Comparison Of Muscle Activity Between The Tsunami Barbell™ And An Olympic Barbell

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Abstract

Variations on a standard Olympic barbell (chains, resistance bands, board presses) have been used as alternative methods for power development. A new product, the Tsunami Barbell™ (TSB), claims to incite increased muscle activity due to its flexible nature when comparing to performing similar lifts on an Olympic barbell (OB). PURPOSE: The study sought to determine whether there is a difference in muscle activity and force production when performing a bench press with a flexible barbell (Tsunami Barbell™) versus a standard Olympic barbell. METHODS: Male varsity athletes (n = 18) age 19.5 ± 1.1 years old were recruited at University who had been previously trained with the TSB volunteered to participate. Each subject had substantial prior training to incite both TSB and the Olympic Barbell. Each subject was familiarized with both barbells and given a 10-rep set at 80% of their 1RM on each barbell. Pretesting was conducted to maximize the barbells at the same level. For this study, the subjects performed 7–10 reps in sync with a metronome at 50Hz. The TSB and OB sets were normalized to the 1RM voltage. Two measures were analyzed: the normalized max (NM) and the mean of the integrated signals (MI) for 4 reps in the middle of each set. RESULTS: The TSB showed significantly higher muscle activity for all muscle groups in both analyzed measures (Table 1). CONCLUSIONS: The results of this study suggest that muscle activity in the muscle groups studied may be greater when performing a bench press with the Tsunami Barbell™ than with an Olympic barbell at the same weight.

Introduction

The bench press exercise has always been a popular form of upper body resistance training. It is primarily used to develop the pectoral muscles, shoulder muscles, triceps, and anterior deltoids. This exercise Bryant has been incorporated into everyday training programs for years due to its popularity. It is often performed to maintain and increase muscle mass of the upper body (the arms and shoulders). The purpose of this study was to determine whether there is a difference in muscle activity and force production when performing a bench press with a flexible barbell (Tsunami Barbell™) versus a standard Olympic barbell. Specifically, this study compared muscle activity for the three heads of the deltoid (anterior, lateral, posterior), the pectoral major, and the long head of the triceps brachi while performing the lift at 40% of the subject's one rep maximum. This study was conducted under the null hypothesis that no difference would be observed in muscle activity between the TSB and OB.

Methods

Participants

Thirty three male athletes (age = 19.5 ± 1.1 years old) were recruited at the University of Georgia. Each subject had been previously trained with the TSB and the Olympic Barbell. Each subject was familiarized with both barbells and given a 10-rep set at 80% of their 1RM on each barbell. Pretesting was conducted to maximize the barbells at the same level. For this study, each subject was familiarized with both barbells and given a 10-rep set at 80% of their 1RM on each barbell. Pretesting was conducted to maximize the barbells at the same level. For this study, the subjects performed 7–10 reps in sync with a metronome at 50Hz. The TSB and OB sets were normalized to the 1RM voltage. Two measures were analyzed: the normalized max (NM) and the mean of the integrated signals (MI) for 4 reps in the middle of each set. Results: The TSB showed significantly higher muscle activity for all muscle groups in both analyzed measures (Table 1). Conclusions: The results of this study suggest that muscle activity in the muscle groups studied may be greater when performing a bench press with the Tsunami Barbell™ than with an Olympic barbell at the same weight.

Figure 1 shows the Tsunami Barbell at its lowest point during a standard bench press repetition.

Figure 2 shows the Tsunami Barbell at its highest point during a standard bench press repetition.

Results

The data was analyzed using a paired samples T-test in SPSS statistical software with a p<0.05 level of significance. Table 1 contains the descriptive statistics to which the T-test were applied. Significant differences between means have been bolded and identified with an asterisk.

Table 1: Descriptive Statistics in %MVC

<table>
<thead>
<tr>
<th>Muscle Group</th>
<th>TSB</th>
<th>OB</th>
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<tbody>
<tr>
<td>Anterior Deltoid</td>
<td>NM: 83.5 ± 11.7%</td>
<td>MI: 5.7 ± 1.3%</td>
</tr>
<tr>
<td>Lateral Deltoid</td>
<td>NM: 66.5 ± 13.5</td>
<td>MI: 5.0 ± 1.2</td>
</tr>
<tr>
<td>Pectoralis Major</td>
<td>NM: 56.2 ± 24.4</td>
<td>MI: 3.3 ± 1.3%</td>
</tr>
<tr>
<td>Triceps Brachi</td>
<td>NM: 50.5 ± 18.8</td>
<td>MI: 3.7 ± 1.3%</td>
</tr>
</tbody>
</table>

Data Analysis

The EMG data for the TSB and OB sets were normalized based on the 1RM voltage so that values for each contraction were represented as %MVC. The first measure was the normalized maximum value (NM) for %MVC of each analyzed contraction. This measure was simply the highest peak in each contraction wave. The second measure was the mean of the integrated signals (MI) for %MVC of each analyzed contraction. For this measure, the entire contraction wave was integrated and the mean wave obtained.

Figure 3 shows an EMG with each wave representing a greater amount of muscle activity compared to the other wave.

Conclusion

The results of the study suggest that muscle activity and force production may be greater when using the TSB compared to using a standard OB at the same weight. For both the EMG results, the electrical signal (NM) and the average of the electrical signal during the entire contraction (MI) for each muscle group tested, the TSB showed a significantly higher than the OB. Each muscle group displayed at least a 15.9% higher NM MVC for the TSB than they did for the OB, with the PM having the greatest difference in %MVC at 18.7% and the MI having the greatest difference. The MI %MVC was also higher for the TSB by at least 0.6%, with the PM once again having the greatest difference and LD having the smallest. There are two possible reasons for the increased amount of muscle activity seen with the TSB when compared to the OB. First, the TSB was designed to provide the ability to lift while simulating an unstable environment. Because the deltoïd muscles serve not only to move the shoulder joint, but also to stabilize the shoulder, a barbell that is meant to develop the deltoïd muscles would have a greater amount of muscle activity and force production by those muscles. Second, the movement of the barbell through its oscillation created peaks of large muscle activity at the highest and lowest points of a repetition, which would also explain why more muscle activity was required to move the TSB.

In displaying greater significance in muscle activity and force production, the TSB can seemingly become an alternative to the standard and be used to simulate the effects of in-competition manipulation as it provides an unstable resistance in a strength training setting and exercise. By using the TSB the TSB can supplement standard bench press exercises, as there are benefits to the OB.

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References


