and after the intervention of 4 weeks in mild grade of group B.**



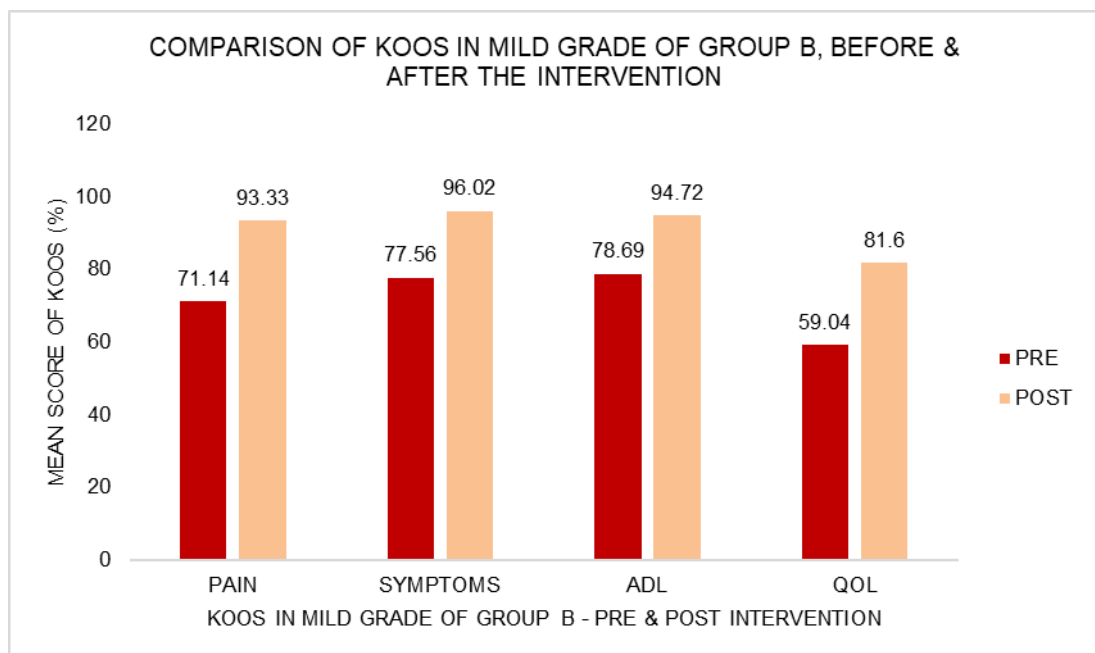
The graph shows comparison of proprioception (error score) at 3 angles (30°, 45° and 70°) in mild grade of group B before and after 4 weeks of intervention which shows significant improvement at the end of 4 weeks at all the angles, p value being > 0.05.

**C.) Balance** is assessed by Star Excursion Test **before and after the intervention of 4 weeks in group B of mild grade.** 4 directions- anterior, posterior, medial and lateral excursions were measured using measuring tape.



The above graph presents comparison of balance using SEBT in mild grade of group B, before and after the intervention of 4 weeks. This shows that balance is improved significantly in all the directions, with p value of < 0.05.

**D.) Functional activity** is assessed by Knee injury and Osteoarthritis Outcome Score (KOOS) before and after the intervention in group B of mild grade. The dimensions are Pain, Other Disease-Specific Symptoms, ADL Function and knee-related Quality of Life. Being non-parametric data, non parametric tests, Wilcoxon Matched pairs signed ranks test is used to analyze the data.



The above graph shows comparison of KOOS in mild grade of group B, pre and post intervention of 4 weeks. The dimensions of pain, symptoms, ADL and QOL were proved significantly after the intervention with p value being 0.05.

**Fig 4: Compares the outcome measures of pain, proprioception, balance and functional activity in group B of mild grade, before and after the intervention of 4 weeks using paired t test. Pain and KOOS, being nonparametric data, the non parametric test (Wilcoxon Matched pairs signed ranks test) is used.**

## CONCLUSION

Neoprene knee sleeve with patella relief has helped to reduce pain in individuals with chronic knee OA. Neoprene knee sleeve with patella relief has also helped to improve proprioception in mild grade of chronic knee OA at 30° and 45°. Neoprene knee sleeve with patella relief has also helped to improve the function assessed by KOOS in overall grade and also in mild grade of chronic knee OA. Neoprene knee

sleeve with patella relief could not add any extra effect to improve balance in individuals with chronic knee OA. Strengthening exercises given in both the group has improved balance but no additional effect of neoprene knee sleeve with patella relief is seen in group B (overall group B as well as the subgroups- mild grade of chronic knee OA. In the exercises group (A) only strengthening exercises were given. These exercises have helped to reduce pain, improve proprioception, balance and functional activity.

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