

Load bone to make it grow

Bone injuries are common in sports, particularly those involving contact and high velocity collisions. Dependant upon the injury sometimes such injuries can be quite difficult to manage. Dependant upon severity and location a period of immobilisation is usually observed to allow the bone injury to resolve. This may be in a cast, spint, walking boot and the length of time will depend on the type of injury obtained.

Although the management of bone injury will differ in many respects to the management strategy of a soft tissue injury: muscle, tendon, ligament, there are some similarities and it is those similarities that we will discuss today.

Types of bone

We know bones are made up of different types of tissue: woven, lamellar bone and that different types have different structural components. With lamellar bone fibres are aligned in parallel layers and woven bone which contains less organised fibre alignment and is often found at sites of fracture healing and at ligament and tendon insertional sites.

Environment for repair

For bone repair we need an adequate blood supply and sufficient mechanical stability. Regarding mechanical stability, a fractured bone may need surgical repair to ensure and promote bony repair. That would occur if the fractured bone(s) were not aligned well enough to be managed conservatively i.e. in a cast without surgery.

Osteoblasts are the drivers behind laying down new bone following injury. They help to vascularise and ossify the injured area. The normal body's response following fracture is to increase blood supply to the area, peaking at around 2 weeks post injury. However, during a period of immobilisation i.e. cast and non weight-bearing blood supply can be reduced. It is therefore important that we think of ways to stimulate blood flow to the injured area without compromising the injury site.

A great example of that could be the use of open chain hip and knee exercise pretty much immediately after a fibula fracture. Such exercise is not directly

loading the injured tissue yet is promoting increased blood flow and in turn promoting bone healing.

Electrotherapy

I am not a fan of electrotherapy and as yet have not found a place for it in my practice. The only exception is using ultrasound for fracture healing. Providing a low intensity ultrasound treatment does have some evidence in improving bone healing time. The majority of studies are animal based although a few human studies are available. The evidence is relatively weak however, this form of therapy isn't going to be of a detriment and can be self administered by the player/client, in addition to other treatment and rehab techniques.

Progressive loading

When able we need to start to load the bone to accelerate bony healing. As you would a muscle, tendon or ligament injury once adequate healing has occurred the structures need to be loaded in order to gain their pre-injury characteristics. Bone is no different. Loading the injured bone/fracture site will vary dependant upon the severity and the bone(s) involved. However, if not loaded full bony repair will not occur. In addition, studies have shown that early loading accelerates bony healing, largely due to the role loading has on orientating fibres in the correct direction.

Loading has to be painfree and any increases need to be progressive. We obviously need to respect the bony injury and progressing too quickly could be detrimental to healing.

Using an example of an isolated fibula fracture fixed using surgery a progression overview may look something like this:

- Fibula bony fixation via operation (Day 1)
- Wound care and potential immobilisation/non weight or partial weight bearing. Can begin open chain exercise (1-7 days)
- Partial weight-bearing in a walking boot progressing to full weight bearing in boot (7-21 days)
- Removal of walking boot (approx 21-28 days). Ideally the subject will have been mobilising in the boot (full weight bearing) for 1 week.
- Localised rehab working on ankle mobility, hip and knee strength (3-8 weeks)
- Return to sport progressions (6-10 weeks)

I purposefully haven't gone into a great amount of detail regarding the example above. This is because each individual will vary and some of the time frames given above will be varied dependant upon how the subject is progressing.

In conclusion, it is important that we load bone like we would other tissues. Whilst we need to be respectful of the bony injury we also need to load the injury site to aid healing. Load to grow.....

Thanks for reading

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