





## Comparison of Sciatic Nerve Gliding and Lower Extremity Dynamic Stretch on Hamstring Flexibility in Athletes

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### ABSTRACT

**Background of the Study:** Hamstring muscles are targeted among football players. Sciatic nerve gliding improve hamstring flexibility among football players. To compare the effects of sciatic nerve gliding and lower extremity stretching on hamstring flexibility among football players.

**Methodology:** In this randomized clinical trial 20 male athletes were selected which divided in two groups. One group was given sciatic nerve gliding while other lower extremity stretches. Athletes with age of 18-30 years, male foot ballers who regularly exercise 2 to 3 times a week for 30 minutes for 6 weeks were included. Goniometer was used to collect data by performing straight leg raise and Active knee extension test.

**Results:** The results showed that the mean age and SD was 21.30±1.809. Comparison of treatment within group was checked by Wilcoxon Rank test showed significant results (P was less than 0.05 )and between group comparisons was checked by Mann Whitney test and found sciatic nerve gliding gave more improvement in Athletes performance ( p value was less than 0.05 for straight leg raising and active knee extension test.

**Conclusion:** It was concluded that sciatic nerve gliding gave more effective results than lower stretching in increasing hamstring flexibility among football players.

**Key words:** Football, hamstring muscles, muscle stretching exercises, lower extremity, sciatic nerve, neurodynamic.

### INTRODUCTION

The hamstrings fundamentally influence adaptability of the body, and diminished hamstring adaptability brings about diminishes in trunk dependability and money owed to inappropriate change of the gluteus Maximus and stomach muscles<sup>1,3</sup>. The hamstring muscles is a significant part in the presentation of day by day exercises like Dynamic Stretched development of the storage compartment, strolling, running, and bouncing , and it is a significant muscle associated with keeping up with equilibrium and stance in standing position<sup>4,5</sup>. Increased hamstring's flexibility plays a contributing role in enhancing athletic overall performance<sup>6</sup>. Balanced muscle tissues maintains joint's range of movement, which improves the encircling muscle groups' blood and contractibility, decreases put on and tear on the articular systems encapsulating the joint, promotes recuperation of confused tissue, and assists in motor-mastering strategies to make sure

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**Citation:** Shafique S, Aabroo S, Muneeb HN, Arshad U. COMPARISON OF SCIATIC NERVE GLIDING AND LOWER EXTREMITY DYNAMIC STRETCH ON HAMSTRING FLEXIBILITY IN ATHLETES. Pakistan Journal of Rehabilitation. 2023 Jan 4;12(1):131-137. <https://doi.org/10.36283/pjr.zu.12.1/019>

Received: Wed, Dec 1, 2021

Accepted: Tue, Nov 22, 2022

Published: Tue, Jan 03, 2023

extra powerful and accurate overall performance techniques<sup>7,8</sup>. Recently created strategies to build the adaptability of the hamstrings incorporate static extending, contract-loosen up extending, thermo-treatment, rub, and neurodynamics<sup>9,10</sup>. Neurodynamic is a manual technique for applying power to nerve structures through act and multi-joint development<sup>11,13</sup>. In light of the rule that the sensory system ought to be likewise extended and contracted appropriately to keep up with ordinary muscle pressure and guarantee scope of movement<sup>14,15</sup>. Previously, it has arisen as prominent that a pre-body heat-up before active work can without a moment's delay impact execution<sup>11</sup>. Generally, a pre-action heat-up has included low profundity cardio practicing and some state of extending, alongside static or dynamic stretching<sup>16</sup>. Warming up can likewise affect muscle strength and force, athletic execution, joint assortment of development<sup>17</sup>, muscle adaptability, and possibility of injury<sup>12,18</sup>. Moreover, the impact of a warm-up on physical issue decrease is uncertain<sup>19</sup>. In this manner, it's miles basic to place in power amazing procedures of warming as much as accomplish the most adequate results and to save you mishaps<sup>8,20</sup>. Dynamic stretching has been defined as a “managed movement thru the lively range of movement for every joint” there may be some proof to suggest that dynamic stretching enhances electricity, agility sprinting overall performance vertical leap height and electromyography pastime measured at some stage in an isometric maximal voluntary contraction<sup>19</sup>. Neurodynamic is known to be very effective technique in increasing flexibility of hamstring muscles and is thought to be useful way to reduce neural mechanosensitivity (the specific response to mechanical stimulation)<sup>21,22</sup>. In Neurodynamic techniques, neural structures slide respectively to the nearby structures. The method to apply force is by postural method and movement of multi joint with the objective to stretch and slide neurodynamic structures<sup>9,23</sup>. The literature describes four common strategies of assessing hamstring muscle period those consist of the knee extension angle take a look at, the sacral angle take a look at, the straight leg boost check, and the sit-and-reach take a look at<sup>7,16</sup>. Hamstring muscles flexibility is very important among football players. By giving lower extremity stretching’ and sciatic nerve gliding blood supply and contractibility of muscle improved. The rationale of current study is to compare the effects of sciatic nerve gliding and lower extremity stretching’s on hamstring flexibility among football players.

