

PDHPE

Research Paper

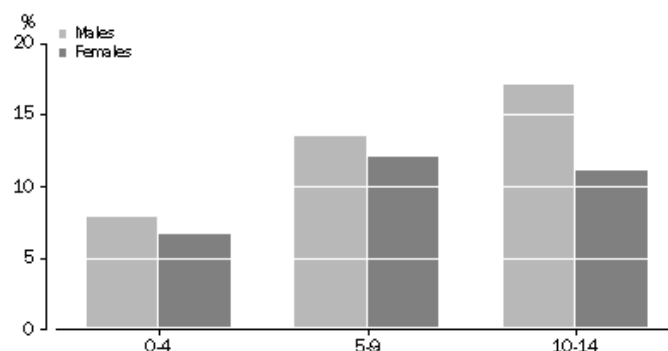
Topic: How does sports medicine address the demands of specific athletes?

Sports medicine defined as 'the field of medicine concerned with physical fitness and the prevention, diagnosis, and treatment of injuries sustained in sports or exercise-related activities.'¹ In relation to addressing the demands of specific athletes, this is dynamic and relative to the individual. Generally, athletes can be grouped among three categories for this topic – Children and young athletes; Adult and aged athletes, and female athletes.

Children and young athletes face several limitations which may impede their performance in comparison with a fully functional athlete. There are considerations which need to be taken into account when organising competition in sport for children and young athletes under sports medicine approach. These include the effects of heat, higher susceptibility and probability to injury and the complications of inherited medical conditions.

Children and young athletes who have medical conditions such as epilepsy, asthma and diabetes (the 3 most common childhood illnesses) must take special precaution when participating in physical activity. The number of children with type 1 diabetes in Australia is increasing, with 'Previous state-based estimates of the incidence of Type 1 diabetes in children have ranged from 12.3 per 100,000 in 1983 to 23.2 in 2002 (Australian Institute for Health and Welfare)². Type 1 diabetes affects glucose distribution from the bloodstream to convert into energy. In relation to sport and physical activity, obstacles which detract from optimum performance and increase the risk of further and prolonged illness such as kidney damage can be minimised by insulin injections in the abdomen or buttocks before and after sport or physical activity. This can be conducted via an insulin pump or injected manually, as insulin is absorbed faster from the arms or legs.

Asthma is another common medical condition in children. In 2004-05, one in eight children aged under 15 years (12%) were reported as having asthma as a long-term health condition, which was similar to the rate in 2001 (ABS 2006 & ABS 2002). Among children aged under 15 years, rates of asthma were 13% for boys and 10% for girls³(as seen in the provided graph). Asthma in sport causes increased difficulty in breathing, as airways in the lungs constrict quickly with asthmatic sufferers.



Source: ABS, National Health Survey, 2004-05

¹ <http://www.principalhealthnews.com/topic/medglossary>

² <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/4829.0.55.001/>

³ <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/4829.0.55.001/>

This can cause an asthma attack – the airways will constrict immediately upon sudden halt of physical activity. Sports medicine addresses this issue in the prevention from this occurrence by advising sufferers to participate in team sports where their condition can be monitored, and have a gradual warm-up and cool-down so their lungs can adjust to shifts in activity intensity. Adequate water must be consumed and if required, inhalers should be puffed for appropriate use.

Children fatigue much more quickly under the influence of heat and high humidity in comparison with adults. This is because children have:

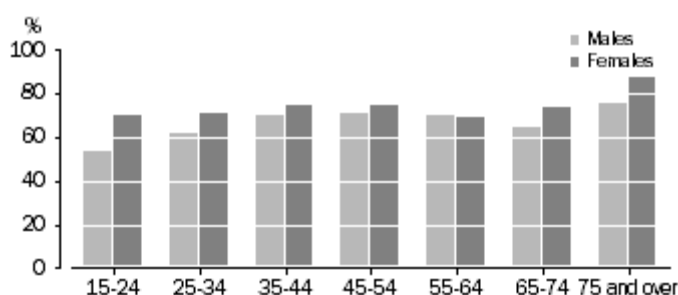
- A larger surface area/body mass ratio which affects their ability to dissipate heat when environmental temperature is greater than skin temperature (Falk 1998). This can be a disadvantage when heat gain occurs via radiation or convection.
- Immature sweating mechanisms which require a greater increase in body temperature before the onset of sweating.
- Fewer and smaller sweat glands which limits the production of sweat (Araki et al., 1979, Falk, 1998, Wagner et al., 1974)⁴

Hence sports medicine demands that young athletes and children play sport and perform physical activity in environments with a temperature less than 34°C. This will reduce risk and have a higher probability of preventing heat exhaustion and dehydration to children and young athletes, of whom their main priorities are safety and enjoyment.

