

ATHLETICS OMNIBUS – DIFFERENCES BETWEEN MEN AND WOMEN

From the Athletics Omnibus of Richard Stander, South Africa

1. INTRODUCTION

Throughout history perceptions existed that men are superior to women. The development of women was, and in some cases still are, suppressed by cultural and religious believes. Prejudice in many cases made the development of female athletics difficult.

Traditionally women were not allowed near the competition areas, as men were competing for honour wearing little or no clothing. It was only in the late 1800's that women were allowed to compete in a limited amount of events.

As recent as 10 years ago, women were not allowed to compete at the Olympic Games in Pole Vault, Triple Jump, Hammer Throw, Long Distance Running or Long Distance Race Walking and Steeple Chase.

Even today, many countries do not allow women to participate freely. Often the prescribed and restrictive clothing women have to wear prohibits women from performing according to their true potential.

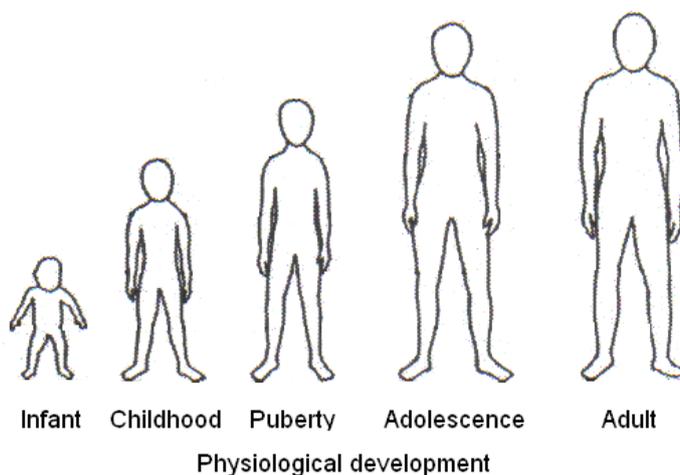
Fortunately in today's modern society, information is much more available then in the past. It is universally accepted that athletics as a sport does not harm femininity and that physical activity is in total harmony with the image of the modern woman.

We now know that the advantages of physical activity are the same for men and women.

We know that the practice of athletics is suitable for both sexes and the precautions to be taken into account for the one are also valid for the other.

The criteria for training and participation in athletics should not be based on subjective perceptions about men and women.

The principles of training and participation should be based on the physiological development of the individual.



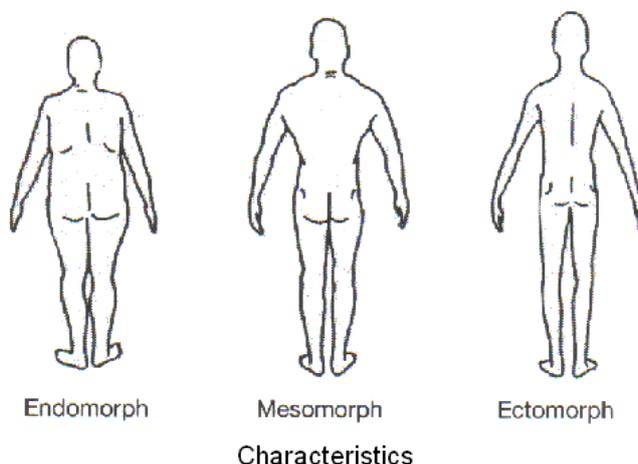
The four phases of development for the child to become an adult should be a deciding factor of the level of for training and participation in athletics. Each of the four phases has specific needs that must be addressed.

The characteristics of the individual should also be the deciding factor for training and participation in athletics.

The endomorph is a heavily built individual and the body type is not suitable for long distance running purity because the risks of injury to, and overuse of muscles.

The endomorph are more likely to enjoy satisfaction and success by participating in field events such as shot put, discus throw, javelin throw or hammer throw.

