



Does Motivational Music Influence Maximal Bench Press Strength and Strength Endurance?

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Abstract

The purpose of this study is to examine whether motivational music selected by participants has an effect on maximal bench press strength and strength endurance (number of repetitions to failure with a 60% of 1-RM). 26 healthy male students with an average age of 23.92 ± 2.05 , average weight of 73.57 ± 4.14 and average height of 178.57 ± 3.65 who were having at least three strength workouts a week participated in the study voluntarily. The participants were grouped in two as experimental group and control group. The measurements of the experimental group were taken in two different sessions as with music and without music with 1 repetition maximum and number of repetitions to failure with 60% of 1 repetition maximum. The two sessions of the control group were conducted without music. At the end of the study, it was found that in experimental group motivational music was not effective on maximal strength (1RM) ($p > 0.05$), while it was found to increase strength endurance statistically by 3.9% ($p < 0.05$). In the control group, no statistically significant difference was found in both sessions ($p > 0.05$). As a conclusion, it is stated that listening to fast music creates an ergogenic acute effect and it is recommended to use music during strength workout to have a better strength endurance performance.

Keywords: Motivational music, Strength, Bench Press.

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1. Introduction

Music has been in people's lives for centuries and human beings have continually used music and are still continuing to use music in various ways. Music has sometimes been used to heal patients physically and mentally (Bally *et al.*, 2003; Habibzadeh, 2011; Uyar and Akin, 2011) sometimes it has been used to encourage shopping customers to shop more (Radoy and Boyle, 2003) and sometimes it has been used to help people express their feelings to others (Somakçi, 2003). Recently, it has been shown by some authors that music develops physical performance, physiological parameters and moods of people who take exercise. Studies have reported that exercise with music positively influences rate of perceived exertion, increases running exhaustion time and positively influences participants psychologically and physiologically (Mohammadzadeh *et al.*, 2008; Karageorghis *et al.*, 2009; Thakur and Yardi, 2013). Terry *et al.* (2012) stated that motivational music increases exhaustion time while running by 18.1% when compared with no music. In addition, it has been found that mood is more positive in motivational music, exercise with music decreases O₂ consumption with a rate of 1-7% and motivational music influences running economy better. Music needs to have some characteristics to be able to stimulate the person and influence exercise performance. Karageorghis *et al.* (1999) stated that it is important for musical rhythm, music type and harmony, cultural effect and musical tempo to be 120 beat per minute (bpm) and higher so that music can encourage effort. Studies conducted have generally examined the effect of music on cardiovascular performance and anaerobic performance; however, the effect of music on strength has been examined by a few researchers. Thus, the purpose of this study is to examine the effect of motivational music on maximal bench press strength and strength endurance.

2. Method

2.1. Research Group

26 healthy male students studying at Sirnak University with an average age of 23.92 ± 2.05 , average weight of 73.57 ± 4.14 and average height of 178.57 ± 3.65 who were having at least three strength workouts a week participated in the study voluntarily. The participants were randomly assigned in two as experimental group (average age 24.69 ± 1.84 ; average weight 72.69 ± 6.67 ; average height 176.61 ± 3.19 ; n:13) and control group (average age 23.15 ± 1.95 ; average weight 74.46 ± 3.50 ; average height 180.53 ± 3.09 ; n:13). Research procedures were approved by the Ethics Commission of the University of Sirnak. The participants who had any upper extremity injuries were not included in the study. The participants were asked not to have intense workout, not to consume alcohol and supplements that can produce any ergogenic effects at least 48 hours before the measurements.

2.2. Procedure

Two measurements were performed on each group at the same hours of the day with one week in-between the measurements (Test 1 and Test 2). Experimental group performed the tests with and without music. Control group performed both tests without music. In the first measurements (Test 1) strength endurance (number of repetitions to failure with a 60% of 1-RM) of the control group was measured without music after 1 repetition maximum (1RM) and 5-minute long passive rest. In the experimental group, strength endurance (number of repetitions to failure with a 60% of 1-RM) and repetition maximum (1RM) were found by dividing the group in two as with music and without music in Test 1 in order to prevent learning. One week later (Test 2), 1RM and strength endurance measurements of the control group were made again with no music. In the experimental group, the participants whose measurements were taken with music in Test 1 did not listen to music, while those whose measurements were taken without music in Test 1 listened to music. The participants participated in the tests with the motivational music they selected and the group that listened to music continued to listen to music with music players and ear phones from the warm-up period until the measurements ended. Beats of the music (tempo) were adjusted as >120 bpm as recommended by Terry and Karageorghis (2011). According to this, it is emphasized that music with 120 and higher bpm, strong beats, obvious sound flow and rhythmical characteristics motivates and activates the individual (Terry and Karageorghis, 2011). The music used in the study was adjusted between 135- 140 bpm in order to standardize all the music.

