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CORRELATION BETWEEN HAMSTRING FLEXIBILITY AND DYNAMIC BALANCE AMONG MIDDLE AGE GROUP MALE AND FEMALE

Physiotherapy

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ABSTRACT

19 healthy men and women participated in the study in which 9 were female and 10 were middle aged men. Following the initial assessment of hamstring flexibility using the back saver sit and reach test and active knee extension test, the dynamic balance was assessed using the SEBT and YBT test. Both the parameters were correlated to find out the relationship between them. The Pearson Correlation Coefficient test was used to analyse the relationship between the same. The purpose of the present study was to analyse the correlation between hamstring flexibility and dynamic balance among middle aged population. The findings of the study suggest that there is no significant correlation between hamstring flexibility and dynamic balance in middle aged group including both male and female. While our results do establish weak correlations between leg length, height, and reach distance, the correlation values are low, establishing the need for further investigation into performance contributions during the SEBT.

KEYWORDS

Hamstring, dynamic balance, flexibility, middle aged.

INTRODUCTION

The hamstring muscle complex, which consists of three separate muscles, located in the posterior compartment of the thigh i.e. semitendinosus, semimembranosus, and biceps femoris muscle [1]. Hip extension (posterior femur movement) and knee flexion (posterior tibia and fibula movement) are two major movements that the hamstring muscle group is involved in. [2].

Hamstring flexibility is regarded as a crucial component of the proper biomechanical operation of the knee, hip, and pelvic joints. Hamstring's restricted range of motion increases the likelihood of repeat injuries and reduces the capacity to carry out ADLs [3]

Inadequate flexibility of hamstring may lead to muscle injuries and is a commonly documented risk factor for hamstring strains and reduced sports performance [4].

Balance control is a fundamental motor skill and can be defined as the individual's ability to control equilibrium by maintaining or returning the center of body mass over its base of support [5].

Dynamic stability is defined as the capacity to keep the body in an erect posture and to maintain equilibrium by keeping the centre of mass over a base. Limited extensibility of the hamstrings results in changes in the dynamic range of motion used while moving. Hamstring tightness is one of the factors that affect dynamic balance because it loses the ability to deform while being stretched. Therefore, the aim of this study is to determine the correlation between hamstring flexibility and dynamic balance among middle aged population.

MATERIAL AND METHODS

19 healthy middle aged male and female (10 male and 9 female) participated in the study and were informed about the testing procedure and written informed consent was obtained. The subjects were included in between the age group of 25-50 years and who were physically active. they were excluded if they had injuries in the knee, ankle or hip joint, recent surgeries in the lower limb, low back pain.

Experimental Procedure

Hamstring flexibility was measured by active knee extension test, sit and reach test, back saver sit and reach test. Dynamic balance was measured by STAR excursion balance test and Y balance test.

Statistical Analysis

The arithmetic mean, standard deviation and standard error of mean were calculated to prepare a summary of statistics. The data was analysed for statistical significance using Statistical Package for Social Sciences (SPSS 21) software.

1. RESULT

Table 1: Summary of Anthropometric data

Characteristics	Mean (N=19)
Age	39
Height	169.5
Weight	68.5
BMI	23.6

Table 2 YBT Score VS L+R (back Saver SandR)

VARIABLES	YBT ANTERIOR		YBT PL		YBT POSTEROMEDIAL	
	R	L	R	L	R	L
YBT ANTERIOR	1	1	0.69	0.69	0.73	0.73
YBT PL	0.69	0.69	1	1	0.68	0.68
YBT PM	0.73	0.73	0.68	0.68	1	1
L+R B.S	-0.12	-0.16	-0.10	-0.09	-0.01	-0.06

Table 3 YBT Score VS Left + Right Limb AKE

	YBT ANT	YBT PL	YT PM	(L+R) LIMB AKE
YBT ANTERIOR	1	0.69	0.73	0.03
YBT ANTERIOR	0.69	1	0.68	-0.21
YBT PM	0.73	0.68	1	0.02
(L+R) LIMB AKE	0.03	-0.21	0.02	1

Table 4 SEBT Score VS Left+ Right Limb Back Saver (SIT AND Reach)

