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Effect of selected yogic Asana’s in improving core strength of moderately active youth

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Abstract

The purpose of the study was to determine the effect of selected Yogic Asana’s on improving the “Core Muscle Strength test scores” of moderately active individuals. For this purpose subjects were selected from Government College Tanur. The investigator insisted that these were subjects who had previous experience of physical activity and the subjects were divided into two groups of 25 individuals each. The investigator insisted that none of the students were previously engaged in any sort of Core Training modalities. An experimental training programme was administered and the data on the pre-test and post test scores of the experimental group and control group was compared using the two tailed paired t- test. The pre and post test data of the control group indicated a Sig. (2-tailed) value of .339 which in turn was $>.05$ so it was concluded that there was no significant difference between the pre and post test data. The group that received no training had no effect on the “Core Muscle Strength test scores”. Whereas the experimental group had a Sig. (2-tailed)-value of .036 which in turn was $<.05$ which indicated that there was significant difference from pre to post test scores due to Yogic Asana’s that the group had performed. The result of the study thus indicated that selected Yogic Asana’s was able to bring about significant change on the “core muscle strength test scores” of moderately active individuals.

Keywords: Yogic Asana’s, core strength and moderately active youth

1. Introduction

The word yoga is derived from the Sanskrit root yuj meaning to bind, join, attach and yoke, to direct and concentrate one’s attention on, to use and apply. Yoga is one of the six ortho do systems of Indian Philosophy. It was collated, Co-ordinated and systematize by Patanjali in his classical work, the Yoga Sutras, which consists of 185 ters aphorisms. The Yoga Sutra of Patanjali is divided into four chapters and the eight limbs of Yoga are described in the second chapter. Among the eight limbs, the third limb is the Asanas or posture. Asanas brings steadiness, health and lightness of limb. A steady and pleasant posture produces mental equilibrium and prevent fickleness of mind. Asanas have been evolved over the centuries so as to exercise every muscle, nerve and gland in the body. They secure a fine physique, which is strong and elastic without being muscle-bound and they keep the body free from disease.

A recent development in muscular fitness training is a focus on the core. Core exercises recruit one or more large-muscle areas, involve two or more primary joints, and are a high priority for health and performance. Core stability and core strength have been subject to research since the early 1980s. Research has highlighted benefits of training these processes for people with back pain and for carrying out everyday activities.

Core training focuses on the central portion of the body, an area that many consider the foundation for performance in sport. A moderate amount of core training seems to be important for low-back health.

Many elite athletes undertake core stability and core strength training as part of their training

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programme, despite contradictory findings and conclusions as to their efficacy. This is mainly due to the lack of a good standard method for measuring core stability and strength when performing everyday tasks and sporting movements. A further confounding factor is that because of the differing demands on the core musculature during everyday activities (low load, slow movements) and sporting activities (high load, resisted, dynamic movements), research performed in the rehabilitation sector cannot be applied to the sporting environment and, subsequently, data regarding core training programmes and their effectiveness on sporting performance are lacking.

In the rehabilitation sector, improvements in lower back injuries have been reported by improving core stability. Although there are a wide variety of therapeutic exercises that have been proposed as treatments for low back pain (LBP), the last 20 years have seen the development of a substantial focus on the use of exercises that are intended to address intersegmental stability in the lumbar spine. These exercise programs are variously referred to as lumbar stabilization, segmental stabilization, or core stabilization, among other terms, and are aimed at improving the neuromuscular control, strength, and endurance of a number of muscles in the trunk and pelvic floor that are believed to play important roles in the dynamic stability of the spine.

Few studies have observed any performance enhancement in sporting activities despite observing improvements in core stability and core strength following a core training programme. A clearer understanding of the roles that specific muscles have during core stability and core strength exercises would enable more functional training programmes to be implemented, which may result in a more effective transfer of these skills to actual sporting activities.

The aim of core stability training is to effectively recruit the trunk musculature and then learn to control the position of the lumbar spine during dynamic movements (Brandon 2001). The deep trunk muscles, Transversus Abdominis (TA), multifidus (MF), Internal Oblique (IO), paraspinal, pelvic floor, are key to the active support of the lumbar spine. The co-contraction of these muscles produce forces via the "theracolumbar fascia" (TLF) and the "intra-abdominal pressure" (IAP) mechanism which stabilise the lumbar spine, and the paraspinal and multifidus muscles act directly to resist the forces acting on the lumbar spine.

