STRENGTH & CONDITIONING

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

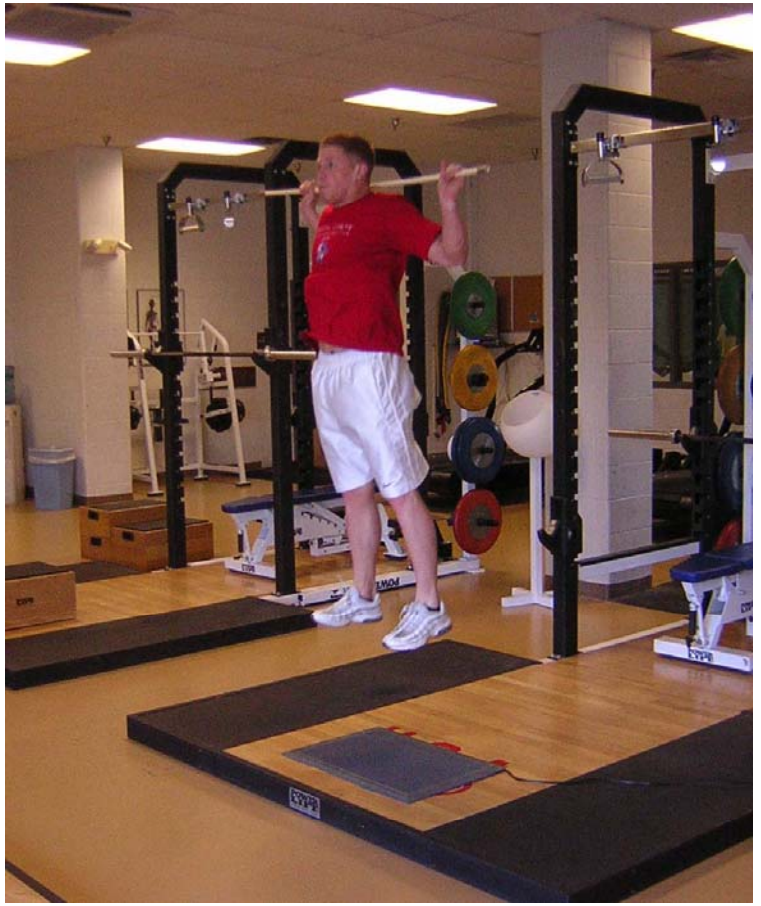
- Examine the influence of external loading on vertical jump and SSC performance in recreationally active college-aged adults

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% subjects bodyweight was added in form of a weighted vest
- 150lb = 7.5lb vest

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

Measurements

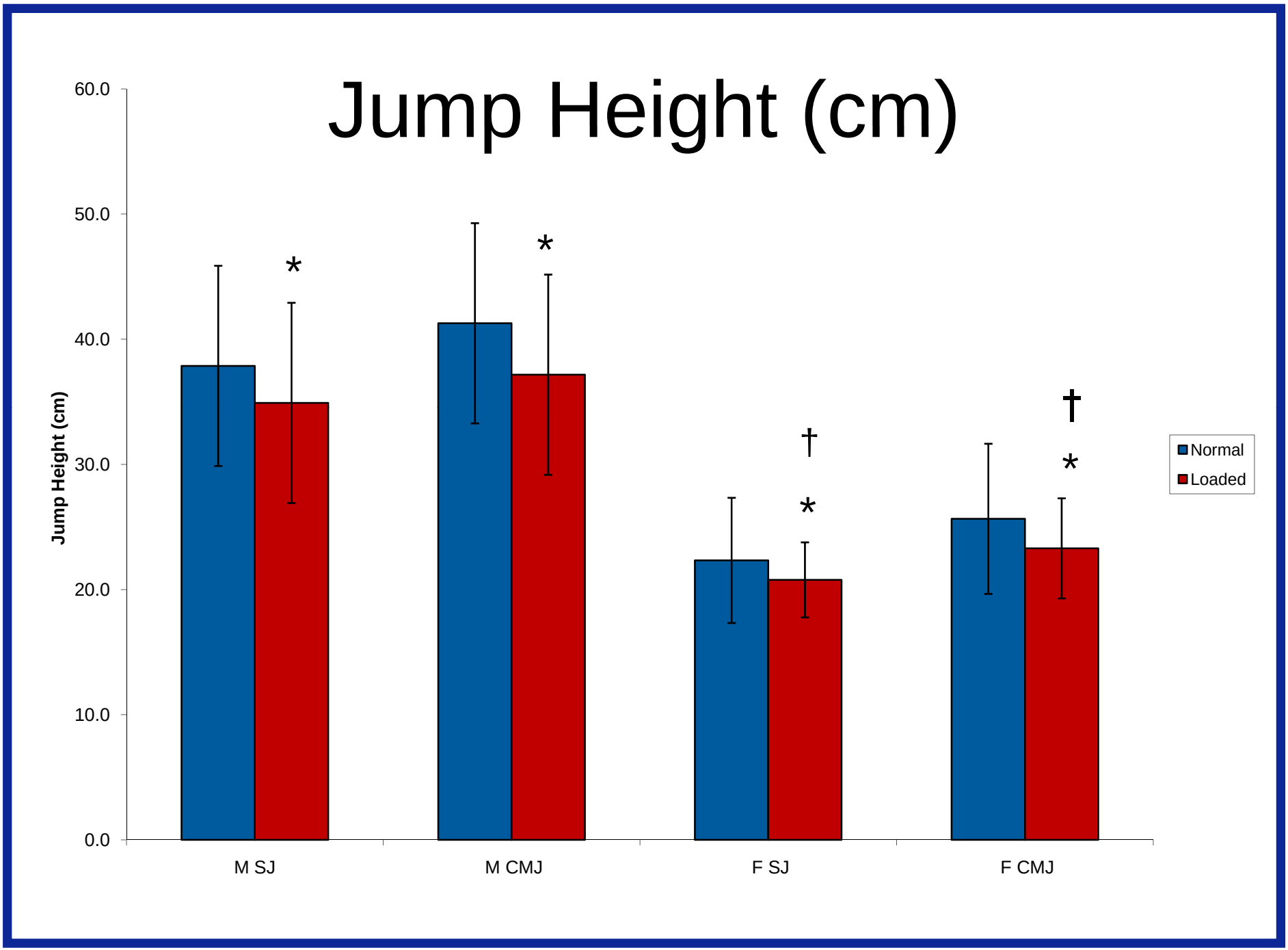
- Peak power was estimated from vertical jumps using the equation developed by Sayers et al. [PP (W) = (60.7) x jump height (cm) + 45.3 x body mass (kg) –2055].

- 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.


Jump Height (cm)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Jump Height (cm)
M SJ
M CMJ
F SJ
F CMJ
Normal
Loaded
*
*
†
*
†
*

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

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