The Power of Flexibility – Examination of Lower Limb Power In Relation to Flexibility

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Abstract

Summary: All tests are to be performed within the immediate facilities of the FGCU Human Performance Laboratory. 120 participants, consisting of college-aged men and women were fit for the criteria of this study with appropriate considerations noted below.

Materials

Materials used for this project include necessary materials to effectively facilitate a sit-and-reach test, standing broad jump test, and vertical jump test.

Methods

Standing Vertical Jump (in)

Vertec™ Vertical Jump Tester

Standing Broad Jump: A flat jumping area of at least 20 feet in length, a tape measure of at least 10 feet long, marking tape

Subjects. The subjects for this project are recruited students within the Exercise Science classes of 2020 and 2021, that are currently or previously enrolled in the Methods of Resistance Training and Conditioning Lab (APK 4130) course.

Selection Criteria. Each subject must be above the age of 18 years old. Subjects must be healthy with no major health complications. Exclusion criteria includes any recent health status change, medication change, and/ or injuries. At any time during the research, students had the opportunity to choose to withdraw from participating.

Ethical Considerations. The institutional review board governing research on living matter of Florida Gulf Coast University has determined that the study protocol adheres to ethical principles.

Material and Subject Preparation.

Consent Form: Consent Forms were provided to participants electronically and were to be documented before providing means of data collection by the research team.

Protocol: Sit-and-Reach Protocol – Sit and Reach protocols adhered to ACSM guidelines to ensure consistency and reliability of results. Sit-reach scores were collected after power assessments to promote muscle stretch shortening cycles seen in power trials.

Standing Vertical Jump Protocol – Using a Vertec™ Vertical Jump Tester, the testing apparatus was adjusted to the client’s standing reach height with their dominant hand raised to the highest comfortable position. The following figures were performed on each subject.

Standing Broad Jump Protocol – Randomized in performance order, SJU trials were performed before or after completion of SVJ trials. SJ trials are performed on turf or field to limit excessive joint impact during power testing. Standing broad jump trials adhere to ACSM Standing Long Jump guidelines.

Discussion and Summary

The results drawn are limited in quantity whilst providing some possible reinforcement to the proposed hypothesis; reinforcing the possibility of a correlation between maximal lower limb flexibility and maximal power output demonstrated in the standing broad jump and static vertical jump tests. Testing protocols to achieve data were facilitated with ease as a result of lack of complexity in testing equipment. Standing broad jump and standing vertical jump were both examined to test the credibility of the two power assessments. Alternatives to traditional protocol exist where specialized equipment is not necessary. The testing apparatuses were used in this study to promote accuracy and repeatability.

It was unexpected to examine a negative trend in relationships seen in the standing broad jump from the male sample group. This same participant, seen in the standing broad jump from the male sample group. This same participant, seen in the standing broad jump and sitting broad jump trials. The possibility of a deviation in trend could be the accumulation of fatigue in lower limb musculature throughout the continuation of performed trials. Test selection between standing vertical jump and standing broad jump tests were randomized in order. It is to be noted that testing bias was possible as student practitioners facilitating student participants for data collection may effect results and relationships. The small sample size may be due to the remote collection methods used for data acquisition.

In conclusion, this study, although limited in sample size, reinforces the original hypothesis, confirming positive correlations in lower limb flexibility and maximal power output.

References


