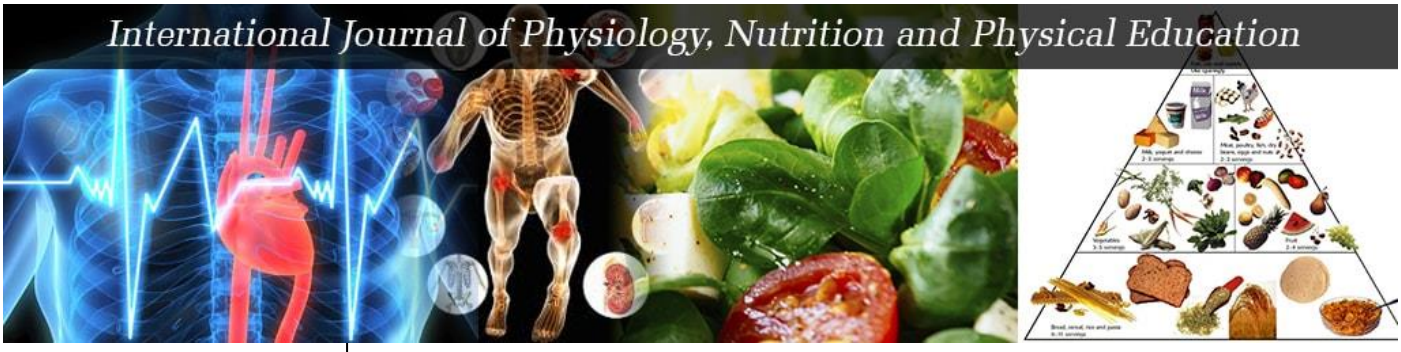


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# Impact of low intensity sports specific resistance training with yoga on selected osteokinematics variables of badminton players

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**Abstract**
This study was designed to find out the impact of low intensity sports specific resistance training with yoga on selected osteokinematics variables of badminton plyers. To achieve the purpose of the study 40 badminton players were selected from SS badminton and RV badminton club at coimbatore. The subject was randomly assigned to two equal group (n=20). group I underwent low intensity sports specific resistance training with yoga (LISSRTWY) and group II acted as control group (CG). The respective training was given to the experiment group for 3 days per week (Monday, Wednesday and Friday) for the period of eight weeks. The control group was not be given any sort of training except their routine work. The osteokinematics variables shoulder- elevation through flexion, extension, horizontal adduction, horizontal abduction, extension rotation and internal rotation was assessed by 360˚ Universal Goniometer. The data collected from the subject was statistically analyzed with't' ratio to find out significant improvement if any at 0.05 level of confidence. The results of the selected variables improved significantly due to impact of low intensity sports specific resistance training with yoga with the limitation of (diet, climate, life style) status and previous training. The result of the present study coincide findings of the investigation done by different experts in the field of sports sciences Influence of low intensity sports specific resistance training with yoga significantly improved elevation through flexion, extension, horizontal adduction, horizontal abduction, extension rotation and internal rotation of badminton players.

**Keywords:** Sports Specific Resistance Training, Yoga, osteokinematics and Badminton

## Introduction
The quality and degree of motion actually observed in the bony lever arm is called osteokinematic motion. Osteokinematic motion is the movement of the whole bone resulting from rolling and sliding (arthrokinematics) between the articulating surfaces that compose the joint measured.37 For example, when raising the arm overhead, the bony lever arm (the humerus) moving overhead is the osteokinematic motion. But in order for this motion to occur, the head of the humerus must roll and slide on the glenoid fossa (arthrokinematic motion). In most cases, osteokinematic motion is the actual motion that is measured and is the focus of this textbook. Osteokinematic description of movement follows a generalized system based on definitions of planes of movement around axes of rotation. For effective discussion of planes of motion and axes of movement, a reference point is required, a point referred to as the anatomical position. This reference point (anatomical position) is defined as "standing erect with the head, toes, and palms of the hands facing forward and with the fingers extended."90 When measuring the range of motion at a joint, the starting position is typically the anatomical position. Figures 1-1 through 1-4 all show the model standing in the anatomical position. Osteokinematic movement may be described as occurring in one of three imaginary planes of the body arranged perpendicular to each other, with the axes of each plane intersecting the center of gravity of the body. These imaginary planes are referred to as the cardinal planes of the body. It should be emphasized that human motion is not limited to movement in these cardinal planes, but that this system of planes of movement around axes of rotation provides a simple method for describing range of motion and muscle length (Nancy Berryman Reese 2002).

