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Immediate Effects Of Suboccipital Inhibition Technique Vs Passive Stretching In Hamstring Tightness: Comparative Study

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Abstract: Hamstring tightness is a prevalent issue among young individuals, often linked to sedentary lifestyles. This study aimed to compare the immediate effects of suboccipital muscle inhibition and passive stretching on improving hamstring tightness. Forty-four participants (aged 17-25) were randomly divided into two groups: one receiving suboccipital inhibition and the other passive stretching. Both groups demonstrated significant improvements in hamstring flexibility, as measured by the popliteal angle and sit-and-reach test, following a single session of their respective interventions. This suggests that both techniques are equally effective in addressing hamstring tightness, offering potential therapeutic options for individuals experiencing this common musculoskeletal condition.

Index Terms **-** Suboccipital Inhibition Technique, Passive Stretching, Hamstring Tightness, Comparison

I.INTRODUCTION

Flexibility is the ability of a joint or series of joints to move through an unrestricted, pain free range of motion. Although flexibility varies widely from person to person, minimum ranges are necessary for maintaining joint and total body health. Many variables affect the loss of normal joint flexibility including injury, inactivity or a lack of stretching. The range of motion will be influenced by the mobility of the soft tissues that surround the joint. These soft tissues include: muscles, ligaments, tendons, joint capsules, and skin. A lack of stretching, especially when combined with activity can lead to a fatigue induced soft tissue shortening over time.

Restriction to stretch of a muscle or group of muscle due to reduced activity leads to tightness of it. It is the most common widespread dysfunction faced by younger individuals. Hamstring tightness being the commonest dysfunction faced by individuals. The prolonged sitting hours required in today's concept of work from home to online lectures is one of the major factors predisposing the individual towards hamstring tightness. According to studies prevalence of hamstring tightness is very high in younger individuals of age group 18-25.

Recently it has been reported that there is an improvement in hamstring tightness using suboccipital inhibition technique. Suboccipital inhibition technique is a method of relaxing the tension in the suboccipital muscles (rectus capitis posterior major, rectus capitis posterior minor, obliquus capitis superior, and obliquus capitis inferior) that are located between the occiput and the axis. There is myofascial bridge between the suboccipital muscles especially the rectus capitis posterior minor and the dura and also between the ligamentum nuchae and the dura. In addition, there is attachment between the dura and the posterior aspect of bodies of lumbar, thoracic vetrtebrae and the posterior longitudinal ligaments.

Stretching is a form of physical exercise in which a specific skeletal muscle is deliberately to its fullest length in order to improve the muscle's felt elasticity and reaffirm comfortable muscle tone. The result is a feeling of increased muscle control, flexibility and range of motion. The common form of stretching used for rehabilitation is passive stretching administered by the therapist to the individual.

II. METHODOLOGY

The study which was conducted in Nashik, is a comparative study between two techniques that are suboccipital muscle inhibition technique and passive stretching on hamstring tightness. The age criteria for the study were younger individuals of age 17-25 years. Participants recruitment was based on below mentioned inclusion and exclusion criteria. The intervention performed on Participants was through lottery method. A sample size of 40 individuals was taken. The effects of intervention were measured using the two following outcome measure: Popliteal angle, Sit and reach test.

III. OUTCOME MEASURES

3.1 Sit and Reach Test

A. This test involves sitting on the floor with the legs stretched out straight ahead without shoes, the soles of the feet should be placed against the wall/box.
B. Both knees should be locked and pressed flat against the box
C. Placing the hands one above another while palm facing downward, the subject reaches forward along the measuring line as far as possible
D. Ensure that the hands remain at the same level
E. Hold that position for at least 1 to 2 seconds while the distance is recorded.

3.2 Popliteal Angle (Active Knee Extension Test)

A. It is a measurement of hamstring flexibility.
B. In this, the subject is lying on plinth.
C. While the lower extremity is positioned in hip and knee flexion in 90-90 degree then the angle between them is measure by goniometer.
D. The axis is positioned at patient's lateral epicondyle of femur, fixed arm along the long axis of femur and moving arm along the line between fibular head and lateral malleolus.

Fig. 1: Sit and Reach Test

Fig. 2: Popliteal Angle

IV. SUBOCCIPITAL MUSCLE INHIBITION TECHNIQUE

Suboccipital muscle inhibition (SMI) technique is a method of relaxing the tension in four muscles: Rectus capitis posterior major, Rectus capitis posterior minor, Obliquis capitis inferior, Obliquis capitis superior.

