

# Suryanamaskar And Its Effect on Muscle

Dr. Minakshi Patil<sup>1</sup>, Dr. Shraddha Atkar<sup>2</sup>

<sup>1</sup>Associate Prof. Rachana Sharir department, Indutai Gaikwad Patil Ayurved College, Hospital and Research Centre Nagpur.

<sup>2</sup>Assistant Prof. Rachana Sharir department, Indutai Gaikwad Patil Ayurved College, Hospital and Research Centre Nagpur.

**Abstract**—India has a rich tradition of yogic practices. Now-a-days yoga, the ancient practice of postures, breathing and meditation is gaining a lot of attention from health care Professionals. With increasing scientific research in yoga, its therapeutic aspects are also being explored. Suryanamaskar – the salutation to the god sun is also a part of Indian traditional yogic practices. Each cycle of suryanamaskar is a sequence of certain 'asanas' performed along with pranayama' The nomenclature 'suryanamaskar' is composed of two terms 'surya' (meaning 'the sun god') and 'namaskar' (connoting obeisance). Both the words have their roots in Sanskrit. Surya Namaskara is a series of 12 physical postures made up of a variety of forward and backward bends. The sequence of asanas is such that each asana is complimentary to the next. During Suryanamaskar, muscles of the entire body experience stretch and pressure alternately and therefore it is said to give more benefits with less expenditure of time. The series of movements stretch the spinal column and massage, tone and stimulate vital organs through alternately flexing the body forwards and backwards. While performing surya namaskar the breathing exercise (pranayam) gives more oxygen to your lungs. The rhythm of breathing becomes heavy with vitality. Each breath becomes deep and clear. It carries more oxygen to the parts of your body. Surya namaskar has a deep effect in detoxifying the organs through copious oxygenation and has a deeper relaxing effect. It reduces stress, rejuvenates us and improves circulation and as a result this study was undertaken to find out the effects of suryanamaskar yogasana on muscular endurance and flexibility.

**Index Terms**—Yoga, Surya Namaskar, Asana, Posture, Physical Health, muscles, flexibility etc

## I. INTRODUCTION

Suryanamaskar is an ancient Indian method of offering prayers to the rising Sun in the morning along with a series of physical postures with regulated breathing aiming at range of physical, mental and spiritual

benefits (Parag and Manjunath, 2012) [1]. It is a graceful combined sequence of twelve postures along with regulated breathing and relaxation. It relieves stiffness, revitalizes the body, refreshes the mind and purifies subtle energy channels. There are number of studies have been conducted on Suryanamaskar and found significant improvement in flexibility (Choudhary and Krzytof, 2010) [2]. Physical fitness, generally, is a state of health and well-being. Moreover, Physical Fitness has been measured through its five basic components i.e. Strength, Speed, Endurance, Flexibility, and Coordination. Although, there is no single way to measure a physically fit person and no single way to get achieve it. Therefore, we need to know and understand every dimension of the components of physical fitness. The foremost component of physical fitness is strength. Strength is a maximal force that can be applied against a resistance. The second component, Speed is the ability to move from one place to another in the shortest possible time. Endurance is a capability of a person's ability to repeatedly apply maximal force over a period of time. Flexibility can be defined as the ability to execute movements with a greeter amplitude of range. One of the most important benefits of a flexibility program is the potential for relaxation. Physiologically, relaxation is the cessation of muscular tension. Undesirably high level of muscular tension has several negative side effects, such as decreasing sensory awareness and raising blood pressure. It also wastes energy, contracting muscles requires more energy than relaxed muscles. Furthermore, habitually tense muscles tend to cut off their own circulation. Reduced blood supply is results in a lack of oxygen and essential nutrients that causes toxic waste products to accumulate in the cells. This process predisposes one to fatigue, aches, and even pain. (Michael, 2004). [3] The practice of Yogasanas is the best way to improve the fitness

components especially flexibility. There plenty of studies that have been done to see the effect of Yogic asanas on flexibility and Suryanamaskar are itself a combination of seven asanas. (Shankar & Pancholi, 2011). [4] Going through many research papers this query has been raised to find in which trend (pattern) fitness components improve and how much time is needed for significant improvement in all components of physical fitness.