### **Objective**

To compare the effects of sciatic nerve gliding and lower extremity stretching’s on hamstring flexibility among football players

## **METHODOLOGY**

### **Study Design**

Randomized clinical trial. Randomization was done by lottery method. The Non probability convenient sampling technique was used. The study was single blinded (Assessor blinded). The sample was calculated by epitool software. Sample size was (n1): 10 athletes (n2): 10 athletes

### **Total Sample Size**

(both groups): 20 athletes. The data collection Tools was used Universal Goniometer, Knee extension test, Straight leg raise test.

**Duration**

This study was 10 months.

**Setting**

Data was collected from Pakistan Sports Board Coaching Center, Lahore.

**Inclusion Criteria**

Footballers male with 18 to 30 years and having hamstring tightness of one or both legs, unable to achieve more than 160° knee extension with hip at 90° flexion and can reach <70° hip flexion in SLR.

**Exclusion Criteria**

Athletes with prior history of injury in lumber area, level of activity low for last three days, any disorder of low back like disc slip or herniation etc. and with the history of lower limb fracture were excluded from study.

**Data Collection Procedure and Treatment Approach**

After taking consent, participants were randomly selected and assigned in two groups. A 5 minutes warm up and cool down session were given before and after the treatment respectively and it was same for both groups. Before starting the exercise participants was assessed by using goniometer by performing straight leg raise and active knee were performed for both pretreatment and post treatment evaluation. After noticing down the measurements participants were divided in to two group. First group was given Sciatic nerve gliding and its procedure was force was applied at the proximal end and then released distally which is done by applying force on the proximal and repeat the processing in reverse order. This process was applied for thirty seconds and six times on each leg for three minutes (360 seconds). Second group was given lower extremity dynamic stretching. It was applied on the ankle in downward direction by holding for 30 seconds and repeated five times for total three minutes (360 seconds).this was done on both legs .total Treatment was of 3 weeks with 2 sessions per week.

**RESULTS**

Analysis was through SPSS version 21. Graph 1 showed that Mean age and SD of athletes was  $21 \pm 1.809$ . Within group comparison was done between pre and post treatment values which showed mean and SD for SLR right leg ( $60 \pm 4.33$ ), ( $76 \pm 6.70$ ) and for SLR left was ( $62 \pm 9.33$ ), ( $84 \pm 2.06$ ) while mean  $\pm$ SD for the knee extension test right were ( $54 \pm 12.12$ ), ( $113 \pm 12.51$ ) and for the knee extension test left were ( $50 \pm 15.45$ ), ( $108 \pm 9.52$ )  $p < 0.05$  for all which is statically significant in table 1.

Outcome variables	Groups		Means± SD	Z value	p value
SLR RIGHT LEG	Sciatic nerve gliding	Pre	60±4.33	-2.812	<0.05
		Post	76±6.70		
	Dynamic Stretch	Pre	70±4.30	-2.816	<0.05
		Post	86±2.22		
SLR LEFT LEG	Sciatic nerve gliding	Pre	62±9.33	-2.807	<0.05
		Post	84±2.06		
	Dynamic Stretch	Pre	60±4.16	-2.810	<0.05
		Post	82±4.82		
KNEE EXTENSION RIGHT LEG	Sciatic nerve gliding	Pre	54±12.12	-2.809	<0.05
		Post	113±12.51		
	Dynamic Stretch	Pre	47±12.96	-2.805	<0.05
		Post	125±6.03		
KNEE EXTENSION LEFT LEG	Sciatic nerve gliding	Pre	50±15.45	-2.803	<0.05
		Post	108±9.52		
	Dynamic Stretch	Pre	48±13.3	-2.805	<0.05
		Post	121±10.99		

