

# COMPARATIVE EFFECTS OF SURYANAMASKAR AND DYNAMIC STRETCHING ON CRICKET SPECIFIC MOTOR PERFORMANCE IN FAST BOWLING

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**Abstract:** The purpose of the present study was to compare the acute effects of suryanamaskar and dynamic stretching on the motor performances of Club Level Cricket Players. Thirty players competing in the Club level Leagues took part in the study. The training protocols consisted of 10 mins suryanamaskar and Dynamic Stretching protocol was a series of specific progressive exercises lasting a total of 10 minutes over a distance of 20m with a jog recovery (Young, 2007). The data collected without warm-up at baseline and immediately after the completion of two types of warm-up protocols namely Suryanamaskar and Dynamic Stretching the Speed, Upper-Body, and Shoulder muscular strength endurance, Core Stability, Balance, & Static Strength, Agility, Explosive leg power and were statistically analyzed by using a t-test. P value<0.05 was considered significant for this study. After the warm up protocol, the effect of suryanamaskar and dynamic stretching has shown a high positive significant effect when compared to the baseline values of no warm-up protocol in eliciting the greatest performance in speed, agility movements, upper-body & shoulder muscular strength endurance, core stability, balance, & static strength and explosive leg power by decreased sprinting time, agility test time and increased the number of push-up in one min., time in prone hold test and distance of vertical jump test. No significant difference was found after the warm-up protocols among the motor performance between the two groups. Based on the limitation of the study it can be concluded that both the protocol can be used during warm up sessions.

**Index Terms:** Suryanamaskar, Dynamic Stretching, Cricket Specific Motor Performance, Fast Bowling.

## INTRODUCTION

In the field of sports this is a well-known fact that a Proper warm-up helps players to get ready for the next activity and is also done in order to increase the physiological performance like heart rate, body and muscle temperature through easy exercise, whole-body movement, stretching, and games. A good warm-up before cricket training sessions and matches may help the players' best chance to train and play at their potential level. It also allows a fast bowler to bowl fast because the bowlers are physically and mentally ready and reduce the risk of getting injured. In cricket, fast bowling involves repetitive micro-trauma to the spine and surrounding tissues. That's why a good warm-up is a reasonable balancing act getting the workloads right for each individual bowler while completing enough physical development to increase their bodies' resilience to injury. In the present days coaching session uses the traditional warm-up protocols which involve some dynamic mobility, stretching, SMR, running, muscle activation work which is general warming up for a skill such as fast bowling. During warm-up, dynamic stretches are used for active movements with go through a full range of motion of joints and muscles which may facilitate warm up the body before a major activity and also functional and mimic the movement pattern of fast bowling which a bowler about to perform. In the present study, the researcher' will incorporate Suryanamaskar an alternate general warm up protocol before specific and individual warming up to find out the effectiveness of suryanamaskar during the warm-up sessions. Practicing Suryanamaskar may stimulate every big muscle group in the body and 97% of the body muscles also stretch which improves the general physical fitness (Gauri Shankar, 2011, Rajani Dalvi, 2012). Chaturanga Dandasana, yoga plank or push up, posture in suryanamaskar, is also excellent for core control (Cheryl Fenner Brown, 2011). Some research studies agreed that a rapid suryanamaskar process (fast rhythmic manner) is similar to physical exercise. Research findings also suggest that practicing suryanamaskar at different intensity and speed provides distinct benefits like if the suryanamaskar is done rapidly it warms up the body and acts as a cardiostimulant, on the other hand when done slowly it strengthens and tones the muscular system and enhances the functioning of internal organs (Sun Salutation, 2010). Therefore, the purpose of this study was to determine the comparative effectiveness of suryanamaskar and dynamic stretching on cricket-specific motor performance in fast bowling and whether the suryanamaskar can be incorporate as a warmup protocol in as general warmup.

## METHODOLOGY

### Subjects

Thirty (30) male cricket player who plays cricket in regular basis from West Bengal were selected as subjects for the study. The age of the subject ranged from 18-25 years. The subjects were categorized into two groups i.e. Dynamic stretching warm-up and Suryanamaskar. At the time of testing, all the subjects were bowled without being restricted by injury and all are "match fit".