## II. MUSCLES INVOLVED

Nearly all muscles and muscle groups

Extensor and flexor muscles of the abdomen, lower extremities, and arms

Mainly the vertebral muscles, cervical, thoracic, lumbar.

## III. DISCUSSION

Surya Namaskar consists of twelve different physical positions. These asanas, which alternate between backward and forward bending, flex and stretch the limbs and spinal column to their fullest extent. Few other forms of exercise can be matched to the series' profound stretching of the entire body. It's crucial to time your breathing to your motions. The fundamental breathing rule is to inhale when bending backwards because the chest expands, and to exhale when bending forwards because the chest and abdomen contract. - Surya Namaskar strengthens the muscles of the heart, wrists, and arms and relieves tension in the neck and shoulders. It is also an excellent cardiovascular exercise. Surya Namaskar offers all the major health benefits of yoga in a compact package as it not only provides physical health benefits but also mental and spiritual benefits. In addition to muscles, it benefits the joints, ligaments, and skeletal system by improving flexibility, posture, and balance For the upper body, the upper trapezius muscle showed high activation patterns for chair, downward facing dog, and warrior. The biceps brachii were most active during chair pose, and engaged in high and low plank, and upward facing dog as one might expect. Triceps brachii were most employed during Chaturanga, and somewhat for chair, warrior, plank and upward facing dog. - The erector spinae muscles showed greater activation during chair, "halfway lift" (Urdhva Mukha Uttanasana), upward dog, and warrior as compared to

downward facing dog, forward fold, and mountain pose. - Muscles of the lower body also responded in an expected fashion. Values for the rectus femoris were greatest during chair pose, downward dog, high plank, and warrior compared to forward fold, and elevated during up dog and warrior pose when compared to "halfway lift." - The biceps femoris on the other hand, showed higher patterns of activation during chair, high and low plank, upward dog and warrior pose compared to forward fold. - Lastly, the tibialis anterior was most engaged during chair, downward dog, high and low plank and warrior compared to the more passive mountain and forward fold poses. - If you stop using your muscles, your body won't waste the energy it needs to take care of them. Instead, your body will start to break your muscles down, which causes them to decrease in size and strength.

Surya namaskar effect on muscle strength

The increased muscle endurance would be a strong justification for doing the exercise programme frequently for people who don't have much time for strength training or who avoid it altogether. Additionally, since the simulated push-up element of the exercise targets the triceps and serratus anterior muscles especially, regular Suryanamaskar practise may increase muscle strength and stamina. Given that strength declines with age, Suryanamaskar may be especially helpful for old age people. In contrast to Telles et al.11 [5] who discovered a decrease in resting heart rate following the implementation of a yoga training programme and instruction on how to specifically lower resting heart rate, few study did not detect any differences in resting heart rate following the yoga intervention. Significant drops in heart rate from baseline readings were also discovered by , who examined the effects of a six-week yoga intervention on participants with coronary artery disease. This finding of the study Telles et al.'s as it stimulated the protocol for voluntarily lowering heart rate since multiple journal comments on the difficulty of lying still for 5 minutes, it might be deduced that the mindset of true relaxation following the rigours of the Suryanamaskar routine was difficult.

## IV. EFFECT OF SURYA NAMASKAR ON FLEXIBILITY

Reduced flexibility can be caused by a number of things, including a desk job, a sedentary lifestyle, or

fat buildup around joints, which limits full range of motion. Various factors are involved for reduced or altered functioning of skeletal muscles. Various biomechanical alterations in joints and changed postures can result from changes in flexibility. So, in order to carry out daily tasks with ease, flexibility is required.

Maintaining flexibility may aid in reducing stress and stiffness, which can result in physical issues that are persistent and frequently crippling. The series mimicked push-up movement and weight-bearing positions for the upper body may aid in building pectoral, triceps, and trunk muscles with greater strength and endurance. The sequence offers such a significant physical stretch that it is regarded as constituting a whole yoga practise in and of itself.