The mesomorph is more likely to enjoy satisfaction and success by participating in events such as the sprints or hurdles.



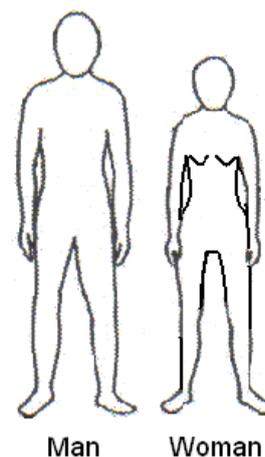
The ectomorph has a light body frame and is likely to enjoy satisfaction and success by participating in high jump, triple jump and long jump.

This article will only focus on the generic differences between men and women.

This article will attempt to clarify some of the perceptions that existed about the differences between men and women participating in sport.

The anatomical, physiological and psychological differences of men and women will be identified and suggestions will be made to develop men and women on their respective strengths.

There are minor variations when comparing the anatomy, physiology and psychology of men and women in Europe, Asia and Africa.



2. ANATOMICAL DIFFERENCES

Apart from the visible genital differences of an infant, the way to tell a boy and a girl apart during the infancy and childhood phases, without embarrassing them, is to look at the way the boys and girls wear their clothing and cut their hair.

It is only during puberty that changes between boys and girls become more obvious. The most obvious changes during puberty are the physical changes.

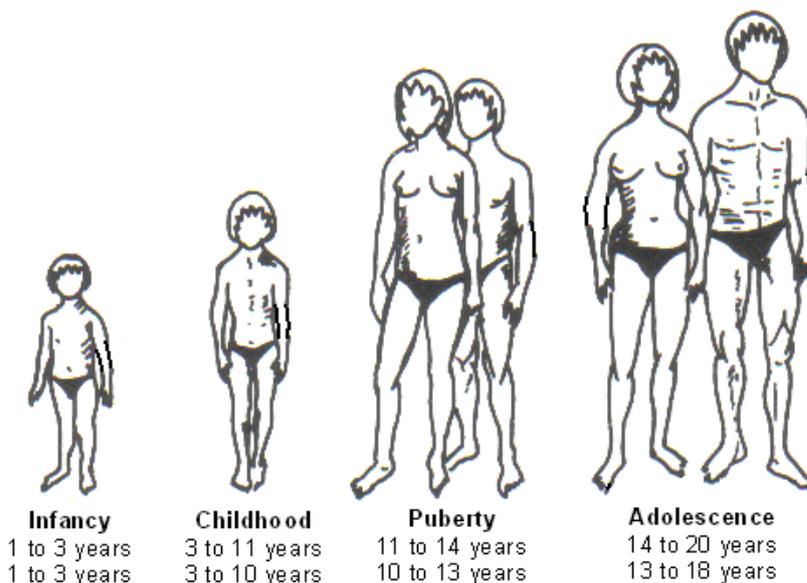
The diagram illustrates the physical differences in the various phases of development.

The body shape starts to change mainly because of skeletal and adipose (fat) tissue changes.

The bone structure of the skeleton, which was mostly cartilages at birth, change to more dense bone structures as the child grows older.

As the bone structure develops, boys start to develop broader shoulders with narrower hips and the girls develop broader hips and narrower shoulders.

During puberty the bone density of boys will become higher than in the case of the girls.



PHASES BETWEEN BIRTH AND ADULTHOOD

Disparity in the ratio of adipose (fat) tissue to lean body weight increase also takes place. From puberty, women will develop more fat tissue than men. Adult women have $\pm 20\%$ body fat as compared to $\pm 10\%$ body fat in men.

The muscle mass of men is $\pm 41\%$ of his total body mass as apposed to the woman's $\pm 35\%$. Under the same training conditions the man's muscles will develop $\pm 6\%$ per week as apposed to the $\pm 4\%$ of women.

At 14 years of age the girl has already grown to $\pm 97\%$ of her final height as apposed to a boy that will grow to $\pm 85\%$ of his final height at the same age.

