

Getting to grips with ligaments

By Paula Shingler, BSc, MCSP

We all know we have ligaments but what they are and why do we have them?

Construction and function of ligaments

Fibres in ligaments are arranged in a longitudinal pattern which is the most stress resistant. These fibres are made up of collagen, a protein; 90% are collagen type 1, 9% collagen type 3 and the remaining 1% is fibroblast cells. These cells produce collagen type 3 which is converted into collagen type 1 - this takes 3 months and is an important factor in the healing process (remember this for later on!) Collagen has great tensile strength but is inelastic, so once stretched it always stays stretched.

The main functions of ligaments are:

- Linking bone to bone
- Supporting joints
- Allowing normal range of movement and preventing excess movement
- Providing proprioceptive (balance) information to the brain

Ligaments – the back up to muscles

These functions mean that the ligaments provide a crucial link to enable us to walk or run smoothly. If a ligament is injured this can have a catastrophic effect on a joint's stability. Different joints have different degrees of ligamentous support. The joints with fewer ligaments tend to be the most easily dislocated e.g. the shoulder, which has minimal ligament

support and relies on muscle strength to provide stability. Muscles are more elastic and, if not strong, are unable to maintain a joint in its normal position when a powerful force is exerted upon it. If a joint has ligamentous support then, if the muscles give way, the ligaments will be there to reinforce the joint and keep it in place - a much preferred situation!

Damage from over-use or unexpected movement

Even so, ligaments can get damaged due to over use or sudden unexpected movement due to a trip, fall or heavy contact. This is more usual in contact sport rather than orienteering unless you disturb an unfriendly kangaroo! Ligaments can keep a joint in place but can get damaged in the process causing a sprain. When a sprain occurs and a ligament is stretched beyond its normal capacity, there are 3 divisions:

1. A few torn fibres giving pain and inflammation over the ligament
2. Extensive fibre damage with intense pain, joint swelling and inflammation
3. Rupture with intense pain, joint swelling and instability

A proper diagnosis is essential. Level 3 sprains require surgery, where the other levels fibres will recover but can take up to 3 months. Unfortunately once the ligament is stretched it will remain so and continual stretching will lead to an unstable joint.

Injured? RICE then accurate diagnosis is key

If you sustain an injury and think there may be ligament damage then the initial treatment is the normal RICE and then accurate diagnosis. Unfortunately ruptures can be missed in the initial stages as the amount of swelling makes it difficult to assess the joint. An MRI scan is the best diagnostic tool in this case. Once the degree of damage is decided, a structured programme of rehabilitation can be started with treatment reducing both swelling and inflammation, and then strengthening the muscles surrounding the joint. After any ligament damage the ligament will not be quite as good as before so try to protect the joint as much as possible. Strengthening of the muscles is essential so that muscles will protect the joint for longer before the ligament needs to come into play.

Investing in recovery

Anyone who has had a bad sprain will know what a slog it is to get back into shape. Going back before strength has been regained can just lead to a recurrence - even more frustrating. It is therefore worth putting in the time and effort so you can head out into the bush confident that your body will hold together- unless you meet that kangaroo...

Paula Shingler is a Physiotherapist at The Clinic Physiotherapy at Macquarie University Hospital, Sydney, long time member of Big Foot Orienteers, keen fell runner and mother of 2