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RELATIONSHIP BETWEEN CURVATURE OF SPINAL COLUMN AND BODY COMPOSITION AND VOLUME OF CHEST EXPANSION IN VOLLEYBALL PLAYERS

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Abstract
Identifying requirements of different sport fields is considered one of the important research areas in sport sciences and physical education. Researches in this field, through identifying and analyzing effective factors in sport performance of age groups, gender and different positions, try to provide necessary information for organizing programs in the process of talent selection and training elites. The main aim was to assess relationship between curvature of spinal column and body composition and volume of chest expansion in volleyball players. Tests such as Mean, Standard Deviation, Percentage, t-ratio was used to comprise the data and to classify the kind and character, position, side, reason of damage, season, work out, position etc, deploying SPSS was used for the analysis of data and desired results were obtained.
Keywords: Curvature, Spinal column, body composition, chest expansion and volleyball players.

Introduction
Today, attending in international sport events would be a futile effort without applying scientific findings. Among important and substantial principles in training elite athletes is identifying body composition and congenital and acquired skills. Investigating anthropometric, physiological and physical characteristics are vital in reaching championships (Montazeri, 2003; Keogh, 1999; Wilmore & Costill, 1999). It is clearly evident that specific physical features and anthropometric profiles determine whether a player is capable of participating in highest levels of a sport field or not (Claessens, Lefevre, Beunen & Malina, 1999; Bourgois et al, 2000; Reilly, Bangsbo & Franks, 2000; Gabbett, 2000; Ackland, Ong, Kerr & Ridge, 2003; Slater et al, 2005). Anthropometric and morphological characteristics are sensitive indices for physical growth and nutritional status of athletes in reaching the highest point in their career (Wilmore & Costill, 1999; Chatterjee, Chatterjee & Bandhyopadhyay, 2006). This highly relates to genetics, age, gender, socioeconomic status, race, height, diets, personal cares and sport exercises (Bouchard &Lortie, 1984; Fagard, Bielen & Amery, 1991). Experts in the field of physical education and sport sciences believe that while appropriate selection of talented people, organized exercise program and creating a suitable context are effective in increasing efficiency and performance of athletes, the most important thing is focusing on body composition and anthropometric features. Therefore, recently much attention has been paid to applying Kin anthropometry methods in different sport fields, specifically after summer Olympic Games in Mexico in 1968 and Montreal Olympic Games.

As Schmitt (2002) argued, every research study can deal with certain limited aspects of a specific issue in a thorough and complete way and must leave the other aspects to be covered by other researchers in later studies. The present study too needs to be limited in its scope to be able to deal with the investigated variables in a thorough way. Therefore the present study will investigate a selected sample of Professional Volleyball players, including 25 male athletes. The main aim of the study will be the investigation of the relation of spinal column curvature of volleyball players on their body composition, Spinal column Flexibility and volume of chest expansion.

Resistance to Loading of Spinal Column

The spinal curves increase the shock-absorbing capacity of the vertebral column and facilitate its stability and equilibrium. The vertebral column acts like an elastic column with alternating curves. Because it has 3 curves, the spine is 10 times more resistant to loading than if there were no curves. The law of physics that governs elastic

