Chapter - III

Methodology

This chapter explains the procedures adopted by the researcher in selecting the subjects, design used, selection of the variables, selection of the tests, reliability of the instruments, competency of the testers, fixing up of training loads and training.

This chapter also deals with the statistical procedures employed to analyze the collected data.
Methodology

3.1. Selection of the Subjects

The purpose of the study is to analyze the training effects of yogic practice and physical exercises among the residential male College students on selected physical and physiological variables. It was decided to select Residential male college students from the School of Engineering and Technology, Bharathidasan University, Tiruchirappalli. From the total population of 250 hostellers 60 healthy students were randomly selected, their age ranged between 17-22 years. With the help of the medical officer special care was taken to find out if they were medically fit enough to undergo the training schedule of yoga and physical exercises.

3.2. Experimental Design

The experimental design used for this study was a random group design. The selected subjects were divided into three groups of 20 each, namely Yogic Practices group (Group A) Physical Exercises group (Group B) and Control group (Group C). They belonged to the various years of Engineering course.

The experimental groups (Group A and Group B) underwent training for a period of twelve weeks whereas; the control group maintained their routine activities and no special training was given. The subjects of the three groups were tested using standardized tests and procedures on selected physical and physiological variables before and after the training period to find out the training effects.
3.3. Selection of Variables and Tests

The subjects were tested on the following Physical and Physiological test variables.

**Physical Variables (PV)**

1. Speed
2. Agility
3. Flexibility
4. Explosive Power
5. Cardio Respiratory Endurance

**Test**

- 50 Meters Run
- Shuttle Run
- Sit and Reach Test
- Standing Broad Jump
- Cooper’s 12 Min Run / Walk Test

**Physiological Variables (PLV)**

1. Resting Pulse Rate
2. Breath Holding Time
3. Maximum Inspiratory Volume
4. Peak Flow Rate

**Equipments**

- Stethoscope
- Digital Stop Watch
- Hudson Incentive Insiprometer
- Wright’s Peak Flow Meter

3.4. Reliability of the Instruments

The instruments and equipments used for the Administration of the tests were borrowed from the Research Laboratory, Department of Physical Education, Bharathidasan University. The instruments such as Hudson incentive Insiprometer (Hudson RCI, one CAT. No.1750; U.S. Patent No. 4,
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232, 633) and Mini Wright's Peak Flow Meter (Asma Plan, Vitalograph, EN-46001) were borrowed from the Department of Physical Education, National Institute of Technology, Warrangal, Andra Pradesh. The instruments and equipments were reliable and accurate enough to carryout the test procedures successfully.

3.5. Competency of the Tester

The investigator conducted the test procedures along with five qualified Physical directors who were well trained in handling the instruments and know the test procedures well.

3.6. Reliability of the Data

For the purpose of establishing reliability of the data, 5 subjects were selected at random by 'lot-method'. To ensure reliability, test and re-test method were followed. The entire experimental variables selected for this purpose were tested twice, by the same testers under similar conditions.

3.7. Orientation of the subjects

Before the commencement of the training, the subjects were explained the purpose and importance of the study. The training and test procedures were advocated and demonstrated in detail to them to ensure proper understanding and secure effective co-operation so as to derive reliable data from the tests.
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3.8. Test Administration

Before the conduct of the tests, the researcher demonstrated each test to the subjects. A model performance by a few persons other than the active participants has also been done to make them clearly understand the test procedures. The test items and the procedure for the Administration used in the present study are explained below.

3.9. PHYSICAL VARIABLES

3.9.1. Speed

Test : 50 meters Run

Purpose : To measure the speed

Equipments

Stopwatch, whistle, score sheet, pen and lime powder

Procedure

The subjects take their position behind the starting line. The starter used the command “Ready” and blew the whistle. The latter was accompanied by a downward sweep of the starter’s arm as a signal to the timer. On hearing the whistle sound, the subjects started running as fast as possible up to the finishing line.

