

Equal But Separate — Ensuring Safety In Athletics

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The competitive athletic scene is in the forefront of controversy and is experiencing a period of great change. Those in athletics are being faced with many questions, which when answered will shape future athletic competition for all. Through the influence of the enactment of Title IX, one question in particular is being asked numerous times by numerous people throughout the country. That question is, do women have the right to compete on men's athletic teams when comparable women's teams do not exist? When that question is asked the opposite side is inevitable — do men have the right to compete on women's teams when comparable men's teams do not exist?

These questions elicit varied responses, all being loudly voiced and firm, and the court systems throughout the country are being asked to supply the final answers. But there exist facts, well documented and well proven that can provide some common sense answers to these controversial questions. Definite anatomical and physiological differences exist between the male and female that precludes mixed athletic competition in certain sports. It is necessary to look at these differences to provide answers to the questions concerning mixed competition because the differences are clear and the answers appear to be much simplified when we rely on the facts.

PRE-PUBERTY — No essential difference in work capacity exists between boys and girls in the period of pre-adolescence. (2) Males and females have the capability of equal performance up to ten to fourteen years of age. Females begin their adolescent growth spurt between 10 1/2 to 13 years of age. This growth spurt is terminated at the onset of menstruation and total growth terminates at approximately sixteen years of age. Males begin their

growth spurt at 12 1/2 to 15 years of age. These extra years of physical growth, under the influence of growth hormones, prior to sexual maturity, account for the greater size of males. Males experience, during this time, a significant increase in creatinine excretion, which is an indicator of muscle mass. This increase does not occur in the female.

Therefore, at puberty, boys surpass girls in all athletic performances, except flexibility. The male at this point becomes considerably stronger, taller, heavier, possesses greater muscular and cardiovascular endurance, and is more proficient in almost all motor skills. These differences increase through full maturity at which time they become relatively constant through life.

FAT vs. MUSCLE — By the age of seventeen, males are two to four times stronger than females as a result of a greater ration of muscle to fat in males. (5) Relative to body composition, females possess less bone mass and less muscle components than males. Muscle comprises 39.9% of the females total body weight as compared to 51.5% in males: The more fat and less muscle per unit volume in the female is significant in modifying a woman's work capacity, endurance and athletic performance in which strength is a factor. (5) "The combination of more fat and less muscle per unit volume has a deleterious effect upon physical performances requiring strength, speed and power". (3) This increased percentage of fat in girls places them at a disadvantage when competing against boys. Females accumulate fat on the waist, arms and thighs whereas men accumulate fat on the back, chest and abdomen. This difference in distribution has implications for movement efficiency. (3)

The fact that men are heavier, leaner and larger than women are current absolutes. The strength that women can generate as compared to men has been estimated at 75-80% (Rfland), 60% (Hettinger) and 50% (Shaffer-1964, Kroll-1971). (3) Assmussen (1973) has indicated that an average estimate from all studies might be that an adult woman can produce about 65% of the strength that an average man can produce. (3) These differences are attributed to the superior size of the male, the increase in muscle mass, and the strength proportional to the transverse sectional area of muscle.

CARDIOVASCULAR DIFFERENCES — The



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physiological support systems present some marked differences between the male and female.

It is apparent that men have larger hearts, greater stroke volume, greater cardiac output, greater lung capacity, faster return from exercise to resting levels, greater hemoglobin content and consequently, a higher aerobic capacity. Males have a greater potential for endurance that cannot be matched by females and at submaximal work levels, females have to work much harder to produce similar work capacities of males.⁽³⁾ The maximum oxygen uptake tests (the best single criterion of cardiovascular endurance) show a clear superiority for men. Males have a higher percentage of red blood cells than females and 30% greater amount of total body hemoglobin due to their greater size. This produces a higher oxygen content of the blood. Because of the smaller size of the heart and lungs in the female, a lower stroke volume and lower vital capacity exist. This data regarding physiological differences clearly indicates that women should not compete against men in endurance events, if competitors are to have equal opportunities to win.

