A Classification of Sporting Injuries

Injury to an athlete may be considered to be either;

1. **An ACUTE injury**: Injury occurs **suddenly** to previously normal tissue. The principle in this instance is that the force exerted at the time of injury on the tissue (ie. muscle, tendon, ligament, and bone) exceeds the strength of that tissue damaging it. Forces commonly involved in acute injury are **muscular contraction** (eg. muscle/tendon tears), **twisting injury** to joints (ankle sprains, knee ligament injury) and **direct trauma/contusion** (impact from an object or opponent).

   First aid treatment involving RICE (rest, ice, compression, elevation) to the injury should be done ASAP. This is done to minimise bleeding. Thereafter an early accurate diagnosis of the tissue(s) injured is essential to directing the optimal treatment pathway. Treatment may involve surgery (e.g. knee ligament reconstruction) followed by a graded rehabilitation programme or treatment may be non- surgical with a sports medicine professional guiding the injured athlete through a well designed graded rehabilitation programme specific for that injury.

2. **An OVERUSE injury:** Any **repetitive activity** (e.g. running, fast bowling in cricket etc.) can lead to an overuse injury. The principle in overuse injury is that **repetitive microtrauma** overloads the capacity of the tissue to repair itself.
   The most common overuse injuries affect tendon (now termed **Tendinopathy or tendinosis**, a condition formerly known as **tendinitis)** and bone (**Stress Fractures**).

   Common Overuse Injuries include
   - Patellar Tendinopathy
   - Achilles Tendinopathy
   - Rotator Cuff (shoulder) Tendinopathy
   - Tenoperiostitis of tibia (ie. Shin splints)
   - Stress Fracture of tarsal (foot) bones.

To better understand overuse injury it helps to think in terms of what is happening at the **microscopic level** to the tissue that has been "stressed" during the repetitive workouts. During exercise the tissues (muscles, tendons, bones, ligaments, etc) experience **excessive physiological stress**. When the activity is over the tissues undergo **adaptation** so as to be stronger to be able to withstand a similar stress in the

future if required. Overuse injury occurs when the **adaptive capability** of the tissue is **exceeded** and **tissue injury** then develops. That is, in the over- zealous athlete there is not enough time for adaptation to occur before the next work out and the cumulative tissue damage eventually exceeds a threshold for that tissue causing pain and tissue dysfunction.

The adaptive capability of the tissue may be exceeded secondary to **excessive repetitive forces** attributable to one or more commonly a combination of the following factors,

Intrinsic Factors	**Extrinsic Factors**
Poor Biomechanics	Training Errors - excessive volume
Lack of Flexibility	- excessive frequency
Muscle Imbalance	- excessive intensity
Muscle Weakness	- faulty technique
	Surfaces (concrete vs grass)
Age	Shoes (inappropriate or worn out)
Size/Body Composition	
Bone Health	

The cause of overuse injury is most often **MULTIFACTORIAL** and can involve both extrinsic and intrinsic factors. Training errors and poor biomechanics are usually involved.

The greatest challenge is to **identify and correct the cause(s) of overuse injury**. It is not sufficient to just diagnose and treat the injury. The cause(s) of the injury must be identified and treated otherwise the athlete may suffer a recurrence of the same or similar injury. Most causal factors are modifiable but some are not (e.g. age).

Treatment of overuse injuries therefore involves two separate considerations,

1. **Early accurate Diagnosis**. Treatment on occasion can be surgical (e.g. displaced stress fractures of bone) but is usually non- surgical involving relative rest, that is, the avoidance of aggravating activities while maintaining fitness (cross-training); and a well designed graded rehabilitation programme specific for that injury.
2. **Identification of causal factors** (intrinsic and extrinsic) and modifying these accordingly (e.g. orthoses to optimise biomechanics, adopt a graded scientific training programme to allow safe progressive exercise to eliminate training errors).

Dr Tom Cross
MBBS, FACSP, DCH
North Sydney Sports Medicine
The Stadium Clinic
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