There is a myofascial bridge between the suboccipital muscles, especially the rectus capitis posterior minor muscle and the dura and also between the ligamentum nuchae and dura. In addition, there is attachment between the dura and the posterior aspect of bodies of lumbar, thoracic vertebrae and the posterior longitudinal ligaments. The technique is executed as follows:

A. With the patient in supine position, the therapist sits near the head of table and places the palm of hand under the subject's head.

B. Pads of therapist's finger are placed over posterior arch of atlas which was palpated between the external occipital protuberance and the spinous process of axis vertebrae.
C. Therapist locates this with middle and ring fingers of both hands in the space between the occipital condyles and the spinal process of second cervical vertebrae.
D. Then, with the metacarpophalangeal joints in 90 degrees of flexion, therapist rests the base of skull on hands.
E. Pressure is exerted in upward direction and towards the therapist. The pressure is maintained for 2 minutes until tissue relaxation is achieved.
F. During the SMI technique, the subject is asked to keep his eyes closed to avoid eye movements affecting the suboccipital muscle tone.
G. The technique is applied for 2 minutes.

V. PASSIVE STRETCHING

A. Subjects are positioned in supine lying with low back as flat as possible
B. Hip flexed to 90 with slightly flexed knee supported by investigator at the ankle by placing it on his shoulder while stabilizing the other extremity.
C. With the knee in maximum extension, the hip as far as possible until the participant felt the stretch feeling on posterior thigh
D. The position of sub maximal stretch was maintained for hold of 15 seconds.

Fig. 3: Suboccipital Muscle Inhibition Technique

Fig. 4: Popliteal Angle

VI. DATA ANALYSIS

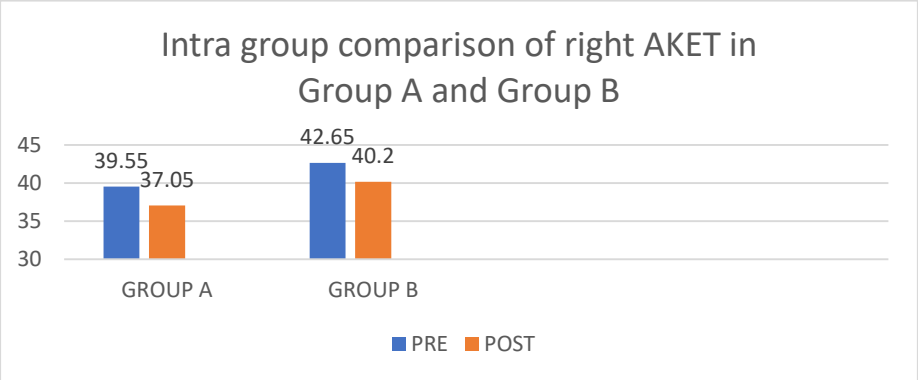
Descriptive analysis, including mean and standard deviation, was performed for all variables. Paired t test was used for comparison with group that is between pre and post intervention values. Unpaired t test for comparison between groups that is sub-occipital muscle inhibition technique and passive stretching.

Table 1: Intra group comparison of right AKET for Group A and Group B

	Pre treatment	Post treatment	p-value	t-value	Significance
t-test GROUP A (n=20)	39.55 ± 4.59	37.05 ± 4.78	<0.0001	21.7	Extremely significance
GROUP B (n=20)	42.65 ± 6.36	40.20 ± 6.34	<0.0001	15.96	Extremely significance

Values are presented as Mean ± Standard deviation P – values are obtained using paired t-test, after confirming the underlying normality assumptions P value <0.05 is considered to be extremely significant.

Graph 1: The distribution of Pre treatment and Post treatment of Right AKET for two study groups



