

Application of Video Analysis for Enhancing Kinematic Parameters and Techniques of Yoga Performers

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Abstract

Background: Yoga asanas help to increase the wholesome development of an individual. At the same time, the execution of the asanas gives complete benefits to the practitioners.

Aim: The purpose of the study was to find out the application of video analysis for enhancing kinematic parameters and techniques of yoga performers.

Methods and Material: For this study, three men yoga performers selected from SRMV Maruthi College of Physical Education, Coimbatore, Tamil Nadu, India. The age of the participants was 24 years. He had a good experience in performing yoga including difficult classical asanas. For this study angle of joints, movement of body parts and position of balance, holding time were selected as dependent variables. Sports Insight motion analysis cameras and software were used to find out the angle of joints, movement of body parts and body balance. The baseline kinematic variables were tested before intervention. At the time of intervention, the execution of the asana (virksasana) was recorded by the researcher through the sports motion analysis camera and software.

Statistical analysis used: Descriptive statistics were used to analyse the performance of the yoga performers.

Results: The captured video was showed to the participant to understand his execution of asana. The researcher gave the necessary guidance to correct the mistakes and provide opportunities for self-evaluation. After the 10 days of training, post-test was conducted and data were collected from the participant.

Conclusion: It is concluded that the application of video analysis produced a significant difference in angle of joints, movement of body parts among the yoga performers. It is concluded that the application of video analysis produced significant improvement in the position of balance, holding time among the yoga performers.

Keywords: *video analysis, kinematic parameters, techniques, asanas, virksasana. the angle of joints, movement of body parts and position of balance, holding time, sports motion analysis camera and software.*

Introduction

Motion analysis method has been used in the study of human movement. ^[1] Kinematic values are analysing with body-mounted sensors (Veltink et al. 1996:375-85; Bussmann et al. 1995:2-7; van den Bogert et al. 1996:949-54; Dai et al 1996:63-72; Luinge et al. 1999:455-9; Tong et al. 1999:87-94; Veltink et al. 1999:383-91). The yoga practitioner is performing and compares it with a video

of the same 'asana' performed by an expert. Thus, it helps to detect and eventually correct errors induced in practising the art using only a webcam and an expert video as aides for the user (Patil et al. 2011;43-46).

The yoga instructor gives feedback about performing various asanas (Fishman et al. 2009:47-53). (Video analysis increase performance among the badminton players (Srinivasan M. 2012:12-14). The

skill acquisition has been taken place by using video. [11] Feedback procedure is more important for yoga practice and improves performance. [12] The skill performance variables namely, bowling speed, bowling accuracy and bowling ability significantly improve due to the e-content assistive and imagery specific training with traditional training. [13]

The use of video analysis has been used in sports and play activities. [14] Video modelling and video feedback were used to increase the performance. [15], [16], [17] Boyer et al. (2009) examined the effectiveness of a video treatment and feedback for gymnastic skills. [15] Nielsen et al. (2009) evaluated the effectiveness of video modelling and feedback procedures for increasing safe and correct patient lifting transfers. [16].

For these reasons, the researcher was in exploring to overcome the mistakes committed by the yoga performers. The video analysis is the innovative approach to give proper feedback and motivate the yoga practitioners to perform at their highest potential. The video analysis help to understand the angle on the joints while perform the poses; aware about body movements; maintain the body balance; increase holding time.

Subjects and Methods

Materials and methods

Selection of participants: For this study, three men yoga performers selected from SRMVC Maruthi College of Physical Education, Coimbatore, Tamil

Nadu, India. The age of the participants was 24 years. He had a good experience in performing yoga including difficult classical asanas.

Selection of variables: For this study angle of joints, movement of body parts and position of balance, holding time were selected as dependent variables.

Criterion measures: Sports Insight motion analysis cameras and software were used to find out the angle of joints, movement of body parts and body balance.