On average the fully grown women's spine is $\pm 14\%$ shorter than that of the average man. The shorter spine of women creates the perception that the legs of women are longer than that of men.

Purely academically, the weight of a woman's brain is $\pm 92.5\%$. This however has very little impact on the capacity of women to perform in sport.

3. PHYSIOLOGICAL DIFFERENCES

The cardio vascular system (blood circulation system) of men and women on average differ as follows:

- 3.1. Men has $\pm 80\%$ larger heart than women
- 3.2. Men has $\pm 40\%$ more blood volume in the body than women
- 3.3. Men has $\pm 11\%$ more red blood cells in the body than women
- 3.4. Men has $\pm 11\%$ more haemoglobin in the body than women

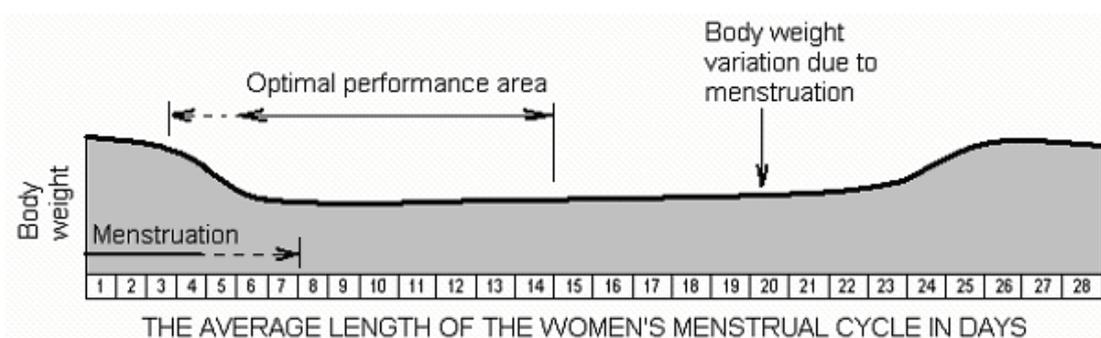
The cardio respiratory system (oxygen carrying system) of men is on average $\pm 39\%$ bigger than the cardio respiratory system of women and the consumption of oxygen of women is 17% less than men.

There are however virtually no difference in the anaerobic capacity (energy production without oxygen) of men and women.

One very obvious male/female physiological difference influencing the female lifestyle is the female menstrual cycle. Menstruation (periods) is a normal biological process that starts with the sexual development of a girl during early puberty, ± 13 years, but can be as early as 8 years or as late as 16 years.

Menstruation signals the start of the production of mature eggs in the woman's ovaries. It starts with the loss of small amounts of blood through the vagina.

Menstruation on average lasts about 5 days. Weight loss of between 0.5 – 3 kg may be experienced during menstruation.



Physical activity enhances the ability of a woman to cope with menstrual symptoms. Menstruation may stop during periods of strenuous and prolonged training. When this happens, reduce training and menstruation will return. Menstruation may also stop when the body fat ratio proportional to body weight drops to less than 6%.

There is no loss in the performance capacity of women during menstruation. The training loads of women should be reduced between the last 3 days of the menstrual cycle and the first day of menstruation.

4. PSYCHOLOGICAL CAPACITY

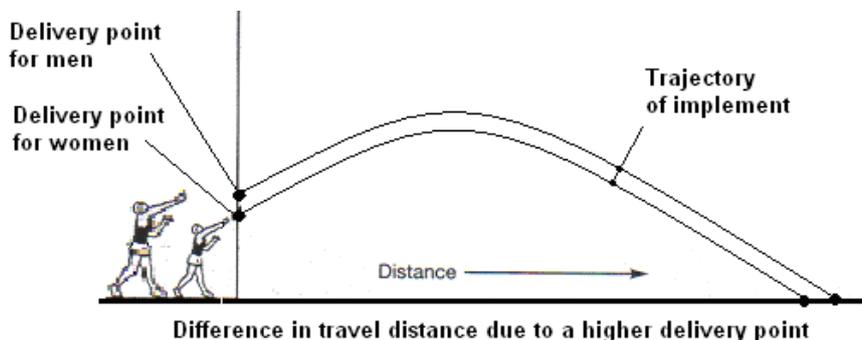
At birth and during infancy, there are no essential differences in the physiological working capacity between boys and girls. It is only during puberty that the differences start to appear.