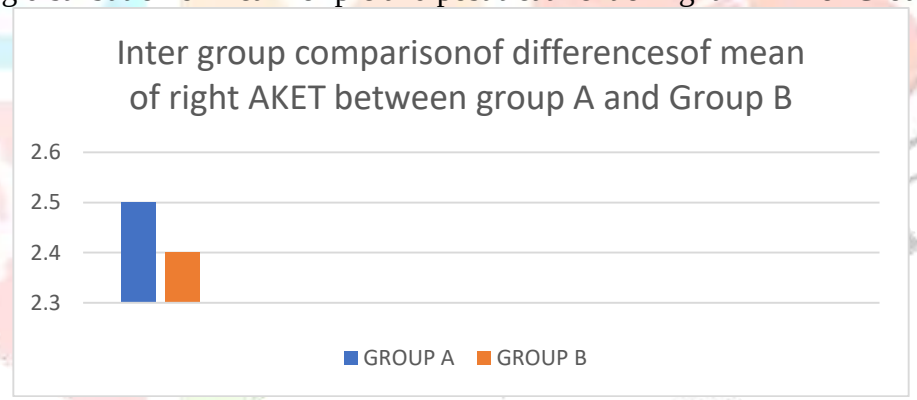
There was statistically significant difference observed between pre and post treatment values of Right AKET of Group A (p-value <0.0001) and between pre and post treatment values of Group B (p-value of <0.0001).

Table 2: Inter group comparison of difference of mean (Pre-treatment - Post treatment) for Right AKET

	GROUP A	GROUP B	p-value	t-value	Significance
Difference between pre and post treatment	2.50±0.513	2.40±0.68	0.6028	0.524	Not significant

Values are presented as Mean ± Standard Deviation P-values are obtained using paired t-test, after confirming the underlying normality assumption. P - value < 0.05 is considered to be extremely significant.

Graph 2: Showing distribution of mean for pre and post treatment of right AKET of Group A and Group B



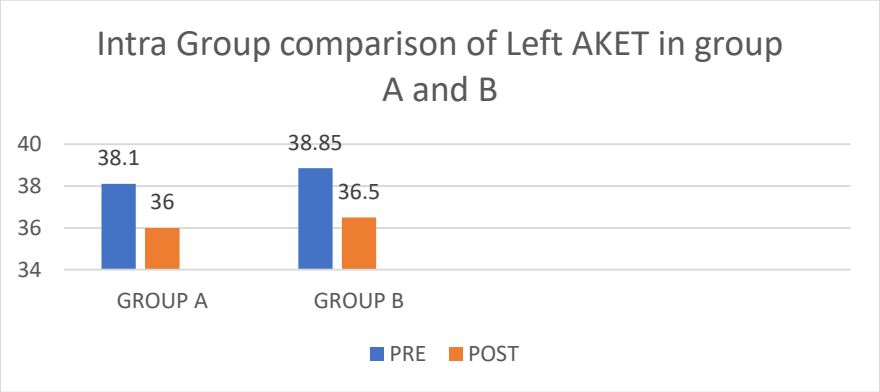
The average difference of pre treatment and post treatment of right AKET shows non – statistical significance between two study groups (p=0.7644) showing equal effectiveness in both Group A and Group B.

Table 3: Intra group comparison of Left AKET for Group A and Group B

	Pre treatment	Post treatment	p-value	t-value	Significance
GROUP A (n=20)	38.10 ±4.49	36.0 ± 4.51	<0.0001	21.0	Extremely significant
GROUP B (n=20)	38.85 ± 4.1	36.5 ±4.17	<0.0001	17.89	Extremely significant

Values are presented as Mean ± Standard Deviation. P – values are obtained using paired t-test, after confirming underlying normality assumption. P-value<0.05 is considered to be extremely significant.

Graph 3: The distribution of Pre treatment and Post treatment of Right AKET for two study groups



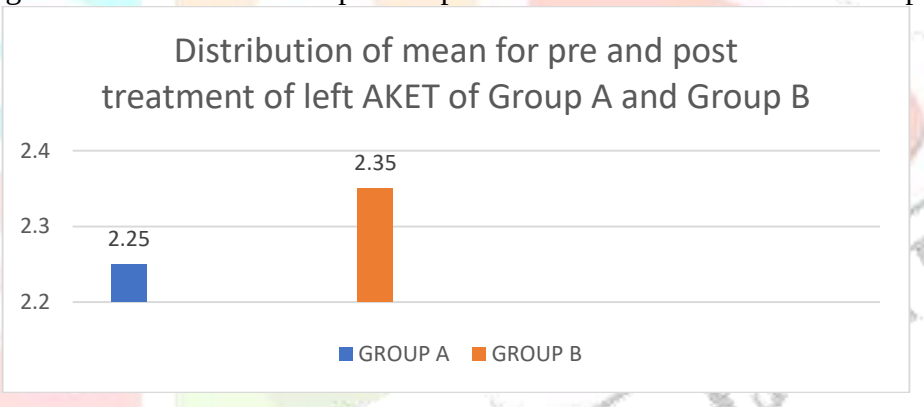
There was statistically significant difference observed between pre and post treatment values of Left AKET of Group A (p-value <0.0001) and between pre and post treatment values of Left AKET of Group B (p-value <0.0001).