Another consideration is weight classification – the growing process occurs continuously through childhood, as the rate differs from child to child. This is apparent in contact sports such as rugby league and rugby union, where size is a main discriminate between player ability, and risk of injury is increased. Hence there may be a need to classify children into different weight divisions in contact sport, if age divisions are insufficient in ensuring athlete safety.

Adults and aged athletes experience different barriers impeding optimum performance from a sports medicine perspective. As individuals grow older they have a likelihood of suffering from aging bones and muscles, which affect their physical capabilities to varying degree. Problems can arise, including coronary heart disease, osteoporosis and decrease in flexibility and joint mobility. However, they can be the result of natural progression(old age). Sports medicine addresses these demands in allowing sport and physical activity to be performed by aged athletes and adults that is both safe and of suitable intensity by taking into consideration their lifestyle changes – access to physical activity and sport is hindered by other priorities, such as work and family commitments.

Sedentary or low exercise levels, 2004-05



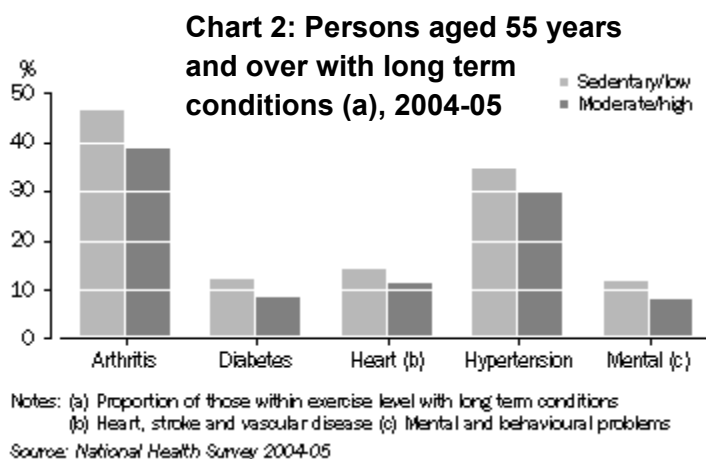
Source: National Health Survey, 2004-05 (cat. no. 4364.0)

⁴ http://www.sma.org.au/information/preventing_heat_illness_in_sport_policy.asp

Recent social trends (as of 2004) show a high level of adults (>60%) who undertake little or no physical activity during the week⁵. Another aspect of this study suggests this lack of exercise has attributed to lifestyle-related diseases incurred over the age of 55. The case study states 'While most of those who were sedentary or exercised at a low level considered they had excellent or very good health (52%), people with moderate to high exercise levels were more likely to report excellent or very good health (67%).'

It is against common sense to for a typical adult to perform at a high intensity for prolonged periods of time, if they are suffering from any of the following conditions. However, this is relative to the condition they are experiencing. Heart conditions, involving cardiovascular problems account for the 3rd largest group of aged athletes with long term conditions. They can be caused by smoking, high blood pressure, obesity and a diet containing high blood cholesterol accompanied by an inactive lifestyle. Individuals suffering from heart conditions must follow these guidelines and restrictions to ensure safety whilst performing physical activity:

- Initially, they require medical clearance
- Exercise must be aerobic
- Progress must be gradual
- Activity needs to be at moderate intensity (at maximum)⁶



If this is not followed, consequences will occur to cause possible cardiovascular emergencies such as heart attack, stroke, angina, hypertension and acute exacerbation of chronic heart failure.

Another primary long term condition experienced by people aged over 55 years is arthritis, which is highest in terms of sufferers. Arthritis can cause osteoarthritis – 'damage to the joints, particularly at the cartilage-covered articulating surfaces'.⁷ If an individual suffers from this condition, it is recommended that they participate in non-weight bearing sports, such as cycling, swimming and water polo, or low impact activities such as walking and aerobics. They also need to be specific to a person's physical limitations, as flexibility and joint mobility wears out through arthritis, aching joints and tight muscles. There is no treatment that can reverse the effects of osteoarthritis, but by taking part in suitable exercise the surrounding muscle and bone can be kept in good condition. In doing so, there is a possibility that a normal range of motion can be achieved.