It is not just the recruitment of these deep-trunk muscles, but how they are recruited that is important. The co-contraction of the TA and MF muscles occur prior to any movement of the limbs which suggested that these muscles anticipate dynamic forces that may act on the lumbar spine and stabilise the area prior to any movement.

Many yogic asanas are capable to strengthen the core musculature of the body and thereby strengthen the back as a whole.

2. Statement of the problem

The purpose of the study was to determine the effect of selected yoga Asanas on improving the "Core Muscle Strength test scores" of moderately active individuals. Whereby the effectiveness of selected Yoga Asana training could be understood.

2.1 Delimitation

1. The study was delimited to fifty moderately active individuals (who volunteered for the study) between the age group of 18 to 21 years.

2. The groups for the study were delimited to two, the experimental group and the control group.
3. The subjects in each group were confined to 25 and the duration for experimentation was confined to eight weeks.

2.2 Limitation

1. No specific techniques were used to motivate the subjects and the subject's lifestyle, dietary differences and other conditions were beyond the control of the investigator.
2. Non availability of sophisticated equipments was also considered as another limitation for the study.

3. Hypothesis

Based on the understanding of the literature and the nature of the study it was hypothesised that selected basic yogic Asanas would improve the "Core Muscle Strength test scores" of the experimental group.

4. Definition and explanation of terms

4.1 Lumbar spine

The section of the spine that makes up the low back is called the *lumbar spine*. The lumbar spine is made up of the lower five vertebrae often referred to as L1 to L5. The lowest vertebra of the lumbar spine, L5, connects to the top of the *sacrum*, a triangular bone at the base of the spine that fits between the two pelvic bones.

4.2 Transversus Abdominis (TA):

The transversus abdominis muscle, also known as the transversalis muscle and transverse abdominal muscle, is a muscle layer of the anterior and lateral abdominal wall which is just deep to (layered below) the internal oblique muscle.

4.3 Multifidus (MF)

The multifidus muscle is one of the smallest yet most "powerful" muscle that gives support to the spine. The multifidus muscles help to take pressure off the vertebral discs so that body weight can be well distributed along the spine. The superficial muscle group keeps our spine straight while the deep muscle group contributes significantly to the stability of our spine.

4.4 Internal Oblique (IO)

Internal oblique muscle (of the abdomen) is the intermediate muscle of the abdomen, lying just underneath the external oblique and just above (superficial to) the transverse abdominal muscle.

4.5 Paraspinal

The paraspinal muscles are the muscles that run next to, and roughly parallel with, the spine. They consist of many small muscles that are attached to the vertebrae and control the motion of the individual bones, as well as assist with the larger motions of the whole trunk, or core, area. Together with other muscles, they help support the spine and keep it in proper alignment. They also limit the range of motion of the spine, which helps to prevent injuries to the disks and spinal cord caused by overextension.

4.6 Pelvic floor

The pelvic floor or pelvic diaphragm is composed of muscle fibers of the levator ani, the coccygeus, and associated connective tissue which span the area underneath the pelvis. The pelvic diaphragm is a muscular partition formed by the

levatoris ani and coccygei, with which may be included the parietal pelvic fascia on their upper and lower aspects. The pelvic floor separates the pelvic cavity above from the perineal region (including perineum) below.

5. Significance of the study

Yoga Asanas used in this study can be used by experts to develop strength and endurance of the core areas of the body. The study can be used to understand the significance of providing core strength and stability training for athletes and sports persons so as to improve their overall sports performance. The exercises included in the study can be used to prevent the occurrence of low back pain and can be used to rehabilitate low back injuries of sedentary individuals.

6. Materials and method

2.2 Selection of subjects

In order to determine the effect of selected Yoga Asanas subjects were selected from among the students of Government College Tanur. The investigator insisted that these were subjects who had no previous experience of core activation and the subjects were divided into two groups of 25 individuals each. The first groups consisting of 25 individuals were kept as control and were not given any sort of training apart from their regular physical activity routine that they were performing. The second groups consisting of 25 members were given selected Yoga Asana training and was termed as the experimental group.

