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## Abstract

**Introduction:** Having a precise strength training plan can help prevent injuries (1). Football is one sport in which is very physically taxing and injuries often occur. With the NFL-225 training, we believe football players will add strength and have a better body composition.

**Methods:** Participants worked out four days a week for 5 week time period mainly focusing mainly on the bench press and back squat.

**Results:** Mean change in body mass, back squat, and bench press were all averaging in a positive weight increase.

**Conclusion:** After recording 5 weeks, we concluded that on average, most of the participants significantly increased in strength but it could not be determined if weight change was due to muscle gain or fat loss.

## Introduction & Research Question

### Introduction

Strength training can help prevent injuries and enhance athletic performance <sup>2</sup>. In a physical sport such as football, one must have the strength, power, and endurance to be able to take the contact a football player will endure for a whole game and for a whole season. Athletic trainers and certified strength and conditioning specialists commonly combine various weight lifting exercises in a football weight training program, including the 1-repetition maximum (1RM) bench press, back squat, and the NFL's 225 bench press test (NFL-225).<sup>1</sup> The NFL-225 test is an exercise where the player must perform the bench press, lifting exactly 225 pounds repeatedly until failure. The NFL-225 assesses upper body strength and muscular endurance, and previous research indicates the test is representative of overall strength in football players <sup>3</sup>. This study investigated what factors in a strength training program contribute to improved strength over time as indicated by the NFL-225 test.

### Research Question

Does Training For the NFL-225 Improve Overall Strength In Football Players?

### Hypothesis

Utilizing the NFL combining training such as the 1 RM bench press, 1 RM back squat, and the NFL-225 test will *increase* strength in a college football player.

## Research Design & Data Collection

### Participants:

➤ A total of 85 collegiate football players were recruited from the University of Hawaii<sup>1</sup> at Mānoa. Only 43 players made it to all data collection sessions, were able to complete both the pre- and post-tests for the back squat and bench press, and were able to complete the NFL-225 one time and thus were included in the study.

### Procedures:

- Participants completed a standardized weight training routine four days a week (Monday, Tuesday, Thursday, and Friday) over a 5 week time period during the summer of 2018.
- Workouts consisted of several exercises conducted at different percentages of 1-max repetition and with variation in repetitions and sets. Back squats and bench press maximum repetitions at a given resistance were utilized for comparison of strength gains before and after the summer weight lifting program.
- During the first and last workout session, participants were weighed, and maximum resistance for back squat, bench press, and NFL-225 were recorded.
- A paired sample student's t-test was conducted to assess differences in strength prior to the start of and after completion of the training period. Results from the t-test were supported via observation of normal distribution on a box plot.

## Results

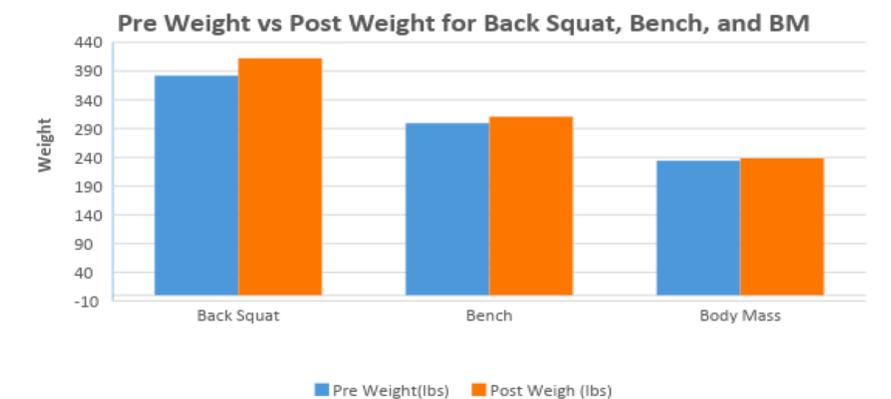
- There was a significant difference in strength (weight lifted) between pre-strength training program (M=382.33 lbs, SD=70.16) and post-strength training program (M=412.09, SD=67.02) back squat weight,  $t(42) = 4.32$ ,  $p < 0.05$ .
- There was a significant difference in strength between pre-strength training program (M=299.53, SD=46.10) and post-strength training program (M=310.47, SD=46.89) bench press weight,  $t(42) = 2.22$ ,  $p < 0.05$ .

**Table 1:** Percentage of players who completed one or more repetitions of the NFL-225 test

	# of players	Percentage
Only 1 rep NFL-225	1	2.33%
<10 reps of NFL-225	10	23.26%
10< reps of NFL-225	32	74.42%

N=43

**Figure 1.** Difference in weight lifted and body mass pre- and post-training program



## Discussion

- A 5 week summer strength program training designed to train athletes to complete the NFL-225 did increase in strength gains.
- The athlete with the highest body mass did not lift the maximum amount of reps for the NFL-225, max back squat, or the max bench press.
- This means even if a football player has the heaviest body mass, this doesn't automatically mean that participant will have the heaviest weights lifted for the back squat, bench press, and NFL-225.
- However, players that lifted the highest weight in the bench press also completed the most NFL-225 repetitions, supporting research that shows the NFL-225 is representative of muscular strength.

## Conclusions

- Overall the average change in weight lifted was positive which means almost everyone increased in strength.
- 16.28% of participants decreased in body weight but increased in both back squat and bench press weight lifted.
- Though we did not measure body composition, this could mean that the participant was losing fat but was able to increase strength instead of losing muscle mass in the back squat and bench press.
- A future study should include assessment of body composition to determine if participants lose %BF and/or gain muscle mass during this type of strength training program.

### References

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