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EFFECTS OF STRETCHING THE PECTORAL MUSCLES ON BENCH PRESS ONE REPETITION MAXIMUM

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EFFECTS OF STRETCHING THE PECTORAL MUSCLES ON BENCH PRESS ONE REPETITION MAXIMUM

by

Justin Pickles

B.S., Southern Illinois University, 2021

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Science

School of Human Sciences
in the Graduate School
Southern Illinois University Carbondale
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RESEARCH PAPER APPROVAL

EFFECTS OF STRETCHING THE PECTORAL MUSCLES ON BENCH PRESS ONE REPETITION MAXIMUM

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in the field of Human Sciences

Approved by:

M. Daniel Becque, Ph.D., Chair

Graduate School
Southern Illinois University Carbondale
May 5, 2024

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INTRODUCTION

The pursuit of optimal performance in resistance training necessitates an understanding of various factors influencing strength gains and muscle function. Among these factors, pre-exercise stretching has received considerable attention. Many experts advocate stretching before exercise to enhance flexibility, prevent injury, and improve exercise performance. Stretching, defined as the deliberate elongation of muscles, and surrounding connective tissues. However, there is conflicting evidence that appears regarding the effects of stretching on maximal strength during a 1 RM bench press test.

In exploring the isometric phase of the bench press, wherein the muscles remain contracted without significant movement, the influence of pre-exercise stretching emerges as a critical factor. When comparing the isometric phase between sessions with and without pre-exercise stretching, intriguing disparities manifest. In instances where stretching precedes the bench press, the pectoralis muscles may exhibit heightened flexibility, potentially altering the biomechanical dynamics during the isometric phase. Conversely, in sessions devoid of pre-exercise stretching, the pectoralis muscles may operate within a comparatively constrained range of motion. Research has shown that stretching reduces peak torque during the concentric and eccentric phase of muscle contraction (Cengiz, 2016). The elongation of muscles and tendons caused by static stretching could cause a decrease in short term muscular performance. The purpose of this study was to determine the effects of stretching on 1RM bench press.

HEADING 2

METHODOLOGY

At the first meeting, participants read the informed consent form and had their questions answered. After their questions were answered, the participant signed the consent form. The height and weight of the participants was measured and recorded, and then the testing was explained. The participants were instructed in the pectoralis stretching and they lightly practiced the stretching. The participants were required to provide an estimate of their one-repetition maximum (1RM) bench press strength and were shown the equipment that would be used for the testing. The treatments were scheduled on two separate days with a minimum of 72 hours between each treatment. The order of the treatments was randomized between the participants.

Participants started with a pectoral stretch using an exercise band wrapped around a power station approximately 1 foot above their head. The hands of a clock were used to describe the stretch positions. Participants began by placing their right hand above their head starting at 12 o'clock and leaning forward until they reached the maximum stretch on their pectoralis muscle (chest). They held this position for 10 seconds then released the pressure. Participants repeated this process for the 1, 2, 3, 4, and 5 o’clock positions. In the 6 o’clock position, they stretched the pectoralis muscles by stepping forward and lunging while keeping the chest up and back straight. The participants repeated the process with their left arm. Once the stretching was complete, there was a two-minute rest. After resting, participants started the bench press one repetition maximum test. They started the test at 60% of their self-reported 1 repetition maximum (1RM) for 5 repetitions. Weight on the bar was increased in increments of 10% until the participant failed or indicated that they had achieved their maximum. At 70% the participant did 4 repetitions, 80% did 3 repetitions, 90% did 2 repetitions. At 100% of estimated maximum

the participant performed 1 repetition. If the participant succeeded and wished to keep going, the weight on the bar was increased in increments of 10 pounds for 1 repetition until the participant failed or indicated that they had achieved their maximum.

Participants started at 60% of their self-estimated 1RM for 5 repetitions. Weight on the bar was increased in increments of 10% until the participant failed or indicated that they had achieved their maximum. At 70% the participant completed 4 repetitions, 80% the participant completed 3 repetitions, and at 90% they completed 2 repetitions. At 100% of estimated maximum the participant performed 1 repetition. If the participant succeeded and wished to keep going, the weight on the bar was increased in increments of 10 pounds for 1 repetition until the participant failed or indicated that they had achieved their maximum.

HEADING 3

RESULTS

Ten young adult males volunteered to be in this study (age = 27 ± 1.7 years, height = 71.1 ± 1.97 inches, weight = 180 ± 17.86 pounds). All participants had prior experience performing a bench press. Two participants had been consistently lifting weights 3 to 5 times a week for more than 5 years. Six participants had been weightlifting for 2 to 4 times a week for the past year. Two participants were within the first 6 months of weightlifting 2 to 3 times a week.

Half of the participants completed the no-stretch treatment first followed by the stretch treatment. The other half of the participants completed the stretch treatment first followed by the no-stretch treatment. The average 1RM maximum for the stretch treatment was 209.7 ± 35.90 pounds. The average 1 RM maximum for the no-stretch treatment was 220 ± 36.97 pounds.

