EFFECT OF POSITIONAL RELEASE THERAPY VERSUS STATIC STRETCHING, ON SUBJECTS WITH HAMSTRING TIGHTNESS

EFFECTUL TERAPIEI DE DEBLOCARE PRIN POZIȚIONARE VERSUS STRETCHINGUL STATIC, LA SUBIECȚII CU SCURTAREA ISCHIOGAMBIERILOR

Anand Heggannavar[1], Ashwini Behere[2]

Key words: positional release therapy, static stretching, hamstring tightness, AKE, soft tissue technique.

Abstract

Background. Hamstrings are the most common group of muscles prone for tightness. Tight hamstrings are a contributing factor for low back pain. Static stretching has been proved to be an effective method for releasing the tight hamstrings. Positional release therapy (PRT), a manual therapy technique has been proposed to increase muscle flexibility. Though its use has been documented, it has been rarely used for decreasing hamstring tightness.

Purpose of the study. To investigate the effect of PRT on hamstring tightness and to compare the effect of PRT with static stretching on hamstring tightness.

Materials and Methods. Thirty undergraduate students of KLEU Institute of Physiotherapy between the age group of 18-25 years with hamstring tightness were allotted to 2 groups, static stretching and PRT. Hamstring tightness was determined using Active knee extension test. Pre- and post-intervention measures were taken and the values were compared.

Results. There was statistically significant difference within groups for group A (right $t=27.388$, $p<0.001$, left $t= 21.227$, $p<0.001$) & group B (right $t=28.111$, $p<0.001$, left $t=27.388$, $p<0.001$) there was no statistically significant difference (right $t=0.519$, $p=0.608$, left $t=0.904$, $p=0.374$) between the groups.

Conclusion. Both static stretching and positional release therapy are equally effective in decreasing hamstring tightness.

Cuvinte cheie: terapie de deblocare prin poziționare, stretching static, tensionarea ischiogambierilor, AKE, tehnica manipulării țesuturilor moi.

Rezumat

Introducere. Ischiogambierii sunt grupul muscular cel mai des predispus la tensionare și scurtare. Ischiogambierii scurtați sunt un factor contributiv la apariția durerii lombare joase. Stretching-ul static s-a dovedit a fi eficient pentru detensionarea ischiogambierilor scurtați. Terapia de deblocare prin poziționare (PRT), o tehnică manuală, a fost propusă pentru creșterea flexibilității musculare. Cu toate că folosirea acesteia a fost documentată, a fost rar folosită pentru a reduce tensiunea ischiogambierilor .

Scop. Lucrarea dorește să investigheze efectul PRT asupra detensionării ischiogambierilor și să compare efectul acestei tehnici cu efectul stretching-ului static aplicat în același scop.

Material și metodă. 30 de studenți de la Institutul KLEU de Fizioterapie, cu vârste cuprinse între 18-25 ani**,** cu tensionarea ischiogambierilor au fost împărțiți în 2 grupuri, stretching static și PRT. Scurtarea ischiogambierilor s-a determinat folosind testul de extensie activă a genunchiului. S-au efectuat evaluările pre și postintervenție și s-au comparat.

Rezultate. Există diferențe statistice semnificative în cadrul analizei intragrup pentru grupul A ($t=27.388$, $p<0.001$, left $t= 21.227$, $p<0.001$) și grupul B ($t=28.111$, $p<0.001$, left $t=27.388$, $p<0.001$) și nu au fost diferențe semnificative ($t=0.519$, $p=0.608$, left $t=0.904$, $p=0.374$) la analiza intre cele două grupuri.

Concluzii: Atât stretching-ul static cât și terapia de deblocare prin poziționare sunt la fel de eficiente în detensionarea ischiogambierilor.

Introduction`

Muscle tightness is the adaptive shortening of the contractile and non-contractile elements of the muscle [1] Hamstrings are example of muscle groups that have a tendency to

[1] Associate Professor, Dept of Orthopaedic Manual Therapy, KLE University, Institute of Physiotherapy, JNMC Campus, Nehru Nagar, Belgaum, Karnataka

Corresponding author: email: anandhegs@yahoo.co.in, contact no - +919945282896

[2] Post-Graduate Student Dept of Orthopaedic Manual Therapy, KLE University, Institute of Physiotherapy, JNMC Campus, Nehru Nagar, Belgaum, Karnataka, email: ashwini.behere19@gmail.com

shorten (Turner et al 1988). [2] One of the most common reasons for hamstrings to become tight is due to our daily habits like sitting in chair. They are thus, rarely stretched across their entire length. Cailliet has shown that the normal relationship among the alignment of the spine, the position of the pelvis, and the length of the muscles attaching to the spine and pelvis contributes to the development of LBP.[3] Kendall and McCreary have argued that shorter hamstrings causes pelvis to tilt posterior thereby causing flat back and reducing lumbar Lordosis. [4]

Numerous interventions for increasing hamstring flexibility have been investigated including static stretching, [5, 6] dynamic stretching [7] and proprioceptive neuromuscular facilitation. [8]

Static stretching is performed by placing muscles at their greatest possible length and holding that position for a period of time. Static stretches are usually held anywhere from 5 to 60 seconds. Bandy WD et al. have shown that 30 seconds is the most effective time for maintaining the stretch. [5] Positional release therapy (PRT) is a manual therapy procedure proposed to increase muscle flexibility. The technique involves positioning the restricted joints and muscles in the direction opposite to that of stretch or strain for a period of at least 90 seconds. [9]

Effectiveness of static stretching on hamstring muscle tightness has been extensively studied, but effect of PRT technique for decreasing muscle tightness has been rarely studied. Thus, the purpose of this study was to investigate the effect of PRT on hamstring tightness and the objective of the study was to compare the effect of PRT with static stretching on hamstring tightness.

