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ORIGINAL ARTICLE

# EFFECT OF STATIC STRETCHING PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION AND SELECTED YOGASANAS ON FLEXIBILITY AND REACTION TIME ON OBESITY MEN

**K.V.BALAMURUGAN AND P.KANNADASAN**

Associate Professor, Department of Physical Education and Sports Sciences,
Annamalai University, Annamalainagar , Tamilnadu.

**Abstract:**

*The purpose of this study was to asses the Static Stretching Proporoceptive Neuromuscular Facilitation (PNF) and selected Yogasanas on flexibility and Reaction time on obesity men. The aim was to asses the subject's flexibility and reaction time by Static Stretching Proporoceptive Neuromuscular Facilitation (PNF) and selected Yogasanas. Thirty obesity men were selected from Cheyyar town, Tamil Nadu and their average age was 30 years. The experimental groups were subjected a training programme for 12 weeks. The selected variables were Static Stretching, Proporoceptive Neuromuscular Facilitation (PNF) and selected Yogasanas. Prior and after training period the data were collected. The ANCOVA was applied and the result shows that there was a significant improvement in flexibility and reaction time.*

**KEY WORDS:**

Static Stretching, PNF Techniques, Yogasanas and Obesity.

## INTRODUCTION

A balanced physical education program provides each student with an opportunity to develop into a physically-educated person one who learns skills necessary to perform a variety of physical activities, is physically fit, participates regularly in physical activity, knows the benefits from involvement in physical activity and it is contributions to a healthy lifestyle ( Donatelle J Rebecca, 2005)

## STRETCHING

The body loves to stretch. It's the first thing it does when it wakes up in the morning, and it hates being in one position for too long. Flexibility and suppleness are qualities best exhibited in youth, and sadly the greatest fitness battle that each has to face at the same time. Time inevitably takes its toll on flexibility, and yet simple, regular stretching exercises can roll back the years and help us achieve renewed heights of flexibility, suppleness and mobility. Always start stretching slowly and gently. Your muscles need to be sufficiently warm in order to tense and stretch safely and without injury. (Irion W.D and Bandy J.M, 1994)
Proprioceptive Neuromuscular Facilitation (PNF) Stretching

PNF stretching is currently the fastest and most effective way known to increase static-passive flexibility. PNF is an acronym for proprioceptive neuromuscular facilitation. It is not really a type of stretching but is a technique of combining passive stretching and isometric stretching in order to achieve maximum static flexibility. The term PNF stretching is itself a misnomer. PNF was initially developed as a method of rehabilitating stroke victims. PNF refers to post-isometric relaxation stretching techniques in which a muscle group is passively stretched, then contracts isometrically against resistance while in the stretched position, and then is passively stretched again through the resulting increased range of motion.

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PNF stretching usually employs the use of a partner to provide resistance against the isometric contraction and then later to passively take the joint through its increased range of motion. It may be performed, however, without a partner, although it is usually more effective with a partner's assistance. Most PNF stretching techniques employ isometric agonist contraction/relaxation where the stretched muscles are contracted isometrically and then relaxed. Some PNF techniques also employ isometric antagonist contraction where the antagonists of the stretched muscles are contracted. In all cases, it is important to note that the stretched muscle should be rested for at least 20 seconds before performing another PNF technique. (Fisher M.M. And Decicco P.V., 2005)

**Yogasanas**

The mind and body are not separate entities although there is a tendency to think and act as though they are body and mind. The gross form of the mind is the body and the subtle form of the body is the mind. The practice of asana integrates and harmonizes the body and mind. Both the body and the mind tensions or knots. Every mental knot has a corresponding physical, muscular knot and vice versa. (Madanmohan, et.al. 2005)

The aim of asana is to release these knots. Asanas release mental tensions by dealing with them on the physical level through the body and the mind. For example, emotional tensions and suppression can tighten up and block the smooth functioning of the lungs, diaphragm and breathing process, contributing to a very debilitating illness in the form of asthma.