Table 01: Comparison within Groups

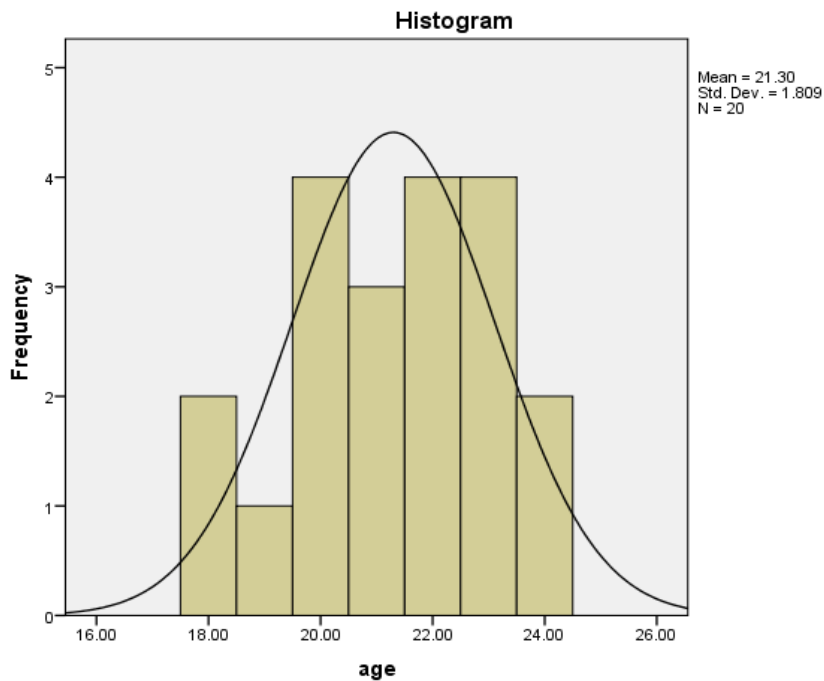


Table 02: Between Group Comparison

The of difference in sciatic nerve gliding and Dynamic Stretch group by using Mann Whitney test which showed mean and SD for SLR right leg (60±6.95),( 76±6.70)Mean rank (5.80) and for SLR left was(62±9.33),( 84±2.06)Mean rank (11.65) while mean ±SD for the knee extension test right were(54±12.12),( 113±12.51) and Mean rank (7.50) and for the knee extension test left were(50±15.4),( 108±9.52)Mean rank (7.50) and  $p < 0.05$  for all which is statically significant and showed sciatic nerve gliding was more effective in improving hamstring flexibility in table 2.

Outcome variables	Groups		Means±sd	Means rank	Z value	P value
<b>SLR RT.</b>	Sciatic nerve gliding	Pre	60±6.95	5.80	-3.560	.000
		Post	76±6.70			
	dynamic stretch	Pre	70±4.30	15.20		
		Post	86±2.22			
<b>SLR LT.</b>	Sciatic nerve gliding	Pre	62±9.33	11.65	-.879	.38
		Post	84±2.06			
	dynamic stretch	Pre	60±4.16	9.35		
		Post	82±4.84			
<b>KNEE EXT. RT.</b>	Sciatic nerve gliding	Pre	54±12.12	7.50	-2.276	.023
		Post	113±12.51			
	dynamic stretch	Pre	47±12.9	13.50		
		Post	125±6.03			
<b>KNEE EXT. LT.</b>	Sciatic nerve gliding	Pre	50±15.4	7.50	-2.296	.022
		Post	108±9.52			
	dynamic stretch	Pre	48±13.3	13.50		
		Post	121±10.11			

Table 02: Between Group Comparison

## DISCUSSION

Current Study showed that sciatic nerve gliding was more effective in improving hamstring flexibility. Similar study from previous literature found in 2020 conducted by Danguole Satkunskiene et al showed that viscoelastic behavior of the sciatic nerve was affected by stretching technique whereas more increase in the extensibility of hamstrings was due to the results of neurodynamic technique as a consequent of increased length of connective tissues and decreased nerve tension. So conclusion was made that neuro dynamic technique gave better results in increasing the extensibility of hamstrings. Current study's findings also showed that sciatic nerve stretching is more effective<sup>21</sup>. In contrast to current study, 2019 Chaitali Shah et al, conducted research which concluded that sciatic nerve gliding technique is less effective than the stretching of hamstrings. While the study reported it as well that both the techniques i.e. sciatic nerve gliding and stretching of hamstring are effective in their own way. According to current study comparison of active stretching and sciatic nerve gliding, sciatic nerve gliding gave more effective results<sup>22</sup>. The current study supports the findings of the study conducted by A Balci et al in the year 2020 on wrestlers, revealed that the flexibility of hamstrings is increased by neural sliding and neural stretching exercises of the sciatic nerve<sup>24</sup>. AR Ahmed et al. 2016 in the study short term effects of neurodynamic stretching and static stretching techniques on hamstring muscle flexibility in healthy male subjects concluded that flexibility of hamstrings could be increased markedly by neurodynamic stretching technique as comparative to sciatic nerve stretching in males with hamstring tightness. Current study also showed similar results<sup>25</sup>. In contrast to current study, In 201 Amit Kumar Singh et al conducted study that concluded that PNF stretching is found to be more effective in increasing flexibility of hamstrings than Neurodynamic sliding in students of college. While the current study concluded opposite findings that sciatic nerve gliding to be more effective in increasing hamstring flexibility<sup>26</sup>.

## CONCLUSION

On the basis of result, it was concluded that sciatic nerve gliding gave more effective results than lower limb stretching in increasing hamstring flexibility among football players.

**AUTHORS' CONTRIBUTION:**

The following authors have made substantial contributions to the manuscript as under:

**Conception or Design:** Sidra Shafiq, Sara Aabroo

**Acquisition, Analysis or Interpretation of Data:** Hafiza Neelum Muneeb

**Manuscript Writing & Approval:** Umair Arshad

All authors acknowledge their accountability for all facets of the research, ensuring that any concerns regarding the accuracy or integrity of the work are duly investigated and resolved.

**ACKNOWLEDGEMENTS:** We thanks all the participants in this study.

**INFORMED CONSENT:** Written Informed Consent was taken from each patient.

**CONFLICT OF INTEREST:** The author (s) have no conflict of interest regarding any of the activity perform by PJR.

**FUNDING STATEMENTS:** None declared

**ETHICS STATEMENTS:** N/A

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