Muscle flexibility is defined as the ability to move a single joint or series of joints smoothly and easily through an unrestricted, pain-free range of motion. Hamstring is a two joint muscle which contracts eccentrically to maintain a proper posture in standing hence are prone to be tight. Hamstrings are an example of muscle groups that tend to shorten (Turner et al., 1988). A tight hamstring causes increased patellofemoral compressive force, which may eventually lead to patellofemoral syndrome. Hamstring tightness can also lead to altered gait patterns that are inadequate knee extension at initial contact and overuse injuries. Donald E Hartig (1999) reported that increasing hamstring flexibility decreases lower extremity overuse injuries in basic military trainees. The superficial back line includes the hamstrings. The entire posterior surface of the body, from the bottom of the foot to the top of the head, is connected and shielded by the superficial back line. The superficial back line performs as an uninterrupted line of integrated myofascial when the knees are extended, such as during standing. As a result, when Suryanamaskar is performed, the hamstrings are stretched via the visible back line.

Additionally, a study by Deshmukh et al. comparing the effects of Pilates and Surya Namaskar on flexibility in sedentary women using the sit-and-reach test and the shoulder and wrist test found that Surya Namaskar is more effective at improving flexibility in sedentary women than Pilates and can be added to a daily fitness routine. In a different investigation, Anagha Mangaonkar et al. examined the impact of Surya Namaskar vs. dynamic stretching on hamstring

flexibility in physiotherapy students and came to the conclusion that Surya Namaskar is more efficient in enhancing hamstring flexibility than dynamic stretching. Prof. (Dr.) Kanwaljeet Singh et al. study 's on the impact of Surya Namaskar yogasana on yogini intercollege athletes' concludes to increase flexibility and muscular stamina. Additionally, Ananda Balayogi Bhavnani et al. 2013 investigated the immediate effects of Surya Namaskar on reaction time and heart rate in female volunteers and came to the conclusion that Surya Namaskar may be used as an efficient training method to enhance neuromuscular abilities. Additionally, research by Mastrengele et al. found that Surya namaskar significantly increased menopausal women's hamstring flexibility. Kanwaljeet Singh, Dr. Baljinder Singh Bal, and Dr. Wilfred Vaz conducted a similar study on the impact of Suryanamaskar on the muscular endurance and flexibility of intercollegiate yoginis. It was established that Suryanamaskar yogasana significantly increased muscular endurance and hamstring flexibility. Suryanamaskar has also been demonstrated to enhance hamstring flexibility, upper body strength, and muscle endurance in a study by Kristine Fondran. The superficial front and rear lines both extend during the suryanamaskar, which causes the superficial back line to likewise constrict. Even the smallest muscles of the spinal column and the back are strengthened when the back muscles are contracted, but dynamic stretching only affects the specific muscle and joint that is being stretched. The spinal region's blood circulation is improved by suryanamaskar, which in turn stimulates the nerves there. It proved that Suryanamaskar yogasana has a significant effect on improving muscular endurance and hamstring flexibility. A study by Kristine Fondran has also proved that Suryanamaskar improves hamstring flexibility, upper body, muscle endurance and also improves overall mental health. In suryanamaskar, the superficial front line also gets stretched which causes co-contraction of the superficial back line. Owing to the contraction of the muscles of the back, even the smallest muscles of the spinal column, as well as the muscles of the back, are strengthened whereas dynamic stretching affects only the targeted muscle and joint. Suryanamaskar improves blood circulation in the vertebral region, and consequently, the nerves in this region are invigorated. In addition to the hamstrings, suryanamaskar improves and maintains spinal flexibility. Suryanamaskar has

been shown to have beneficial physiological effects in addition to increasing flexibility by enhancing pulmonary function, respiratory pressures, hand grip strength, endurance, and resting cardiovascular parameters. These are the potential explanations for why suryanamaskar performed better than muscular stretching in this study.

## V. CONCLUSION

A well-known and important technique in the yoga arsenal is Surya Namaskar. Its adaptability and practicality make it one of the most effective ways to promote a healthy, active living and become ready for spiritual awakening and the ensuing awareness. In yoga, the pingala or surya nadi, the pranic channel that conveys the vital, life-giving force, is used to symbolise the sun. Due to its addition to the original asana group at a later date, this dynamic set of asanas is not a traditional component of hatha yoga practises. However, it is a useful method for releasing tension, stretching, massaging, and toning all of the body's joints, muscles, and internal organs.

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