



# Effect of Shavasana on Recovery after Physical Stress

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## Abstract

Shavasana is a yogic relaxation posture which has numerous health benefits. It is also used to prevent and control psychophysiological stress. This study was conducted to analyze Shavasana's effects on reducing stress after participation in physical activities. Ten (10) male under -17 National level soccer players of Tripura Sports School were selected purposively for the study. The subjects were instructed to run on a treadmill with 40% intensity, with a gradual increase of 10% after every two minutes till it reached their 80% level of intensity. The final intensity was increased to 90% of their maximum speed ability, and they continued to run for five minutes. At the end of the run, two different recovery modes (Active and Shavasana) were provided on two separate days. In the active recovery, the subject performed for five minutes with 25% intensity on the treadmill and then sat quietly for 60 minutes. The passive recovery process included 'Shavasana' for five minutes after the activity and then sitting on the chair for 60 minutes. Blood samples and heart rates were collected simultaneously after every program stage. During the recovery phase, the data was obtained from the 5th, 10th, 30th, and 60th minutes. Data was analyzed with the help of paired t-tests. The comparison between active and passive recovery processes revealed a statistically significant difference in selected physiological parameters. A significant reduction was seen in blood lactate values while performing low-intensity active recovery.

**Keywords:** Blood lactate, active recovery, gradually, intensity.

## Introduction

Effects of yogic practices on reduction of psycho-physiological stress have been examined by several researchers. 'Shavasana', as a yogic relaxation posture had been found to prevent and control psycho-physiological stress and to recover from physical stress the average period of 10 minutes required (Bera, et al., 1998). Regular yoga practise improve heart rate, blood pressure, blood glucose, fatigue, baroreflex sensitivity, oxidative damage, mental, emotional etc (Devasena, et al., 2019). Chand & Shaw, 2020 found that yoga practice reduced blood lactate concentration. In another study, regular practice of 'Pranayama' was found effective in lower down blood lactate level at rest (Raju, et al., 1994).

The present study was planned to analyze the effects of Shavasana on the reduction of stress after participation in physical activities.

## Methodology

**Subject:** Ten junior male national-level soccer players of Tripura Sports School volunteered as subjects for the present study. The subjects' mean age, height and weight were:  $15.6 \pm 0.52$  years,  $167.25 \pm 6.09$  cm, and  $53.45 \pm 4.07$  kg, respectively. Written consent was taken from each subject prior to the test. The human ethical committee of Tripura University approved all test procedures. Participants were instructed to avoid training, smoking, alcohol and caffeine beverages 24 hrs before each test.

**Test Protocol:** The procedure was divided into two phases - (i) the blood lactate accumulation phase and (ii) the recovery phase. In the accumulation phase, the subject was directed to run on a treadmill with 40% intensity. The intensity was gradually increased by 10% after every two minutes till it reached its 80% level of intensity. Finally, the intensity was increased to 90%, and the subject continued running at this speed for five minutes. The maximum sprint speed of each individual determined the exercise intensity.

At the end of the run, two different recovery modes (Active and Shavasana) were provided on two separate days. In the active recovery, the subject performed on the treadmill for five minutes with 25% intensity and then sat quietly for the next 60 minutes. For passive recovery, they were instructed to perform Shavasana for five minutes and then sit on the chair for the next 60 minutes.

### Collection of data

Before the test, blood lactate, heart rate, blood glucose and basal blood pressure were measured. Then, the data was collected in different stages of the program. The data collection times were after ten minutes of graded exercise after a five-minute run with 90% intensity, then five minutes of active recovery or passive recovery and after the 10th, 30th, and 60th minutes. The blood sample was drawn from the fingertips.

Heart rate and blood pressure were measured continuously before, during and after the test.

### Statistical analysis

The data was analyzed with the help of Microsoft Office Excel, and the significance level was set at 0.05. The researcher calculated the difference between the stages by subtracting one stage from another. Then, from the obtained data, the researcher applied a paired t-test on the differences in the stages.

### Results of the study

Statistical analysis revealed a significant difference between blood lactate values after 5 min active and passive recovery ( $P < 0.05$ ).

Results showed a significant difference between the blood glucose values of the last stage of the active and passive recovery process.

In between the active and passive recovery processes, a significant difference was found in the heart rate values of soccer players.

The researcher also found a significant difference between the systolic blood pressure after 5 minutes of active and passive recovery. Other than that, in between stages, there is no significant difference in the selected physiological parameters of the soccer players of Tripura.