Procedure: The baseline kinematic variables were tested before intervention. At the time of intervention, the execution of the asana (virksasana) was recorded by the researcher through the sports motion analysis camera and software. The captured video was shown to the participant to understand his execution of asana. The researcher gave the necessary guidance to correct the mistakes and provide opportunities for self-evaluation. After the 10 days of training, a post-test was conducted and data were collected from the participant.

Video analysis training: The participants were asked to perform virksasana for capturing the pose. The captured postures were analysed by the sports motion analysis package. The feedback and postural correction, body movement, body balance, angle of the position were discussed with the participants. Ten days of postural training were given to the participants and the feedback of the participants were also recorded for further application.

Analysis of Virksasana performance

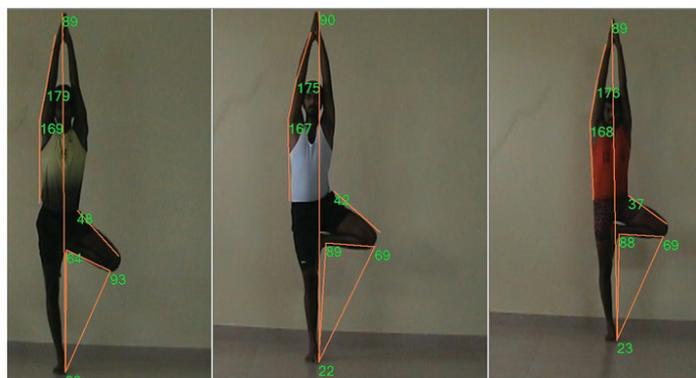


Figure 1: Bar diagrams showing the means difference of pre-test and post-test scores on the angle of joints

Results

Table 1: Table showing the means difference of pre-test and post-test scores on the angle of joints

Joint	Average Angles	
	Baseline	Post-test
Standing leg and hands	82°	89°
Shoulder and hands	182°	176°
Standing leg, folding ankle joint and knee joint	22°, 70°, 92°	22°, 80°, 77°
Trunk joint of the folding leg and knee joint	46°	42°

The results of the study reveal that the movement of the body parts was well synchronized with less effort when compared with the baseline test. Further, the body balance of the poses was significantly improved when compared with the baseline test. And also, it shows that the holding time of the poses was significantly increased when compared with the baseline test.