Girls reach their maximum work capacity sooner than boys. On average the difference is 1 – 2 years.

Due to the boys that developed a higher bone density than girls during puberty and adolescence, the bones of boys become stronger. Due to the lesser bone density of women, women have a greater risk to develop bone fractures than men.

The bones in the skeleton of men grow slightly longer than the bones of women resulting in men being slightly taller.

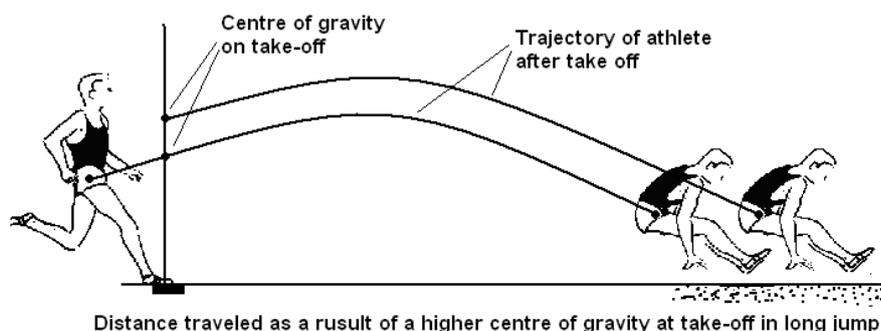
The greater height of a man provides an advantage in the delivery distance in field events as illustrated in the sketch.



The higher centre of gravity of men also provides an advantage for men during the take-off in jumping events.

The wider hip of the women also result in the centre of gravity being lower than for men.

As a result stride lengths will be shorter, the trajectory in horizontal jumps will be shorter, the trajectory in vertical jumps will be lower, etc.



Due to the lower centre of gravity of women, and a greater distribution of weight towards the hips and thighs, women normally enjoy greater range of joint action than men.

The average range of joint movement and joint flexibility of women is $\pm 7\%$ better than that of men.

As a result, the co-ordination of women is much better than that of men, which makes women a lesser injury risk in technical events such as the jumps, hurdles etc.

Due to the bigger joint movement and flexibility, women execute advanced techniques such as the Fosbury Flop in high jump, hurdling and mobility exercises much easier than men.



Because men have broader shoulders than women, and women have broader hips than men, the angles of tendon attachment and muscle alignment are also different.

The wider the hips, the more the muscles will lose the efficiency of the muscle pull, resulting in an increased injury risk.

Less obvious but very important skeletal changes are the smaller elbows and smaller carrying ankle in males which makes for greater strength in males.

After puberty, boys surpass girls in all characteristics of athletic performance except flexibility and neuromuscular co-ordination.



As a result of the lesser vascular and respiratory capacity of women, men will generally do better in endurance events lasting up to 2 hours. In events lasting longer than 2 hours, women will do better because of their greater natural store of fuel in the form of fat in the body.

Due to menstruation cycles women will experience blood loss during the 1st few days of the menstrual cycle. Due to the blood loss and the added stress as a result of training, women may become anaemic.

The reduced quantity of haemoglobin in the blood as a result of the menstruation may cause excessive tiredness, breathlessness, have less resistance to infection and the skin may appear pallor. These symptoms are all curable by simple intervention by a Doctor.

The duration of menstruation and blood loss may be irregular and tend to be longer and more severe during adolescence.