**Obesity**

This is still absolutely true. Many people will know that fat people simply eat too much and exercise too little. This is extremely simplistic. Obesity and overweight seems to be caused by a complex interchange of factors, including lifestyle, quality (i.e. nutrition content) and spacing (i.e. length of time between) of meals, exercise, genetics, hormones, metabolism, dieting history, and perhaps even chemical pollutants. Which (if any) of those factors is most important, and how they vary between individuals, is still under considerable debate. There is no proof that overweight people who lose weight will become as healthy as normal weight people, if indeed they are successful in keeping weight off (95% of people who lose weight will regain it within two years and not a failing in willpower). Most importantly, there is a reason to believe that dieting is extremely harmful to many important systems in the body. First, it causes a slowdown in metabolism. To a certain point this is achieved through atrophy, that is, the loss of muscle tissue. After that point it results mostly from loss of tissue of organs (e.g. kidneys, intestines, etc.), which reduces their energy need. It also makes them less efficient and more prone to infection. Dieting can negatively affect the circulatory system. The mechanism is unknown, It is believed, but to the information that speculates may be due to the loss of potassium induced by calorie restriction, with potassium playing an important role in healthy hearts and lungs. These facts both contribute (many others would imagine) to the negative health effects of dieting. In fact, anorexics do not die of starvation; by and large, if excessive calorie restriction may result in the death of a sixteen-year-old girl from a heart attack, over a long term it can hurt anyone.( Webster BL, Barr SI,1993).

**Studies on Prediction in Stretching**

Bandy (1994) has studied on “The Effect of Time on Static Stretch on the Flexibility of the Hamstring Muscles” The results of this study suggest that duration of 30 seconds is an effective time of stretching for enhancing the flexibility of the hamstring muscles. Given the information that no increase in flexibility of the hamstring muscles occurred by increasing the duration of stretching from 30 to 60 seconds, the use of the longer duration of stretching for an acute effect must be questioned.

. Decicco (2005) conducted a study on “The effects of proprioceptive neuromuscular facilitation stretching on shoulder range of motion in overhand athletes”. It was concluded that the CRC and HRC PNF stretching techniques are effective at increasing external shoulder ROM when consistently performed 2 times a week for six weeks.

Madanmohan et. al., (2005) conducted a study on “Effect of Slow and Fast Pranayama on Reaction Time and Cardio Respiratory Variables”. It was concluded that different types of pranayams produce different physiological responses in normal young volunteers.

## METHODOLOGY

The subjects for this study were randomly selected from the Cheyyar town, Tamil Nadu. In total, thirty obesity men were selected and their age ranged from 25 to 35 years.

They were divided in to three groups namely Static Stretching, Proporoceptive Neuromuscular Facilitation (PNF) and Yogasanas groups. Sit and Reach test was used to measure Flexibility and hand reaction was measured by electronic chronoscope. To assess the flexibility and reaction time, the following test namely sit and reach and Foot reaction test were used. The obese male subjects underwent treatment such as Static Stretching exercises, Proprioceptive Neuromuscular Facilitation (PNF) Technique and Yogasanas continuously for a period of 12 weeks Pre and Post test data were Collected and statistically analyzed by using Analysis of Covariance (ANCOVA). The level of confidence was fixed at 0.05 level for significant difference.

