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A study of relationship of abdominal muscles strength endurance and static balance to Olympic weightlifting skill snatch performance

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Abstract

The Present study was to investigate the relationship of Abdominal Muscles strength Endurance and static Balance to Olympic weightlifting skill performance Snatch. The study was conducted on (n=100) male weight lifters of different universities, who represented the All India Interuniversity Weightlifting Competition in last 3years 2014, 2015 and 2016. Weightlifting skill Snatch performance data was collected from the official records of Competition score sheets. Abdominal muscle strength endurance was measured by Bent Knee sit ups test (Maximum counting in 30 Sec) and Stork Stand Test (Minutes/Seconds) was used to measure static balance. Pearson's Product Moment Correlation ($P > .05$) was being used to find out the relationship of Abdominal Muscles strength and Static Balance to Weightlifting skill Snatch performance. The results of present study have shown Abdominal Muscles strength Endurance ($r = 0.65$) Significant relation to Weightlifting Skill snatch Performance, where as no significant relationship was found between Static Balance ($r = 0.11$) and Weightlifting Skill snatch Performance.

Keywords: Strength endurance, balance, weightlifting, snatch

Introduction

The sport of Weightlifting has been dominated throughout its history by individuals who are able to display superior Physical strength and technical mastery. The skills movements of weightlifting sport are the snatch and Clean & Jerk and the total of both the skills decide the position in the Competitions. The weightlifting skill Snatch requires a single movement to bring the weight with barbell to the final position. (Storn *et al.* 2006).

The snatch is performed in one uninterrupted movement. The bar is lifted from the platform with straight extended arms without a pause. Snatch is the most technical weightlifting movements and it requires great strength of legs, trunk, back and abdominal muscles, but also precise coordination of movement, good reflexes, mobility and flexibility in the hip and shoulder joints. The snatch is made up of three successively performed parts:- the start, the lifts to full extension, and drop under the bar and recovery. (Vorobyev, A.N, 1978).

Abdominal Muscles consists of four major muscles, the rectus abdominis, external oblique, internal oblique, and transverses abdominis. These groups of muscles reflect the requirement of a weightlifting sports performance in the competition. During the snatch performance weight lifters use sitting position with heavy weights and barbell, abdominal muscles support the spin to reduce stress on it.

Body balance is also an important factor in weightlifting performance while lifting heavy weights over the head. The lifting of weights is accompanied by the significant loading of various parts of the body framework. Above all, very strong stress is experienced in head, spine, hip bone, shoulder, joints, muscles. Therefore, in the training or competition, body balance is required for the completion of lifting performance.

It was being hypothesized that there is positive correlation between abdominal muscle strength endurance with weightlifting skill Snatch performance.

Methodology

To achieve the purpose, the present study was conducted for (n=100) Male Weightlifters from

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(age 18 to 26 Years) different university who represented the all India interuniversity weightlifting Competition in last 3year (2014, 2015 and 2016) in different body weight Categories. All the subjects had two year Participation experiences in inter college, Inter University Weightlifting Competitions. The Weightlifting skill Snatch performance data was collected from the all India inter University weightlifting championship (official recorded) results as dependent variable. The Abdominal muscle strength Endurance and Static Balance were selected as independent variables and tested by Bent Knee sit ups test (Maximum Counts in 30 second) and Stork stand test (holding a position on foot of dominant leg in maximum Minutes/Second). The data was collected for independent variable tests after 24 hours of completion of Weightlifting Competition of each weight Category in order to examine the Contribution of the abdominal muscle strength and static Balance in Weightlifting Skill Snatch performance. After the explanation of the purpose of the study, each participant agreed to take part as subject for the study. All the subjects were given 10 Minutes for warming up for the tests as listed below in table 1.

Table 1: All the subjects were given 10 Minutes for warming up for the tests as listed below

S.NO	Variables	Test used	N
1.	Abdominal Muscles strength Endurance	Bent Knee Sit ups (Maximum Counts in30 Second)	100
2.	Static Balance	Stork stand (Holding a position on foot of dominant leg in maximum Minutes/Second)	100

Statistical Procedure

SPSS Version 20 was used to Calculate Person’s Product Moment Correlation to find out the relationship of Abdominal Muscles Strength Endurance and Static Balance in Weightlifting skill Snatch performance. In using the Pearson Product Movement Correlation, a value of 0.195 was needed for significance at the 0.05 level of confidence for 98 degree of freedom

Result

Descriptive statistics for Abdominal Muscles strength, Static Balance for Weightlifting skill Snatch performance as blow

Table 2: Shows the Means and Standard Deviation of Sit up test, Stork Stand Test and Weightlifting skill snatch performance values of all 100 male weightlifters.