Table 4: Inter group comparison of mean (Pre treatment – Post treatment) for Left AKET

	GROUP A	GROUP B	p-value	t-value	Significance
Difference of pre and post treatment	2.25±0.44	2.350±0.58	0.547	0.607	Not significantly

Values are presented as Mean ± Standard Deviation P-values are obtained using paired t-test, after confirming the underlying normality assumption. P - value < 0.05 is considered to be extremely significance.

Graph 4: Showing distribution of mean for pre and post treatment of left AKET of Group A and Group B



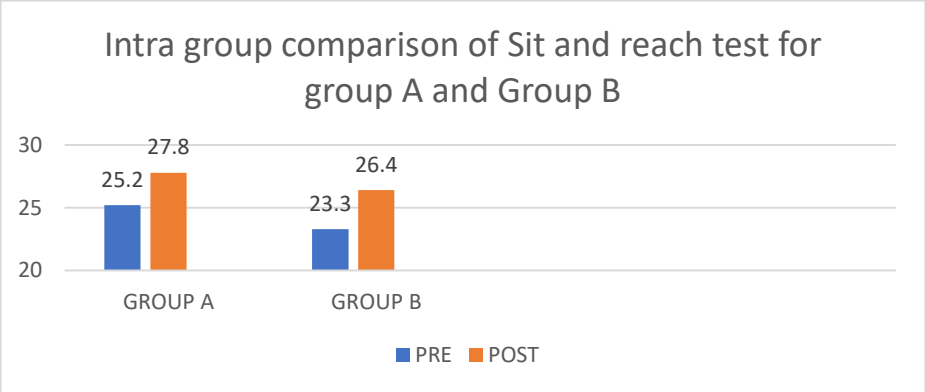
The average difference of pre treatment and post treatment of Left AKET shows non – statistical significance between two study groups (p=0.7644) showing equal effectiveness in both Group A and Group B.

Table 5: Intra group comparison of Sit and Reach test for Group A and Group B

	Pre treatment	Post treatment	p-values	t-values	Significance
Group A (n=20)	25.2 ± 5.20	27.8 ± 5.20	<0.0001	15.4	Extremely significance
GROUP B (n=20)	23.3 ± 6.22	26.4 ± 5.87	<0.0001	8.13	Extremely Significance

Values are presented as Mean ± Standard deviation P-values are obtained using paired t-test, after confirming the underlying normality assumption. P-values is <0.05 is considered to be statistically significant.

Graph 5: The distribution of Pre-treatment and Post-treatment of Sit and reach test for two study groups



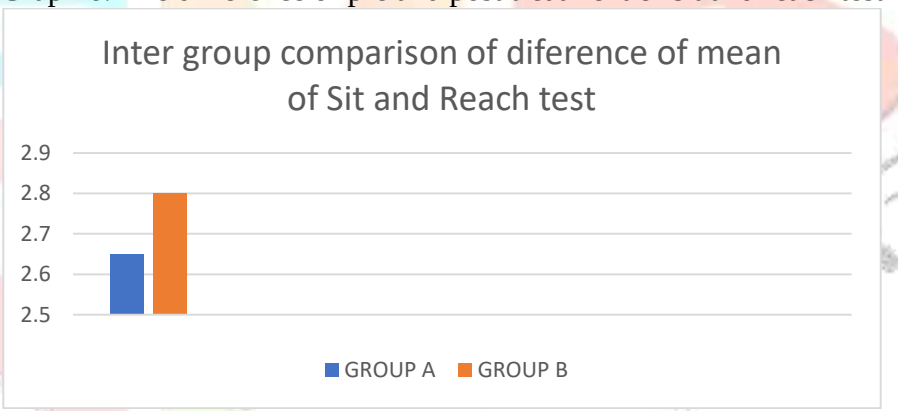
There was statistically significant difference observed between pre and post treatment values of sit and reach test of Group A (0.0001). Same was observed between pre and post treatment values of sit and reach test of Group B (0.0001).

Table 6: Inter group comparison of difference of mean (Pre treatment - Post treatment)-of Sit and Reach test

	GROUP A	GROUP B	p-value	t-value	Significance
Difference of pre and post treatment	2.65 ± 0.8	2.80 ± 0.9	0.595	0.536	Not significantly

Values are presented as Mean ± Standard deviation P-values are obtained using unpaired t-test, after confirming the underlying normality assumption. P-values <0.05 is considered to be statistically significant.

