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EFFECT OF HAMSTRING EXTREMITY STRETCHING EXERCISES ON BALANCE

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ABSTRACT

Balance is the ability to maintain the body's centre of mass (COM) within the limits of the base of support. Young adults are having sedentary lifestyle now a days which may affect ther flexibility of muscles the main objective of the study is to find the effect of stretching on balance score of and individual. *Methodology*: 40male subjects were taken as per inclusion criteria on which pre stretching balance score was noted with berg balance score and single limb standing (with open eyes) were noted followed by stretching of hamstring and calf was given and again balance score was noted. Results its is found that hamstring stretching definitely helps to improve individuals balance score

KEYWORDS: Hamstring Stretching, Balance Score.

Hip flexors and hamstrings are among the most important groups of muscles OF HUMAN body. They are necessary for the long term mobility and stability of lower body. Healthy and well-conditioned hip flexors and hamstrings are key for the prevention of hip, knee and lower back issues.

flexibility is considered an essential element of normal biomechanical functioning in sport activities and day to day activities like walking running etc.[1] The studies done earlier suggests a number of associated benefits of flexibility including improved athletic performance, reduced injury risk, prevention or reduction of post-exercise soreness, and improved coordination. few studies have shown that decreased hamstring flexibility is a risk factor for the development of patella tendinopathy and patellofemoral pain, risk of fall,

hamstring strain injury, 6 and symptoms of muscle damage following eccentric exercise, osteoarthritis at an early age.[1-4]

Falls are among the leading causes of fatal and nonfatal injuries in the elderly. tremendous amount of revenue is spent annually for the care of the elderly with fall-related Injuries the risk of Fallsincrease with age.[5]

Balance is defined as "the condition in which all the forces acting on the body are balance such that a center of mass is within stability, boundaries of base of support. Balance and upright postural control and fundamental components of movement, this involves both the ability to recover from instability and the ability to anticipate and move in ways to avoid instability.[6]

Postural imbalance is a major risk factor for falls. Nguyen et al. found that bone mineral density, postural sway and quadriceps strength were the important indicators of falls. Lord et al. showed that eyes closed postural sway, reaction time, lower limb proprioception and strength of ankle dorsiflexors were significantly divergent between multiple fallers and nonfallers. Wolfson et al. reported that the decline in balance ability in the elderly was most probably related to loss of strength in lower extremity and decline in sensorimotor functions.[7]

Numerous studies have concluded that there is relationship between hamstring flexibility and balance score of human being and maximum studies have take elderly population for their studies so there is an need of sudy to be done on young population as maximum number of young adult now a days have sedentary life style (as per ASCM guideline s) so there will be decrease in hamstring flexibility therefore this study help us to find out that is there any effect of hamstring flexibility on balance sore on young adults.

Systematic reviews have quoted that there is insufficient evidence to show a beneficial effect of stretching on injury risk and movement performance.[8-9] & It is also seen that chronic stretching can effectively increase joint range of motion (ROM).[11-13] The change in joint range of motion after stretch training has been attributed to mechanical and neural factors as well as tolerance to stretch.

METHODOLOGY

Inclusion Criteria

- asymptomatic male with age group of 18-20 years
- Habit of sitting 4 hours or more/day
- BMI 18.5 to 24.9kg/m^2

Exclusion Criteria

- Diagnosed case of any systemic/musculoskeletal/neurological /psychological disorder
- Any history of trauma in last 6 months which can affect the study like fracture of lower limb etc…

Procedure

Subjects who were fulfilling inclusion criteria were explained about the study after their written consent they were considered for the study.

A total of 40 subjects were considered for the study, pre stretching single limb stance test score and Berg Balance score were noted following which hamstring stretch were given by the therapist for hamstring and calf . 4 sets of stretches, holding each stretch for 30 seconds and alternating the right and left limb (8 stretches in total).[5]

The stretching exercises proceeded and were followed by a warm-up and cool-down period. warm was done by hot pack on muscles to be stretched for 20 minutes & The cool-down period was consisted of (1) taking a deep breath in while bringing both arms over the head and letting the breath out while bringing the arms back down,(2) shaking out the arms and legs the total session last for 2 weeks session on each alternate day after which again balance score was noted.

Table 1: Pre-post single limb stance time with eyes open changes analyses using paired t-test.

Group	Pre stretching	Post stretching
Mean	33.20	39.80
SD	4.46	4.79
SEM	0.71	0.76
N	40	40

t=15.8176 df=39 standard error of difference = 0.417 **P value and statistical significance:** The two-tailed P value is less than 0.0001 & statistically significant.

Confidenceinterval

The mean of Group One minus Group Two equals -6.60 95% confidence interval of this difference: From -7.44 to -5.76

Table 2

Pvalueandstatisticalsignificance

The two-tailed P value is less than 0.0001 & is statistically significant.