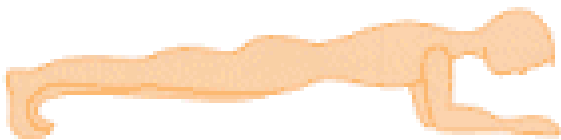
6.2 Selection of test

Core Muscle Strength & Stability Test was used to assess the stability of core muscles

7. Administration of the test

7.1 Core Muscle Strength & Stability Test

The Core Muscle Strength & Stability Test was conducted as follows:



1. The subject was asked to assume the basic press up position (elbows on the ground) - as in the picture above
2. Hold the position for 60 seconds (3 Points with 1 point for each 20 second completed)
3. Lift the right arm off the ground and hold this position for 15 seconds (8 Points)
4. Return the right arm to the ground and lift the left arm off the ground and hold this position for 15 seconds (14 Points)
5. Return the left arm to the ground and lift the right leg off the ground and hold this position for 15 seconds (20 Points)
6. Return your right leg to the ground and lift the left leg off the ground and hold this position for 15 seconds (30 Points)
7. Lift your left leg and right arm off the ground and hold this position for 15 seconds (45 Points)
8. Return you left leg and right arm to the ground
9. Lift your right leg and left arm off the ground and hold this position for 15 seconds (70 Points)
10. Return to the basic press up position (elbows on the ground) - as in the picture above and hold this position

for 30 seconds (100 Points)

8. Experimental training programme

8.1 Jathara parivartanasana

Technique

1. Lie flat on the back
2. Stretch out both arms sideways in line with the shoulders, so that the body resembles a cross.
3. Exhale, raise both legs together until they are perpendicular to the floor. They should remain poker stiff, do not bend them at the knees.
4. Remain in this position for a few breaths. Then exhale, and move both legs sideways down towards the floor to the left until the toes of the left foot almost touch the fingertips of the outstretched left hand. Try and keep the back well on the floor. In the initial stages, the right shoulder will be lifted off the floor.
5. Both legs should go down together, the knees being kept tight throughout.
6. Stay in this position for about 20 seconds, keep the legs stiff throughout. Then move the still stiffened leg slowly back to the perpendicular with an exhalation.
7. Remain with the legs perpendicular for a few breaths and then repeat the movements by lowering the legs to the right and turning the abdomen to the left. Stay here also for the same length of time and with an exhalation, come back to the perpendicular legs position and then gently lower the legs to the floor and relax.

8.2 Uttana padasana

Technique

1. Lie flat on the back, keeping the feet together and the knees tight. Take three or four deep breaths.
2. Exhale, raise the back off the floor and arch it up by stretching the neck and moving the head back until the crown of the head rests on the floor. If resting the crown on the floor proves difficult, bring the hand by the side of the head, raise the neck and pull the neck as far as possible by raising the dorsal and lumbar regions of the back from the floor. Then rest the arms at the side. Take two or three breaths.
3. Stretch the back and with an exhalation lift the legs up until they are about 45 to 50 degrees from the floor. Raise the arms, join the palms and keep them parallel to the legs. The arms and the legs should be kept stiff and not bend at the elbows or the knees. Keep the legs together at the thighs, knees, ankles and feet.
4. Extend the ribs fully and remain in this pose for half a minute with normal breathing. The body should be balanced only on the crown of the head and the buttocks.
5. Exhale, lower the legs and the arms to the floor, straighten the neck, release the head grip, lower the trunk and relax lying flat on the back on the floor.

8.3 Paschimottanasana

Technique

1. Sit on the floor with your buttocks supported on a folded blanket and your legs straight in front of you. Press actively through your heels. Rock slightly onto your left buttock, and pull your right sitting bone away from the heel with your right hand. Repeat on the other side. Turn the top thighs in slightly and press them down into the floor. Press through your palms or finger tips on the floor beside your hips and lift the top of the sternum toward the ceiling as the top thighs descend.