Scoring

The score is the elapsed time to the largest one tenth of a second between the starting and the instant the subject crosses the finish line (Clarke and Clarke, 1987).
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3.9.2. Agility

Test : Shuttle run
Purpose : To measure agility

Equipments

Two lines parallel to each other are placed on the floor 30 feet apart. Since the student must over run both of these lines, it is necessary to have several feet more of floor space at either end. Two blocks of wood and a stopwatch are needed.

Procedures

The student stands at one of the lines with the 2 blocks at the other line. On the signal to start, the student runs to the blocks, takes one, and returns to the starting line, and places the block behind that line. He then returns to the second block, which is carried across the starting line on the way back. Two trials are necessary to return the blocks after each race.

Scoring

The score is the elapsed time recorded in seconds and tenths of seconds for the better of 2 trials (Harold M. Barrow and McGee, 1979).
ADMINISTRATION OF SIT AND REACH TEST
Methodology

3.9.3. Flexibility

Test : Sit and Reach
Purpose : To measure flexibility

Equipments
Sit and Reach apparatus, score sheet.

Procedure
The sit-and-reach apparatus should have the 25cm mark equivalent to the point where the feet touch the box.

The subject warm-up for the test by performing slow stretching movements before taking actual measurements. The subject, sits barefoot with the legs fully extended with the soles of the feet placed flat against the horizontal cross board of the apparatus, with the inner edge of the sole placed 2 cm from the scale, keeping the knees fully extended, arms evenly stretched, palms down. The subject bends and reaches forward (without jerking) pushing the sliding marker along the scale with the fingertips as far forward as possible. The position of maximum flexion must be held for approximately two seconds. The test is repeated twice. If the knees flex, the trial is not counted. There should be no attempt to hold the Knees Down.

Scoring
Record the maximum distance reached to the nearest 0.5cm.

(Operation manual for “The Canadian fitness Challenge”)
3.9.4. Explosive power

Test : Standing broad jump
Purpose : To measure explosive power

Equipment

Floor with take off mark and Tape measure.

Procedure

The subject should stand with feet several inches apart and with the toes just behind the takeoff mark. They may swing the arms and bend the knees in making the jump forward. Both feet should leave the floor at the same time.

Instructions

You should crouch before the takeoff and swing your arms down in a preliminary movement. As the jump is made, throw your arms up and out. Jump from both feet and try not to fall backwards on landing.

Scoring

The measurement is made from the takeoff line to the nearest point where any part of the body touches the floor. Three trials are permitted and the best one is estimated to the nearest inch (Harold M. Borrow, McGee, 1979).
3.9.5. **Cardio Respiratory Endurance**

Test : Cooper’s 12 Minutes Run / Walk

Purpose : To assess the Cardio-Respiratory Endurance

**Equipments**

Stop Watch, Whistle, Score Sheet, Pen, Track and Lime Powder.

**Procedure**

The test was administered in a 200 meter track with markings at every 5 meters. The investigator and the testers served as the lap scorers. The subjects were asked to stand behind the starting line drawn at the finish of the 200mts track. They were instructed to cover as much distance as possible by running/walking, in case of running throughout the 12 minutes was not possible. They were instructed to continue till the final whistle. The race was started with a whistle and at the end of the twelfth minute again the whistle was blown. The 5th, 10th and 11th minutes were announced to them. At the final whistle after 12 minutes, they stopped instantly and stood on the spot.

**Scoring**

The distance covered by each subject in twelve minutes was recorded to the nearest fifth meter (*Clarke and Clarke, 1987*).
Methodology

3.10. PHYSIOLOGICAL VARIABLES

3.10.1. Resting Pulse rate

**Test** : Stethoscope reading / Digital pressure monitor

**Purpose** : To measure the rate of the heart beat per minute

**Equipment**

Stethoscope, Score Sheet, Stop Watch.

**Procedure**

For the sake of accuracy, in this study, the resting heart rate was measured in the subject’s hostel rooms as soon as they woke up from their sleep in the morning. They were instructed to remain in their beds till the investigator arrived to measure their resting heart rates. Even though measuring thirty subjects on a single morning was a time-consuming exercise, the result procured was worth the effort made. The resting pulse was measured while the subject remained lying on the bed around 7 a.m. in the morning.

The stopwatch was used to count the seconds for starting and ending the heart beat counts. After every minute, when the stopwatch was stopped, both the subjects and investigator called out the number of beats counted by them simultaneously.