2.3. Measurements

In the first session (Test 1), the participants first had a light run of 10 minutes on the treadmill by listening to music they selected and after this, they had 5 minutes of static and dynamic stretching. Later, the participants performed bench press to familiarize with lower loads. 1 repetition maximum (1RM) and strength endurance test (60% of 1RM) were found according to NSCA guidelines. While measuring 1RM bench press and strength endurance, the participants lied back with their heads, shoulders and hips on the sitting bench and legs touching the ground. The arms gripped the bar a bit wider than the shoulder width and for safety purposes, one person accompanied with the descending and ascending bar. For the start position, the participants lowered the bar to the point that could touch their chest and continued to lift until the elbows came to the full extension position. During the movement, the participant's head, shoulder and hip continued to touch the sitting bench (Miller and Conditioning Association, 2012).

2.4. Statistical Analysis

Statistical analysis was performed with SPSS-20 version. Kolmogorov-Smirnov test was conducted to find out whether the data were normally distributed. Paired Sample t-Test was conducted to measure the differences between the groups. $p < 0.05$ confidence interval was used for statistical procedures.

3. Results

Table 1 shows the 1RM and strength endurance (number of repetitions to failure with a 60% of 1-RM) of the experimental and the control group. It was found that listening to motivational music influenced 60% of 1RM statistically better in the experimental group when compared with no music state ($p < 0.05$). However, listening to music does not influence maximal strength ($p > 0.05$). In the control group, the measurements of the participants

were made in Test 1 and Test 2 without listening to music and in both sessions, no statistical changes were found in 1RM and 60% of 1RM ($p>0.05$).

Table-1.1.Maximal strength and 60% of maximal strength and Bench Press performance values of the experimental and control group

	Test 1	Test 2	P
	Mean \pm SD	Mean \pm SD	
Experimental group; n:13			
1RM (kg)	67.44 \pm 2.61	67.61 \pm 2.57	0.304
60% of 1RM	21.84 \pm 0.98	22.69 \pm 1.18	0.005*
Control group; n:13			
1RM (kg)	70.11 \pm 5.30	70.46 \pm 5.44	0.121
60% of 1RM	20.38 \pm 1.38	20.61 \pm 1.44	0.427

* $P<0.05$. 60% of 1RM: The number of repetitions to failure with 60% of 1 repetition maximum RM: Repetition maximum

4. Discussion

A great number of studies conducted in literature have examined the effect of different types and tempo of music on endurance performance and anaerobic capacity, while a few studies have researched the influence of music on strength and strength endurance. The purpose of this study is to research the influence of participants' listening to motivational music they selected during workout on maximal strength and strength endurance and to contribute to literature.

This study conducted found that listening to music before and during exercise did not increase maximal strength. Some researchers predict that the reason why music does not increase maximal strength can be that music does not have an influence in maximal strength and that there is no rhythmical compound in one repetition at high load. Another reason predicted to decrease the effect of music on performance is the maximum intensity of 1RM test (Simpson and Karageorghis, 2006; Bateman and Bale, 2008; Bartolomei *et al.*, 2015). Some researchers state that when work load is too high, the individual's attention is directed to the painful effects of effort and since the attention is not focused on music, the individual cannot make use of music during exercise (as cited in: Waterhouse *et al.* (2010)). In loads with maximal strength or close to maximal strength, the organism gets under stress due to the load on the organism and the central nervous system gives all its attention to overcome this load in order to overcome the stress. As a result of this, it is predicted that music does not increase performance during maximal exercise since the brain cannot pay attention to music.

An interesting result of this study is that motivational music increases strength endurance (bench press repetitions to failure with 60% of 1RM) by 3.9%. In a similar study, Bartolomei *et al.* (2015) found that music did not influence maximal strength but increased strength endurance by 5.8%. Crust (2004) reported that listening to music during strength workout would ensure higher muscle endurance and on the contrary to listening to music before exercise, listening to music during the whole workout increased strength endurance time. Karageorghis *et al.* (1996) reported that motivational music created a positive effect on grip strength. Unlike these studies, Biagini *et al.* (2012) reported that music selected by participants did not increase performance in bench press strength endurance. In our study, the participants started to listen to self-selected motivational music and they continued to listen to this music during exercise because starting to listen to music before exercise simulates individuals and helps to motivate them. Studies conducted have reported that starting to listen to motivational music with warm up before starting to exercise increased strength endurance time and short term maximal performance (Crust, 2004; Chtourou *et al.*, 2012). Listening to self-selected music with exercise was reported to increase performance when compared with listening to non self-selected music (Nakamura *et al.*, 2010). Thus, it is recommended that in order to increase performance, athletes and individuals who have exercise should listen to self-selected music during the exercise session starting from the warm up.

5. Conclusion

In this study conducted, acutely 3.9% increase occurred in strength endurance (60% of 1RM) as a result of participants' listening to self-selected motivational music. As a conclusion, it is stated that listening to fast (motivational) music creates an ergogenic acute effect and it is recommended to use music during strength workout to have better strength endurance performance.

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