2. Draw the inner groins deep into the pelvis. Inhale, and keeping the front torso long, lean forward from the hip joints, not the waist. Lengthen the tailbone away from the back of your pelvis. If possible take the sides of the feet with your hands, thumbs on the soles, elbows fully extended; if this isn't possible, loop a strap around the foot soles, and hold the strap firmly. Be sure your elbows are straight, not bent.
3. When you are ready to go further, don't forcefully pull yourself into the forward bend, whether your hands are on the feet or holding the strap. Always lengthen the front torso into the pose, keeping your head raised. If you are holding the feet, bend the elbows out to the sides and lift them away from the floor; if holding the strap, lighten your grip and walk the hands forward, keeping the arms long. The lower belly should touch the thighs first, then the upper belly, then the ribs, and the head last.

8.4 Salabhasana

Technique

1. Lie full length on the floor on the stomach, face downwards. Stretch the arms back.
2. Exhale, lift the head, chest and legs off the floor simultaneously as high as possible. The hands should not be placed and the ribs should not rest on the floor. Only the abdominal front portion of the body rests on the floor and bears the weight of the body.
3. Contract the buttocks and stretch the thigh muscles. Keep both legs fully extended and straight, touching at the thighs, knees and ankles.
4. Do not bear the weight of the body on the hands but stretch them back to exercise the upper portion of the back muscles.
5. Stay in this position as long as you can with normal breathing.

8.5 Ustrasana

Technique

1. Kneel on the floor, keeping the thighs and feet together, toes pointing back and resting on the floor.
2. Rest the palms on the hips, stretch the thighs, curve the spine back and extend the ribs.
3. Exhale, place the right palm over the right heel and the left palm over the left heel. If possible, place the palms on the soles of the feet.
4. Press the feet with the palms, throw the head back and push the spine towards the thighs, which should be kept perpendicular to the floor.
5. Contract the buttocks and stretch the dorsal and the coccyx region of the spine still further, keeping the neck stretched back.
6. Remain in this position for about half a minute with normal breathing.
7. Release the hands one by one and rest them on the hips. Then sit on the floor and relax.

8.6 Bhujangasana

Technique

1. Lie on the floor face downwards. Extend the legs, keeping the feet together, Keep the knees tight and the toes pointed.
2. Rest the palm by the side of the pelvic region.
3. Inhale, press the palms firmly on the floor and pull the trunk up. Take two breaths.
4. Inhale, lift the body up from the trunk until the pubis is in

contact with the floor and stay in this position with the weight on the legs and palms.

5. Contract the anus and the buttocks, tighten the thighs.
6. Maintain the pose for about 20 seconds, breathing normally.
7. Exhale, bend the elbows and rest the trunk on the floor. Repeat the pose two or three times and relax.

8.7 Purvottanasana

Technique

1. Sit on the floor with the legs stretched straight in front. Place the palms on the floor by the hips, with the fingers pointing in the direction of the feet.
2. Bend the knees and place the sole and heels on the floor.
3. Take the pressure of the body on the hands and feet, exhale and lift the body off the floor. Straighten the arms and the legs and keep the knees and elbows tightened.
4. The arms will be perpendicular to the floor from the wrist to the shoulders. From the shoulder to the pelvis, the trunk will be parallel to the floor.
5. Stretch the neck and throw the head as far back as possible.
6. Stay in this pose for one minute, breathing normally.
7. Exhale bend the elbows and knees, lower the body to sit on the floor and relax.

8.8 Marichyasana

Technique

1. Sit on the floor with the legs stretched straight in front.
2. Bend the left knee, place the sole and heel of the left foot flat on the floor. The shin of the left leg should be perpendicular to the floor and the calf should touch the thigh. Place the left heel near the perineum. The inner side of the left foot should touch the inner side of the outstretched right thigh.
3. With an exhalation, turn the spine about 90 degrees to the left, so that the chest goes beyond the bent left thigh and bring the right arm over the left thigh.
4. Place the right shoulder beyond the left knee and stretch the right arm out forwards by turning the spine still more to the left and stretching the region at the back of the right floating ribs. Take two breaths.
5. With an exhalation, twist the right arm around the left knee, flex the right elbow and place the right wrist at the back of the waist. Inhale and hold the pose.
6. Exhale deeply and turn the left arm from the shoulder behind the back. Either clasp the left hand behind the back with the right hand or vice versa. In the beginning, one finds it difficult to twist the trunk sideways, but with practice, the armpit touches the bent knee. After one has twisted the arm round the knee, one also finds it difficult to clasp the fingers of one hand with the other. Gradually one learns to clasp the fingers, then the palm and lastly to hold the hand at the wrist behind the back.
7. The right arm should lock the left bent knee tightly. There should be no space between the right armpit and the bent left knee.
8. Stay in this pose for half a minute to a minute with normal breathing.

