International Journal of Physical Education, Health and Social Science (IJPEHSS)
www.ijpehss.org
Peer Reviewed, Indexed and UGC Approved Journal (48531)
ISSN: 2278 – 716X
Vol. 7, Issue 1 (Jan, 2018)
Impact Factor 5.02

EFFECT OF ISOMETRIC AND ISOTONIC TRAINING PROGRAM ON BONE MINERAL DENSITY IN OVERWEIGHT CHILDREN

Mr. Moirangthem Ebhion Singh, Ph.D. Scholar
Dr. Leons Wilfred Vaz, Professor
LNIPE, Gwalior (M.P.)

ABSTRACT
The purpose of the study was to see the effect of Isometric and Isotonic Training program on Bone Mineral Density (BMD) in overweight children. Total thirty subjects were selected on the basis of BMI (IAP Boys Body Mass Index Charts). They were further divided into tree groups i.e. isometric (10), isotonic (10) and control groups (10). The purposive sampling technique was used to achieve the objective of the study. Data were collected with the Dexa instrument. The means of different treatment were compared by applying the ANCOVA. Statistical significance was tested at 0.05 level. Based on obtained data, it can be concluded that both the isometric and isotonic training program can be used to improve the BMD in overweight children.
Keywords: Isometric, Isotonic and Overweight

INTRODUCTION
It was once thought that carrying some additional weight truly helped shape stronger bones. The theory said that bones get stronger when they bear weight. But more newly, studies have shown that being overweight or having type 2 diabetes can really prime to an increased risk of low bone density and fractures. Research has shown that overweight people have reduced bone density relative to their body weight, as well as an increased risk of fractures even in those with normal bone density. In addition, type 2 diabetes and insulin resistance are also associated with an increased risk of fractures. A new animal study published in the journal Metabolism confirmed these results, showing that obesity and type 2 diabetes led to weakened bones. But the study also found that exercise not only prevented weight gain and diabetes in the obese, but it increased bone strength. In other words, the exercise helped prevent low bone density even in the obese animals.

METHODOLOGY
Selection of Subjects
Total thirty subjects were selected for the purpose of the present study on the basis of BMI. They were further divided into Isometric (N=10), Isotonic (N=10) and Control group (N=10). Purposive Sampling technique was used to select the subjects.
The following variables were taken for the study

- Isometric
- Isotonic
- Bone Mineral Density

The gathered data was duly analysed through SPSS. ANCOVA was used to find out significant effect of Isometric and Isotonic programme on BMD. The level of significant was set at 0.05.

ISSN: 2278 – 716X
Vol. 7, Issue 1 (Jan, 2018)
Impact Factor 5.02

FINDINGS

TABLE 1
MEAN AND STANDARD DEVIATION OF ISOMETRIC AND ISOTONIC HIIT PROGRAM

Treatment	Mean	Std. Deviation
Isometric	0.80	0.12
Isotonic	0.78	0.10
Control	0.76	0.19
Total	0.78	0.13

From Table 1, it can be seen that the training program is more effective in Isometric treatment whereas the least mean is in treatment Control group. The next question is to see whether this difference is significant or not after adjusting for the covariate

TABLE 2
ANALYSIS OF COVARIANCE OF ISOMETRIC AND ISOTONIC HIIT PROGRAM

Source	Sum of Squares	df	Mean Square	F	Sig.
Pre	0.555	1	.555	8031.895	.000
Treatment	0.008	2	.004	54.803	.000
Error	0.002	26	6.910		
Corrected Total	0.564	29			

Table 2 shown that, the F-value for comparing the adjusted means of the criterion variable in three treatment groups (isometric, isotonic, and control). F-statistic computed for treatment is significant because p -value is .000 which is less than .05. Thus, the null hypothesis of no difference among the adjusted means for the data on criterion variable in three treatment groups may be rejected at 5% level.

TABLE 4
PAIRWISE COMPARISONS

(I) Treatment	(J) Treatment	Mean Difference (I-J)	Sig.
Isometric	Isotonic	.000	.970
	Control	.034	.000
Isotonic	Isometric	.000	.970
	Control	.034	.000
Control	Isometric	.034	.000
	Isotonic	.034	.000

ISSN: 2278 – 716X
Vol. 7, Issue 1 (Jan, 2018)
Impact Factor 5.02

In table 3, p-value for the mean difference between treatments isometric and control as well between treatments isotonic and control is .000. Since p value is less than .05, both these mean differences are significant at 5% level. Thus, the following conclusions can be drawn:
There is a significant difference between the adjusted means of criterion variable in treatment isometric and control.
There is a significant difference between the adjusted means of criterion variable in treatment isotonic and control.
There is no significant difference between the adjusted means of criterion variable in treatment isometric and isotonic.

DISCUSSION

In this present study, isometric and isotonic training program found to significantly improve on BMD in overweight children. A studied by Leslie suggested that obesity and diabetes lead to the bone loss. Many means have been assumed to justify why overload weight might damage bone quality, including the effects on the osteoblast cells that build bone and the osteoclast cells the break down bone. Bones are repeatedly replenishing themselves, being built up and broken down, but dissimilarities in the speed of these two processes can lead to bone loss. It found that bone development was reduced in the obese rats in the early stages of diabetes, although bone breakdown was increased three-fold in obese and diabetic rats. Over time, these changes would lead to loss of bone mass and weakening of the bones." It's already known that weight bearing exercise strengthens bone. The present study shows that isometric and isotonic exercise can help poor bone quality and density by improving the BMD.

CONCLUSIONS

The results of the study indicate the following:

- Isometric training program can be significantly improving the BMD
- Isotonic training program can be significantly improving the BMD
- There is no significant distinction effect of isometric and isotonic training program on BMD.

REFERENCE

Anna (2015) Relationships between bone mineral density and new indices of body composition in young, sedentary men and women. Annals of Agricultural and Environmental Medicine Vol 25, No 1, 23–25.
Jay (2011) Effects of obesity on bone metabolism, Journal of Orthopaedic Surgery, 6:30 http://www.josr-online.com/content/6/1/30
Kirsti et al (2010) Is Childhood Obesity Associated with Bone Density and Strength in Adulthood? Journal of Osteoporosis Volume 2010, Article ID 904806, 7 pages doi:10.4061/2010/904806
Leslie et al (2017) Effects of obesity and diabetes on rate of bone density loss. International Osteoporosis, DOI 10.1007/s00198-017-4223-9
Manzoni et al (1996) Influence of body composition on bone mineral content in children and adolescents1. American Journal of Clinical Nutrition, DOI: 10.1093/ajcn/64.4.603
Verma JP. (2013). Data analysis in management with SPPS software. Springer New Delhi Heidelberg New York Dordrecht London. Page no. 298-307