C.V.A and Calcanium Eversion with Hamstring Tightness -A Correlative Study

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Abstract

Muscle strain injuries are common, yet the mechanisms of injury remain vaguely defined. The hamstring muscle group is one of the most complex sets of muscles in the body and these muscles are highly abused. One factor that makes hamstring muscle so susceptible to injury is their anatomical arrangement being a biarticular muscle group means that they may be subjected to large length changes. There are number of clinically useful sets of myofascial chain. The suboccipital muscle, hamstring and calf muscle are included in same superficial back line so. addressing any of the structure in the chain may have positive effect of the entire line itself. This study tries to find out a correlation between hamstring tightness, C.V.A and Calcanium Eversion which are influnced by the muscles in the same superficial back line. Present study included 60 subjects who were divided into three groups according to their hamstring tightness. C.V.A and Calcanium eversion was calculated for each subject in a single session. Correlation was calculated by pearson correlation test. Finding of the present study showed that there is a positive correlation between hamstring tightness and Calcanium eversion and a negative correlation between hamstring tightness and C.V.A.

Keywords: Hamstring tightness, Superfecial Back Line, Calcanium Eversion, C.V.A, Active Knee Extension Test, Lateral Photographic Method.

Introduction

Muscle strain injuries are common, yet the mechanisms of injury remain vaguely defined. The hamstring muscle group is one of the most complex sets of muscles in the body, intricately involved in both locomotion and stability of the lower extremity. Unfortunately, however, these muscles are highly abused. One factor that makes hamstring muscle so susceptible to injury is its anatomical arrangement being a biarticular muscle group means that they may be subjected to large length changes. The hamstrings are often ignored in the weight room in deference to their stronger, more aesthetically appealing counterpart, the quadriceps. Hamstrings tightness is one of the most common problem which is faced by a majority of population be it an athlete or a sedentary worker. Nearly 85 million Americans suffer from Hamstring muscle tightness each year. Muscle tightness can contribute to uncoordinated and awkward movements thus increasing the potential for injury.

Tom Mayer has described a number of clinically useful sets of myofascial chain. According to this concept,the muscle may end at the attachment point,

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but the fascia continues along its way, linking up to other muscles in chains. They are of practical importance in helping draw attention to dysfunction pattern in lower limb which impact directly on structures in upper limb. The suboccipital muscle, hamstring and calf muscle are included in the same superficial back line. Suboccipital muscle tightness has an effect on neutral head posture. The Craniovertebral Angle is a simple and convenient descriptor of natural head posture (NHP). The position of the calcaneus is greatly determined by the Achilles tendon. A tight Achilles provides not only plantar flexion, but also eversion to the calcaneus. The purpose of the study was to find out if there was any correlation between forward head posture and foot pronation with hamstring tightness.

Materials & Methods

The study was conducted on 60 subjects who were randomly selected. Subjects were divided into three different groups with 20 subjects in each. Group allocation was done according to the hamstring tightness. *Variables***:** Independent Variable was Hamstring Tightness. Dependent Variables were CVA and Calcanium Eversion.

Procedure: On the basis of inclusion and exclusion criteria, 60 subjects were selected for the study. Age of the subjects ranged from 20-30 years. Informed consent and voluntary participation forms were taken from them. All the subjects were thoroughly explained of the measurements performed. The readings were taken in three main steps, in a single session. Hamstring tightness of dominant leg was measured using A.K.E test. C.V.A was calculated using lateral photographic method with the help of Coral Draw Software. Calcanial Eversion was also measured of the dominant side. Subjects were divided into 3 different groups on the basis of their hamstring tightness. Descriptive statistics and comparison of mean values observed in the groups was done by using SPSS 13 software. Results were calculated by using 0.05 level of significance. The variables (Hamstring Tightness, C.V.A and Calcanium Eversion) were correlated using Karl Pearson coefficient of correlation in all the groups.

Results & Discussion

TABLE 1: Mean and standard deviation of C.V.A and Calcanium eversion in all the groups

GROUPS	GROUP A	GROUP B	GROUP C
	Mean± SD	Mean± SD	Mean± SD
C.V.A	53.68±2.83	47.16±2.15	40.28 ±2.82
Calcanium Eversion	8.20±1.28	12.10±1.44	15.80 ±1.64

Table 1 & Fig 1 compares the mean values of CVA and Calcanium eversion among the three groups of subjects formed on the basis of their hamstring tightness.