Methods

Ethical clearance was obtained from the Institutional ethical committee. Thirty undergraduate students of KLEU Institute of Physiotherapy, Belgaum between the age group of 18-25 years with lack of at least 10 degrees of active knee extension as shown on the active knee extension test were included in the study. The subjects were excluded if they complained of current hip, knee, lumbar spine or sacroiliac impairment, previous trauma to these joint, any neurological condition that may affect the lower limb function. A written informed consent was taken from the patients prior to commencement of the study.

Using a randomised clinical trial, thirty subjects with hamstring tightness were randomly allotted to two groups with 15 subjects in each group. Hamstring tightness was determined using the active knee extension (AKE) test. Group A received positional release therapy for both lateral and medial hamstrings, bilaterally. The position was held for ninety seconds and repeated three times. Group B received static stretching, bilaterally. The position was held for thirty seconds and repeated three times.

Assessment tool

AKE test (Fig 1)

The subjects were positioned in supine lying on the examination table. A polyvinylchloride (PVC) frame apparatus was used as a reference. There were 3 PVC pipes, the length of which was one foot each and diameter 1.6 .The side to be tested was kept in ninety degrees of hip and knee flexion. Using the PVC frame as a reference the hip was maintained in ninety degrees of flexion throughout the procedure. The subjects were then asked to extend the knee as much as possible and the range was measured using a universal goniometer. The opposite hip remained at zero degrees of flexion and knee extended. If the subjects lacked at least 10 degrees of complete knee extension (full range being 180 degrees) they were included in the study. This procedure was done bilaterally. Measurements were taken pre and post intervention.

Fig 1 - ***AKE Measurement***

Intervention Method

Positional release therapy (Fig 2)

The subjects were in supine lying position. For the treatment of medial hamstrings the affected side hip was extended and abducted at the edge of the couch. The thumb of one hand was placed at the medial hamstrings and pressure was applied anterio-laterally. With the other hand the knee was flexed to 40 degrees, tibia adducted and internally rotated. This position was held for 30 seconds and repeated three times. For the lateral hamstrings the starting position remained the same. The thumb of one hand was placed at the lateral hamstrings and with the other hand the knee was flexed to 40 degrees, tibia abducted and externally rotated. The position was maintained for 30 seconds and repeated three times.

Fig 2- PRT technique for Medial and Lateral Hamstrings

Static stretching (Fig 3)

The subjects were in supine lying position. Passive SLR was performed by the therapist by maintaining the knee in extension through-out. The opposite limb was kept in extension. The stretch was maintained for 30 seconds and repeated three times. Same procedure was done for the opposite limb.

Fig 3 – Static stretching for Hamstrings

Statistical analysis

A categorical data student Chi Square-test was done. It was found that the baseline characteristics of both groups were comparable. The main outcome measure in the study was Active Knee Extension Test. A paired t-test was done to compare the pre and post values within the groups, while unpaired t-test was done to compare the values between the groups.

Results

Thirty subjects 17 males and 13 females were enrolled for the study and its distribution is given in table 1. Mean age of subjects in group A was 22.1 ±1.91 while in group B was 20.9 ±1.71. Mean Height of subjects in group A was 1.64 ±0.09 while in group B was 1.59 ±0.05.

Mean weight of subjects in group A was 54.2 ±10 while in group B was 61.1±10.11.

Mean BMI of subjects in group A was 22.6 ±3.13 while in group B was 21.7 ±4.15. (Table2). The difference between pre & post treatment for group A (Positional release therapy) on right side was 4.93±0.70 and on left side was 4.62±0.89. The results of paired t-test showed statistically significant difference within the group for group A (right $t=27.388$, $p<0.001$, left $t=21.227$, $p<0.001$), (Table 3, 4). The difference between pre & post treatment for group B (Static stretching) on right side was 5.06±0.70 and on left side was 4.93±0.70. The results of paired t-test showed statistically significant difference within the group for group B (right $t=28.111$, $p<0.001$, left $t=27.388$, $p<0.001$), (Table 3, 4). The results of unpaired t-test suggested that there was no statistically between groups (right $t=0.519$, $p=0.608$, left $t=0.904$, $p=0.374$)

Table no 1.Gender Distribution

Group	Male	Female	Total
A(PRT)	8	7	15

B(SS)	9	6	15

Table No 2 – Demographic Profile.