⁵ <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4835.0.55.001>

⁶ Ruskin R, Proctor K, Neeves D, *PDHPE Outcomes 2 HSC Course*, John Wiley and Sons Ltd, Milton 2007

⁷ Sports Medicine Australia, *Sports Medicine for Sports Trainers*, Debbie Lee, Australia 2007

Female athletes have demands due to: lower energy availability (eating disorder), menstrual irregularities (amenorrhoea) and weak bones (stress fractures and osteoporosis). This is the known as the 'Female Athlete Triad'. Sports medicine takes these factors into consideration whilst addressing the demands of female athletes.

Statistics suggest 'that in Australia 2-3% of adolescent and adult females satisfy the DSM IV diagnostic criteria for anorexia and bulimia nervosa'⁸ However, in sport it has been found that '7 percent of athletes in general, and 25 percent of those from lean sports were identified as being at risk for eating disorders'⁹. There are many factors underlying the cause of eating disorders prevalent in females – although this primarily affects their physical health, it is the result of poor mental, emotional and social health. Many females have eating disorders causing lifestyle conditions such as anorexic/ bulimia nervosa due to a range of factors such as:

- Depression due to dissatisfaction of outside appearance
- Psychological feeling of 'being fat'
- A self-conscious need to be liked by fellow peers, due to past history of being outcast
- Being influenced by mass media to stay thin

However, female athletes are sometimes told to be at a certain weight or body structure to meet requirements for certain sports, such as gymnastics and diving. Coaches who are highly demanding will be more forceful, due to their desire for winning possibly being higher than the athlete. It can be also be caused by the athlete trying to control her own body weight. This can be prevented via sports medicine through methods such as:

- A strong support network of family and friends encouraging the athlete and ensuring the coach's demands are not beyond the athlete's limitations
- The individual having an independent mindset not to be influenced by the image that mass media portrays
- Coaches encouraging female athletes to do their best, rather than focus on winning
- Family and friends helping the athlete maintain a steady, stable diet which correlates well with their physical activity. This will help their psychological state of health and increase self esteem.

Eating disorders will have an effect on the female's body nutrients. Although iron is only required in small amounts (35 – 50 mg per kg), many women have insufficient amounts of iron in their body due to their eating habits. Iron deficiency causes anaemia – insufficient red blood cells in the blood, resulting in impaired oxygen-carrying capacity. This affects female athletes participating in aerobic based activities, as limitations to the oxygen available will be a barrier optimum performance. Anaemia can result from intense sporting activity, due to lack of fluids, but is common in female athletes as they may have initial blood loss from menstruation.

This can be managed by referral to a doctor for assessment and management. Supplements can be taken appropriately to control the amount of iron present in the body.

Stress fractures are the result of overuse injury or overtraining. The risk of stress fractures being incurred in women is greater due to the 'female athlete triad'. This makes women subject to earlier osteoporosis, where bones are lesser in density, and hence brittle due to iron and calcium deficiency (from poor nutrition). Female athletes who are beginners need to take up light-intensity sports to increase precaution and lower the risk of possible stress fractures or exercise-induced anaemia, such as aerobics, swimming and cycling. When progressing in intensity, progression

⁸ <http://www.eatingdisorders.org.au/content/view/57/38/>

⁹ <http://www.virtualmedicalcentre.com/news.asp?artid=6262>

should only increase in intensity by 10% each time. If a female athlete is involved in an ongoing program, they need to be aware of the effects of age and menopause on bone density. By reversing eating disorders, the probability of incurring a sports related injury is lessened via increase in bone density by the consumption of foods rich in iron and calcium. This being said, the importance of a well balanced diet should be taken into account.

During pregnancy, fitness is lost and weight is gained. If exercise was implemented pre-pregnancy, it will not cause further stress to the foetus and will be beneficial in maintaining fitness levels. As it has been emphasized throughout this response, a suitable level of exercise is required to keep women physically active and the baby healthy. However, if the individual participates in sedentary or no level of exercise prior to pregnancy, it is unadvisable to begin undertaking exercise during pregnancy.

In conclusion, the demands of athletes are addressed through sports medicine catering for the different needs and wants. It is evident that sports medicine is vital towards maintaining the welfare of athletes.