Results pertaining to Karl Pearson correlation revealed that a significant correlation existed between Hamstring Tightness and C.V.A and Hamstring Tightness and Calcanium eversion. It also revealed that CVA and Calcanium eversion are negatively correlated. On the

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other hand a positive correlation was found to exist between Hamstring Tightness and Calcanium Eversion, whereas a negative correlation was observed between Hamstring Tightness and C.V.A (Table 2).

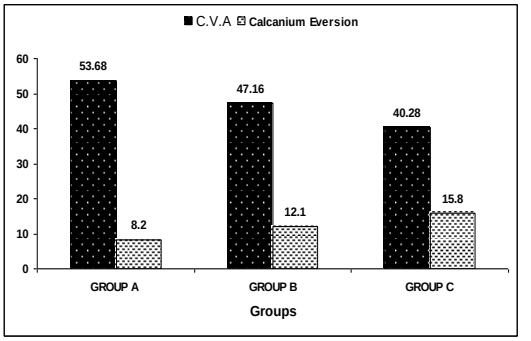

Fig 1: comparison of the mean values for all the variables between all the three groups.

TABLE 2: Correlation of Hamstring Tightness, C.V.A. and Calcanium eversion in the Group A

GROUP A	Hamstring Tightness Vs C.V.A.	Hamstring Tightness Vs Calcanium eversion	C.V.A. Vs Calcanium eversion
r value	-0.975	0.895	-0.874
P value	0.0001	0.0001	0.0001

TABLE 3: Correlation of Hamstring Tightness, C.V.A. and Calcanium eversion in Group B.

GROUP B	Hamstring Tightness Vs C.V.A.	Hamstring Tightness Vs Calcanium eversion	C.V.A. Vs Calcanium eversion
r value	-0.905	0.952	-0.913
P value	0.0001	0.0001	0.0001

Group B also demonstrated similar relationship trends as observed in group A. There is a significant positive correlation between Hamstring Tightness and Calcanium eversion, where as there is a significant negative correlation between Hamstring Tightness and C.V.A and CVA and Calcanium eversion (Table 3). Subjects belonging to the group C also revealed the existence of significant positive correlation between Hamstring Tightness and Calcanium eversion, where as a significant negative correlation between Hamstring Tightness and C.V.A and CVA and Calcanium eversion was witnessed (Table 4).

TABLE 4: Correlation of Hamstring Tightness, C.V.A. and Calcanium eversion for the subjects of Group C

Group C	Hamstring Tightness Vs C.V.A.	Hamstring Tightness Vs Calcanium eversion	C.V.A. Vs Calcanium eversion
r value	-0.964	0.909	-0.906
P value	0.0001	0.0001	0.0001

The purpose of the study was to find out if there was any correlation between forward head posture and foot pronation with hamstring tightness. Forward head posture was demonstrated by C.V.A and foot pronation by Calcanium eversion. The results of the study revealed that there is a positive correlation between hamstring tightness and foot pronation i.e. with the increase in hamstring tightness there is increase in Calcanium eversion. Whereas a negative correlation was observed to exist between hamstring tightness and C.V.A i.e. with the increase in hamstring tightness C.V.A decreases.

In postural control, both the suboccipital and hamstring musculature may be involved. It has been recently found that the application of a manual intervention over the suboccipital muscles induced an increase in hamstring

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flexibility. The continuity of the neural system theoretically links the dura mater, which anatomically is inserted into the suboccipital muscles and the hamstring musculature. This suggests an anatomical relationship between the hamstring muscles and the cervical spine.

As hamstring and calf muscles are included in the same superficial back line it is seen that if hamstrings are weak, calves will often try to make up for that weakness, which means the muscle gets overused, which in turn exacerbates calf tightness. In that same way, hamstring tension is rarely experienced in isolation; rather, if there is tightness in the hamstring muscles, there is also a good chance that one would have tightness in calf as well, due to the synergistic nature of the hamstrings and calves for much of our daily movements.

*Conclusion***:** The results of the study revealed that there is a positive correlation between Hamstring tightness and Calcanium Eversion i.e. with the increase in hamstring tightness Calcanium Eversion increases and a negative correlation exist between Hamstring Tightness and C.V.A in all the groups.

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