There were five repetitions of such one-minute counts and the highest count was recorded as the subject’s resting pulse rate.

**Scoring**

Number of beats per minute was counted.
TEST ON BREATH HOLDING TIME
3.10.2. Breath Holding Time

Purpose : To find out the maximum ability of the subject to hold his breath.

Equipments

A stopwatch.

Procedures

The subject was asked to stand at ease and inhale deeply after which he held his breath as long as possible. The index finger of the subject served as an indicator for the investigator to know the start and end of recording time. To prevent exhalation or inhalation through the mouth during the recording time the subject was asked to couple his lips tightly. Two trials were permitted for each subject with a gap of five minutes and the better time was recorded.

Scoring

The time of holding the breath till the subject lets the air out was recorded to the nearest one tenth of a second using a stop watch (Astrand and Rodahl, 1977).
TEST ON MAXIMUM INSPIRATORY VOLUME

TEST ON PEAK FLOW RATE
3.10.3. Maximum Inspiratory volume

Purpose : To calculate the Maximum Inspiratory Volume

Equipments

Hudson incentive Inspirometer, Stop Watch and Score Sheet.

Procedure

The Hudson incentive inspirometer was set at the flow rate of 400CC/Sec. The subject was asked to keep the mouthpiece of the inspirometer after a deep exhalation and was asked to inhale as long as the subject could. As soon as the ball of the inspirometer starts rising, which indicates the commencement of the inhalation; the measurement of time was started and recorded till the ball reaches the bottom of the instrument, which indicates the person's inability to continue the inhalation. The better of the two trials was taken into account.

Scoring

The Inspiratory Volume was calculated based on the time recorded by the subject multiplied by the set flow of 400 CC./Sec. For example, if the time recorded is 5 sec, then the Inspiratory Volume is 5 Sec x 400CC = 2000 CC (Hudson, 1997).
3.10.4. Peak Flow Rate

**Purpose**: To measure the peak expiratory flow rate

**Equipment**

- Mini Wright’s Peak Flow Meter, Dettol and Score Sheet.

**Procedure**

The instrument consists of a mouthpiece, a marker and a calibrated air tube. When the air is “Puffed” into the mouthpiece, the marker moves along the calibrated air tubes and measures the peak expiratory flow rate in liters per minute. The subject was asked to stand and hold the instrument in one hand in such a way that the fingers do not obstruct the slot. The instrument was held in hand tightly with the slot facing away from the hand with the flattened part of the plastic mouthpiece in horizontal position. Then, he was asked to inhale through his mouth to the maximum capacity. He then expelled the maximum possible amount of air by blowing out into the mouthpiece with a hard blow. The expelled air caused the marker to move up the scale. The value where the marker came to rest was recorded as the peak flow rates in liters per minute. Then the marker was gently pushed back. Three chances were given. Each subject disinfected the mouthpiece with dettol after use.

**Scoring**

The reading indicated by the marker was taken as the score. The best of three trials was taken into account *(Wright, 1990)*.
3.11. Administration of Treatment

In the present study the specifically designed physical exercises and yogic practices which were selected in consultation with the experts the field of Yoga and coaching were given as treatment to the two experimental groups (Group-A and Group-B) for 12 weeks in morning hours excluding Sundays. For the better understanding of the participants both the designed Physical Exercises and the Yogic practices were demonstrated and explained in a systematic manner. The subjects were also instructed on the precautions to be taken while undergoing the intensive training treatment. In this way the investigator was able to get the successful application of interventions. Special care was taken to check that the training load of yogic practice and physical exercises or well balanced at every session of the training.

3.12. Description of Physical Exercises

With the help of field experts, coaches, results of pilot study and intensive study, a package has been designed with selected Physical Exercises that tend to enhance the performance level of the selected physical and physiological variables.

