

EFFECTIVENESS OF LIFTMOR INTERVENTION WITH AEROBIC EXERCISE ON OSTEOGENESIS AND CARDIOVASCULAR HEALTH IN POST MENOPAUSAL WOMEN - A SIMPLE EXPERIMENTAL STUDY

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Abstract-

INTRODUCTION: Post menopause is the time from 12 months after the final menstrual period onwards. Menopause is a natural physiological phenomenon resulting from primary ovarian failure secondary to apoptosis or programmed cell death. During these period, women will experience a number of symptoms such as hot flashes, night sweats, vaginal atrophy, dryness, and mood swings. Besides these, osteoporosis is the most prevalent disease in post-menopause women and is strongly associated with low quality of life. The "LIFTMOR" (Lifting Intervention For Training Muscle and Osteoporosis Rehabilitation) trial is to determine the safety and efficacy of brief, bone-targeted, High Intensity Progressive Resistance Training (HIPRT) with impact loading for post-menopausal women with low bone mass.

OBJECTIVE: Aim of the study is to find out the effectiveness of LIFTMOR with aerobic exercise on osteogenesis and cardiovascular health in postmenopausal women.

METHODOLOGY: It was a simple experimental study of 30 members. 30 postmenopausal women with age group ranging between 45-55 years were selected by purposive sampling technique according to the selection criteria. LIFTMOR - the high intensity progressive resisted exercise with aerobic exercise is given to the subjects. The pre-test and post test values were measured by BMD (Bone Mineral Density) for osteogenesis and vo2 max (6 min walk test) for cardiovascular health.

RESULTS: The study concludes that there was statistically significant improvement in osteogenesis and cardiovascular health in postmenopausal women. The pre-test and post-test mean values of osteogenesis (BMD) and cardiovascular health (SIX MINUTE WALK TEST) were analyzed using the paired 't' test. The pretest and posttest values of LIFTMOR intervention were analyzed using paired t test. For 29 degrees of freedom and 5% level of significance, the table 't' value is 2.462 and calculated 't' value 20.57. Since the calculated 't' value was greater than table 't' value, null hypothesis is rejected. The pre-test and post-test mean values of cardiovascular health were analyzed using the paired 't' test. For 29 degrees of freedom and 5% level of significance, the table 't' value is 2.462 and calculated 't' value 17.3946. Since the calculated 't' value was greater than table 't' value, null hypothesis is rejected.

CONCLUSION: Based on the statistical results, this study concluded that LIFTMOR along with aerobic exercise was effective in improving bone mineral density or osteogenesis and cardiovascular health in postmenopausal women.

Keywords: Osteogenesis, LIFTMOR, Aerobic Exercise, BMD and Vo2 max.

INTRODUCTION:

The time of women's life following menopause is called postmenopausal period and it begins 12 months after menopause or they are considered as postmenopausal when women don't have period for an year. Every woman reaches this stage as it is a natural part of aging process. Ovaries begin to shut down and there will be drastic hormonal changes in the postmenopausal women. Ovaries make less reproductive hormones and it leads to cessation of ovulation. Women's risk of cardiovascular disease and osteoporosis increases after menopause naturally and it is the end reproductive stage of life. The average age of menopause is 51 years and it may range from 45 to 50 years based on individual health. Many factors may influence postmenopausal characteristics of a woman that includes lifestyle habits,

