

Short Communication

Role of Music on Muscle Recruitment

Ramasubramania Raja, N.A. and Arumugam, N.

Sardar Bhagwan Singh Post Graduate Institute of Bio Medical Sciences & Research, Balawala, Dehradun

Abstract

The study was conducted to register the occurrence of Bioccipital/ Rotator Cuff Tendonitis in the subjects involved in Bench Press Activity in gymnasium. Fifty male subjects (age group 20-30 years), having shoulder pain for at least three weeks, were selected randomly and were interviewed for the present history of shoulder pain, from various gymnasia. The subjects were interviewed through a questionnaire and assessed using standard orthopedic examination techniques. The value of Z (3.68) >3 showed a definite relationship between subjects doing Bench Press activity in gymnasium and occurrence of Bioccipital / Rotator Cuff tendonitis. This study gave preliminary data on the incidence of tendonitis in subjects who train with weights. Occurrence of these shoulder injuries can be prevented by a proper knowledge of the technique, supervision and knowledge about the mass of poundage lifted.

Key Words: Hawkin's Test, Isometric Abduction, Isometric External Rotation, Injury

Introduction

Physical activities have major role in the human beings, these activities can vary depends upon the physiological and psychological functions. The activities if done while listening to music can alter the physiological and psychological functions, because music affects the physiological and psychological actions and may even are music specific. *Sears in 1957* observed that muscle tension can be altered by music: who reported that stimulating music increased muscle tension while sedative music decreased muscle tension. *Pearce (1981)* revealed the effects of different types of music on physical strength. *Johnson et al (2002)* conducted a study that demonstrated some positive responses to familiar music as an external stimuli that facilitated adherence to a physical rehabilitation exercise program with persons who were elderly.

According to *Chipman (1966)* music accompaniment improved muscular endurance in the performance of junior high students doing sit-ups. *Copeland & Franks (1991)* observed that soft music as compared to loud fast music increased walking/jogging on a treadmill time at sub maximal intensity. A review of studies by *Dainow, (1977)* indicates that heart rate tends to only moderately follow the music; increasing in response to fast music and decreasing in response to slow music. The study was conducted with the following specific aims:

- To find out the effects of music on muscle recruitment
- To compare the effectiveness between Stimulative music, sedative music and music silence on various neuromuscular part.

Materials and Methods

The study was conducted on randomly selected 60 physically and medically normal subjects of S.B.S.P.G.I, Balawala, Dehradun of both sexes between 19 – 25 yrs of age, having normal muscle power and endurance and BMI between 21 – 25 adult students.

The subjects having any musculoskeletal, cardiovascular, auditory, psychological disorders, signs and symptoms of peripheral neuropathy or H/O neuromuscular disease or not interested in listening music, history of Diabetes Mellitus or thyroid diseases or having difficulty in joint positioning were not included in the study.

Electrodiagnosis machine with software computer (diagnosis EMG and NCV machine) was used to record the EMG (dependent variable) and karaoke (only music without lyrics, independent variable) was administered. Two types of music were selected. These were named as stimulating and sedative types of music as per the assessment of the eminent musician. Stimulating music included songs like “Dhol Taro Dhol” and “Man Mohini” of Hum Dil De Chuke Sanam movie, “Chori Pe Chori” of Sathiyaa, “Dhoom Machale” of Dhoom, “Balle Balle” and “Dharak Dharak” of Bunty aur Bablie“ and Babuji Zara” of Dum. Similarly the sedative category of music included tunes of the songs “Man Tarpat Hari Darshan Ka”, “Man Re Te Kahe Na Dheer Dhare”, “Roja JaneZa”, “Dil Hai Chotasa“, Albela Sajan”, “Ayo Kahan Se Ghanshyam” and “Jonn Tere Charan Kamal” from Baiju Bawra, Chitralkha, Roja, Roja, Hum Dil De Chuke Sanam, Buddha Mil Gaya, Sursangam movies respectively.

This music was applied in the Karaoke manner, that is without lyrics and

only music of these songs was used. The atmosphere of the research lab was kept free from noise pollution and air pollution and room temperature was maintained. The execution of the experiment was completed in the following steps:

Step I: The subject was positioned in a comfortable pose (High sitting without ground contact) and all metallic contacts were removed to avoid artifacts.