The following are the package of physical exercises related to the Physical and Physiological variables in the present study.
3.13. List of Physical Exercises

Speed

➢ Wind sprint
➢ Striding
➢ Acceleration drills
➢ Sprint drills
➢ Falling acceleration
➢ Quick starts
➢ High knee action

Agility

➢ Side shuffle
➢ T-Drill
➢ Zigzag Drill
➢ Four corner Drill
➢ Quick Feet
➢ L-Drill

Flexibility

➢ Lateral, front, back neck stretch
➢ Double anterior Shoulder Stretch
➢ Overhead shoulder stretch
➢ Lateral trunk stretch
➢ Trunk and Leg stretch
Methodology

- Quadriceps’s stretch
- Hip flexor stretch
- Hamstring stretch.

Explosive Power

- Hopping
- Hop step up
- Standing Long jump
- Split jump
- Squat jump
- Four counts jumping jacks
- Leg thrust.

Cardio Respiratory Endurance

- On the spot running
- On the spot jogging
- Jogging
- Shuttle Run
- On the spot jumping
- Side leg kick
- Front leg kick (Alternative)
- Skipping
- Split jump
- Step up jump (8’ to 10’)


Methodology

**Resting Pulse Rate**

- Slow and continuous running
- Medium phase running
- Short and easy running
- Tempo runs.

**Breadth Holding Time**

- Endurance running (Slow)
- Continuous running (Medium Phase)
- Short sprints
- Accelerated running.

**Maximum Inspiratory Volume**

- Slow and continuous running
- Short and easy running
- Endurance running (Medium Phase)

**Peak Flow Rate**

- Fast continuous Running
- Fartleks
- Explosive running
- Speed Endurance **(Dr. Jay Hoffman, 2002)**

All the physical exercises were used on rotations in various sessions of the training period according to the intensity and load of the session.
3.14. Training Details of Physical Exercise

Duration of the training - 12 Weeks
Number of days per week - 6 Days
Duration of the session - 90 Minutes

3.15. Training Phases

The training consists of three phases in a session

Phase - I - General Warm up and Stretching
Phase - II - Training for specific component on rotation
Phase - III - Warm down

3.16. Time Schedule for a Session

Warm up and stretching - 15 Minutes
Training for specific components - 50 Minutes
Distributed rests in between the load - 10 Minutes
Warm down - 15 Minutes

The training period consisted of twelve weeks, one session a day. A Training week consisted of six days Sunday being allotted for rest, scoring 72 days which means 72 training sessions where a maximum of 216 rotations of physical exercises from the total list for specific components were possible during the total Training period. The rotations of specific components were possible numbering 2-3 in a single session depending upon the Training load and Repetitions. When a session was found reaching beyond the threshold the
SUBJECTS DURING YOGA PRACTICE

VAJRASANA

BHUJANGASANA
number of rotations for specific components was restricted in accordance with the total Training duration of a session.

3.17. Description of Selected Yogic Practices

The following are the selected Yogic practices included in the training package.

i) Asanas

ii) Pranayamas

iii) Meditation

3.17.1. Asanas

➢ Padmasana
➢ Vajrasana
➢ Paschimothanasana
➢ Matsyasana
➢ Ardha Matsyendrasana
➢ Halasana
➢ Bhujangasana
➢ Dhanurasana
➢ Shalabhasana
➢ Sarvangasana
➢ Pawan Muktasana
➢ Chakrasana
SUBJECTS DURING YOGA PRACTICE

DHANURASANA

SHAVASANA
Methodology

➢ Utthita Parsvakonasana
➢ Virabhadrasana
➢ Utkatasana
➢ Vrksasana
➢ Tadasana
➢ Garudasana
➢ Shavasana

3.17.2. Pranayama

➢ Nadisuddhi
➢ Ujjayi
➢ Kapalbhati
➢ Bhramari
➢ Bhastrika

3.17.3. Meditation

Observing the Breath.
SUBJECTS DURING YOGA PRACTICE

SHALABHASANA

SARVANGASANA
PADMASANA

Padmasana (the lotus pose)

- Sit with the legs extended forward.
- Fold one leg and place its foot on the top of the opposite thigh.
- The sole of the foot must be upward and the heel should touch the pelvic bone.
- Fold the other leg and place its foot on top of the other thigh (Swami Sathyananda Saraswati, 1993).
VAJRASANA

Vajrasana (the thunderbolt pose)

• Stand on the Knees with the feet stretched backward and big toes crossed.

