

# **INFLUENCE OF LACK OF LOAD KNOWLEDGE ON MECHANICAL PARAMETERS AND MUSCLE ACTIVATION DURING BENCH PRESS THROWS**

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## **INTRODUCTION**

The ability to generate as power as possible during a time-limited action is highly important especially in explosive-related activities, in which the time available to perform the specific sport movements is limited. Therefore, many researchers have sought different methodologies to develop this ability. In addition, several studies have shown that uncertainty can entail changes in both kinetic and neuromuscular aspects. Therefore, the aim of this study was to check how the uncertainty about the load lifted affects on explosive parameters and muscle activity during bench press throws.

## **METHOD**

Fifteen physically active male college students took part in the study. Aiming to check the influence of load knowledge during the bench press throw exercise, each participant performed 6 sets of 6 repetitions using three different loads: 30, 50 and 70% of 1RM. Three of these six sets were performed with absence of knowledge about the load (unknown condition), whereas in the other three, the participants knew the load (known condition). In both conditions, the order of the loads within each set was randomized (always being two repetitions with each load). During the protocol, mechanical data, such as power and ratio of force development (RFD), and electromyographic activity (EMG) of pectoralis major and anterior deltoid were collected. The data was analyzed in time windows of 50ms, since 100ms prior to the movement onset, up to 150ms after this onset. A repeated-measures ANOVA using condition (known vs unknown), load (30 vs 50 vs 70% 1RM), and time window (0-50, 50-100, 100-150 for power and RFD; pre100-pre50, pre50-0, 0-50, 50-100 and 100-150 for EMG activity) as a main factors, was used to establish differences.

## RESULTS

Both power and RFD were significantly higher under unknown condition in the first 0-50, 50-100 and 100-150ms, and 0-50 and 50-100ms respectively. In addition, significant shorter time needed to reach peak RFD at 50 and 70% of 1RM was observed in unknown condition compared to known condition. Nevertheless, data of peak power, peak RFD and time to peak power did not show differences between conditions. Furthermore, significant greater EMG activity was found for both the pectoralis major (since pre-50 up to 100 ms after the movement onset) and the anterior deltoid (since pre-100 up to 100 ms after the movement onset).

## DISCUSSION

Analysis of explosive parameters (power and RFD) have revealed higher values in the absence of load knowledge, showing this kind of methodology as an interesting way to develop the ability of generate force in the first phases of the movement. In addition, data muscle activation during the first phases before and after the onset of the movement agree with the literature, being greater under unknown conditions. Based on these results, the use of unknown loads in strength training could be applied to athletes involved in sports where the time available to develop force is limited.

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