Step II: In the next step the subject was instructed to gently respond to the touch at the tip of great toe of the subject whenever applied by the investigator. The response should be bending the hand three times during music playing.

Step III: The subject was then asked to close the eyes and a headphone was placed in a comfortable manner.

Step IV: After 5 minutes of positioning of the subject, the tip of the great toe was touched by the investigator and amplitude of biceps muscle recruitment was recorded without music (Music silence)

Step – V: The above step was repeated with music on for 5 to 10 minutes (first stimulating music and then after a gap of 15 minutes sedative music) and the biceps muscle activity was recorded.

Results & Discussion

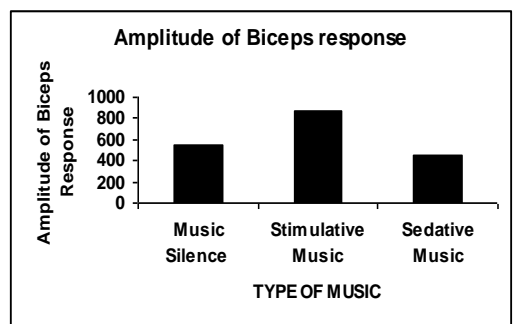


Figure 1. Amplitude of biceps response to different types of music

Table 1: Comparison of magnitude of muscle recruitment among subjects to different types of music

Type of Music	Mean	±S.D
Music Silence	543.75	251.36
Stimulative Music	877.36	336.12
Sedative Music	454.55	178.93

Table 2. ‘t’ test between the variables

Variables	t value	P value
Music Silence Vs. Stimulative Music	-7.14	P<0.05
Stimulative Music Vs. Sedative Music	8.24	P<0.05
Music Silence Vs. Sedative Music	3.27	P<0.05

There is a significant difference of muscle recruitment between stimulative music, sedative music and music silence (Table 2). Stimulative music is observed to increase the muscle recruitment and sedative music decreases it (Table 1), so one can apply the stimulative music for flaccid muscles to increase the muscle tone and sedative music for spastic muscle conditions to decrease the muscle tone. It is indicated by the study that the stimulative music can increase muscle recruitment and the sedative music can decrease muscle recruitment (Figure 1) in the normal muscle, as a result the music can play an important part in the rehabilitation depending upon the different muscular conditions. Future scope of the study includes thorough investigations in studying the role of music in Flaccidity, spastic conditions and gait rehabilitation.

References

Hanser, S. B. 1985. Music therapy and stress reduction research. *Journal of Music Therapy*, **12(4)**: 193-206

Harris, C. S., Bradley, R. J. & Titus, S. K. 1992. A comparison of the effects of hard rock and easy listening on the frequency of observed inappropriate behaviors: Control of environmental antecedents in a large public area

Scartelli, J. P. 1984. The effect of EMG biofeedback and sedative music, EMG biofeedback only, and sedative music only on frontalis muscle relaxation ability. *Journal of Music Therapy*, **21(2)**: 67-78.

Peretz, Isabelle 2001. Listen to the brain: a biological perspective on music and emotion (pp. 105-135). In: Sloboda, J.A & Juslin, P.N. (Eds.) *Music and Emotion: theory and research*. New York: Oxford University Press

Terwogt, M. M., & Van Grinsven, F. 1991. Musical expression of mood states. *Psychology of Music*, **19**: 99-109

Pearce, K. A. 1981. Effects of different types of music on physical strength. *Perceptual and Motor Skills*, **53**: 351-352

Sears, W. W. 1957. The effect of music on muscle tonus. In E. G. Gaston (Ed.), *Music Therapy* (pp. 199-205). Lawrence, KS: Allen Press.

Staum, M. J. (1983). Music and rhythmic stimuli in the rehabilitation of gait disorders. *Journal of Music Therapy*, **20**: 69-87.

Dainow, E. 1977. Physical effects and motor responses to music. *Journal of Research in Music Education*, **25**, 211-221. Copeland, B. L., & Franks, B. D. (1991). Effects of types and intensities of background music on treadmill endurance. *The Journal of Sports Medicine and Physical Fitness*, **31**: 100-103.

Maslar, P. M. (1986). The effect of music on the reduction of pain: A review of the literature. *The Arts in Psychotherapy*, **13**: 215-219.