surgery, stress . During the menopausal transition phase, oestrogen levels fluctuate widely from low to very high representing a state of oestropogestational imbalance , the period during which bone loss accelerates and change in fat distribution in body occurs. It leads to increased visceral fat distribution (abdomen) with higher cardiovascular risk and change in body shape from from feminine pear to masculine apple physical profile.According to American Heart Association, Oestrogen hormone have positive effects on women health- it maintains healthy inner arterial wall and regulates blood flow. Decrease in oestrogen levels post menopause affects the arterial wall structure and thus leading to cardiovascular disease.women who use hormonal therapy as window of opportunity have reduced cardiovascular risk factor.Hormones acts as protection of vascular system.In untreated post menopausal women low density lipoprotein increases with age.Through exercise women were found to have reduced total cholesterol levels.osteoporosis is also a major risk for post menopausal women . Loss of height and postural changes occur due to loss of bone cells.The peak bone mass is attained at around age 30 and there is 0.7% of bone loss per year after it and at menopause there is accelerated rate of bone loss. In first twenty years after menopause,there is 50%reduction in trabecular bone and 30% cortical bone due to lack of oestrogen as it is responsible for promoting osteoblast activity. It is very challenging to provide cost effective intervention to promote cardiovascular health and skeletal health in post menopausal women. LIFTMOR intervention and aerobic exercise plays a major role here.Based on reports from journal of American college of cardiology women who exercised regularly were 24%less likely to die from any cause and also had 36% lower risk of fatal heart attack, stroke and other cardiovascular event compared to non exercising women. Also the dose response relationship of activity to benefit also differs. The researchers reported that women who engaged in 140 minutes of moderate aerobic exercise weekly saw an 18% reduced death risk while just 57 minutes of vigorous aerobic exercise a week produced 19%reduced death risk. Reports from American Academy of family physicians, regular exercise also provides greater array of health benefits and for women these benefits expand to their combination of hormones and health benefits.Aerobic training has been widely recommended in postmenopausal women because it is proven to be positive lifestyle for approaching CVD .Hence aerobic exercise training of any form like cycling, swimming, jogging must be included with the LIFTMOR intervention trial to improve cardiovascular endurance and also the bone health.In general National Osteoporosis foundation (NOF) and centres for Disease control and prevention make the recommendations for older adults. It includes strength training done atleast twice a week which includes major muscle groups of the body including hips, shoulders, legs, back , chest and arms which maintains the muscle mass and bone density. Secondly, the balance , postural and functional exercise is included that targets to improve balance as the individual ages. Third recommendation includes moderate intensity aerobic exercise each week with duration of 2 hours or 30 minutes which is a good way to improve physical fitness. All these helps to improve muscle mass and bone density and helps to ward off cardiovascular problems.Bone mineral density and vo2 max is used to measure bone and cardiovascular health. Also certain precautions must be carried out during the exercise program for post menopausal women .when prescribing an exercise program to prevent or treat post menopausal osteoporosis, some precautions should be taken to guarantee the effectiveness and safety of the program . First recommendation would be to wear tied shoes and with adherent soles and also start the exercise session with warm up (e.g walking or gentle stretching). During all the exercise execution the participants should maintain a good body posture to maintain and prevent muscle pain and fracture . During exercise of destabilization in balanceboard and trampoline , the patient should stand in front of the wall and where she can hold in case of slip or fall. It is very important to strengthen the abdominal muscles used in the maintenance of good body posture during almost all activities of daily life and it is also necessary for normal spine function. And it is notable that one of the main actions of abdominal muscles is spine flexion , however this kind of movement leads to lot of stress on vertebral body and in case if the person has bone fragility fracture occurs. Spine flexion is the position in which the vertebral bodies get more stressed so studies with osteoporotic people performing spine flexion exercises are not carried out . Abdominal exercises can be safely carried out in following strategies. Isometric contractions with spine aligned in the physiological position without valsalva maneuver , semi hip flexion with person lying on floor , hip ante version and retro version and forced exhaling. Also consider other factors like age, genetics, previous fracture, calcium and vitamin D deficiency which can decrease bone health and increases the chances of fracture and risk of falls. The aim of the study is to find the effect of LIFTMOR intervention with aerobic exercise on osteogenesis and cardiovascular health in post menopausal women

METHODOLOGY:

It was a simple experimental study of 30 subjects from the group of postmenopausal women base on selection criteria.. The study setting was at outpatient department of swamy Vivekanandha physiotherapy college. The intervention is about 6 weeks and the study duration is about 3 months and the study sampling technique was purposive sampling technique. Inclusion criteria includes female postmenopausal women with BMD Score -2.0 and age ranging from 45 to 55 years with good general health is included. The exclusion criteria includes postmenopausal women with BMD - 2.5 to -4.0 ,women with postural abnormalities like kyphosis and women of bad general health . The parameters used for the analysis of cardiorespiratory health and osteogenic activity includes six minute walk test and BMD.

PROCEDURE:

The aim and objectives of the study was explained to the participants of the study. 30 subjects were chosen based on inclusion and exclusion criteria. The subjects were clearly explained about the study procedure and exercise programme. The subject is instructed to present on particular date and time. Cardiovascular health and osteogenic activity in post menopausal women were assessed using 6 min walk test and BMD scale .The treatment regimen was given and post intervention measures were also taken.