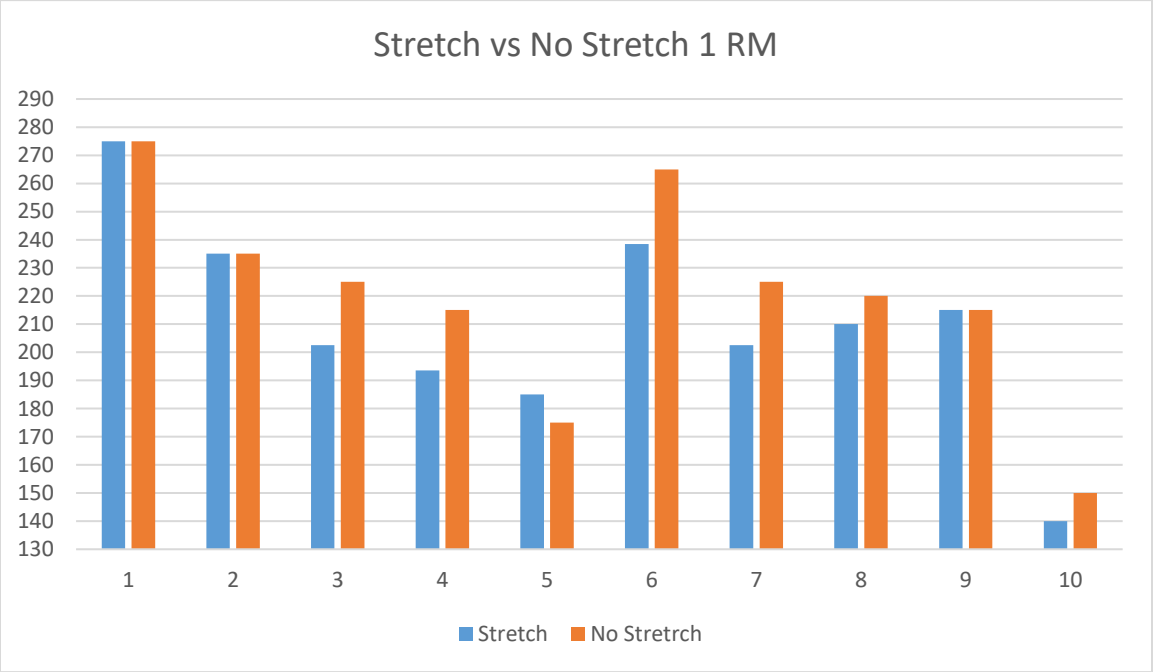

Figure 1 - Stretch vs. No Stretch 1 RM

HEADING 4

DISCUSSION

Stretching has been a vital part of exercise activity for decades. This project focused on the short-term effects of a static stretch of the pectoralis muscles before maximum strength output during the bench press. Participants had a two-minute pause between stretching and starting their work up to their 1 RM. Participants 5 and 10 were outliers during this project. These participants were within the first 6 months of weightlifting. Both participants had a higher maximal bench press on their second day of this research even though one had stretched, and the other had not. The lack of previous engagement with weightlifting likely explains why their second attempts irrespective of the treatment showed an increase in maximal weight.

The results of this research project are comparable to the data collected by (Cengiz, 2016). Stretching was shown to reduce the peak power in athletes. Both peak torque and peak power are critical factors influencing maximal strength during resistance exercises, such as the bench press. The observed reductions in these parameters suggest that static stretching likely compromises muscle force production and power generation. Both muscle force and power are essential for achieving a high 1RM bench press performance. Moreover, (Silva et al., 2015) investigated the effects of unilateral plantar flexor static stretching on jump measures. Jumping is indicative of lower body explosive power. The study revealed significant decreases in jump height following static stretching. Although jump height and bench press performance involve different muscle groups and movement patterns, both rely on muscular power and strength to generate force efficiently. Therefore, the findings imply that static stretching-induced decreases in lower body explosive power may result in suboptimal performance in maximal upper body strength tasks too.

These findings raise concerns regarding the potential detrimental effects of static stretching on 1RM bench press performance. One plausible mechanism underlying the observed decrements in muscular performance following static stretching is the acute reduction in muscle-tendon stiffness (Kay & Blazevich, 2012). Decreased muscle-tendon stiffness may compromise force transmission and neuromuscular coordination, thereby impairing maximal strength output during resistance exercises.

HEADING 5

CONCLUSION

In conclusion, static stretching appears to exert acute effects on the physical performance of the 1RM bench press. The observed decrement in 1RM bench press performance following static stretching underscores the importance of carefully considering whether to stretch before resistance exercise. This is especially true when lifting for maximal strength when this study and others have shown decrements in strength after static stretching. Further research is warranted to elucidate the underlying mechanisms and identify optimal stretching strategies for enhancing 1RM bench press performance while minimizing negative impacts on muscular performance.

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