• The Knees should be together, heels apart.

• Lower the buttocks onto the insides of the feet, the heels at the sides of the hips.

• Place the hands on the knees, palms downward (Swami Sathyananda Saraswati, 1993).
PASCHIMOTTANASANA

Paschimottanasana (the back stretching pose)

- Sit on the floor with the legs straight in front of the body, the lower arms on the thighs.
- Relax the whole body, especially the back muscles.
- Slowly bend the body forward.
- Try to grasp the big toes with the fingers and the thumbs. If this is impossible then hold the heels, the ankles or the legs as near to the feet as possible.

Again, consciously relax the back and leg muscles. Keeping the legs straight and without utilizing the back muscles, only using the arms, pull the trunk a little lower toward the legs. This should be a process without any sudden movement or excessive strain anywhere in the body. If possible, without strain, touch the knees with the forehead.

Remain in the final pose for a comfortable length of time, trying to further relax the whole body, and then slowly return to the starting position (Swami Sathyananda Saraswati, 1993).
MATSYASANA

Matsyasana (the fish pose)

Sit in padmasana. Bend backward, supporting the body with the arms and elbows, until the crown of the head touches the ground. Hold the big toes and rest the elbows on the floor.

Arch the back as much as possible. Remain in the final pose up to 5 minutes. Do not strain (Swami Sathyananda Saraswati, 1993).
ARDHA MATSYENDRASANA

Ardha Matsyendrasana (the half spinal twist pose)

- Sit with the legs straight in front of the body.
- Place the right foot flat on the floor outside the left knee.
- Bend the left leg to the right and place the left heel against the right buttock.
- Place the left arm outside the right leg and with the left hand hold the right foot or ankle. The right knee should be as near as possible to the left armpit.
- Turn the body to the right, placing the right arm behind the back.
- Twist the back and then the neck as far as possible without strain.
- Remain in the final pose for a short time and then slowly return to the starting position.
- Change the legs and repeat to the other side (Swami Sathyananda Saraswati, 1993).
HALASANA

Halasana (the plough pose)

- Lie flat on the back with the arms straight and beside the body, palms facing downward.

- Keeping the legs straight, slowly raise them to the vertical position above the body. Only use the stomach muscles to raise the legs. Do not use the arms. Simultaneously bend the trunk upward, hips first.

- Slowly lower the legs over the head and touch the floor with the toes of both feet. Keep the legs straight, bend the arms and place the hands on the back as in sarvangasana. Relax the body.

- Remain in the final pose for a comfortable period of time. Then either return to the starting position or perform the following additions to the basic pose:
  1. Walk the feet away from the head until the body is completely stretched and a tight chin lock occurs.
  2. Walk the feet towards the head until the back is fully tensed. Keep the legs straight and directly above the head. Grasp the feet with the fingers. Maintain these poses for a comfortable length of time, and then return to the final pose of basic halasana (Swami Sathyananda Saraswati, 1993).
BHUJANGASANA

Bhujangasana (the cobra pose)

Lie on the stomach with the legs straight and the feet extended. Place the palms flat on the floor under the shoulders. Rest the forehead on the ground and relax the body. Slowly raise the head and the shoulders off the ground, bending the head as far back as it will go. Try to raise the shoulders without using the arms, only utilizing the back muscles. Now bring the arms into action and slowly bend the back as much as possible without strain until the arms are straight. Keep the navel as near to the ground as possible. Hold as long as comfortable.

Practice up to 5 times.

Breath

Inhale while raising the body from the ground. Breathe normally in the final pose. If the final pose is held for a short time, retain the breath inside (Swami Sathyananda Saraswati, 1993).
Dhanurasana (the bow pose)

Lie flat on the stomach and inhale fully. Bend the knees and hold the ankles with the hands. Tense the leg muscles and arch the back. Simultaneously raise the head, chest and thighs as high as possible. Keep the arms straight.

Hold forth as long as is comfortable. Practice up to 5 times (Swami Sathyananda Saraswati, 1993).
SHALABHASANA

Shalabhasana (the locust pose)

Lie on the stomach with the hands under the thighs, palms facing downward. Stretch the legs and tense the arms. Raise the legs and abdomen as high as possible without bending the legs. Practice up to 5 times.