Prolonged periods of stress may also lengthen the menstruation cycle as well as the menstruation itself. Seek medical help when this happens.

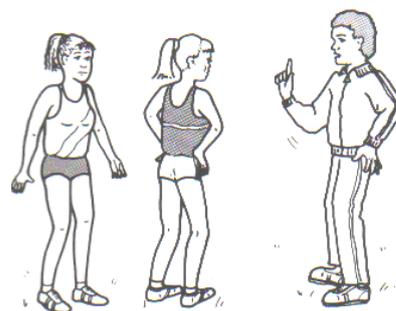
5. PSYCHOLOGICAL DEVELOPMENT

There are differences in the psychological behavior of men and women. The reasons for the psychological differences may differ. The more visible sexual development of both men and women during puberty has as a result that both men and women are more aware of their sexual status.

The more visible sexual development of women during puberty causes physiological difficulties, and also causes mental and emotional preoccupation. Due to their sexual awareness, girls are much more likely to inhibit their participation and physical activity.

The most clearly psychological differences are:

- 5.1. Women develop psychological stress faster than men during competition
- 5.2. Women are much more dependant on personal care than men
- 5.3. Women are much easier to motivate than men
- 5.4. Women are more difficult to work with in a group than men
- 5.5. Women lose their fear for losing faster and will hope for success much faster than men.
- 5.6. Women are easier motivated by their own achievements than men.
- 5.7. Women's emotional patterns vary according to their menstrual cycle.



6. CONCLUSION

The main differences between men and women are:

- 6.1. Women have a smaller body than men
- 6.2. Women have shorter legs than men
- 6.3. Women have a narrower rib cage than men
- 6.4. Women have wider hips and smaller shoulders than men
- 6.5. The pelvis of women has a different inclination than men
- 6.6. The curvature of the spine of women is greater than that of men
- 6.7. The elbows and the knees of women are bigger than that of men
- 6.8. The muscular volume of women is less than that of men
- 6.9. The percentage of adipose tissue of women is greater than in men.
- 6.10. The lungs are smaller and consumption of oxygen of women is less than men.
- 6.11. The heart of a woman is smaller and the circulatory capacity is limited by a smaller heart
- 6.12. The women's body has less volume of blood and a proportionally less quantity of red blood cells
- 6.13. The neuro-muscular system of women has smaller muscle fibres.

As a result of the anatomical, physiological and psychological differences between men and women, women have less strength, less speed and speed endurance than men. The effectiveness in biomechanical and muscular activity of women is also less than men.

Psychologically, women are emotionally more advanced than men. Women are also more sensitive than men. However due to the menstrual cycle, relaxation training should be applied more frequently for women to create psychological stability.

Women have excellent elasticity, flexibility and co-ordination, have more enthusiasm, conscientiousness and patience.

The general rule when training both men and women is that the training load for women should be about two thirds of the training load of a man and that training loads for women must be phased in over longer periods of time than for men.

Strength training exercises must be applied more gradually for women than for men. Women finish their adolescent growth spurt earlier than men, and women can therefore start with strength training immediately after the adolescent growth spurt, up to 2 years before the men to compensate for the gradual application of strength training.

Technically, the training of women should also be adjusted. In running events, the stride length of women is shorter and the arm action is less efficient, but the cadence (stride frequency) is the same for both men and women. Due to the shorter legs, hurdles for women must be lower. The lower hurdles allows for a low angle of attack, a faster and better co-ordinated action of the free leg and a speedier and more economic action of the driving leg.

In jumps women must use techniques that rely less on leg strength, e.g. the Fosbury flop is much more suitable for women than the straddle because it requires less leg strength for the take-off. The Fosbury is also more suited to women, because of their greater flexibility. The run-ups for all jumps should be shorter for women. A longer run-up requires more leg strength during take-off in the jumps.

In the throwing events women should rely more on speed and technique to compensate for the lack of muscle strength.

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