Confidenceinterval

The mean of Group One minus Group Two equals -6.95 95% confidence interval of this difference: From -7.98 to -5.92

t=13.6927

df=39

standard error of difference = 0.508

Group	Pre stretching	Post stretching
Mean	39.38	46.33
SD	2.85	3.45
SEM	0.45	0.55
N	40	40

DISCUSSION

This study demonstrated that the effects of lower limb muscle stretching significantly improved single limb stance time and balance which was evaluated using berg balance score Single limb stance time is a one-leg standing balance which is a promising predictive marker for assessment of balance score of an individual

During standing, the goal is to maintain the body's center of gravity (CG) within the base of support. The initiation of gait, however, is an unstabilizing event whereby the body's CG is made to fall forward and outside of the stance foot. By the time the selected cadence is achieved, the only stabilizing period is double-support stance, and even during that time period the one limb is pushing off with considerable force while the other limb is accepting the full weight of the body.9 During natural cadence, 80% of the stride period is singlesupport stance, when the CG of the body has been shown to be outside the footlo; the closest it gets to the base of support is when it passes forward along the medial border of the foot. Even during the two 10% double-support stance periods, both feet are not flat on the ground. During the first half of double-support stance, or heel contact (HC), the weight-

accepting foot is being lowered to the ground; during the latter half of double-support stance, the final stage of push-off has weight only under the toes. Thus, the body is in an inherent state of instability. Most of the findings from balance studies during standing, therefore, have very limited relevance to gait. The dynamic balance of the head, arms, and trunk (HAT) and the safe transit of the foot during the swing phase of gait (safe toe clearance and a gentle foot landing) present a challenge to the central nervous system during walking. The HAT constitutes two thirds of the body mass, and the HAT'S center of mass (CM) is located about two thirds of the body height above ground level. The CM is the point where all the mass of the HAT can be considered to act in all three axes as compared with the CG, which is its location in the gravitational axis. In the sagittal plane, even in slow walking, the horizontal momentum of the HAT results in inherent instability.[14]

The reasons for improvement in balance can be attributed to the below theory.Stretching might have induced changes in both peripheral neural (proprioception) and mechanical output (musculo-tendinous unit or stiffness) affecting the ability to adapt adequately to the stability challenges. The prolonged static- stretching protocol may have reduced the stiffness of the joint, fascia, and musculo-tendinous unit, thus hindering balance during the single leg balance task. These changes might affect the muscle afferent input to the central nervous system and the muscle output during balance. However, the absolute mean change in the single limb stance time both in eyes open and closed and balance from pre- to post-stretching values increased in both the stretched lower limbs.[5]

Two parts of fitness that are often overlooked are flexibility and balance. This may be because of conflicting information regarding their importance or relevance. However, both can play a vital role in overall fitness and function. Tight muscles can contribute to back pain or difficulty performing simple tasks, such as putting objects into overhead cupboards. While poor balance is known to increase the risk of falls in older persons, it may also affect sports performance in younger individuals. Luckily, it is very easy to work on both flexibility and balance on your own.(ACSM)

REFERENCES

1. Hutson M. Sports injuries: recognition and management, 2nd ed. Oxford:Oxford University Press, 1996.
2. Hartig DE, Henderson JM. Increasing flexibility decreases lower extremity overuse injuries in military basic trainees. Am J Sports Med, 1999; 27: 173–6.

3. Gleim GW, McHugh MP. Flexibility and its effects on sports injury and performance. Sports Med, 1997; 24: 289–99.
4. Pope R, Herbert R, Kirwan J, et al. A randomized trial of pre-exercisestretching for prevention of lower limb injury. Med Sci Sports Exer, 2000; 32: 271–7.
5. Ravi Shankar Reddy, Khalid A Alahmari. Effect of Lower Extremity Stretching Exercises on Balance in Geriatric Population *International Journal of Health Sciences, Qassim University, July-Sept 2016; 10(3).*
6. Lundin-Olsson L, Nyberg L, Gustafson Y. "Stops walking when talking" as a predictor of falls in elderly people. *The Lancet,*1997; 349(9052): 617.
7. Sumit Kalra*, Nidhi Kalra Effect of Menopause on Balance Score: POTJ, October - December 2015; 8(4).
8. Carmeli E, Kessel S, Coleman R, Ayalon M. Effects of a treadmill walking program on muscle strength and balance in elderly people with Down syndrome. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences.,* 2002; 57(2): M106-M110.
9. Tsang WW, Hui-Chan CW. Effects of exercise on joint sense and balance in elderly men: Tai Chi versus golf. *Medicine and science in sports and exercise,* 2004; 36(4): 658-667.
10. Behm DG, Bambury A, Cahill F, Power K. Effect of acute static stretching on force, balance, reaction time, and movement time. *Medicine and Science in Sports and Exercise.,* 2004; 36: 1397-1402.
11. Godges JJ, MacRae H, Longdon C, Tinberg C, MacRae P. The effects of two stretching procedures on hip range of motion and gait economy. *Journal of Orthopaedic & Sports Physical Therapy,*1989; 10(9): 350-357.
12. Murphy JR, Di Santo MC, Alkanani T, Behm DG. Aerobic activity before and following short-duration static stretching improves range of motion and performance vs. a traditional warm-up.*Applied Physiology, Nutrition, and Metabolism,* 2010; 35(5): 679-690.
13. Shellock FG, Prentice WE. Warming-up and stretching for improved physical performance and prevention of sportsrelated injuries. *Sports Medicine,* 1985; 2(4): 267-278.
14. David A Winter et al Biomechanical Whng Pattern Changes in the Fit and Healthy Elderly Physical Therapy flolume, June 1990; 70(6).