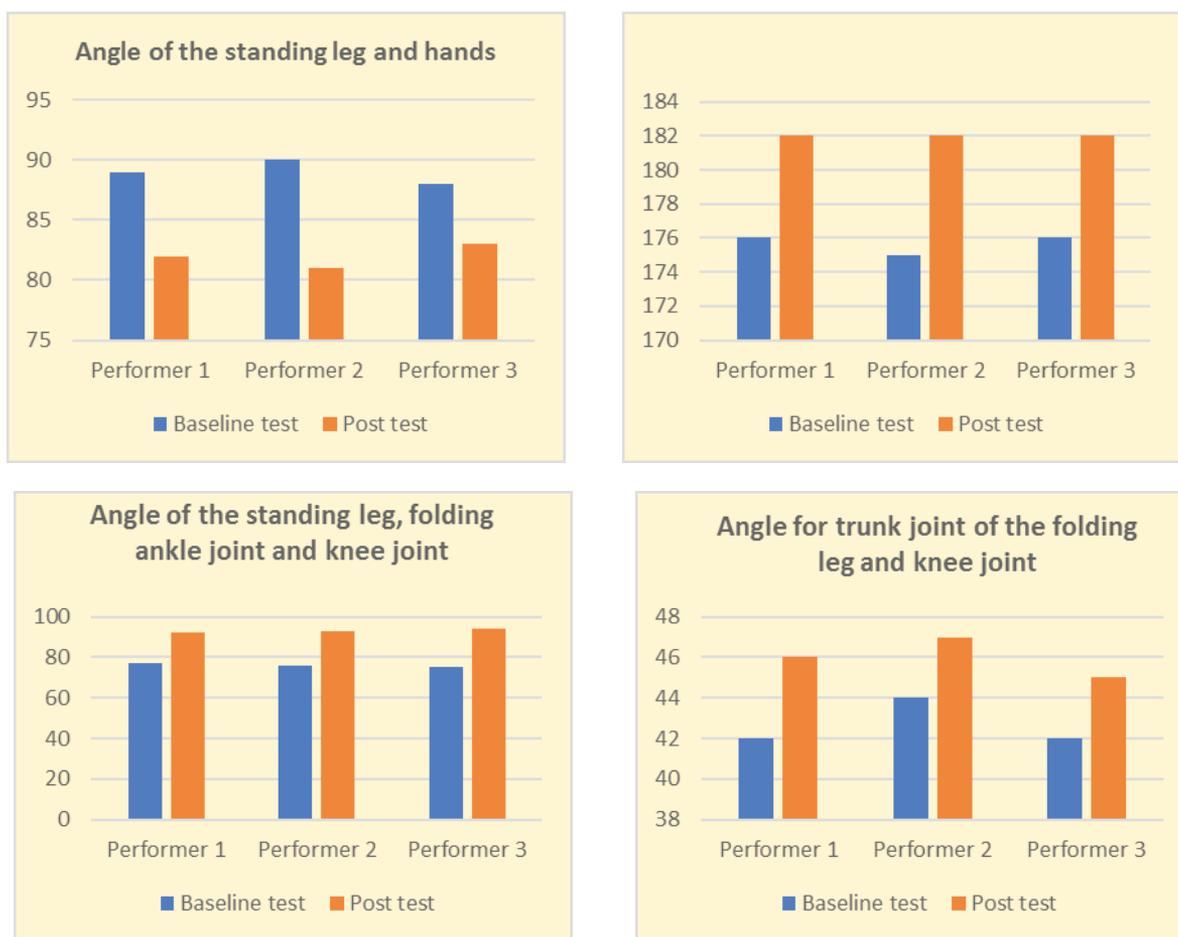


Figure 2: Bar diagrams showing the means difference of pre-test and post-test scores on the angle of joints

Discussion

The study analyzed the efficacy of video analysis for enhancing kinematic parameters and techniques of yoga performers. The application of video analysis increased the performance in virkasasana. It also reduced the errors unintentionally committed by yoga practitioners. The researcher could find out the difference in the angle of joints between the baseline test to post-test. The application video analysis increased the confidence among the yoga practitioners. Video analysis acted as a tool to prevent the injury because the practitioners could understand the possibilities of movement of the joints.

Furthermore, such an application provides more evidence that individuals can evaluate their performance through video to increase their performance. The video analysis software and cameras are very sophisticated to show the video in ultra-slow motion. It provides 64 slides in one second and can draw different angles and other measurements too. The finding of the study shows that the holding time of the poses significantly increased due to video analysis. The results of the study show that there is a significant difference between the execution of virkasasana. They have followed the techniques properly throughout the intervention.

The results of this study are comparable to those of studies evaluating similar procedures including self-monitoring and self-evaluation from video. [18] and video feedback with self-evaluation. [19]. Muhammad Usama Islam (2018) investigated that Yoga posture recognition by detecting human joint points in real-time using Microsoft Kinect. It analysed various joints of the human body to calculate the accuracy of the particular yoga pose. [20]

Furthermore, video feedback increases performance. [14] Schmid (2009) suggesting that yoga may be an exemplary intervention to manage Fear of Falling and improve balance, and reducing fall risk. [21] Teja Kiran Kumar Maddala (2019) studied that Yoga Net: 3-D Yoga Asana Recognition Using Joint Angular Displacement Maps with Conv Nets. It captures the lateral and rotational spatiotemporal variations. It accurately

recognizes 3-D yoga actions. [22]

Conclusion

It is concluded that the application of video analysis produced a significant difference in angle of joints, movement of body parts among the yoga performers. Furthermore, it is concluded that the application of video analysis produced significant improvement in the position of balance, holding time among the yoga performers.

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Conflict of Interest: The researchers claim no conflicts of interest.

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