The effects of external load on vertical jump performance

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Background

• The ability to utilize the stretch shortening cycle (SSC) effectively can translate to superior performance in sports.

• Sprinting and Jumping are common aspects of sports relying on the SSC
Background

• It is not known to what extent the use of protective equipment, or application of the equipment as an external load, may have on the SSC or sports performance.
Purpose

• Examine the influence of external loading on vertical jump and SSC performance in recreationally active college-aged adults
Methods

- Twenty-four subjects (12 male, 12 female)
- Squat jump (SJ) and counter movement jump (CMJ)
- Counter Movement Jump (CMJ)
Methods

• Squat Jump (SJ)
Methods

• An external load of 5% of bodyweight was added in form of a weighted vest

• 150lb = 7.5lb vest

• “Average” sports equipment varies between 3-8% depending on sport.
Measurements

• Peak power was estimated from vertical jumps using the equation developed by Sayers et al. 

\[ PP (W) = (60.7) \times \text{jump height (cm)} + 45.3 \times \text{body mass (kg)} - 2055 \].

• The reliance of SSC was determined using the eccentric utilization ratio (EUR), which is derived from the difference between SJ and CMJ and was determined under both conditions.
Results

• There were significant differences in jump performance (p<0.05) between males and females, as such all results are analyzed by gender.

• The application of external load significantly reduced jump height (p<0.05) in SJ and CMJ for both groups.
Results

• CMJ Peak power was reduced in only the male group, however this was not significant (p>0.05).

• The external load had a significant effect on EUR power in only the male group (1.3±1.7%; p=0.02).
Conclusions

• Data from this investigation suggests that an external load, such as protective athletic equipment, may have an influence on vertical jump and SSC performance in recreational athletes.

• In males, an applied external load decreases CMJ power output and may influence the ability to maximize the use of SSC.
Practical Application

• Testing for sports performance using an external load similar to that used in the sport may more accurately predict performance.
Further Research

• Further investigation is needed to determine if the results from this study are consistent when testing highly trained athletes.

• Further investigation is needed to determine if the effects are similar in linear movements.

• Training Study?
References