BIOMECHANICAL DISADVANTAGES — From a biomechanical point of view "the longer and heavier bones of the male add to body weight and the longer levers provide a much greater excursion of the moving ends, resulting in greater speed and force, a decided advantage in throwing, striking and explosive types of events".⁽⁴⁾ The longer the limbs and less fat in proportion to muscle mass, the greater the rotatory speed that may be produced.

The sex differentiated factors previously mentioned, such as "comparative body size, body composition, skeletal differences, muscle strength and mass, and cardiorespiratory functioning are reasons why performance differences between men and women are as great as they are".⁽³⁾

Since the muscles of the male are of greater bulk than the female and strength potential is directly related to the physiological cross section of the muscle itself, the male possesses greater strength in terms of muscle contraction. This advantage, coupled with the advantage he enjoys in respect to leverage and angles of pull, makes it possible for him to perform at levels of strength not possible for women.⁽⁴⁾

MALE vs. FEMALE — A DEFINITE NO — "Comparisons of the physiques of male and female athletes reveal that males have specific physical advantages that should preclude their competing with females".⁽³⁾ The "anthropometric differences indicate that the female should compete only with those of her own sex in activities where strength, power, and endurance are the principle factors".⁽⁴⁾ It is "inconceivable to believe that persons would suggest co-ed sports in which the average woman will engage in physical contact with the average man".⁽⁵⁾

Because of the distinct disadvantages between the male and the female it is advisable on medical grounds not to participate together in contact sports. Even when competitors are matched according to weight, girls are still exposed to potentially greater injury since the ratio of adipose tissue to lean body weight varies between the two sexes and puts the girl at a disadvantage. "Such participation with its inherent injury risk jeopardizes the health and safety of the female athlete and clearly outweighs the benefits of such participation."⁽²⁾

In 1973, the New York State Board of Regents passed an amendment granting boys the opportunity to compete in sports that were open formerly to women only. This is in accordance with the Title IX regulation prohibiting any student to be excluded from competition solely by reason of his or her sex. However, the amendment prohibits mixed competition in baseball, basketball, field hockey,

football, ice hockey, lacrosse, soccer, softball, speedball, team handball, power volleyball and wrestling".⁽¹⁾

CONTACT, NON-CONTACT? Many sports are relatively easy to classify as contact or non-contact activities, i.e. football. However, the problem in determining appropriate sport participation for men and women becomes compounded when certain sports do not specifically fall into a contact, non-contact classification. Power volleyball has been a sport that has created great controversy in this regard. It is essential in these instances to refer to the factual information regarding the differences in the sexes that does exist.

The anthropometric and physiological differences mentioned above that exist between men and women, present specific information as to why men and women should compete on separate teams when considering the sport of power volleyball. Furthermore, the biomechanical advantage that the man possesses in regard to leverage and throwing and striking certainly creates an imbalance in force situation which places the female in a position of physical danger.⁽⁵⁾ With his increased strength the male exhibits a greater vertical jump potential, that coupled with the official net height difference that exists in men's and women's volleyball (7'4 1/4" for women and 8' for men) gives the male a distinct advantage in spiking skills, and presents yet another potential danger for the female competing on an opposing team.

It must be the goal of all athletic programs to establish principles and guidelines for safe, challenging and enjoyable competition by girls and women. Such principles and guidelines must be established as a result of reviewing the factual information presented regarding the female athlete, not merely based on legal rights or emotions.

CONCLUSIONS — Women are certainly capable of competing successfully in high level athletic performances. The abilities of the female athlete have been previously underestimated and she has not been stressed or conditioned to her potential. Yet, "even though the female physical machine can become quite efficient, it is inferior in the production of muscular force, speed, and endurance when compared to that of the male".⁽³⁾ The "essential fact is that the superior physical performance of the male is to be accepted as a performance dissimilarity, but not used as basis for sport inequality".⁽³⁾ We do not consider the lightweight wrestler to be an inferior performer as compared to the heavyweight. But neither do we put the two athletes against one another in competition in the athletic arena and if we did, no one could ever call it equal or fair or safe — or even sport.

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