AMERICAN COLLEGE of SPORTS MEDICINE
LEADING THE WAY

61st Annual Meeting

May 27-31, 2014 at Orange County Convention Center in Orlando, FL
http://acsmannualmeeting.org/

Presentation Abstract **2014** ACSM 'Annual Meeting'

Session: Presentation # 1952. Board #238 May 29, 3:30 PM - 5:00 PM

Presentation: A Comparison of the Olympic Barbell to Tsunami Barbell™ Force Production: **Man Verses Machine**

Author(s): Anthony Caterisano, FACSM, Randolph Hutchison, Morgan Kuhar, Jason Jakeila. Furman University, Greenville, SC.

Abstract: Previous research on the Tsunami Barbell™ (TB), using a mechanized lifting machine, compared force production to that of an equally weighted Olympic barbell (OB). Results showed that the TB generated greater forces than the OB. No studies reported results comparing the two lifting modes in human experiments, and none have compared humans to machines. **Purpose:** The purpose was to compare the results of humans performing a bench press with the TB and OB of equal weight, and compare results to normalized data collected from machine lifts. **Methods**: Varsity football players who regularly trained with both barbell types (n = 11) performed 10 repetitions of bench presses using a weight equivalent to 40% of their 1RM in randomized trials, with both a TB and an OB on a force plate. All lifts were performed in time to a metronome at a rate of 50 cycles per minute for each repetition. In addition, a mechanized lifting machine, which displaced the barbells at a rate of 50 cycles/min was used to replicate the bench press movement. This was also conducted on the force plate. In the machine trials, a fixed weight of 105 pounds was used. In order to compare the independent variables, data were normalized by taking the difference between the mean maximum and minimum forces generated (newtons) and dividing it by the weight (lb.) on the barbell. Data were analyzed using a 2X2 Factorial ANOVA.
(P < 0.01) Results: The results are presented in the following table:

	Tsunami Barbell®	**Olympic Barbell**
Human	2.93 ±0.26 Newtons/lb.	2.30 ±0.19 Newtons/lb.
Machine	1.72 ±0.08 Newtons/lb.	1.46 ±0.08 Newtons/lb.

The TB generated significantly greater forces than the OB in both trials. In addition, the humans generated significantly greater forces than the machines in both barbell types (P < 0.01).

Conclusions: The results of this study suggest that the flexible nature of the TB allows for greater force production than a standard OB.