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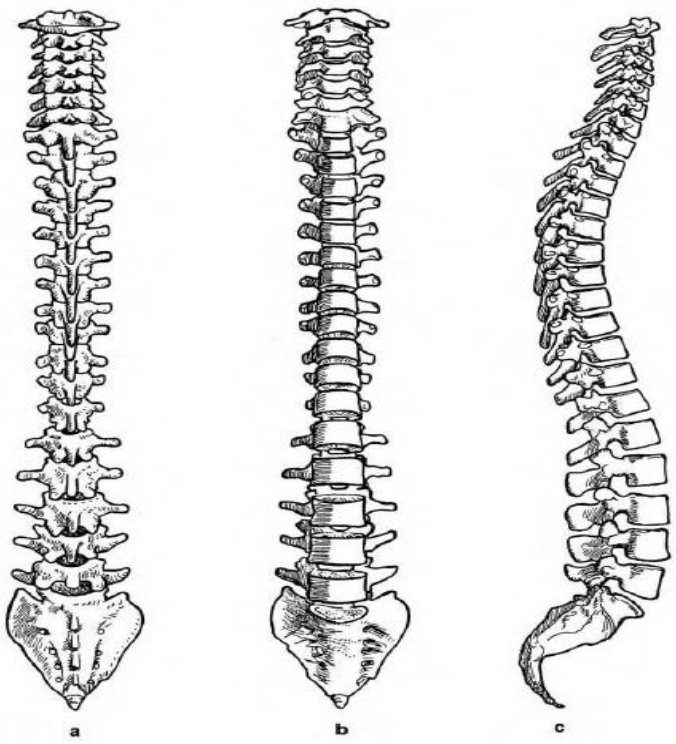
columns with alternating curves is expressed as follows: if n is the number of curvatures and 1 is the resistance of a straight column system, the resistance of the system with alternating curves is equal to n2+1, in this case 32+ 1 = 10. Although this law cannot be strictly applied to the spine, it nevertheless gives us an appreciation of the effect of spinal curves on stability. When viewed from the side, an adult spine has a natural S-shaped curve. The neck (cervical) and low back (lumbar) regions have a slight concave curve, and the thoracic and sacral regions have a gentle convex curve. The curves work like a coiled spring to absorb shock, maintain balance, and allow range of motion throughout the spinal column.



Vertebral column and sacrum. a. Posterior view. b. Anterior view. c. Lateral view.

Methodology

Statistical society consisted of national athletes of volleyball in Iran. Volleyball players, having two years of participating in national & international competitions were recruited in this study. None of them have records of operation in spinal cords, chronic backache, deformity, asthma, smoking, special disease or fracture. To determine sample volume, 30 persons were selected using convenient and purposeful method for every sport field. First, an invitation was sent to all persons, and tester explained method of testing and physical examination. The tastes were assured about confidentiality. The method of study is comparative-causative. Moreover, it is applicational in purpose and retrospective in time. The reason of using this method was identifying age, gender and task differences in terms of body composition as well as physiological, physical and anthropometric characteristics. In these process to find the incidence and prevalence of injuries data was summarized, and statistical techniques i.e. Mean, Standard Deviation, Percentage, t-ratio was used to comprise the data and to classify the kind and character, position, side, reason of damage, season, work out, position etc. likewise appropriate statistical software like Microsoft office excel and SPSS was used for the analysis of data.

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Findings

TABLE 1
RESULTS OF PEARSON CORRELATION COEFFICIENT (RELATION BETWEEN VOLUME OF CHEST EXPANSION AND DELMAS AMONG VOLLEYBALL PLAYERS)

Measured Item	Frequency	'r'	Level of significance
Volume of chest expansion and Delmas index	30	-0.35	0.05

According to results, observed r (-0.35) at α = 0.05 indicates that no significant correlation exists between volume of chest expansion and Delmas index.

Second hypothesis: There is a significant relation between curvature of spinal column and volume of chest expansion among volleyball players

TABLE 2
RESULTS OF PEARSON CORRELATION COEFFICIENT (RELATION BETWEEN CURVATURE OF SPINAL COLUMN AND VOLUME OF CHEST EXPANSION AMONG VOLLEYBALL PLAYERS)

Measured item	Frequency	'r'	Level of significance
Curvature of Spinal Column and Volume of Chest Expansion	30	-0.39	0.05

According to results, observed r (-0.39) at α = 0.05 represents a negatively significant correlation between curvature of spinal column with volume of chest expansion in volleyball players.

Conclusion

The issue of proper measurement of natural vertebrae and changes in the sagittal plane is the subject of much discussion in today's lectures. In addition, there is no uniform observation of balance in spinal column in the field of medical sport. Neuroscientists, physiotherapists, chiropodists and massagers have done extensive research in this field. The sagittal curvature at the surface of the sagittal, known as lordosis and kyphosis, forms the entire postural of the individual and provides equilibrium for body's center of gravity. Abnormal curvature at sagittal surface has a destructive effect on the joints of the lumbar spine, knees and legs. The results of this study indicate that there is no significant difference between the volume of chest expansion of elite Volleyball players and non-athletes. Volleyball exercises do not play a role in maximizing maximum oxygen consumption due to the use of an anaerobic energy system. It seems that relation between maximum chest expansion and spinal curvatures is subject to higher levels of kyphosis and lordosis.

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