This figure represents the blood lactate removal pattern of a soccer player from Tripura during two different recoveries. The pattern was formed based on mean scores of blood lactate values. A blue column indicates active recovery, and a red column indicates passive (Shavasana) recovery. It can be seen that while using two different recoveries, a similar pattern was formed.

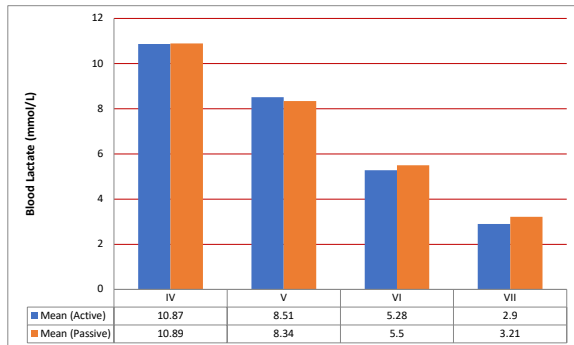


Figure 1: Blood Lactate Removal Pattern of Soccer Players During Recovery

On day one, after 90% intensity on the treadmill, the blood lactate accumulated up to 15.19 mmol/L. In the active recovery process, among all stages of the recovery, the maximum blood lactate removal was seen at 4.32 mmol/L between the third and fourth stages of the program and the lowest was recorded at 2.36 mmol/L between the fourth and fifth stages.

The maximum blood lactate accumulation on day two was 13.16 mmol/L. In the passive (Shavasana) recovery, the highest lactate removal occurred at 2.84 mmol/L between the fifth and sixth stages and the lowest change was seen at 2.27 mmol/L between the third and fourth stages.

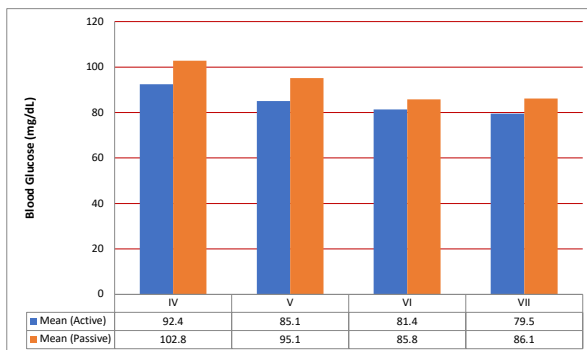


Figure 2: Blood Glucose Pattern of Soccer Players During Recovery

Figure 2 shows the blood glucose pattern of soccer players while using two different recoveries. However, after 90% intensity on the treadmill, the blood glucose was recorded at 85.5 mg/dL on the first day and 90.3 mg/dL on the second day of the program. During the recovery phase, the Blood glucose values of soccer players varied from 81 mg/dL to 103 mg/dL. This figure represents a

similar blood glucose pattern of soccer players. Data reflects a constant depletion in glucose levels after every stage of the program except the last stage of the passive recovery process.

In the Active recovery process, the maximum depletion in glucose level was 8.9 mg/dL, which occurred between the fifth and sixth stages, and the minimum was 6.9 mg/dL between the sixth and seventh stages of the program.

During Passive recovery, the highest depletion was 12.5 mg/dL between the third and fourth stages. Among all stages, the lowest depletion in blood glucose level was 2.5 mg/dL between the sixth and seventh stages.

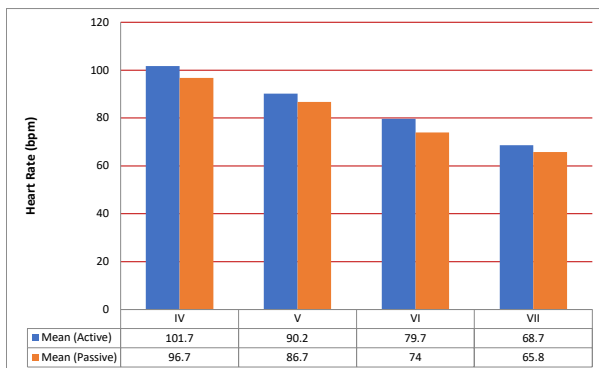


Figure 3: Heart rate Pattern of Soccer Players During Recovery

On the first day of the program, after submaximal intensity, the heart rate was accumulated up to 186.3 bpm, and on the second day, the maximum heart rate was recorded at 184.5 bpm.

