

Efficacy of yoga on flexibility

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Abstract

Introduction: Flexibility is 'the range of movements in a joint or joints of the body and ligaments in the muscle fibres that cross the joints.' Flexibility varies particularly between the differences in muscle length of multi joint muscles and flexibility in some joints can be increased to a certain degree by exercise with stretching a common exercise component to maintain or improve.

Gender, age and genetics are important for range of motions. Many factors are taken into account Flexibility is 'the range of movements in a joint or joints of the body and ligaments in the muscle fibres that cross the joints.' Flexibility varies particularly between the differences in muscle length of multi joint muscles and flexibility in some joints can be increased to a certain degree by exercise with stretching a common exercise component to maintain or improve.

Gender, age and genetics are important for range of motions. Many factors are taken into account when establishing personal flexibility-jointstructures, ligaments, tendons, muscles, skin, tissueinjury, fattissue, body temperature and activity level.

The body flexibility level is measured and calculated by performing 'Sit and Reach' or 'Stand and Reach' methods. The result obtained is defined as 'Personal Flexibility Score.'

Objectives: To prove flexibility increases very well by the practice of Yoga asanas,

To prove flexibility enhancement in school children with more of sedentary lifestyle-less outdoor sports involvement and physical activities are taken as the control

Methodology:

1. Children in age group between 12-14 years are selected.
2. They should be less involved in outdoor sports and other strainuous physical activity.
3. The students selected are 05 boys and 20 girls.
4. The study is conducted minimum for 3 weeks.
5. The personal flexibility score is recorded by Stand and reach method, Sit and reach method, Reach beyond feet method.
6. The scores are recorded as Pre Test and Post Test and the results are given as scores. The difference in scores is the result of the study.

Summary: 1. The purpose of the study was the effect of 3 weeks yoga training on the flexibility of the students. The effort was to prove the fact that yoga is most efficient means of improving flexibility. And the results are obtained even in short duration of practice. This helps in people who are involved in sports where flexibility should be their main advantage.

2. The subjects were 20 female and 05 male students of high school students. Everyday evening 2 hours yoga training was given systematically. A pre-test (sit and reach method) was conducted before the training sessions were started. And as a comparison post-test was also taken by the same method. The analysis showed significant variation in the flexibility. To know the significance, 0.05 level was chosen.

Conclusion: On the bases of the analyzed data, the conclusion was drawn. The students mean score of the flexibility in post-test is more than pre-test score and the result is significant at 0.05 level. When establishing personal flexibility-jointstructures, ligaments, tendons, muscles, skin, tissueinjury, fattissue, body temperature and activity level.

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Keywords: flexibility, multi joint muscles

Introduction

"Yoga is the physical, mental and spiritual practices or disciplines which originated in ancient India with a view to attain a state of permanent bliss of mind in order to experience one's true self. " The term "yoga" is derived from either of two root words- "Yuj -Yoga" (to yoke) or "yujsamadhu" (to concentrate). The yoga Sutras of Pathanjali defines yoga as "the stilling of the changing mind." Yoga is defined as "union with the divine" in other contexts and traditions.

Yoga Education

Commonly, the term yoga education has been referred to as "training and teaching processes of yoga." The applications of

Yogic techniques have proved to support the education process. The target is to achieve discipline and to enhance socially useful potentials of human personality. To achieve this target, the system of yoga lays foundation stones whereupon education system may flourish in all areas. Yoga education lays the physical, psychological, interpersonal, professional and spiritual refinement of a personality. Moreover, it also helps to attain refinement at the level of thoughts or intellectual development and feelings or affective aspect hence bringing in overall development of a being at a higher level.

Through Yoga Education, the value of ethics, earning, enjoyment and emancipation can be taught in a simpler and

easy way. The potential of Yogic practices are duly proved positive concerned with education process, i.e., treating physical disabilities, development of mental health and stress management, positive promotion of health, however, many aspects of yoga practices, and is proved to be helpful in giving good support to maintain their persistent efforts for studying in students and train about inner-self, development of awareness of one's own psychosomatic system. Yoga education is a training about inner-self, "obviously takes in process of pursuit of transcendental state of psyche leading to the development of wide-ranging awareness, unfoldment of creative consciousness and promotion of uniqueness or talent in the students."