S. No	Variables	Mean	S.D	N
1.	Weightlifting skill Snatch	94.55	22.02	100
2.	Sit up Test	14.51	1.38	100
3.	Stork Stand Test	50.09	3.73	100

Findings

The score on each of the independent variables abdominal muscle strength and static balance were correlated with Weightlifting skill Snatch performance and analysis of data pertaining to this presented in Table 3.

Table 3: Relationship of abdominal muscle strength endurance and Static Balance were correlated with Weightlifting skill Snatch performance

S. No	Variables	‘r’ Value	N
1.	Weightlifting Skill Snatch Performance and Abdominal Muscles strength Endurance (Bent Knee sit-ups test)	0.65	100
2.	Weightlifting Skill Snatch Performance and Static Balance(Stork Stand Test)	0.11	100

N=100

Correlation is significant at the 0.05 level of Confidence.

Table 3 indicate that the there was significant positive Correlation between Abdominal Muscles strength Endurance (r= 0.65) and Weightlifting skill Snatch performance, where as no Significant relationship was obtained between Static balance (r=0.11) and Weightlifting skill Snatch performance. The relationship between Abdominal Muscles strength endurance and Static balance to weightlifting Snatch performance is graphically presented in Figures 1 and 2.

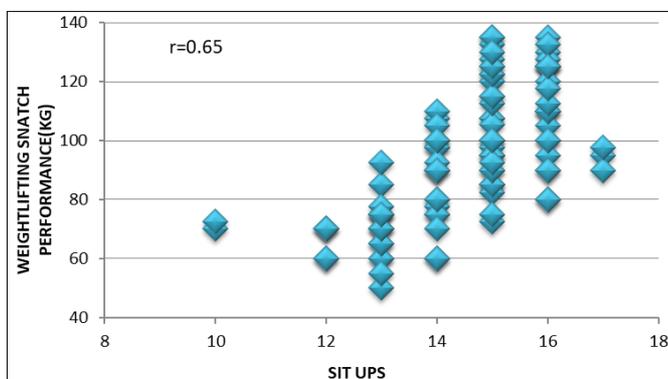


Fig 1: Maximum count in 30 seconds

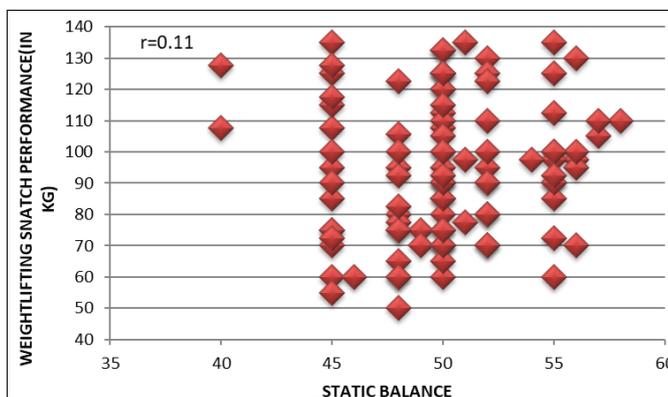


Fig 2: Duration of balance on the ball of the foot minutes/seconds

Discussion of findings

The analysis of data in respect of relationship of independent variables abdominal muscle strength endurance and Static Balance with dependent variables Weightlifting skill Snatch performance has shown that abdominal muscle strength endurance in the study found to be significantly related for the

criterion variables. Even though static balance has shown low value, which indicate that these have no significantly related to weightlifting skill Snatch performance. As evident from the results the efficiency of abdominal muscle strength endurance is a one of the main factor for optimum performance in weightlifting skill Snatch performance.

Conclusions

It was observed that there is significant positive Person's Correlation observed between abdominal muscle strength endurance and weightlifting skill snatch performance of all (n=100) the lifters, (Maximum no. of bent knee sit-ups test with in 30 second). The relationship was not found between static balance and weightlifting skill snatch performance, (Stork Stand Test) of all (n=100) lifters. The study also justifies, as per the results, that abdominal muscle exercise form (Bent Knee Sit-ups) a valuable part of the weightlifting skill snatch training programme. Before prescribing abdominal exercises, a musculoskeletal assessment of the lumbar and hip areas should be performed to establish lifters individual needs.

Implication of research findings

For the study, limitations were acknowledged and the focus is primarily to understand the relationship between abdominal muscle strength endurance and Static Balance to Weightlifting skill Snatch performance. The findings of the study suggestions can help to coaches, trainers and players to make future weightlifting training plan.

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