The above figure indicates a similar recovery pattern of heart rate of soccer players while using two different recoveries. The heart rate significantly dropped after 5 minutes of Active or Passive recovery. However, in every stage, Shavasana is better than active recovery.

After 90% intensity, the systolic blood pressure was recorded at 151.1 mmHg on day one and 163.6 mmHg on the program’s second day. This figure represents the systolic blood pressure pattern of soccer players in Tripura during recovery. Both recoveries showed a similar pattern. After every stage, the systolic blood pressure was lower in the passive recovery process compared to active recovery, except in the last stage of the program.

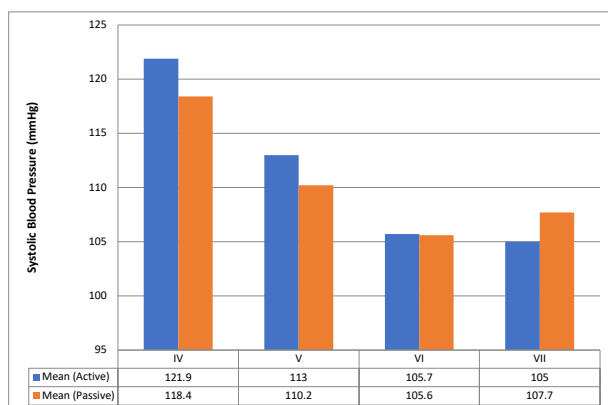


Figure 4: Systolic Blood Pressure of Soccer Players During Recovery

## Discussion

Yoga is a psycho-somatic-spiritual discipline that aims for union and harmony between our mind, body, and soul (Balaji et al., 2012). Shavasana is a yogic relaxation posture. It is not just simply lying down in a supine position. While performing Shavasana, subjects close their eyes and shift their attention to different parts of the body or simply focus on abdominal movement during breathing. During Shavasana, the whole body is well-supported because the centre of gravity is close to the ground (Bera et al., 1998).

The present study proved that after Shavasana, the maximum blood lactate removal occurred after the 10th minute of the recovery process, which was supported by Khatami et al. In their study, blood lactate removal was the maximum at 5 minutes after immersing in cold water of recovery and at 15 minutes after the yoga practice of recovery (Khatami et al., 2021).

In their study, Gupta et al. (1996) concluded that active recovery is the best modality for maximum blood lactate removal after exercise compared to short-term body massage and passive recovery. Another study found that active recovery (walking) is better than passive (Shavasana) recovery after 10 minutes of HIHY (High-Intensity Hatha Yoga) (Lee et al., 2021). Another finding of the present study was that active recovery is better than passive recovery for blood lactate removal; this finding is supported by Gupta et al. and Lee et al.

In a study, 3 months of Shavasana training decreased the basal heart rate and basal blood pressure (Priya, 2012). Deep relaxations reverse the flight or fight response, which results in a maximum decrease in heart rate and blood pressure, even below the basal values (Bera et al., 1998). Another study reported that yoga can naturally control and lower high blood pressure (Devasena et al., 2019). Jain, 2016 found that the practice of Shavasana for a short duration immediately improves heart rate and blood pressure. Further, it may be more beneficial for normal subjects and hypertensive patients. Priya, Bera et al., Devasena et al., and Jain supported the result of the present study that Shavasana is better as compared to active recovery for normalizing systolic blood pressure and heart rate of soccer players of Tripura.

The limitation of the present study is that it showed the instant effect of Shavasana on recovery, and it is the result of a small sample of soccer players. Five minutes later, Shavasana had no significant recovery from blood lactate removal from soccer players in Tripura.

Researchers recommended more studies to identify the effects of long-term training in a larger scale population, which further helps to enhance our understanding of the intrinsic mechanisms by which changes occur. Furthermore, this study may be fruitful for female players or even elite players who have some knowledge of Shavasana.

## Conclusion

Based on the data and results of the study, the researcher concluded that 5 min of low-intensity active recovery was better than 5 min Shavasana (Passive) recovery for blood lactate removal of soccer players of Tripura. Further active recovery helps to recover Blood Lactate almost 96% after 1 hour of recovery compared to 91% in the passive recovery process.

The present study further concluded that Shavasana is one of the best ways to control and lower the heart rate and systolic blood pressure. Also, the depletion rate in blood glucose levels was higher in the active recovery process than in Shavasana. Tripura soccer players showed a similar pattern of physiological parameters while using two different recoveries.

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