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respect. The average number of strokes per inning and the ratio of work period to rest period were both significantly lower in the college league players ($p < 0.05$). From the relationship between the average number of strokes and the ratio of work period to rest period, it became clear that the values of second class players' matches were marked more to the left and toward the lower side. The results obtained from these data indicate the demanding nature of badminton. In conclusion, I would like to note that it is necessary for the college league badminton players to obtain a high level of physical fitness, along with the ability to recover after work periods and be skilled in keeping rallies. Moreover, this information can assist badminton coaches in developing training programs that are more specific in nature than the present ones.

PA-69

The Effects of 10-Week Deep Water Running With Vest on Aerobic Fitness of the Middle-Age Female

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The Deep Water Exercise is new and getting popular sport, however, the effect of training on cardiovascular function is not much conducted. The purpose of this study was to investigate the effects of 10-week deep water running with vest of middle-age female on aerobic fitness. Twenty-four women (average age was 64.58 ± 4.25 yr) were recruited as subjects and randomly assigned to Deep Water Running (DWR, 12 subjects) and Control Group (CG, 12 subjects) equally. The DWR group had received 10-week deep water running with vest (3 time a week, 32 minutes a day with intensity of 55-70% maximal heart rate) and CG didn't participate any training. All subjects took YMCA test (by cycle ergometer) to predict the VO_{2max} and 6 minutes walking before and after training program. The collected data were analyzed by Paired Sample t-test and one way ANCOVA ($p < .05$). The VO_{2max} (DWR: pre 23.15 ± 4.04 vs after 28.31 ± 4.72 ml/kg/min; CG: pre 21.14 ± 4.79 vs after 23.87 ± 4.91 ml/kg/min) and six minutes walking (DWR: pre 572.5 ± 12.76 vs after 636.9 ± 14.22 m/6min; CG: pre 589.94 ± 14.79 vs after 591.12 ± 15.51 m/6min). DWR were significantly improved on VO_{2max} and six minutes walking ($p < .05$) after 10-week of deep water running with vest. Ten-week deep water running with vest can improve aerobic fitness of middle-age female.

PA-70

Investigating Some Selected Physiological Characteristics in Elite Female Futsal Players & Female Futsal Players of Ferdosi University of Mashhad

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The aim of the present study is to analyze and compare, an aerobic power & aerobic power in elite female futsal players and female futsal players in mashhad university. His investigation was one of a quasi - experimental nature carried out as a filed method. For this purpose 12 female university players (average age of $21 \pm 1/41$) and 12 female players in the national team (average age of $20/08 \pm 2/35$) were selected voluntarily. Five factors such as height, weight, BF%, an aerobic power which measured by Margaria-Calamen power Test and aerobic power which measured by Astrand Test. For the purpose of statistical analysis T test was used. Results showed that anaerobic power has significant difference between two groups. In BF% and VO_{2max} there is no significant difference. Anaerobic capacity in the intermittent game of soccer, would appear to be an important factor for successful performance. Also, teams with superior aerobic fitness would have the advantage and higher VO_{2max} will give a better base for on-field performance regarding intensity and demands of soccer match-play. Furthermore, the height, weight and body fat percentage, these parameters are not essential factors for success in futsal; more over, they might determine the playing positional role.

PA-71

Motion Analysis of Race Walking in an Actual Condition: Focusing on the "Loss of Contact"

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In walking race, the rule of "loss of contact" is judged by the judge's watching. It is a fact that there are a lot of misjudgments for this reason. It was demonstrated that even an international athletic meeting, many athletes violated the "loss of contact" from the result of video shooting in a present study. But the most these athletes were not disqualified in the race. The walking race of the male 50 km of international level was analyzed by video camera of 200 frames per second. The athletes of best four walkers were selected for analyze by means of computer analysis. The camera was set and filmed from a side view of the course. The video film chances were 25 times. In the most of the cases of walker presented the "loss of contact" in the race. It will be requested that a new idea for fair judgment of the race from both the judges and players, also the idea need understandable to the general spectator. From the result of present study, we recommend adopting video camera system