**TABLE I**

**MEAN, STANDARD DEVIATION AND STANDARD ERROR FOR STATIC STRETCHING, PNF STRETCHING AND YOGASANAS GROUPS ON FLEXILITY**

| Experimental Groups | Subjects No. | Tests | Mean | Std. Deviation | Std. Error |
|---|---|---|---|---|---|
| **Static Stretching Group** | 10 | Pre | 13.7300 | 0.54782 | 0.17324 |
| | | Post | 13.8700 | 0.62548 | 0.19779 |
| **PNF Group** | 10 | Pre | 13.6000 | 0.96954 | 0.30659 |
| | | Post | 13.7500 | 0.91318 | 0.28877 |
| **Yogasanas Group** | 10 | Pre | 13.5600 | 0.63105 | 0.19956 |
| | | Post | 13.7300 | 0.77896 | 0.24633 |

Table I shows that the pre-test and post-test means for Static Stretching group, Proprioceptive Neuromuscular Facilitation (PNF) group and Yogasanas group on flexibility. The pre-test means for the three experimental groups were 13.7300, 13.6000 and 13.5600 respectively. The posttest means for the three experimental groups were 13.8700, 13.7500 and 13.7300 respectively.

## TABLE II

## RESULTS OF THE ANALYSIS OF VARIANCE FOR PRE AND POST TEST SCORES ON FLEXIBILITY

| Sources of Variance | Df | SSx | SSy | MSx | MSy | 'F' ratio |
|---|---|---|---|---|---|---|
| Between Means | 2 | 0.158 | 0.115 | 0.079 | 0.057 | 0.145 |
| Within Groups | 27 | 14.745 | 16.487 | 0.546 | 0.611 | 0.094 |
| Total | 29 | 16.602 | 14.903 | | | |

Table II indicates that the 'F' ratio of the analysis of variance of pre-test and post-test on flexibility of three groups. The calculated 'F' value for pretest means was 0.145, which was lower than the required table value at 0.05 level. This indicates that the random selection of the subjects were homogeneous with the respect to their performance on flexibility. The calculated 'F' value for the posttest was 0.094, which was lower than the required table value at the 0.05 level. This shows that there was no significant change between the three groups after the training progamme of 12 weeks.

## TABLE III

## MEAN, STANDARD DEVIATION AND STANDARD ERROR FOR STATIC STRETCHING, PNF STRETCHING AND YOGASANA GROUPS ON HAND REACTION TIME

| Experimental Groups | Subjects No. | Test | Mean | Std. Deviation | Std. Error |
|---|---|---|---|---|---|
| **Static Stretching Group** | 10 | Pre | 57.3000 | 5.4375 | 1.7195 |
| | | Post | 57.6000 | 5.5216 | 1.7461 |
| **PNF Group** | 10 | Pre | 59.4000 | 3.5963 | 1.1373 |
| | | Post | 59.3000 | 4.3474 | 1.3748 |
| **Yogasanas Group** | 10 | Pre | 58.2000 | 4.1042 | 1.2979 |
| | | | 58.6000 | 3.8137 | 1.2060 |

Table III reveals that the pre-test and post-test means for static stretching group, Proprioceptive Neuromuscular Facilitation (PNF) group and Yogasanas group on hand reaction time. The pre-test means for the three groups were 57.3000, 59.4000 and 58.2000 respectively. The post test means for the three groups were 57.6000, 59.3000 and 58.6000 respectively.

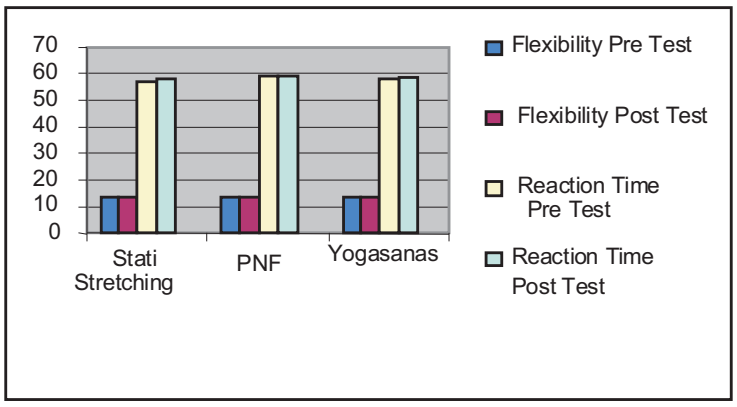
## TABLE IV

## RESULTS OF THE ANALYSIS OF VARIANCE FOR PRE AND POST TEST SCORES ON HAND REACTION TIME

| Sources of Variance | Df | SSx | SSy | MSx | MSy | 'F' ratio |
|---|---|---|---|---|---|---|
| Between Means | 2 | 22.200 | 15.800 | 11.100 | 7.900 | 0.561 |
| Within Groups | 27 | 534.100 | 575.400 | 19.781 | 21.311 | 0.371 |
| Total | 29 | 556.300 | 591.200 | | | |