Group	Age	Height	Weight	BMI
A (PRT)	22.1±1.91	1.64±0.09	61.1±10.11	22.6±3.13
B (SS)	20.9±1.71	1.59±0.05	54.2±10	21.7±4.15
t value	1.714	2.368	1.872	0.670
p value	0.098	0.025	0.072	0.509

Table No 3 - Right Side AKE values

Group	Pre	Post	Diff	T	p
A(PRT)	48.1±5.63	53 ±5.76	4.93±0.70	27.38	<0.001
B(SS)	51.8±5.87	56.7±6.2	5.06±0.70	28.11	<0.001
t value	1.777	1.765	0.519		
p value	0.087	0.088	0.608		

Table No 4 - Left Side AKE values

Group	Pre	Post	Diff	T	p
A(PRT)	47.3±5.78	52±5.64	4.62±0.89	21.22	<0.001
B(SS)	50.6 ±7.43	55.5±7.42	4.93±0.70	27.38	<0.001
t value	1.344	1.467	0.904		
p value	0.190	0.153	0.374		

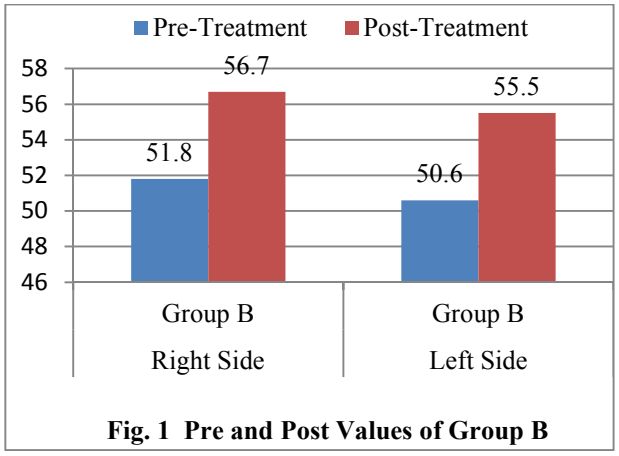

Fig. 1 Pre and Post Values of Group B

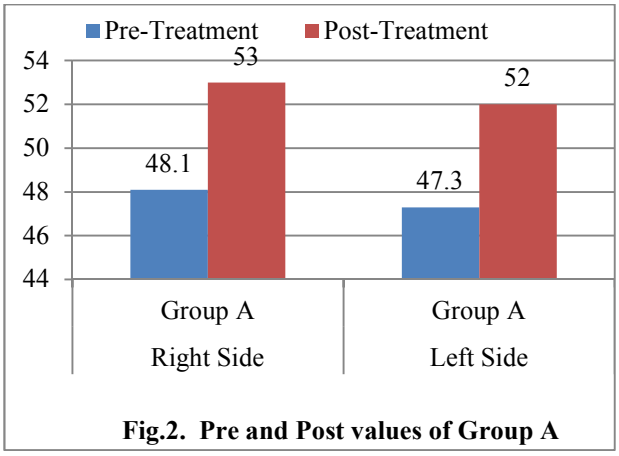

Fig.2. Pre and Post values of Group A

Discussion

The results of this study suggest that both, static stretching and positional release therapy are equally effective in increasing hamstring flexibility in normal individuals. Hamstrings are a group of muscles which tend to shorten more so because of the daily habits which require prolonged sitting. They are thus, rarely stretched across their entire length. Static stretching has been regularly performed for decreasing muscle tightness and has been used in this study of stretching the hamstrings. Static stretching exercise causes plastic stretching which results in irreversible tissue elongation. Positional release therapy, although documented is a less commonly used method for decreasing muscle tightness. The role of PRT is to relieve the somatic dysfunction, which may be expressed as decreased joint play, loss of overt ROM and postural asymmetry. The muscle has to be held in the position of ease for 90 seconds. During this period PRT affects inappropriate proprioceptive activity and helps to normalize tone and set the normal length-tension relationship in the muscle. Thus there is elongation of the involved muscle fibre to its normal state. [9] Our results support previous findings which suggest that static stretching increases hamstrings flexibility.[5] [6] This study also shows consistent results with a

similar study done on the use of PRT on hamstring tightness.[10] The study was conducted on female subjects and Sit and Reach test was used an outcome to measure the hamstring length. Their findings showed that both static stretching as well as PRT is beneficial in treating hamstring tightness. However, contrary to the findings of Trevor et al., [11] which showed no effect of PRT on hamstring tightness; our study shows an increase in hamstring flexibility immediately after the application of positional release therapy. One of the possible explanations to this would be the fact that in the study by Trevor et al only the medial hamstrings were treated using positional release therapy. Therefore any tightness, if present, due to lateral hamstrings was not treated. In this present study both the lateral and the medial hamstrings were treated and the procedure was also repeated 3 times, whereas in the study by Trevor et al, only a single session was given.

Conclusion

The results did not show any statistical significance between both the groups or within the groups. Thus, both static stretching and positional release therapy are equally effective in increasing hamstring flexibility.

Acknowledgement

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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