ISB 2013 BRAZIL
XXIV CONGRESS OF THE INTERNATIONAL SOCIETY OF BIOMECHANICS
XV BRAZILIAN CONGRESS OF BIOMECHANICS

LEVEL OF STABILITY AND LOAD FEET IN FEMALE AND MALE BASKETBALL PLAYERS BEFORE AND AFTER TRAININGS

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INTRODUCTION

Basketball from its inception until today was developing in large steps. Its great popularity is certainly due to the large dynamic range and wide variety of psychophysical the characteristics that players must possess. The game represented a variety of activities (short sprint with sudden stops and changes direction, jumping, etc.), and many of technical and tactical elements (which the players applied with or without the presence of an opponent). Basketball training is very intense and varied training, in addition to requiring physical exertion and increased involvement of psycho-physiological mechanisms in organism, and the additional load to the locomotors apparatus of athletes. During the games and training basketball players a great burden suffer in the lower limbs, where key roles have amortisation in area of foot. In previous research, examines the sexual characteristics of a junior age, biomechanical aspects of the morphology of the lower limbs [1], and the load foot during jumps [2]. Studying the impact of training on the load distribution under the foot is not sufficiently explored, which led to do this research.

PURPOSE OF THE STUDY

The aim of this study was to determine the biomechanical characteristics of load foot basketball players of opposite sex, when performing tests of balance in different conditions (open and closed eyes) before and after training.

METHODS

The experiment involved a total of 28 athletes from first division basketball club in Serbia. The sample consisted of two groups, evenly divided by gender indicator (n=14 men, women n=14). For registration information is used podometric platform “RSscan International” Belgium, size 40x100cm with working frequency of 500 Hz. The experiment included two modified test "Romberg" open (OR) and eyes closed (CR) for 100s, according to the method [3]. The tests were done profile parameters that influence the manifestation of conscious and unconscious body posture control mechanism. The testing was done immediately before the training. The training lasted 2 hours. Training content included the technical and tactical activities of competitive micro-cycles. Immediately after the training was carried out measuring identical to that which is done before training. In addition to the registration displacements of center of pressure (COP), were recorded pressure values below the feet, expressed in percentages (%) in 4 zones (metatarsal and heel, in the left and right foot). The data were subjected to detailed statistical analysis. Two group comparisons were conducted using the Mann-Whitney test for independent group. Also we using a paired Wilcoxon test to determine the statistical significance of differences between pre- and post - experiment for depended groups: values of pressure, dX, dY and COP, $p<0.05$ was considered as significant.

RESULTS

Hypothesis that the impact of training for some biomechanical characteristics of different effects in athletes depending on the sex, is not justified. Not found statistically significant differences (Table 1). We can also note that the parameters of pressure under the foot in heel and in metatarsal zones (in %) have a high degree of variation, so the data cannot be generalized and considered stable, which was not the case in research conducted with air rifle shooters [4]. From Table 2 can be detected reduction COP [mm] in the test OR before 515.4±109.5 and after training 474.4±105.5 ($p <0.033$), and test of CR before 695.6±181.6 and after training 619.5±155.8 ($p <0.019$).

DISCUSSION AND CONCLUSION

Explanation of COP displacement after reduction with respect to the measurement before the training, both variants of the test (OR and CR), may lie in certain psycho-physiological processes of braking CNS. By all accounts emotional and physical stress during training is relaxed and not suspicious and mobilizing effect on athletes. Workload of the foot leads to the values characteristic in both sexes: in the heels part of it is higher by 10% compared to metatarsal. Also, the load is slightly higher if we consider the right foot than the left.

ACKNOWLEDGEMENTS

We express gratitude to “RSscan International” Belgian for the given opportunity to use their equipment in our research.

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Table 1: Biomechanical characteristics of foot loading between different sexes

	Stress loading						
	Metatarsal (%)		Heel (%)		Center of Pressure		Trajectory
Men – Women	**Left foot**	**Right foot**	**Left foot**	**Right foot**	**dX [mm]**	**dY[mm]**	**COF[mm]**
OR Before Women	14.5±9.3	21.0±9.0	32.0±16.4	32.5±12.1	12.4±5.7	23.1±16	485.3±124.5
OR Before Men	19.2±10.6	26.3±9.8	26.6±9.8	27.9±9.6	11.9±5.9	24.9±7.2	545.4±86.3
OR After Women	20.1±11.1	24.6±11.0	28.2±12.7	27.1±9.6	13.5±5.9	26.8±13.9	474.2±132.6
OR After Men	16.2±7.0	25.1±7.5	29.1±6.9	29.6±8.7	12.2±4.5	24.3±10.3	474.6±71.1
CR Before Women	15.4±10.7	23.3±12.4	27.4±11.2	33.9±12.8	15.3±5.8	31.6±18.7	662.4±229.3
CR Before Men	18.4±10.0	26.6±7.7	27.2±10.1	27.8±9.1	15.4±7.2	27.7±9.6	728.9±116.4
CR After Women	17.2±10.2	23.2±11.4	29.3±11.8	30.3±11.1	13.7±6.1	33.1±14.6	615.9±182.8
CR After Men	16.6±7.0	25.3±6.6	29.2±6.5	28.9±7.8	12.6±6.1	30.2±13.1	623.0±130.4

Table 2: Consolidated biomechanical data load of foot for basketball players

	Stress loading						
	Metatarsal (%)		Heel (%)		Center of Pressure		Trajectory
	Left foot	**Right foot**	**Left foot**	**Right foot**	**dX [mm]**	**dY[mm]**	**COF[mm]**
OR Before training	16.8±10.1	23.6±9.8	29.3±13.6	30.3±11.0	12.1±5.7	24.0±12.2	*515.4±109.5
OR After training	18.1±9.3	24.9±9.3	28.6±10.1	28.4±9.1	12.8±5.2	25.5±12.1	*474.4±105.5
CR Before training	16.9±10.3	24.8±10.3	27.4±10.5	30.9±11.4	15.4±6.4	29.7±14.7	**695.6±181.6
CR After training	16.9±8.6	24.3±9.2	29.3±9.3	29.5±9.5	13.2±6.0	31.7±13.7	**619.5±155.8

Wilcoxon Pairs Test - COF[mm] OR Before - OR After $p < 0.033$*, COF[mm] CR Before - CR After $p < 0.019$**