TREATMENT TECHNIQUE:**LIFTMOR INTERVENTION AND AEROBIC EXERCISE:**

Frequency : Two times per day

Intensity : 60- 80% of one repetition maximum

Type : Resisted Exercise and Aerobic activities .

Duration : 6 weeks (Weekly progression)

S.NO	WEEKLY INTERVENTION	RESISTED EXERCISE	AEROBIC EXERCISE
1	WEEK 01	60% of 1RM	WALKING (30 Min)
2	WEEK 02	65% of 1RM	WALKING(30 min)
3	WEEK 03	70% of 1RM	WALKING (35 min)
4	WEEK 04	75%of 1RM	WALKING (35 min)
5	WEEK 05	80%of 1RM	WALKING(45 min)
6	WEEK 06	85% of 1RM	WALKING (45 min)

The activity was progressed based on the coordination level, mental processing level bone strength and aerobic capacity of the post menopausal women. Activity log sheets were maintained for the assessment of BMD and cardiovascular health during each week and final assessment was done after six weeks of intervention.

DATA ANALYSIS:**BMD(BONE MINERAL DENSITY):**

Mean values (s)		Calculated value	't' value	Table 't' value	Level of Significance
Pre test	Post test				
-1.879	1.333	20.5739	2.462		P < 0.01 Significant

The pre test and post test mean values of bone mineral density was analyzed using the paired 't' test. For 29 degrees of freedom and 5% level of significance, the table't' value is 2.462 and calculated 't' value 20.57. Since the calculated't' value was greater than table't' value null hypothesis is rejected.

SIX MINUTE WALK TEST: (CARDIO VASCULAR HEALTH)

Mean values (questionnaire)		Calculated value	't' value	Table 't' value	Level of Significance
Pre test	Post test				
30.43	20.93	17.3946	2.462		P < 0.01 Significant

The pre test and post test mean values of Six minute walk test was analyzed using the paired't' test. For 29 degrees of freedom and 5% level of significance, the table't' value is 2.462 and calculated 't' value 17.39. Since the calculated't' value was greater than table't' value null hypothesis is rejected.

RESULTS:

The pretest and post test analysis of osteogenesis and cardiorespiratory health was assessed using bone mineral density and six minute walk test and balance and the test score revealed that there was a significant improvement in osteogenesis and cardiorespiratory health after the application of LIFTMOR intervention and aerobic exercise in post menopausal women.

DISCUSSION:

The aim of the study was to find the application of LIFTMOR and aerobic exercise on osteogenesis and cardiorespiratory health among post menopausal women. Post menopausal women experience multitude of symptoms after menopause

and it occurs most commonly due to the hormonal imbalances. The study aims to improve the health of postmenopausal women by the application of exercise. Among the multitude of symptoms, osteoporosis and reduced functional endurance are most common. The application of exercise intervention through LIFTMOR technique and aerobic exercise has been found to be effective in improving bone and cardiovascular health. LIFTMOR technique which is an high intensity progressive resisted exercise has been applied for the duration of six weeks as an initial trial which can be progressed for more duration. The resisted exercise is initiated with 50% of one repetition maximum and it is progressed upto 85% of 1RM. The progression is also based on the individual response. Then on discussion with aerobic exercise, it is initially started with walking (30 min) and progressed further for duration of 45 minutes. The exercise frequency is two times per day. The application of LIFTMOR technique on the basis of wolffs law bone will adapt according to the demands placed on them states that bone cells are stimulated to grow by the application of mechanical loads. Here the load being the resisted exercise that acts as a stimulant to increase bone strength and reduces osteoporosis and significantly exercise increases the level of oestrogen hormone which acts as an adjunct to prevent osteoporosis. Then the application of aerobic exercise is found to increase the functional endurance of the postmenopausal women. Walking a type of aerobic exercise has been used because of its easy application and it improves the respiratory and cardiovascular demand and thus oxygen level in the body gets increased and improves blood circulation throughout the body thereby improving the functional endurance of the post menopausal women.

CONCLUSION:

The aim of study is to find out the effect of LIFTMOR and aerobic exercise on osteogenesis and cardiorespiratory health in post menopausal women. 30 post menopausal women cases were selected and assessed. The pathogenesis was measured using bone mineral density scan and cardiovascular health was measured using six minute walk test. Both were measured before and after six weeks of intervention and their results were analyzed using paired 't' test. This study concluded that LIFTMOR intervention and aerobic exercise has improved osteogenesis and cardiorespiratory health and prevented osteoporosis in post menopausal women.

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