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ORIGINAL ARTICLE

CORRELATIONS OF TWO TESTS OF HAMSTRING FLEXIBILITY

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INTRODUCTION

Hamstring is a muscle at the back of the thigh. It consists of four muscles, which originates from pelvis and inserted into the upper leg just below the knee. So it's a two joint muscle, which directly affects the flexibility of hip as well as knee and indirectly the flexibility of spine Being a two joint muscle, it is prone to develop tightness very easily. It's flexibility plays a major role in the performance of hurdle like activities i.e. those activities that involves extension of knee along with the flexion of hip. Hamstring tightness is also a major causative factor to the several lower limb injuries and low back pain. Therefore, the hamstring stretching constitutes an essential component of anti – performance conditioning programme. Presently there are 3 manual methods of assessing the flexibility of this muscle group, viz. sit and reach, straight leg reach and popliteal angle. First test is commonly used by the physical educationists whereas the later two are used by the physiotherapists and other medical groups. Various physiotherapists like Hsieh:1983, Mireau:1989, Gajdosik:1993 and Cameron have reported their findings on SLR. Cornbleet conducted study on assessment of hamstring muscle length using sit and reach teat. The study is on correlation of these two tests which is not widely reported. This study was aimed at determining the correlation of active SLR (Straight Leg Reach) and sit and reach test's scores.

METHODOLOGY

A cross sectional sample of 50 boys and girls of age group 12 – 16 from senior secondary school was surveyed. Equal numbers of boys and girls were drawn out randomly out of 100 students. Four measurements were taken for each student for active SLR using full circle goniometer as per the standard clinical protocol along with administration of a questionnaire. This questionnaire was focussed on obtaining the injury status of the subject and excluding those who had sustained any injury to the lower limb in the last three months and had any pain in the spine and the lower limb at the time of evaluation.

Test administration

The detailed description of the test is as follows:

SLR

Position: supine lying with hip in 0 degree of abduction, adduction and rotation. Pelvis was stabilized to prevent rotation or posterior tilting. Fulcrum of the goniometer was placed over the lateral aspect of the hip joint using the greater trochanter of the femur for reference. Proximal and distal arms were aligned with the lateral midline of pelvis and lateral midlineof the femur respectively. In active SLR protocol, subject was asked to flex the hip while keeping the knee extended. He was asked to perform the action till the comfortable range. The point of discomfort or the point at which knee extension was not maintained was considered as the final range (Norkins and White : 1998). The values were recorded in

degree. The active SLR of both left and right side was measured by a qualified physiotherapist (M.S.). The point scale is as follows:

Degrees

80 to 100 degree off the floor - Good

60 to 80 degree of the floor - Marginal

60 degree or less off from the floor - Unsatisfactory

Sit and Reach

Position: Long sitting position on the floor with legs straight, feet

Straight up; the rular was placed just above the feet of subject and zero reading was kept towards the subject. They were then asked to slowly reach forward as possible without raising the knee and hold. The reading was recorded in centimetres where the fingertips just reached the scale(Davis, Bull and Roscoe, 2000). The flexibility scale is as follows:

Flexibility		Rating
Male	Female	
>14	>15	Excellent
11 – 13	12 – 14	Good
7 – 10	7 – 11	Average
4 – 6	4 – 6	Fair
<3	<3	Poor

Data Analysis

The co-efficient of correlation is presented in Table 1

Table 1

The product moment correlation between SLR and Sit and Reach Test

Name	r
Rt. SLR Vs Sit and Reach	-o.21
Lt. SLR Vs Sit and Reach	-0.19

T= 0.23 at 0.05

The active SLR scores of right and left side were correlated separately with the sit and reach score. It's evident from the table that the product moment correlation was -0.21 and -0.19 respectively for right and left side which was less than the tabulated value of 0.23 at 0.05 level of significance.

DISCUSSION

The main focus of this study was to develop a regression coefficient for the conversion of the two scores of the two tests. Considering the diverse group working on flexibility of a muscle with different methods and terminologies (Idota:1991, Goeken:1994, Lee:2000). It was felt important to make efforts to generate a unified tool for interpreting and cross validating the research data and these studies. However, statistically significant correlations were not established between the scores of these two tests. The plausible reasons for this result could be the biomechanical factors which differs considerably in both the tests. In SLR the spine is fixed and hip moves whereas in sit and reach test lower limb below hip joint remains fixed and hip moves. However, here along with movement of hip there also occurs the movement of the various segments of spinal column. The variability of the spinal

column flexibility of the subjects may affect the score of sit and reach test. The inadequate sample size and the chance of statistical error could be another reason.

It is important that along with sit and reach test score, some account of spinal flexibility of the subject should be mentioned. For research it may be beneficial to include the variable of spinal flexibility too. Sit and reach test score interpretation must exclude the variable of spinal flexibility in order to become specific for the hamstring length estimation.

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