1. Self-education: Yoga teaches us self-education. It is nothing but self-awareness. It teaches us importance of wisdom, and lose interests in worldly orientations. It is a continuous training for the development of self-awareness and teach us about the realities of our present being and future becoming.
2. Pursuit of transcendental psyche: The main aim of Yoga is the attainment of transcendental psyche. Through meditation, accomplishment of knowledge through real vision or wisdom occurs. It abandons reasons that create complexities as complexities lead to tensions. Yoga education gives simple life with peaceful mind.
3. Development of general awareness: Apart from physical, mental and spiritual awakening in an individual, Yoga is also a method of inculcation of social and economic awareness about oneself. Yoga system creates awareness of very delicate aspects of life which are hardly attainable by a subject to single pointed focus. It leads to awareness of those aspects of life which are beyond internal and external attainability. The essence of Yoga education should be a general awareness leading to deeper appreciation and realizations.
4. Promotion of uniqueness: Yoga respects the individual uniqueness and gives a due place when supreme consciousness is reflected through individual uniqueness of the individual soul. This is why in Yoga, many a paths and practices were prescribed for aspirants for their spiritual development.
5. Unfoldment of creativity: Eventually, practice of yoga may make one self-centered and introverted. As one's inner self effloresces, it is emitted to his surroundings and is the right manifestation of internal development. Hence, a subtle communication is established between the inner psyche and external material existence. This silent communication, either with internal physiology or external ecology, causes an expansion of the consciousness.
6. Promotion of will power and perseverance: Without inclusion of ethical values and virtues, the agile tendencies may cause tension and hindrance. Yoga helps aspirant to ably qualify the blockades and obstructions efficiently by enhancing the will power. Yoga is the best way to test as well as the train the will power. Will power is a quality that plays a major role in every creative performance and success.
7. Management of the mental health: Yoga helps to overcome conscious conflicts, subconscious emotional conflicts, and unconscious emotional conflicts. As Patanjali states, "Stability of body, brought about by practice of asanas may lead to emotional stability and psychological

wellbeing. Asanas release tensions which are subconscious in nature. It makes the body function harmonious and restores the natural reciprocity of visceral functions. Asanas contributing to the alignment of the body and changing postural reflexes, naturally, produces indirect psychological changes."

8. Management of stress disorders: Yogic techniques are recommended to control stress. The yoga along with recommended yogic diet reduces tension. The practice of pratyahara - controlling activities of senses, helps at both internal and external levels, to manage the stress of the personal life and bring composure. Yoga appears as the system of self-healing. Meditation is the best way to stabilize the functioning of the autonomic nervous system that causes decrease in anxiety and hypertension levels. Hence Yoga education proves as a great rescuer for managing stress and emotional imbalances.

General Benefits of Yoga

The objectives of yoga are

- Yoga improves posture, increases the intake of oxygen and enhances the functioning of all body systems like respiratory, digestive, endocrine, reproductive, excretory systems.
- Its effects on the emotions are equally beneficial by calming down the mind.
- Yoga also cures behavioral disorders, nervous breakdown and manic depressions.
- Asanas enhance muscle strength, coordination, flexibility, agility and range of motions.
- Yoga gives the capacity to face up life's challenges.
- Yoga is highly recommended for people in competitive, stressful working environments. After a good practice of yoga body and mind becomes vibrant.
- The uses of yoga are several, including physical fitness, stress control, general wellbeing.
- Mental clarity and greater self-understanding is attained.
- Yoga can not only be seen as a way to get into shape but also as a tool for self-healing.
- Practicing yoga ultimately leads towards long term health and well-being

Objectives

The objective of the study is:

- Yoga increases flexibility in adolescent group.

Flexibility

Flexibility is the range of movements in a joint or joints of the body and ligaments in the muscle fibers that cross the joints. Flexibility varies with respect to difference in muscle length and flexibility in some joints can be increased to a certain degree by regular exercises by stretching a common exercise component to maintain or improve.

Gender, age, genetics have an impact on flexibility. Many factors are taken into account while accessing personal flexibility-joint structures, ligaments, tendons, muscles, skin, tissue injury, fat tissue, and body temperature and activity level.

The joint has its own stability, provided by another type of connective tissue called ligaments. They can be stretched, though usually only with effort applied consistently. The force from tendons is transmitted by connecting bones to muscles.

With constant exercise and stretching, ligaments become strong and their tension threshold is increased. Muscle fascia accounts for maximum flexibility. Flexibility results in greater mobility to muscles by increasing its resistance against muscle tension.

As flexibility is increased, there will be full range of motions, squeezing and soaking of the areas of the cartilage not often being used and bringing in the fresh nutrients, oxygen supply and blood supply to the area.

The intensity during the flexibility training by stretching should never be painful. The only intention should be to bring the muscle to the point of slight tension.

Flexibility also means the ability of an individual to live a well-balanced life. It helps the body to function at its good level as flexibility is the part of physical fitness. The muscle works at optimum efficiency. The body easily gets adapted to strenuous activity. Flexibility also helps in gaining threshold for excessive bending and helps a person to be physically fit for unexpected physical activity as well.

Since it is one of the important criteria of physical fitness, it should be achieved with patience and should not be neglected while training the body. It is the first component achieved in body training during Yoga. Regular stretching of body through regular practice of yoga brings remarkable flexibility even in short period of time.