9. Statistical technique

In order to know the significant difference between the two groups after 8 weeks of experimentation, the data on the pre-test and post test scores of the experimental group and control group was measured using the two tailed paired t- test.

10. Results and Discussion

The analysis of data pertaining to the effect of selected yoga Asanas on the experimental and control group are presented in detail. The pre and post test data of "Core Muscle Strength test scores" were subjected to the t-test. The significance

difference from pre to post test scores of the experimental and control group were analysed by t-test.

The result pertaining to the t-test for the "Core Muscle Strength test scores" is presented in table 1 and 2.

Table 1: Mean scores of pre to post test of the experimental and control group on "Core Muscle Strength test scores"

		Mean	N	Std. Error Mean
Control Group	Pre test	11.64	25	1.75
	Post test	12.32	25	1.74
Experimental group	Pre test	11.76	25	1.85
	Post test	14.08	25	1.63

The pretest means score of the control group was 11.64 before commencement of the experimentation and the scores increased to 12.32 after the eight week observation period. The experimental group had an increase from the pretest score

of 11.76 before the start of the experimental training to a score of 14.08 after the experimental treatment. As there was a difference in the mean scores after experimentation the data was analyzed using the t-test.

Table 2: Significance of difference between the pre to post test of the experimental and control group on "Core Muscle Strength test scores"

	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		df	Sig. (2-tailed)
					Lower	Upper		
Control group Pre test - Control group Post test	-.68	3.48	.70	-2.12	.76	24	.339	
Experimental group Pre test - Experimental group Post test	-2.32	5.23	1.05	-4.48	-.16	24	.036	

The pre and post test data of the control group indicated a Sig. (2-tailed) value of .339 which in turn was $>.05$ so it was concluded that there was no significant difference between the pre and post test data. The group that received no training had no effect on the "Core Muscle Strength test scores". Whereas the experimental group had a Sig. (2-tailed)-value of .036 which in turn was $<.05$ which indicated that there was significant difference from pre to post test scores due to the core strength exercise that the group had performed.

11. Discussion of Hypothesis

The hypothesis stating significant training effect for the selected basic core-stability exercises was accepted. This was on account of the results that the training group gained on "Core Muscle Strength Test Scores". The control group did not show any significant change on "Core Muscle Strength Test Scores" this also added to the acceptance of the hypothesis put forward.

12. Conclusion

Core stability exercises must resist motion through the lumbar spine and attempt to engage the abdominal muscle group as a whole in a 'reactive sense'. Ultimately, the goal is to create an environment through exercise that teaches the individual to engage reflexively just as they would in real life and in sports. Core stability and core strength are terms that are often used interchangeably when speaking about training the trunk musculature, whether in the rehab or performance settings. The study proposed to find out the effect of selected Yoga Asana training on "core muscle strength test scores" of males. The subjects for the study were students of Government College Tanur and it was found that selected Yoga Asanas helped in improving core strength scores which in turn is reflective of the core strength that the trainees achieved due to the training undertaken. These Asanas could be used to attain core strength whereby the incidence of back pain and back problems may be prevented.

On the basis of the results of the study it was concluded that

selected Yogic Asanas were able to bring about significant change on the "core muscle strength test scores" of moderately active students.

13. Recommendation

On the basis of the study results and the conclusions drawn the following conclusions are made.

1. Training selected Asanas could be used to bring about significant change in the "core muscle strength test scores".
2. It is recommended that fitness instructors, coaches and physical education professionals should make selected Asanas a part of their training owing to the importance that the training poses in terms of the improvement in strength of the core regions.
3. Further studies should be conducted to find out specific tests for determining core stability and core strength of the individuals.
4. Similar studies may be conducted on women subjects to observe gender differences if any.
5. Studies of similar nature may be carried out on sedentary individuals.
6. Further studies may be conducted to determine the level of core stability achieved using sophisticated equipments.

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