## Methods

### Experimental Approach to the Problem

In order to address the hypothesis presented herein, we selected 40 badminton players from Coimbatore district. The subjects were divided into two equal groups, consist of 20 each, namely, Experimental group I underwent low intensity sports specific resistance training with yoga (n=20), and Group II underwent Control group (n=20). The respective training was given 3 days per week for a training period of eight weeks. The Control group was not given any sort of training except their routine.

### Design

Experimental design is a blue print of the procedure that enables the researcher to test the hypothesis by reaching valid conclusions in testing the relationship between independent variables and dependent variables. The investigator use pre and posttest random group design in this study. This procedure involves dividing a sample into two or more groups based on random selection. No attempt was made to equate the groups in this study. The selected forty subjects was divided into two equal groups consisting of 20 each such as experimental group I (n = 20) and control group (n = 20). The treatment was administered to all the experimental groups for a period of 8 weeks. After the end of 8th week the post test was administered to all the groups.

### Criterion Measure

| Variables | | Test/Equipment | Unit of Measure |
|---|---|---|---|
| Shoulder | Elevation through Flexion | 360˚ Universal Goniometer | In Degree |
| | Extension | | |
| | Horizontal Adduction | | |
| | Horizontal Abduction | | |
| | External rotation | | |
| | Internal Rotation | | |

### Training Program

The training program will be lasted for 60 minutes for session in a day, 3 days in a week for a period of eight weeks duration. This 60 minutes included 10 minutes warm up, 40 minutes respective training and 10 minutes warm down procedure. Every three weeks of training 5% of intensity of load will be increased from 65% to 80% of work load. Volume of training is prescribed based on the number of sets and repetition.

### Statistical Technique

The collected data before and after training period of 12 weeks on the above said variables due to the influence of isometric strength training was statistically analyzed with‘t’ test to find out the significant improvement between pre and posttest. In all cases the criterion for statistical significance was set at 0.05 level of confidence. ($P< 0.05$)

**Table 1:** Computation Of ‘T’ Ratio on Osteokinematics Variables Of Badminton Players On Experimental Group And Control Group (Scores in degree)

| Group | Variables | Group | Mean | S. D | T ratio |
|---|---|---|---|---|---|
| Control Group | Elevation through Flexion | Pre test | 138.30 | 7.40 | 1.83 |
| | | Post test | 138.45 | 7.45 | |
| | Extension | Pre test | 32.80 | 4.50 | 0.62 |
| | | Post test | 32.90 | 4.43 | |
| | Horizontal Adduction | Pre test | 98 | 9.14 | 1.45 |
| | | Post test | 98.10 | 9.14 | |
| | Horizontal Abduction | Pre test | 33 | 3.34 | 1.45 |
| | | Post test | 33.10 | 3.38 | |
| | External rotation | Pre test | 76.30 | 5.11 | 1.00 |
| | | Post test | 76.35 | 5.18 | |
| | Internal Rotation | Pre test | 50 | 5.10 | 1.45 |
| | | Post test | 50 | 5.09 | |
| Experimental Group | Elevation through Flexion | Pre test | 147.50 | 9.28 | 5.99* |
| | | Post test | 149.70 | 8.66 | |
| | Extension | Pre test | 47 | 3.14 | 5.79* |
| | | Post test | 51 | 3.21 | |
| | Horizontal Adduction | Pre test | 113.75 | 5.04 | 7.66* |
| | | Post test | 116.05 | 4.94 | |
| | Horizontal Abduction | Pre test | 33.80 | 3.88 | 7.54* |
| | | Post test | 37.50 | 2.92 | |
| | External rotation | Pre test | 71.80 | 4.70 | 8.31* |
| | | Post test | 73.90 | 4.33 | |
| | Internal Rotation | Pre test | 53.65 | 5.50 | 6.85* |
| | | Post test | 59.20 | 6.66 | |

