

Water balance, fluids and the importance of good hydration

01 June 2006

Water is essential for life, and maintaining hydration is important for physical and mental performance. The human body is largely made of water. Body water content declines with age, from about 75% in babies to 60% in adults. Although we can live for up to 50 days without food, without water we will survive only a few days, even in a cool climate. People generally drink enough water, but for specific population groups, like the elderly, or while exercising, fluid intake might become critical.

Daily water losses

Water leaves our bodies through skin and in breath all the time, amounting to about 700ml each day. We lose another 100ml through faeces, about 1.5 litres as urine and 200ml in normal perspiration. So, even living and breathing in a temperate climate requires about 2.5 litres a day. Exercise and rises in temperature increases perspiration, loss of water and hence fluid requirements. During sickness and diarrhoea, losses of water will also increase considerably.

The effects of dehydration

Dehydration can cause headaches, tiredness and loss of concentration. It is a problem particularly associated with aging, as older adults are less sensitive to mild dehydration, they drink less and take longer to re-hydrate. A deterioration of mental performance can also occur in mildly dehydrated younger adults. Children lose more water in perspiration in trying to keep cool so it is important to make sure they drink enough in hot weather.

Drinking enough to maintain hydration

We should drink enough to balance water losses. The metabolic processes in our bodies produce about 250ml, and we get another 750ml from our food. This leaves 1.5 litres to be supplied from drinks.

All water-containing drinks can contribute to the total required for hydration including fruit juice, soft drinks, tea, coffee, dilute alcoholic drinks such as beer, as well as pure water itself. It has been shown that drink palatability is important when fluid requirement is high.

Studies have also shown that caffeine in amounts typical of a cup of coffee or tea or a cola drink do not have a dehydrating effect, so experts now agree that normal caffeine containing drinks can contribute to total water requirements. However, drinks containing 10% alcohol or more, such as most wines, do result in net fluid losses.

What happens when we exercise in hot climates?

During exercise our bodies keep cool by evaporating fluid from our skin as sweat, so we must drink more to avoid dehydration. In cold or temperate climates young people can often tolerate a 2% loss of body weight as water without impairment of physical performance, but in the heat this amount of fluid loss will compromise performance and can result in heat illness. Losses in excess of 5% of body weight can decrease the capacity for work by about 30%. A number of studies have demonstrated that maintaining hydration before and during endurance exercise is effective in improving performance in a variety of conditions.

Salt stimulates water absorption and aids retention during and after exercise

Adding sodium (salt) to drinks stimulates carbohydrate absorption and this enhances water uptake. Replacing the salt lost in sweat helps to maintain blood volume. If large amounts of water alone are drunk during and after endurance exercise in the heat, dilution of body fluids may occur, leading to large losses of water in the urine. This means hydration will not be maintained and low sodium levels may cause heat cramps and exhaustion. To prevent this, drinks should contain sodium (as in sport drinks which contain amounts similar to those of human body fluids), or water should be drunk with food.

References

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