THE EFFECT OF MENTAL FATIGUE ON SQUAT JUMP AND REPEATED JUMP PERFORMANCE IN COLLEGIATE VOLLEYBALL PLAYERS

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INTRODUCTION

- Psychological factors play an important role in achieving peak physical performance.
- Mental fatigue has been found to be detrimental to muscular strength and aerobic endurance performance.
- This is of particular concern given the high cognitive demands that collegiate athletes constantly face throughout their day.
- However, research to date has yet to examine the impact of mental fatigue on muscular power and power endurance, which are critical to athletic performance in volleyball.

PURPOSE

- To examine the effects of mental fatigue on muscular power and power endurance as well as kinetic and kinematic characteristics during two consecutive jumping tasks to include: 1) maximum effort squat jump, and 2) a set of 15 countermovement jumps.

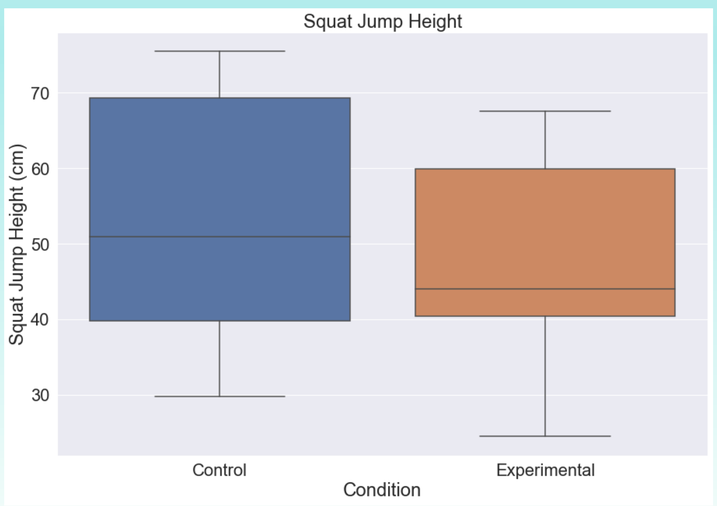

Figure 1. Illustrates the significant difference in Squat Jump Height between the Experimental and Control Conditions.

METHODS

- 14 collegiate volleyball players (age=19.71 ± 1.38 years)
- Athletes performed a 30-minute experimental manipulation consisting of either a Stroop Task (high cognitive demand) or watching a documentary (low cognitive demand).
- Cognitive task was followed by a set of three squat jumps and a set of 15 continuous countermovement jumps.
- Two force platforms were used to collect kinetic measures of peak concentric force and peak landing force for each jump.
- Inertial measurement units were used to record vertical jump height along with kinematic measures of peak hip flexion, knee flexion, and ankle dorsiflexion.
- Separate linear mixed effects models with Condition or Condition*Time effects were computed for jump height, kinetics, and kinematics for the three squat jumps and the set of 15 repeated jumps.

Figure 2. Illustrates the changes in jump height during the repeated jump task. There were no significant differences between conditions.

RESULTS

- Participants reported significantly higher mental demand following the high cognitive demand task compared to the low cognitive demand task, although differences for mental fatigue were non-significant between conditions.
- For the maximal power squat jumps, a significant main effect of Condition was found for peak jump height ($t(1,14) = -2.803$, $p = 0.014$), with significantly lower performance observed for the high cognitive demand condition (47.99±12.73 cm) compared to the low cognitive demand condition (53.26±16.23 cm) (Figure 1).
- No differences in peak jump height were observed for the repeated countermovement jumps (Figure 2). Furthermore, no differences were observed for any of the kinetic or kinematic measures during either jump task.

CONCLUSION

- The current findings suggest exposure to high cognitive demands can impart negative effects on subsequent maximal power peak jump height among collegiate volleyball players, but power endurance does not appear to be impaired.
- Differences in kinetics and kinematics do not appear to underly the detrimental effects found for maximal peak jump height.
- Future work with larger samples is required to replicate these effects and examine other potential intermediary mechanisms.

PRACTICAL APPLICATIONS

- Coaches and trainers should consider the cognitive demands athletes are exposed to throughout the course of a day as it relates to planning training and competition for optimal performance.