*Significant level 0.05 level of confidence (2.093), 1 and 19

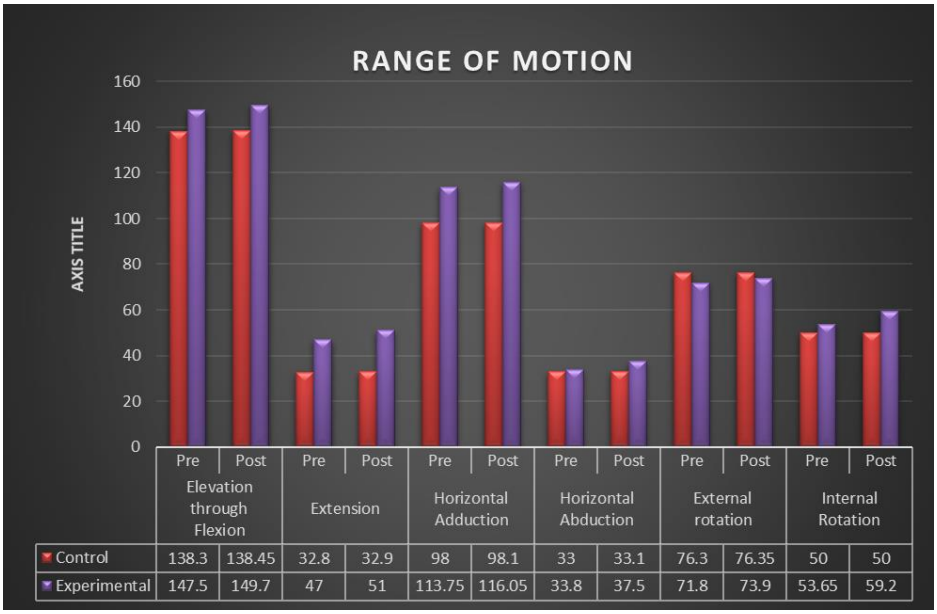


**Fig 1:** Graph represented in osteokinematics variables

## Discussion and Findings

The present study experimented the effect of low intensity sports specific resistance training with yoga on selected osteokinematics variables of badminton plyers. The result of this study indicated that the low intensity sports specific resistance training with yoga improves the osteokinematics variables such as Elevation through Flexion, Extension, Horizontal Adduction, Horizontal Abduction External rotation and Internal Rotation. The findings of the present study had similarity with the findings of the investigations referred in this study Sethu (2016) [2] reported that the Suryanamaskar on joint flexibility improvement takes place on ankle and wrist flexibility. Pinto (2012) [3] determinated that result was improved with both FULL and PART resistance training, but FULL may lead to greater strength gains. Jung-Hyun choi (2016) [4] examined that the result was increase in flexibility and joint range of motion. Fatouros (2018) [5] observed that the results was improves flexibility in the aged. However, intensities greater than 60% of 1RM are more effective in producing flexibility gains, and strength improvement with resistance training is also intensity-dependent. Detraining seems to reverse training strength and flexibility gains in the elderly in an intensity-dependent manner. Bruno (2016) [6] evaluated that the results was elbow flexion exercise with full ROM seems to induce greater muscle damage than partial ROM exercises, even though higher absolute load was achieved with partial ROM. Clark (2011) [7] reported that the results was improves terminal and midrange performance gains, resulting in the athlete possessing an improved ability to control external loading and produce dynamic force.

The results of the present study indicates that the low intensity sports specific resistance training with yoga is effective method to improve elevation through flexion, extension, horizontal Adduction, horizontal Abduction external rotation and internal rotation of badminton players. The discrepancy between the results and the results of previous studies might be attributed to several reasons, such as the training experience level of the subjects, the training programme, the intensity used and the duration of the training programme.

## Conclusions

Eight weeks of low intensity sports specific resistance training with yoga produced significant improvements in the elevation through flexion, extension, horizontal Adduction, horizontal Abduction external rotation and internal rotation of badminton players.

Low intensity sports specific resistance training with yoga is an appropriate training protocol to bring out desirable changes over osteokinematics variables for badminton players.

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