Graph 6: The difference of pre and post treatment of sit and reach test



The average difference of pre treatment and post treatment of sit and reach test shows non – statistical significance between two study groups (p=0.7644) showing equal effectiveness in both Group A and Group B.

Table 7: Master Chart for Group A

SR.NO	AGE	ACTIVE EXTENSION TEST						SIT AND REACH TEST		
		RIGHT			LEFT					
		PRE	POST	Diff	PRE	POST	Diff	PRE	POST	Diff
1	22	41	39	2	42	40	2	18	20	2
2	21	46	44	2	48	46	2	20	22	2
3	23	40	37	3	37	35	2	25	28	3
4	22	36	33	3	34	33	2	29	32	3
5	19	41	39	2	40	37	3	23	25	2
6	22	36	33	3	33	31	2	29	32	4
7	18	38	35	3	36	34	2	28	32	4
8	23	42	39	3	39	37	2	21	23	2
9	21	45	42	3	41	39	2	23	26	3
10	21	35	32	3	35	32	3	37	39	2
11	24	32	29	3	35	32	3	34	36	2

12	24	44	41	3	41	39	2	26	30	4
13	19	41	39	2	39	37	2	15	19	4
14	19	41	39	2	38	36	2	23	25	2
15	19	33	30	3	34	32	2	26	28	2
16	19	49	47	2	47	45	3	26	28	2
17	18	34	32	2	31	29	3	23	26	3
18	23	36	34	2	38	36	2	23	25	2
19	24	38	36	2	33	31	2	31	34	3
20	18	43	41	2	41	39	2	25	27	2

Table 8: Master Chart for Group B

SR.NO	**AGE**	**ACTIVE EXTENSION TEST**						**SIT AND REACH POST**		
		RIGHT			**LEFT**					
		PRE	**POST**	**DIFF**	**PRE**	**POST**	**DIFF**	**PRE**	**POST**	**DIFF**
1.	18	32	29	3	30	29	1	30	32	2
2.	20	46	45	1	43	41	2	20	24	4
3.	19	46	44	2	38	37	1	23	25	2
4.	19	36	34	2	35	32	3	13	16	3
5.	19	47	45	2	39	37	2	29	33	4
6.	20	45	44	1	38	36	2	27	30	3
7.	20	32	31	1	35	34	1	34	37	3
8.	19	45	43	2	44	43	1	28	31	3
9.	20	48	46	2	45	43	2	22	25	3
10.	19	31	29	2	32	31	1	33	34	1
11.	20	45	43	2	39	38	1	24	27	3
12.	20	36	35	1	34	32	2	19	23	4
13.	23	43	41	2	42	39	3	24	26	2
14.	20	36	33	3	34	32	2	14	17	3
15.	21	48	45	3	38	37	1	25	27	2
16.	22	49	46	3	36	34	2	27	29	2
17.	21	47	45	2	39	38	1	16	18	2
18.	21	37	35	2	35	34	1	23	25	2
19.	23	50	49	1	46	44	2	14	17	3
20.	20	44	42	2	39	38	1	18	20	2

VII. DISCUSSION

Hamstring muscles group are most prone to commonly undergo lightness and it is linked with movement dysfunction and lumbar spine, pelvis and lower limb and have been compared with low back pain and abnormality. The ability of an individual to move smoothly depends on flexibility which is the ability of the joints or series of joints to move smoothly or easily through an unrestricted pain-free range of motion. The purpose of this study was to evaluate the effect of the suboccipital inhibition technique and passive stretching on hamstring tightness in younger individuals of 18-25 years of age.

The Suboccipital muscle inhibition technique produced a significant difference in individuals with hamstring tightness. Erika Quintana Aparicio conducted a study on individuals with short hamstring using suboccipital muscle inhibition technique which supports my study. Another study conducted by Riya Chawla and Pinky Raghani regarding immediate Effects of suboccipital muscle inhibition technique on hamstring tightness in younger individuals supports my study as well.

Passive stretching is a technique which produces a significant result especially in improving hamstring tightness. A study conducted by Oves Patni and Sarvanan M. using passive stretching on hamstring tightness supports my study. A study conducted by Mojtaba Heshmatipour comparing effects of Active and passive stretching on hamstring tightness on female individuals supports this study for using passive stretching on hamstring tightness.

