

## BALANCE

Watching sport, we see examples of good balance demonstrated constantly, with athletes running in all directions, jumping, and, despite being bumped and jostled by others, usually staying on their feet. In cricket, seeing a bowler take a return catch is another example. As we slow down with increasing age, the demands on our balance will be less intense but the mechanisms remain much the same.

Following some deliberation I decided that balance must be called a skill. It does, after all, involve brisk movement at a number of joints, and is only effective if those movements are precise. Therefore it requires good sensation, freely available range of movement at a number of joints, with sufficient strength at those joints to support our weight.

When our balance is challenged when we are standing or walking, we hope to be able to alter our position and movements to prevent falling. In approximate order of sequence, this requires -

1. Recognising that our centre of gravity is outside our base of support;
2. Making a postural adjustment to the top half of the body to stop the centre of gravity going further away; and
3. Placing a foot further out in the direction of falling, to break the fall.

Recognition of the loss of balance occurs by the integration of impulses from the vestibular system (in the ear) with others from sensors in the joints and muscles of the limbs and spine. They combine to give us awareness of our position in space, called proprioception. These proprioceptive impulses, like sounds in a crowd, must compete with background noise and, in the nervous system, pain is one of the “noisiest” competitors. Concentration is another factor, and is also affected by the level of background noise.

Bending sideways above the hips needs a certain level of flexibility in the spine and legs, with adequate muscle support. Similarly, stepping (sideways, forwards, backwards, or a combination of these) requires freedom of movement, with strength and stability of the involved joints. For participation in any level of sport the demands are greater than for the rest of the population, because impacts are greater and individuals affected will probably be moving at some speed.

So, rather than feel overwhelmed by these requirements, let's consider how to keep up our balance skills.

The example of sports is helpful in another way. The notion of play, as for a sport, also applies to activities like dancing and riding a bicycle or horse. These skills are maintained by those who continue their involvement into their seventies and eighties. While not a game, gardening also challenges our balance, as it involves stepping up and over things, leaning in all directions and reaching. Climbing ladders acts as a multiplier to the challenges for balance, so must be avoided by those not confident with balance on flat ground. The same applies for standing on a chair.

The notion of use it or lose it is very apt for balance, so don't stop dancing, gardening, or riding your bike or horse. With loss of strength, range of movement, sensation or body awareness, each must be addressed and it is helpful to know that these capacities can usually be improved.

When building a house, if it is to be stable and secure, it cannot have any unsupported parts or gaps. If a person has reduced functional capacity, the more usual causes are loss of strength and reduced (or excessive) range of movement, sometimes with altered body awareness. These might be considered as functional gaps, akin to the unsupported parts or gaps in a building referred to above and each gap must be specifically “filled”.

Weakness tends to lead to stiffness at joints and / or tightness of muscles, those being defensive strategies to compensate for the weakness. So, if range of movement is increased by loosening the joint and muscle, but there is no change to muscle strength, the regained range will most likely be lost in the very near future.

So regaining muscle strength must be a primary aim, and will only occur if exercises target the weaker muscles. Keeping doing the same things will not do it. For example, walking with a limp, which might start because of a minor injury, alters the way muscles work, leading to weakness. At other times it might be weakness that causes a limp which is only evident when muscles get tired. In these situations, walking, alone, will not “fill the gap”.

Strengthening exercises must be targeted to the weak muscles, which initially will probably struggle to achieve much. Therefore a “set” of these exercises may be less than 5, when the focus is on technique. It's not important that you can do 10 or more when you start - more important is that the exercises are maintained for long enough to reach sets of 1 at increasing resistance, and that is expected to take 3 months or more.

Integrating strengthening exercises into a programme that will also improve balance will occur during that period. Being patient during this time is vital - after all loss of strength was gradual over a prolonged time, so don't rush.

The other potential influence on all these capacities is pain, which has a strong inhibiting influence on muscles and joints of the painful region. And, because it demands attention, pain also changes the way people move, becoming more defensive, avoiding challenges to balance. Reducing the “background noise” from pain will facilitate regaining strength.

Physiotherapists are experts in dealing with all these components and, as long as those we work take responsibility for their part - following the exercise programme - the process is relatively straight forward. It just takes time.

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