Importance of Flexibility

Flexibility has wide range of importance in our day to day life, few are mentioned as follows:

- Reduction in muscle rigidity.
- Habituating to the posture by balancing the tension placed across the joint and the muscles that cross it.
- Marked resistance development against injury.
- Improves personality.
- Prepares body for achieving further components of fitness.
- Trains body for strenuous activities.

Statement of Problems

The study is designed to determine the effect of two weeks training of Yoga on flexibility factor, in students between 14-16 years of age. The students are 25 in number.

Hypothesis

It is hypothesized that flexibility has close relationship with regular yoga practice.

Significance of the Study

- The result of the study will help to create awareness among the trainers with regards to flexibility.
- The study will help to learn about the physical fitness.
- The component (flexibility) is significant and more accessible.
- The result of the study will help the trainers to plan the training and coaching schedule of the participant.

Delimitations

The delimitations of the study are mentioned as the following:

- The study was limited to the students between the ages 14-16.
- The study was further delimited to 25 students (20 female and 5 male students).
- The study was further delimited to 2 weeks training.

- The study was conducted only on flexibility variable.

Limitations

The limitations of the study are given as follows:

- The authenticity of the performance given by the subject is considered as one of the limitations of the study.
- The student's physical activities are unable to be controlled before and after the training session.
- Their growth and development is also considered as one of the limitations of the study.

Review of Related Literature

A review of literature is done based on the information availed in the college libraries and internet services.

Dr. Fernando Pages Ruiz tells "If you are already practicing Yoga, you do not need to practice exercises for flexibility." In his research article he explains, "a knowledge of physiology can help you visualize the inner workings of your body and focus on the specific mechanisms that help you stretch. You can optimize your efforts if you know whether tightness is due to poor skeletal alignment, stiff connective tissues, or nerve reflexes designed to keep you from hurting yourself. In addition, new scientific research may even have the potential to extend the wisdom of Yoga. If we understand more clearly the complex physiology involved in Yogic practices, we may be able to refine our techniques for opening the body."

Dr. Thomas Greens explains, "Yoga releases tensions from our body and minds, allowing us to drop more deeply into meditation. In yoga, "flexibility" is an attitude that invests and transforms the mind as well as the body".

According to Michael Alter, author of "Science of Flexibility" (Human Kinetics, 1998), current research demonstrates "the individual muscle fibres can be stretched to approximately 150 percent of resting length before tearing. This extensibility enables muscles to move through a wide range of motion, sufficient for most stretches-even the most difficult asanas. He says there are two major schools of scientific thought on what actually most limits flexibility and what should be done to improve it. The first school focusses not on stretching muscle fiber itself but on increasing the elasticity of connective tissues, the cells that bind the muscle fibers together, encapsulate them, and network them with their organs; the second addresses the 'stretch reflex' and other functions of autonomic nervous system." Yoga works on both. That's why it's such an effective method for increasing flexibility.

Anatomist David Coulter, author of "Anatomy of Hatha Yoga", reflects in his description of asanas as "Yoga is a careful tending to your internal knitting which increases your body flexibility".

In yogic practice, one maintains the posture long enough to affect the plastic quality of the connective tissue. If the stretch is given for a prolonged period, it can produce healthful, permanent changes in the nature of the fascia that binds the muscles. Julie Gudmestad, a physiotherapist and a certified Yoga Instructor, uses 'prolonged asanas' in her classes to bring in flexibility. She says "If they hold poses for shorter periods. People get a nice sense of release but they are not necessarily going to get the structural changes that add up to permanent increase in their flexibility." According to her, stretches should be held 90-120 seconds to change the "ground substance" of connective tissue. The practices should be made sure that the people are not in pain so that they can breathe and

hold the stretch longer.

Yoga uses Reciprocal Inhibition (Whenever one set of muscles contracts, this built-in feature of autonomic nervous system causes opposing muscles to release) mechanism to facilitate stretching and increasing the flexibility. David Sheer, a doctor and Yoga Instructor in Nashville, ‘uses the principle of reciprocal inhibition of yogic practices to improve the range of motion’.

The above reviews can be taken as the proof and norms that Yogic practices improves flexibility.

Methodology

In this chapter, selection of subjects, selection of variables, reliability on data, subject reliability, method of data collection, statistical techniques used for analyzing the data have been explained.

Selection of Variables

Taking into consideration of the importance, Flexibility is taken as the variable for the construction of the data of the study.

Reliability of the Data

Reliability of the data is ensured based on reliability of the testing method and subject reliability.

Instrument Reliability

The measuring tapes used were considered reliable as they were procured from reputed firms and used for the study. To be accurate, the measurements were recorded two times under similar conditions, using same instruments and the scores obtained were same.

