Research Article

# Effect of Sprint Training on Audiovisual Reaction Time in Basketball Players: Randomized Controlled Trial

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## Abstract

Reaction is purposeful voluntary response to different stimuli such as visual or auditory stimuli. As reaction time gives the information how fast a person responds to sensory stimuli, it is a good indicator of performance in reactive sports like basketball. It has been suggested that reaction time could be used as an index of expertise for sport-specific decision-making in basketball players. The present study was carried out to compare the effects of 6 weeks of Sprint Training on Audiovisual reaction time in basketball players. The present study is an Interventional Randomized Controlled Trial. Twenty basketball players aged 15 to 25 years were enrolled for the study. Informed consent was taken from all the participants. They were randomly distributed into 2 groups. Group- 1: Controls: Players undergoing regular training. Group-2: Players undergoing Sprint Training along with regular training. They underwent sprint training for 10 minutes a day, 5 days a week. Audiovisual reaction time was measured by Medicaid RTM -604, before starting the training and after 6 weeks of training. Sprint Interval training led to better improvement in audiovisual reaction time as compared to regular training group. Hence, Sprint Interval training can be suggested as a method to improve audiovisual reaction time in basketball players and improve their performance.

**Key Word:** Sprint Training, Randomized Controlled Trial.

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## INTRODUCTION

Reaction time is defined as interval of time between presentation of stimulus and appearance of appropriate voluntary response in a subject.[1] Nakamoto H, Mori S[2] suggested that reaction time could be used as an index of expertise for sport-specific decision-making in basketball players. In a study from Maharashtra province in India by Kamble *et al*, basketball players were found to lag far behind in various variables including flexibility and agility when compared with national players. Hence, they suggested that there is a need to improve the physical fitness parameters so as enhance player's performance. They also mentioned that efforts to improve the standard of our sportsmen have achieved an insignificant success in this respect.[3] Traditionally, coaches have opted for long distance and low to moderate intensity exercise training. The problem with this approach is that it is not specific to many sports such as the multi-sprint games.[4] Sprint training is now being considered as another option for training. Hence, the present study is being carried out to compare the effects of Sprint Training on Audiovisual reaction time in basketball players.

## MATERIAL AND METHODS

The present Interventional Randomized Controlled Trial was carried out to compare the effects of 6 weeks of

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Sprint Interval Training on Audiovisual reaction time in basketball players. The Institutional Ethics Committee had approved the study protocol. Twenty basketball players aged 15 to 25 years were enrolled for the study. Informed consent was taken from all the participants. They were randomly distributed into 2 groups.

**Group-1:** Controls: Players undergoing regular training.

**Group-2:** Players undergoing Sprint Training along with regular training. They underwent sprint training for 10 minutes a day, 5 days a week.

Audiovisual reaction time was measured in the dominant hand by Medicaid RTM -604, before starting the training and after 6 weeks of training. Three readings were taken and the best results were included as audio reaction time and visual reaction time.

## RESULTS

Following tables indicate the baseline parameters as well as changes in Audio-visual reaction time (AVRT) in both the groups. Paired t test was used to compare the changes in AVRT before and after the intervention. There was a significant improvement in AVRT in sprint interval training group whereas there was no significant change in AVRT in control group.

**Table 1:** Baseline characteristics

| Parameter | Sprint Training Group | Control group |
|---|---|---|
| Age (years) | 20.7 ± 3.9 | 19.4 ± 2.74 |
| Weight (kg) | 57.54 ± 8.43 | 56.15 ± 6.8 |
| Height (cm) | 164.11 ± 8.49 | 165.43 ± 7.6 |
| BMI (kg/m$^2$) | 20.82 ± 2.69 | 20.85 ± 2.76 |

**Table 2:** Comparing Audio-visual reaction time of Sprint Training group and Controls in Basketball players

| Parameter | Sprint Training Group | | Control group | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| Audio reaction time (milliseconds) | 134 ± 9 | 120 ± 7 | 132 ± 8 | 130 ± 8 |
| Difference in means | 13.4 | | 1.8 | |
| (95% CI) | (7.33 to 19.47) | | (-0.30 to 3.90) | |
| p value | 0.0007 ( HS ) | | 0.08 ( NS) | |
| Visual reaction time (milliseconds) | 161 ± 8 | 138 ± 7 | 157± 7 | 156 ± 7 |
| Difference in means | 22.8 | | 1.1 | |
| (95% CI) | (16.51 to 29.09) | | (-2.09 to 4.29) | |
| p value | 0.0001 ( HS ) | | 0.45 (NS) | |

**HS:** statistically highly significant; **NS:** statistically not significant; **CI:** Confidence Interval

## DISCUSSION

Our study has demonstrated that Sprint Interval Training can improve the audiovisual reaction time in basketball players, which can help to increase the competitive ability of players. Speed and quick reactions are among the main qualities in sports. These factors can decide the success of a basketball player during offence as well as during defence i.e. when an offensive player makes a move, speed of reaction of defensive player would decide his success or failure. Also, for a game like basketball, in which movements of players are conditioned by the signals, by the movements of opponents or by the motion of ball, reaction time is of very great importance.[5] It has been reported in animal experiments that there is stimulation of neurogenesis in the hippocampus and brain-derived neurotrophic factor expression is increased in response to the exercise.[6, 7] Kamijo K *et al*[8] have reported that reaction times following all exercise conditions i.e light, moderate and high intensity exercise were shorter when compared to the baseline condition. They also suggested that P3 latency was more sensitive to task difficulty and P3 latency during trials requiring greater executive control processes might be more sensitive to the effects of acute exercise than tasks requiring minimal effort. Also, a study by Hyukki C *et al*[9] have concluded that high intensity exercise decreases the reaction time during the Stroop task, and at the same time increases Oxy-Hb in the prefrontal cortex. Their study provided evidence that exercise improves cognitive function through prefrontal cortex activation. Thus there is literature to support the improved reaction time after high intensity training. Our study has limitations like smaller sample size and further research needs to be done to consolidate the findings.

## CONCLUSION

Sprint training as a training protocol led to better improvement in reaction time in basketball players.

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