## Criterion Measures

The test items selected for this study were standardized and appropriate for the motor performance on selected parameters like speed, muscular strength endurance, core stability, balance, & static strength, agility, and power were measured by using 20mts. run in sec., sit up and push up in numbers, Prone Hold Test in sec., Run a three in Sec. and Countermovement jump in Centimeter respectively.

## Research Design

The experimental design was used in this study is the pretest-posttest design.

## Experimental Protocol

The first 2 weeks of the study comprised 4 familiarization sessions (2 sessions per week) for subjects to become more comfortable and confident with Suryanamaskar and Dynamic Stretching protocol.

Prior to the beginning of the experimental protocol subjects standing heights and weights were measured by using a stadiometer, weighing machine, and history of injury information were taken from the bowlers.

For the purpose of the experimental protocol after completing normal warm-up procedures the bowlers of the two groups were given a protocol of dynamic stretching and Suryanamaskar practice for 10-12 mins.

The selected variables namely speed, Muscular Strength Endurance, Muscular Strength, Agility, Power were measured before and after the experimental protocol.

### Training schedule

#### Group I (The Dynamic Warm-up (DW) group)

In the dynamic warm-up protocols quadriceps, hamstrings, gastrocnemius, soleus, gluteus, adductors, and hip flexors mainly focused. The Dynamic Warm-up (DW) protocol used in the study was a Ten (10) minutes series of specific progressive exercises over a distance of twenty-meter with continues jogging recovery (Young, 2007).

#### Group II (Fast Suryanamaskar group)

Subjects went through a familiarization session to perform suryanamaskar by the researcher himself as he is a qualified yoga expert. All the Twelve (12) postures in suryanamaskar were performed in a rhythmic manner starting with an upright standing position and then moving into alternate forward and backward bending movements by involving both arms and legs and ended with an erect standing position. (Giri Swami Gitananda, 1981; Yogeswar, 1980).

The subjects were trained to perform suryanamaskar in a rapid manner so that all Twelve (12) postures were completed in 2 minutes 6 rounds were performed in 10-12 minutes.

## Analysis and interpretation of data

The data collected without warm-up at baseline and immediately after the completion of two types of warm-up protocols namely Suryanamaskar and Dynamic Stretching the Speed, Upper-Body and Shoulder muscular strength endurance, Core Stability, Balance, & Static Strength, Agility, Explosive leg power were statistically analyzed by using a t-test. Intragroup the comparison was analyzed with the paired t-test and intergroup comparison was analyzed by using an unpaired t-test. The significant level was set at 0.05 levels for this study.

## Findings

Mean and standard deviation of Personal data and anthropometric characteristics of the subject are tabulated and presented in the table 1.

Table 1

**Descriptive Statistical Parameters of Personal Data and Anthropometric Characteristics of the Subject**

Sl. No	Variables	SN Group	DS Group
		Mean±SD	Mean±SD
1.	Age	22.33±1.44	22.866±1.457
2	Height	1.693±0.048	1.684±0.028
3	Weight	58.933±6.307	59.4±6.769
4	Fast Bowling Category Slow-Medium	27.915±1.738	27.867±1.709

Table 2

**Mean and Standard Deviation of Motor Performance before and After the Warm-Up Protocols Of Dynamic Stretching Group (N=15)**

Sl. No.	Variables	DS Group	DS Group	t-stat
		Mean±SD	Mean±SD	
1	Speed (Secs.)	3.263±0.159	3.114±.267	2.74*
2	Upper-Body and Shoulder muscular strength endurance (Nos.)	20.133±2.924	21.857±7.35	4.47*
3	Core Stability, Balance, & Static Strength (Secs.)	95.066±21.832	115.6±27.606	7.83*
4	Agility (Sec.)	10.18±0.337	9.96±0.366	2.744*
5	Explosive leg power ( Jump height in cms)	39.4±9.492	42.2±9.987	10.40*

\*Significant at 0.05 level (t=2.16)

Note: DS Group- Dynamic Stretching Group.