Breath

Inhale deeply in the lying-down position. Retain the breath inside while raising the legs and abdomen. Exhale while returning to the starting position (Swami Sathyananda Saraswati, 1993).
SARVANGASANA

Sarvangasana (the shoulderstand pose)

Lie flat on the back with the feet together, the arms by the sides and palms flat on the ground. Using the arms as levers raise the legs and back to a vertical position. Bend the elbows and use the arms as props to steady the back by presenting it with the palms.

The trunk and legs should extend straight up, forming a right angle with the neck, the chest pressing against the chin (Swami Sathyananda Saraswati, 1993).
PAWAN MUKTASANA

Pawan Muktasana (Wind Releasing Posture)

Lie down on the back. Keeping legs together, hug tightly the drawn up knees against the chest so that the palms are placed on elbows. Raise your head and touch the chin with the knees. Keep the breath normal and toes stretching outside.

Place the head on the ground when the neck gets tired. Cervical patients should perform it without lifting the head from the ground (Y.P. Yadav and Rachna, 1998).
CHAKRASANA

Chakrasana (the wheel pose)

Lie on the back with knees bent and the heels touching the buttocks. The feet should be about one foot apart. Place the palms on the ground beside the temples, with fingers pointing towards the shoulders.

Slowly raise the trunk. Let the head rotate slightly and allow the crown to support the weight of the upper body. The legs will form right angles at the knees. Straighten the arms and legs, life the head off the ground and raise the body so that it is fully arched. You can straighten the knees almost completely by moving the trunk upward.

Slowly lower yourself back to the ground and then the supine position (Swami Sathyananda Saraswati, 1993).
UTTHITA PARSVAKONASANA

Utthita Parsvakonasana (Extended side stretch)

In Sanskrit, utthita means “stretch”, parsva indicates “side” or “flank”, while kona translated as “angle”. In this asana, both sides of your body are stretched intensely, from the toes of one foot to the fingertips of the opposite hand. Remember to keep your body absolutely steady when practising this asana.

Step 1: Stand in Tadasana inhale, and jump your feet about 1.2m (4ft) apart. At the same time, raise both your arms out to the sides, to shoulder-level. Your palms should face the floor. Stretch your arms from the back of the elbows. Ensure that your feet are in line with each other toe pointing forward. Push down on the outer edges of your feet. Press the little toe of each foot down to the floor.

Step 2: Exhale slowly and simultaneously rotate your right leg and foot 90° to the right. At the same time, turn the left foot slightly to the right stretch your left leg and tighten it at the knee. Ensure that your weight falls on the heel, not the toes of your right foot. Adjust the distance between your legs, if necessary. Make sure your feet remain in line with each other.
Methodology

Step 3: Bend your right knee until your thigh and calf form a right angle and your right thigh is parallel to the floor. Take one or two breaths.

Step 4: Exhale, and place your right palm on the floor beside your right foot. Ensure your right armpit touches the outside of your right knee. Stretch your left arm out over your left ear. Turn your head and look up. Hold the pose for 20 – 30 seconds (B.K.S. Iyengar, 2001).

VIRABHADRASANA

Virabhadrasana (Warrior Posture)

Stand with feet about 4-5 ft. apart; stretch the arms over the head. Keep the arms parallel, palms facing each other. Turn the right leg and foot 45° in and the left foot 90° out. At the same time turn the hips and trunk to the left. Bend the left leg to a right angle at the knees and stretch the whole body up, look up.

Move the shoulder blades in and open the chest. Stretch up and stay for 15-20 seconds with normal breathing. Then turn to the center, rest the arms and line up the feet. Repeat it with the other side (Y.P. Yadav and Rachna, 1998).
UTKATASANA

Utkatasana (Fierce Posture)

Stand erect with feet together, stretch the arms overhead with palms together and upper arms touching the ears, bend the knees and sit as in a chair.