Initially 48 participants were recruited for study but only 40 people met the criteria. They were divided into 2 groups 20 each for study. Hence final intervention assessment included 40 individuals group A was participants were intervened with suboccipital inhibition technique and group B with passive snatch stretching while maintaining stretch for 15 seconds outcome measures used were AKET and sit and reach test the outcome measures were taken free and post treatment accordingly and the difference was noted.

6.1 Active Knee Extension Test

A. Using paired t-test for analysis on data (n =20) the pretreatment of right AKET for group A has 39.55 ± 4.59 and post treatment was 37.05 ± 4.78. On comparing the score with paired t-test the value obtained was less than 0.05 which implies that it is statistically significant (table 1).
B. This suggest that suboccipital inhibition technique had an effect in improving hamstring tightness.
C. Using paired t-test for analysis on data (n=20) the mean pretreatment of left active knee extension in group A was 38.10 ± 4.49 and post treatment was 36.0 ± 4.51.
D. On comparing the score with the paired t-test, the value obtained was less than 0.05 which implies that it is a statistically significant (table 2).
E. This suggest that suboccipital inhibition technique had an effect in improving hamstring tightness.
F. In the present study AKET was used as an Outcome measure. The use of AKET for present study was well supported by a study carried out Pramod K. Jagtap and Shubhangi D.Mandale who measured the intratester reliability of an Active Knee extension test in measuring hamstring tightness in individuals of same age group in this study ,using suboccipital inhibition technique.
G. Another study by Erika Quintana Aparicio supported use of AKET in subjects while using suboccipital muscle inhibition.

6.2 Sit and Reach Test

A. Using paired t-test for analysis on data (n = 20) the mean pretreatment on Sit and Reach Test in group A was 25.2 ± 5.20 and post treatment was 27.8 ± 5.20.
B. On comparing score with paired t-test, the P value obtained was less than 0.05 which implies that it is a statistically significant. (table 5)
C. This suggest that suboccipital inhibition technique had an effect in improving hamstring tightness on individuals.
D. Using paired t-test for analysis on data (n = 20) the mean pretreatment on Sit and Reach Test in group B was 23.3 ± 6.22 and post treatment was 26.4 ± 5.80.
E. On comparing score with paired t-test, the P value obtained was less than 0.05 which implies that it is a statistically significant. (table 5)
F. This suggest that passive stretching had an effect in improving hamstring tightness on individuals.

VIII. RESULT

The result showed significant change on hamstring tightness using suboccipital muscle inhibition technique and passive stretching.

IX. CONCLUSION

The single intervention of suboccipital muscle inhibition technique and passive stretching both are equally effective.

X. REFERENCES

1. sBerenguer T, González ÁAL, Vicente-Herrero T. Effectiveness of physical therapy in patients with tension-type headache: literature review. J Jpn Phys Ther Assoc. 2014;17(1):31-8. doi: 10.1298/jjpta.Vol17_005, PMID 25792906, PMCID PMC4316547.
2. Pryse-Phillips W, Findlay H, Tugwell P, Edmeads J, Murray TJ, Nelson RF. A Canadian population survey on the clinical, epidemiologic and societal impact of migraine and tension-type headache. Can J Neurol Sci. 1992;19(3):333-9. PMID 1393842.
3. Blaschek A, Milde-Busch A, Straube A, Schankin C, Langhagen T, Jahn K et al. Self-reported muscle pain in adolescents with migraine and tension-type headache. Cephalalgia. 2012 Feb;32(3):241-9. doi: 10.1177/0333102411434808. PMID 2225020
4. Immediate Effects of the Suboccipital Muscle Inhibition Technique in Subjects With Short Hamstring Syndrome. doi:10.1016/j.jmpt.2009.03.006
5. Immediate effect of suboccipital muscle inhibition technique versus Mulligan bent leg raise technique on hamstring tightness in younger individuals
6. THE EFFECT OF SUBOCCIPITAL MUSCLE INHIBITION TECHNIQUE ON HAMSTRING TIGHTNESS PATIENTS. DOI: 10.14260/jemds/2015/831
7. The effect of suboccipital muscle inhibition technique on hamstring tightness patients. DOI: 10.14260/jemds/2015/831
8. Effect of Active Dynamic Versus Passive Static Stretching on Hamstring Muscle Tightness in Healthy Female Students: A Randomized Trial Study. DOI: 10.15171/hpr.2019.27