Subjects Reliability

Subjects are reliable because the same subjects were used under similar conditions. No motivational techniques were used at the time of testing.

Collection of Data

- **Test:** Sit and Reach Test.
- **Purpose:** To measure trunk flexibility of the subject in forward direction.
- **Equipment:** Measuring tape.

Description

The subject is bare footed, sat on the plain ground with legs extended and feet together with back straight. Then, he or she should bend forward trying to place hands besides respective feet. The movement towards the posture and return from from the posture should be slow and smooth. Jerky movements or hurried movements may cause spasm or tear of the muscles. The length of the fingers beyond the foot is our score.

Statistical Technique

For the computation of data collected for the Flexibility, the following statistical procedures were followed after collecting the scores.

Mean and standard deviation were composed.

$d' = d/N$;

m=mean

d=deviation sample mean

N=number of scores

Standard deviation (Sd)= $\sqrt{[(d^2/n)-(d/n)^2]}$

Test Value

$T_r = d' / [Sd / \sqrt{N-1}]$

T_c=table value

Common Asanas Which Increase Flexibility

The asanas which increase flexibility on regular practice with more efficiency are:

- Tadasana
- Ardhakati chakrasana
- Hastapadasana
- Trikonasana
- Parivartatrikonasana
- Parshwakonasana
- Paschimottasana
- Janushirshasana
- Vakrasana
- Baddhakonasana
- Baddhapadmasana
- Suptakonasana
- Ardhamatsyendrasana
- Utitapadasana
- Viparitarani asana
- Sarvangasana
- Halasana
- Bhujangasana
- Tiryakabhujangasana
- Shalabasana
- Dhanurasana

These asanas were regularly practiced by the controls of 25 students for 15 days during the study period.

Analysis of the Data and Results of the Study

Hypothesis: The hypothesis states that 2 weeks yoga training affects the flexibility of the subjects taken for the study. The ‘t’ ratio is found to be significant at 0.05 level.

Hypothesis 0: The 2 weeks yoga training has no effect on the flexibility of the subjects.

Hypothesis 1: The 2 weeks yoga training has its affect on the flexibility of the subjects.

Table 1

Variable	D	sd	t _c	t _t
Flexibility	4.12	2.44	8.28	1.73

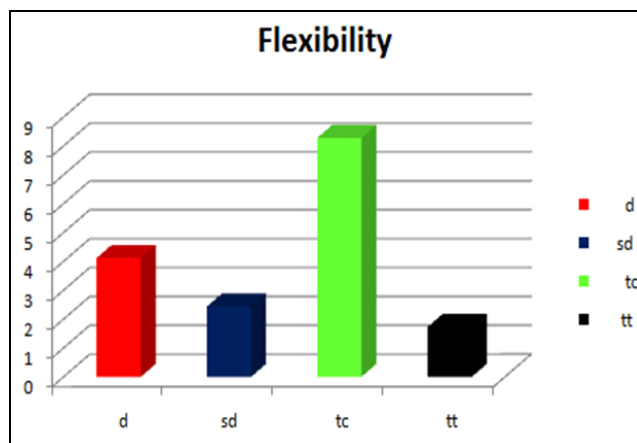


Fig 1

According to Statistical Standards,

$$t_c = 8.28$$

$$t_t = 1.73$$

$$t_c > t_t$$

Null hypothesis is rejected and hypothesis 1 is accepted.

So, we can conclude that 2 weeks yoga training has improved the flexibility of the students.

Discussion and Findings

The result of the study generally supported the proposed hypothesis that 2 weeks yoga training should play a vital role in improving the flexibility of the students. The training also improves general health, organic functioning as well as strength and stability of musculoskeletal system. This is the fact why flexibility is shown significant in the yoga training.

Summary

The purpose of the research was to study the effect of 2 weeks yoga training on the physical flexibility in the students. The effort was to prove that yoga is the most efficient means of improving flexibility. And the results are obtained even in short duration of practice. This helps in people who are involved in sports where flexibility should be their main advantage.

The subjects were 20 female and 05 male students of high school students. Everyday evening 2 hours yoga training was given systematically. A pre-test (sit and reach method) was conducted before the training sessions were started. And as a comparison post-test was also taken by the same method. The analysis showed significant variation in the flexibility. To know the significance, 0.05 level was chosen.

Conclusion

On the bases of the analyzed data, the conclusion was drawn. The students mean score of the flexibility in post-test is more than pre-test score and the result is significant at 0.05 level.

Recommendations

On the basis of the study, the following recommendations were made:

- Similar studies can be made on large number of people.
- Similar studies can be made for 6 weeks or more training period.
- Similar studies can be conducted at various students' level.
- Similar studies can be conducted on rural area students.
- Similar studies can be conducted on national and international yoga practitioners.

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