Use the hands to pull the trunk up strongly. Keep breathing normal, hold the position for about 15 seconds and then come up (Y.P. Yadav and Rachna, 1998).
**VRKSASANA**

**Vrksasana (Tree Pose)**

**Step 1:** Stand in Tadasana (no.1). Without disturbing the left leg, bend the right leg to the side. Catch the ankle and place the foot at the top of the inner left thigh. Take it as high as possible. Press the right knee back, in line with the right hip.

**Step 2:** Inhale and take the arms over the head with the palms facing each other. Straighten the elbows and stretch the arms and trunk up. Stand firmly on the left foot so that you do not overbalance. Stretch the leg up.

![Diagram of Vrksasana](image)

**Step 3:** Right: Join the palms, without bending the elbows. Stay for 20-30 seconds. Exhale, then bring the arms and the leg down. Repeat on the other side *(Mira Mehta, 1994).*
**TADASANA**

*Tadasana (the palm tree pose)*

Stand erect with the feet 4 to 6 inches apart. Raise the arms overhead with the palms facing upward, fingers interlocked and look up at the hands. Lift the heels and feel as though you are being drawn upwards.

Completely stretch the body. Slowly return the heels to the ground (Swami Satyananda Saraswati, 1993).
GARUDASANA

Garudasana (the eagle pose)

Assume a standing position. Raise the right leg and twist it around the left leg. The right thigh should eventually lie in front of the left thigh and the right foot should rest on the calf of the left leg.

Now fold the arms and twist the right arm around the left arm until the palms can be placed together to resemble an eagle’s beak. Bend the left leg and lower the body until the right toe touches the floor. Practise for as long as possible without strain.

Concentration

On a visible point and on balance (Swami Satyananda Saraswati, 1993).
SHAVASANA

Shavasana (The corpse pose)

- Lie flat on the back with the arms beside and in line with the body, palms facing upward.
- Move the feet slightly apart to a comfortable position and close the eyes.
- Relax the whole body. Do not move any part even if discomfort occurs.
- Let the breath become rhythmic and natural.

- Become aware of the inhalation and exhalation.
- Count the number of respirations: I in, I out, and so on.
- Continue to count for a few minutes. If the mind starts to wander bring it back to the counting. If you can keep the mind on the breath for a few minutes, the mind and body will relax (Swami Satyananda Saraswati, 1993).
NADI SUDDHI

Nadi Suddhi (Sun and Moon Breath)

Meaning

Nadi Suddhi means the alternate nostrils breath or Sun and Moon Breath. It is also called Anuloma Viloma Pranayama, Anuloma and Viloma means with the hair and against the hair respectively or we might say, with the grain and against the grain.

Procedure

Sit in a comfortable sitting posture. Close the right nostrils by right thumb and slowly, smoothly and deeply inhale the air through the left nostril. Then close the left nostril by right hand little and ring fingers. Open the right nostril by releasing the right thumb, now slowly and smoothly breath out the air through right nostril. Then slowly, smoothly, and deeply inhale the air through right nostril. Then close the right nostril by the thumb. Gently open the left nostril by releasing right hand little and ring finger. Now slowly and smoothly breathe out the air through left nostril. This is called one round or cycle 3 to 5 cycles can be practised in a practice session (Dr. K. Chandrasekaran, 1999).
KAPALBHATI PRANAYAMA

Kapalbhati Pranayama (frontal brain cleaning)

- Sit in any comfortable meditative pose.
- Close the eyes and relax.
- Perform 60 to 100 rapid respirations.
- Unlike bhastrika, the inhalation should be spontaneous with the emphasis on exhalation.
- Then exhale deeply and perform jalandhara, moola and uddiyana bandhas simultaneously.
- Meditate on the void in the region of the eyebrow center, feeling the all-pervading emptiness and calmness.
- Release the bandhas, inhale slowly and relax.
- This is one round. Repeat up to 5 times (Swami Satyananda Saraswati, 1993).
**Methodology**

**UJJAYI PRANAYAMA**

Ujjayi Pranayama (the psychic breath)

Sit in any comfortable position. Contract the glottis in the throat, and perform khechari mudra, i.e., fold the tongue back so that the under side is pressed against the back of the upper palate. Breathe deeply and softly, like the gentle snoring of a sleeping baby. Feel that you are breathing through the throat only (Swami Satyananda Saraswati, 1993).