Table IV shows that the 'F' ratio for pre-test and post-test on Hand Reaction time of three groups. The calculated 'F' value for pre-test means was 0.561, which is lower than the required table value at 0.05 level. This indicates that the random selection of the subjects were homogeneous with respect to their performance on flexibility. The calculated 'F' value for post test was 0.371, which is lower than the required table value at 0.05 level. This shows that there was no significant change between the three groups after the training progamme of 12 weeks.

Bar Diagram Showing the Mean Difference of Experimental Groups in Flexibility and Reaction Time



## DISCUSSION ON FINDINGS

The findings of the study revealed that there was no significant difference on the flexibility and hand reaction time for all three groups. In the case of flexibility and hand reaction time all the groups had shown improvement. But it was not significant while comparing with the table value at 0.05 level and at 0.01 level. By comparing the means of pre and post test it can be concluded that this type of training can be recommended for improving the flexibility and hand reaction time on general population.

The results of the study showed that there was no significant difference between all three groups of Static Stretching, Proprioceptive Neuromuscular Facilitation (PNF) and Yogasanas group treatment test scores. Hence the null hypothesis was accepted.

The study was framed to analyze and compare the effects of Static Stretching exercises, Proprioceptive Neuromuscular Facilitation (PNF) Technique and Yogasanas on obese male subjects. The obese male subjects underwent treatment such as Static Stretching exercises, Proprioceptive Neuromuscular Facilitation (PNF) Technique and Yogasanas continuously for a period of 12 weeks. The selected criterion measures were flexibility and hand reaction time and the aim of the study was to find out the improvement from pre test data and after training period of 12 weeks of training.

The findings of the study reveal that there was no significant difference on flexibility and hand reaction time for all three groups. These three groups had shown improvement on flexibility and hand reaction time. Hence the research hypothesis regarding flexibility and hand reaction time among Static Stretching, Proprioceptive Neuromuscular Facilitation (PNF) Technique and Yogasanas group is accepted.

From the finding of the study, it was concluded that Static Stretching, Proprioceptive Neuromuscular Facilitation (PNF) Technique and Yogasanas training programmes could induce positive changes in the Flexibility and Reaction time.

## NOTES AND REFERENCES

1.Donatelle J Rebecca., Health, The Basics 6th ed. (Canada: Transcontinental Publication, 2005): 64-72.
2.Kabat Herman M.D., "Proprioceptive Neuromuscular Facilitation (PNF) is a Treatment Technique" British Journal of Sports Medicine 26, (November 1940): 20-25.
3. Irion W.D and Bandy J.M, "The Effect of Time on Static Stretch on the Flexibility of the Hamstring Muscles" Physical Therapy 74(9), (September 1994): 845-50.
4.Madanmohan, et. al., "Effect of Slow and Fast Pranayama on Reaction time and Cardiorespiratory Variables" Indian Journal of Physiological Pharmacology 49(3), (July-September 2005): 313-18.
5.Fisher M.M. And Decicco P.V. "The Effects of Proprioceptive Neuromuscular Facilitation Stretching on Shoulder Range of Motion in Overhand Athletes" Journal of Sports Medical Physical Fitness 45(2), (January 2005): 183-7.
6.Webster BL, Barr SI. Body composition analysis of female adolescent athletes: comparing six regression equations. Med. Sci. Sports Exerc. 25:648–653,1993.