The above Table 3 stated that the computation of 't' ratios of dynamic stretching group on motor performance. The obtained 't' ratios on Speed, Upper-Body and Shoulder muscular strength endurance, Core Stability, Balance, & Static Strength, Agility and Explosive leg power were 2.74, 4.47, 7.83, 2.744 and 10.40 respectively. Since these values were found to be higher than the required table value of 2.16, it was significant at 0.05 level of confidence.

Table 3

**Mean and Standard Deviation of Motor and Motor Performance Before and After the Warm-Up Protocols of Suryanamaskar Group (N=15)**

Sl.No.	Variables	SN Group	SN Group	t-stat
		Mean±SD	Mean±SD	
1	Speed (Secs.)	3.212±0.274	3.105±.230	2.05
2	Upper-Body and Shoulder muscular strength endurance (Nos.)	19.466±1.995	22.5±6.333	9.54*
3	Core Stability, Balance, & Static Strength (Secs.)	91.466±19.56	111.466±22.08	12.91*
4	Agility (Sec.)	10.322±0.212	10.116±0.348	2.97*
5	Explosive leg power ( Jump height in cms)	36.266±5.921	41.666±5.826	9.72*

\*Significant at 0.05 level (t=2.16)

Note: SN Group- Surya Namaskar Group

The above Table 3 reveals that the computation of 't' ratios of Suryanamaskar group on motor performance. The obtained 't' ratios on Upper-Body and Shoulder muscular strength endurance, Core Stability, Balance, & Static Strength, Agility and Explosive leg power were 9.54, 12.91, 2.97 and 9.72 respectively. Since these values were found to be higher than the required table value of 2.16, it was significant at 0.05 level of confidence.

Table 4

**The Comparison of Motor Fitness Components after Warm-Up Protocols between the Fast Suryanamaskar and Dynamic Stretching Groups  
(N=30)**

Sl. No.	Variables	SN Group	DS Group	t-stat
		Mean±SD	Mean±SD	
1	Speed (Sec.)	3.105±.230	3.114±.267	0.095
2	Upper-Body and Shoulder muscular strength endurance (Numbers per min.)	22.5±6.333	21.857±7.35	0.545
3	Core Stability, Balance, & Static Strength (Secs.)	111.466±22.08	115.6±27.606	0.452
4	Agility (Sec.) <i>Run a three (BCCI Protocol)</i>	10.116±0.348	9.96±0.366	1.19
5	Explosive leg power ( Jump height in cms)	41.666±5.826	42.2±9.987	0.247

Significant at 0.05 level (t=2.16)

**Note:** SN Group- Surya Namaskar Group, DS: Dynamic Stretching Group

The above Table 4 reveals that the computation of 't' ratios of Suryanamaskar group on motor performance. The obtained 't' ratios on Speed, Upper-Body and Shoulder muscular strength endurance, Core Stability, Balance, & Static Strength, Agility and Explosive leg power were 0.0095, 0.545, 0.452, 1.19 and 0.247 respectively. Since these values were found to be lower than the required table value of 2.16, it was insignificant at 0.05 level of confidence.

### DISCUSSION

In the present study the warm-up protocols compared were Dynamic Stretching (DS) and Suryanamaskar (SN). However, this is the first study to investigate the effects of suryanamaskar and its application as an alternative protocol of stretching during warm-up.

The findings of the study has shown a high positive significant effect when compared to the baseline values of no warm-up protocol in eliciting the greatest performance in speed, agility movements, upper-body & shoulder muscular strength endurance, core stability, balance, & static strength and explosive leg power by decreased sprinting time, agility test time and increased the number of push-up in one min., time in prone hold test and distance of vertical jump test.