**BHRAMARI PRANAYAMA**

Bhramari Pranayama (the pranic humming control)

Sit in a comfortable meditative asana. The spinal cord should be erect and the heat straight. Close the eyes and relax the whole body for a short time.

Keep the mouth closed throughout the practice. Inhale deeply through both nostrils. Retain the breath inside and perform jalandhara and / or moola bandha. After about 4 seconds’ practice release the bandhas and plug both ears with the index fingers. Keeping the mouth closed, separate the teeth and slowly exhale, producing a long continuous humming sound like a bee.

The exhalation should be slow and steady. Feel the sound vibrations in the brain and be conscious only of the sound. This is one round. Start with 5 rounds and slowly increase the number (Swami Satyananda Saraswati, 1993).
BHASTRIKA PRANAYAMA

Bhastrika Pranayama (the bellows breath)

Sit in any comfortable meditative asana. Hold the head and spine erect. Close the eyes and relax.

**Stage 1:** Place the left hand on the left knee and the index and middle fingers of the right hand on the forehead. Put the thumb beside the right nostril and the ring finger beside the left nostril. Close the right nostril by pressing the thumb against the side of the nostril. Breathe rapidly through the left nostril 20 times, expanding and contracting the abdomen rhythmically. Then take one deep inhalation, close both nostrils by pressing both sides of the nose with the thumb and ring finger, and perform jalandhara and / or moola bandha. Retain the breath for a comfortable period of time, then release the bandhas and exhale.

Close the left nostril with the ring finger. Breathe rapidly through the right nostril 20 times with rhythmic expansions and contractions of the abdominal muscles.

Then inhale deeply, close both nostrils and perform jalandhara and / or moola bandha. Hold for some time and slowly exhale. This is one round. Practise 3 rounds. Then proceed to stage.

**Stage 2:** Sit in the same position with hands on the knees. Breathe rapidly 20 times through both nostrils. Then inhale deeply, retain the breath and
perform jalandhara and / or moola bandha. After a comfortable period release
the bandhas and breathe out. This is one round. Practise 3 rounds. This is the
end of the complete practice of bhastrika. Advanced practitioners may increase
the number of inhalations and exhalations up to 50 and the number of rounds
may also be increased up to 5 for each stage (Swami Satyananda Saraswati,
1993).

3.18. Training details of yogic practice

Duration of the training - 12 Weeks
Number of days per week - 6 Days
Duration of the session - 90 Minutes

3.19. Training phases of yogic practice

The yogic practices consist of three phases in a session.

Phase – I - Asanas
Phase – II - Pranayamas
Phase – III - Meditation

3.20. Time schedule for a session

Asanas - 40 Minutes
Pranayamas - 20 Minutes
Distributed Relaxation - 15 Minutes
Meditation - 15 Minutes
Methodology

The training period consisted of twelve weeks, one session a day. The Yogic practice was carried on from Monday to Saturday totaling a training week to six days as Sunday was allotted for rest. Out of 72 sessions of yogic practices 216 rotations of various asanas and pranayamas in the sequence of sitting, lying and standing were performed. The performance of asanas had three phases:

i. The start

ii. The Hold

iii. The Release

The asanas from the designed package were performed with a sequence of sitting, lying and standing while care was also taken that the counter movements exist during the variations from one asana to another (i.e.) when an asana required forward bending it was complimented by an asana that had a backbend while going for the next.

Eg: Paschimothanasana (against) Bhujangasana

The pranayama practice was also practised in this similar manner, which also had three distinct phases of breathing like

(i) Inhalation

(ii) Suspension and

(iii) Exhalation

Care was taken to provide a suitable noise free, dust free and comfortable ambience to undergo systematic yogic practice. It was also
checked that all the asanas and pranayamas selected are covered systematically on rotations from the framed training package.

3.21. Statistical Techniques

The pre and post training performance of the groups was analyzed with One-Way ANOVA.

Analysis of co-variance (ANACOVA) was used to find out whether there was any significant difference between the adjusted final means. Scheffe's Post-hoc test was used to find out the better group.