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MEASUREMENT OF LIMBS’ ACCELERATION IN TABLE TENNIS USING WIRELESS SENSORS NETWORK SYSTEM

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Introduction In Table Tennis, some coaches are eager to acquire the information of player limbs swing’s force during the training. But it is difficult to collect the real data of force directly during their movements. However, the acceleration data can be measured easily, and used to assess player’s force. The Wireless Sensor Network technology is applied to develop a system to meet the requirement of Table Tennis Coaches. Methods Our design is to measure the acceleration data of the athletes’ arms while they are swinging. By using of the accelerometer data, the upper limbs’ force can be evaluated. For example, a three-axis accelerometer node is fixed around player’s wrist, when they swing upper limbs, the acceleration data are collected. According to Newton’s second law F=ma, obviously, the more the acceleration of wrist is, the more force will put on the shot. Results The Wireless Sensor Network technology’s main features include the intelligent collection node, automatic network organization, self-management according to the protocols, programmable, wireless mesh network route, two-way signal transmission, etc. This developed measurement system by this MSN technology, more than two acceleration sensor nodes could be available inside this system and could be fixed on different positions of players’ limbs to acquire the acceleration data. And not only the acceleration data, but also many other kind of digital signals, such as video signals, pressure force, and angular acceleration. In a test for China Table Tennis male player by this system, the maximum acceleration of his left wrist is 20.62g. Discussion Although this system’s idea originate from the requirement of Table Tennis, the second prototype has been used in tennis, discus, shot. Due to the miniaturization and lightweight of the sensor node, and multi-nodes available in networking, more than one position’s acceleration of players’ body can be collected synchronously. And the players’ movement video shoted by DV and Basler high speed camera could also be collected synchronously in this system for players’ action performance analysis. References Halit Eren 2008. Wireless sensors and components: network, design and application. Mechanical Industry Press. Yu Haibin 2006. Intelligent wireless sensor network system. Science Press. Robert Faludi 2010. Building Wireless Sensor Networks. O’Reilly Media Inc. Wang Qing. Research and establishment of athletic ability status diagnosis and monitoring system for excellent athletes in our country [M]. Beijing: People’s Sports Publishing House, 2004. Holger Karl, Andreas Willig 2007. Wireless sensor network protocol and architecture Electronics Industry Press.

Health and Fitness

PHYSICAL ACTIVITY QUANTIFICATION IN ELDER WOMEN.

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Introduction In view of the society’s life expectancy increasing, mostly common in women, and the benefits provided by regular physical activity in elderly people (Aoyagi & Shephard, 2009), new physical activity initiatives and programs are being taken into consideration. The aim of the study was to make quantification of the physical activity made by elderly women and to measure the impact of a structured physical activity program over that physical activity. Method A quasi-experimental ex-post-facto design was used in this study, with a sample of 76 women aged 56-84 years (72.01 ± 5.28) from Alcobendas. Taking part, or not, in a structured physical activity program over that physical activity was the aim of the study. Results A quasi-experimental ex-post-facto design was used in this study, with a sample of 76 women aged 56-84 years (72.01 ± 5.28) from Alcobendas. Taking part, or not, in a structured physical activity program was included as independent variable as well as the age (plus-70 group, under-70 group) and the body-mass index (BMI). Physical activity levels were measured by means of triaxial accelerometers during a whole week. Results Women on structured physical activity program showed higher physical activity levels than sedentary women on weekdays (271680 ± 116937 vs. 191816 ± 83865 counts; P<0.05). The number of moderate-intensity physical activity minutes of plus-70 group was significantly higher than under-70’s in both weekdays (4030 ± 27.00 vs. 281 ± 22.20 min/day; P<0.05) and weekends (134 ± 26.40 vs. 219 ± 21.60 min/day; P<0.05). No significant differences were found (P>0.05) regarding the body-mass index. Discussion Women enrolled on structured physical activity programs were physically more active than sedentary counterparts. Besides, older women were more active in the weekdays than in weekends, as previously noted by other authors (Togel et al., 2008). The amount of moderate-intensity physical activity was loweron elderly women by increasing age. References Aoyagi, Y., & Shephard, R. J. (2009). Steps per day: the road to senior health? Sports Medicine, 39(6), 423-438. Togo, F., Watanabe, E., Park, H., Yasunaga, A., Park, S., Shephard, R. J., & Aoyagi, Y. (2008). How many days of pedometer use predict the annual activity of elderly women? Medicine and science in sports and exercise, 40(6), 1058.

THE EFFECT OF REGULAR PHYSICAL EXERCISE ON BODY COMPOSITION AND PHYSICAL FITNESS IN MIDDLE-AGE ADULTS COMMUNITY

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Introduction The prevalence of obesity has markedly increased in many parts of the word becoming a global epidemic and has been associated with chronic disease such as cardiovascular disease and diabetes. The main causes of obesity are related to nutritional imbalance and lack of regular physical activity. The present study aimed to investigate the effect of Physical Exercise Program (PEP) on body composition and physical fitness in middle-age adults community. Methods One hundred thirty one middle-aged adults (81.67 % female and 18.33 % male) were randomly recruited. The average age was 50 ± 4 years old. The PEP was performed during 50 minutes in low to moderate intensity for 6 consecutive months, three and two time a week in the follow modalities: hydrogymnastics, swimming or gymnastics. We evaluated body mass, height, upper limbs circumferences (forearm, arm, thorax, waist and abdomen), lower limbs circumferences (hip, thigh and calf) (Lohman et al., 1988), percentage of fat mass (Lukaski, 1987), number of arm flexion in 1 minute (ACSM, 2006), lumbar and lower limbs strength and percentage of maximum oxygen consumption estimated by 1 mile test (Kline et al., 1987) before and after 6 months of PEP implantation. Results The participants evaluated were classified: 28 % eutrophic, 42 % overweight and 17 % obese I, 9 % obese II and 3 % obese III. The PEP reduced the percentage of fat mass, circumferences of upper limbs (except left forearm and hip), but approximately 5 - 10 % (p<0.05). In addition, PEP induced increase lower limb circumferences by approximately 1 - 3 %. We also observed an improvement in the number of arm flexion (16.5 to 19 repetition), lumbar strength (45.3 to 50 kg), lower limbs strength (42 to 56 kg) and percentage of maximum oxygen consumption (15 to 28 %) (p<0.05). Discussion The PEP implantation reduced