However when the comparison is made with physical fitness scale for U-19 male cricket players (Dasondhi Y.S. & Karkare A., 2016) after the warm-up protocols results indicate Good and Very Good level of speed, agility, upper-body & shoulder muscular strength endurance, explosive leg power, and core stability, balance & static strength respectively in fast bowlers of the present the study, as the obtained values of score ranging between 3.15 – 3.28; 9.87 – 10.30; 25 – 22; 43 – 40 and 122 – 76 respectively.

The reasons may be due to the physiological effects of suryanamaskar and dynamic stretching warm-up protocols which can be ascribed to the mechanisms of temperature like; decreased muscle stiffness, increased the rate of nerve conduction, relationship of altered muscle force-velocity, augmentation of anaerobic energy provision and thermoregulatory strain also the non-temperature related factors like; increased blood flow to the muscles, rise in baseline oxygen consumption and post-activation potentiation was activated during the warm-up protocols. (Bishop, 2003). Further, it was stated in other studies that post dynamic stretching (DS) routine performance improvements have been attributed to many factors, such as increased skeletal muscle perfusion (Little T, Williams AG.,2006) and increased intramuscular coordination (Manoel ME, Harris-Love MO, Danoff JV, Miller TA., 2008).

The findings of the current study support several research articles, as well as the research hypothesizes of Weerapong P, Hume P, Kolt G. (2004); Behm DG, Chaouachi A. (2011); Behm DG, Plewe S, Grage P, et al.(2011); McMillian DJ, Moore JH, Hatler BS, et al. (2006); Chtourou H, Aloui A, Hammouda O, et al.(2013); Chatzopoulos D, Galazoulas C, Patikas D, et al. (2014); Taleb-Beydokhti, I., & haghshenas, rouhollah. (2015); Troumbley, P. (2010) and Young and Behm (2003) also stated and support the fact that dynamic stretching increases the performance in power, agility and speed-related activities. In other literature, it is suggested the use of dynamic stretching as the primary method of stretching pre-event warm-up before high speed, and power activities (Little & Williams, 2004).

In other studies of suryanamaskar Bhavanani, A. B., Udupa, K., Madanmohan, & Ravindra, P. (2011) stated that the effects of fast suryanamaskar are alike to aerobic exercises with muscular endurance and power, Sinha and colleagues had also stated that suryanamaskar also a form of aerobic exercise with having dynamic stretching as well as muscular movements involving all major joints. Sinha, B.et.al (2004; 2011). Kanwaljeet Singh, Dr. Baljinder Singh Bal, Dr. Wilfred Vaz (2020) also stated that suryanamaskar can improve muscular endurance and hamstring flexibility significantly. In another study Kristine Fondran (1992) has also proved that Suryanamaskar improves hamstring flexibility, upper body, muscle endurance. But there are no known studies that have demonstrated the immediate improvements in motor performance in fast bowlers as a result of the suryanamaskar protocol.

However, there were no significant differences found after post-test between the warm-up groups namely suryanamaskar and dynamic stretching. Therefore, it remains somewhat unclear which load is optimal for improving neuromuscular performance. Both warm-up protocols allow for subjects to actively focus energy and attention into the stretching period because of the demands of the protocol and also, the protocols allow for constant movement from warm-up to actively keep body temperature elevated leading into an actual competition or testing. Further muscle temperature enhances the rate of ATPase activity (Stein, Gordon & Shriver, 1982), which increases the rate of cross-bridge cycling (Bergh & Ekblom, 1979) which effects result in an improved maximal shortening velocity and concomitant changes in the force-velocity relationship, which in turn improves maximal dynamic performance (Bennett, 1984) so it is clear that both the warm-ups protocols were so similar in nature



that no statistically significant effects may be found or that the carrier did not create a post activation potentiation (PAP) effect. Furthermore, there are no similar studies that have engaged trained cricket fast bowlers despite the fact that these complex warm-up procedures are much more commonly used in this population.

## Conclusions

Within the limitation & findings of the study, it may be concluded that:

1. The Suryanamaskar protocol also effective like dynamic Stretching to improve the cricket-specific motor function.
2. Suryanamaskar protocol generally can be recommended in the general warming up period fast bowlers in cricket.

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