	SEBT ANT	SEBT AL	SEBT PL	SEBT POST	SEBT PM	SEBT MED	SEBT AM	SEBT L	(L+R) LIMB B.S
SEBT ANT	1	0.75	0.78	0.60	0.49	0.47	0.72	0.78	0.04
SEBT AL	0.75	1	0.67	0.65	0.38	0.37	0.38	0.64	0.07
SEBT PL	0.78	0.67	1	0.82	0.69	0.37	0.65	0.88	0.06
SEBT POST	0.60	0.65	0.82	1	0.85	0.51	0.67	0.75	-0.07
SEBT PM	0.49	0.38	0.69	0.85	1	0.53	0.62	0.66	0.00
SEBT MED	0.47	0.37	0.37	0.51	0.53	1	0.60	0.13	-0.03
SEBT AM	0.72	0.38	0.65	0.67	0.62	0.60	1	0.59	-0.27
SEBT L	0.78	0.64	0.88	0.75	0.66	0.13	0.59	1	-0.06
(L+R) LIMB B.S	0.04	0.07	0.06	-0.07	0.00	-0.03	-0.27	-0.06	1

Table 5 SEBT Score VS Left + Right Limb AKE

	SEBT ANT	SEBT AL	SEBT PL	SEBT POST	SEBT PM	SEBT MED	SEBT AM	SEBT L	(L+R) LIMB AKE
SEBT ANT	1	0.75	0.78	0.60	0.49	0.47	0.72	0.78	0.03
SEBT AL	0.75	1	0.67	0.65	0.38	0.37	0.38	0.64	0.04
SEBT PL	0.78	0.67	1	0.82	0.69	0.37	0.65	0.88	0.07
SEBT POST	0.60	0.65	0.82	1	0.85	0.51	0.67	0.75	0.01
SEBT PM	0.49	0.38	0.69	0.85	1	0.53	0.62	0.66	-0.01
SEBT MED	0.47	0.37	0.37	0.51	0.53	1	0.60	0.13	0.17
SEBT AM	0.72	0.38	0.65	0.67	0.62	0.60	1	0.59	0.05
SEBT L	0.78	0.64	0.88	0.75	0.66	0.13	0.59	1	-0.06
(L+R) LIMB AKE	0.03	0.04	0.07	0.01	-0.01	0.17	0.05	-0.06	1

DISCUSSION

The purpose of the present study was to assess the relationship between hamstring flexibility and dynamic balance among middle aged population.

In this study, an attempt has been made to find out the relationship of findings with the theoretical framework introduced in the literature review. The findings have been discussed keeping in mind the research questions explained in the introduction section.

In this study, we found the normative values of hamstring flexibility using the Active knee extension test and back saver sit and reach test, whereas, dynamic balance was assessed by star excursion balance test and Y-balance test of 19 healthy individual of middle age varying from 25-50 age from A+ Orthopaedic and Sports Med Center.

Our results demonstrate that SEBT and YBT for both limbs show slightly positive correlation with AKE, where, SEBT anterior (0.03cm) SEBT AL (0.04cm) SEBT PL (0.07cm) SEBT POST (0.01cm) SEBT PM (-0.01cm) SEBT MED (0.17cm) SEBT AM (0.05cm) SEBT L (-0.06cm) and YBT test shows weak correlation with anterior (0.03cm) posterolateral (-0.21cm) and posteromedial (0.02cm) reach for both limbs. It further indicates that slight decrease in left and right limb back saver test with YBT anterior (-0.14cm), YBT posterolateral (-0.10cm) and posteromedial (-0.03cm).

The results are in contrast with the study done Shaily Sharma et al. (2021) which showed that hamstring flexibility shows no correlation with SEBT reach distance. Hence, we can say that hamstring flexibility has no or very limited impact on dynamic balance.

CONCLUSION

There is no significant correlation between hamstring flexibility and dynamic balance in middle age group male and female

No previous researchers have attempted to examine factors that may potentially contribute to performance. While our results do establish correlations between leg length, height, and reach distance, the correlation values are low, establishing the need for further investigation into performance contributions during the SEBT. Further investigation can be done on athletic population where one can find a correlation between flexibility of lower limb muscles with limb length, agility, and dynamic and static balance

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