

REHABILITATION

By this stage of your recovery, you should have passed the inflammatory phase of tissue healing and be able to manage most activities of daily living with minimal or controlled pain. Your body will now be busy repairing the injured tissue (this is called the proliferation phase) and the duration will depend upon the severity of your injury. The injured tissue will be a lot weaker at this time and have a reduced capacity to withstand previous levels of activity placing the injured tissue at increased risk of re-injury.

Prior to commencing phase 2, you should have **increased joint mobility** and ready to commence **neuromuscular training**. This addresses the foundational platform on the performance pyramid and sets you up for increased loading – or strength training.

The goals of the rehabilitation phase are:

1. To optimize the proliferative phase of tissue healing
2. Gradual exposure to loading starting with double limb and progressing to single limb work
3. Maintain whole body strength using functional movements
4. Regain, maintain, and progress lower limb (especially ankle) joint proprioception.
5. Prepare for function / running and the resilience phase

It is important to identify activities or movements and postures that aggravate your condition and plan to avoid these in the early stage of rehab whilst building up tissue tolerance to loading.

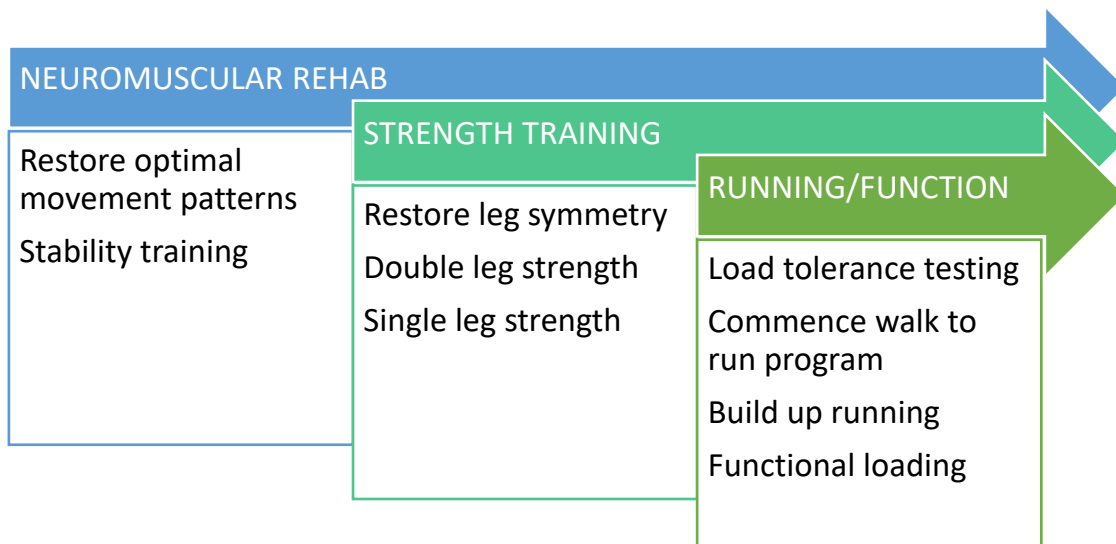


Fig 22: progressive strength training

SPECIFIC ADAPTATIONS TO IMPOSED DEMANDS (The **S.A.I.D.** principle)

As mentioned earlier, our musculoskeletal system responds or adapts to the loads or demands placed upon it. Here, I have identified four main responses to loading:

1. **Not enough load** – the tissue will get weaker and be more vulnerable to injury. (For example, forced bed rest).
2. **Load equals ability** – in this case, there will be no net gain in adaptations. Here we run the risk of injury if we exceed our body's ability.
3. **Load is greater than our ability** – if applied correctly, we will initiate a stimulus for change and soft tissue will adapt to the load and we get stronger.
4. **Load is far greater than ability of the tissue** – here we run the risk of overloading the soft tissue and injury. This may be in one traumatic event (i.e. lifting something too heavy and training a muscle); or gradual exposure to loads with poor recovery or time to adapt leading to overuse injury.

From this it is clear that we need to apply the principles of adaptation in order to recover from injury and move towards a resilient body. Adaptation to loading and exercise is highly specific. In other words, if you train with high loads (alongside adequate recovery periods), you will get better at moving high loads. Reduced exposure to a particular aspect of recovery of training will result in a reduced ability to perform this aspect – use it or lose it!

Therefore, training and rehabilitation following injury needs to be highly specific to the nature in which the injured tissue will be returning to. This needs to consider the range of movement, level of resistance, speed of movement and work capacity (endurance) of the tissues involved. The next section will consider the factors required when designing training programs and further strength training principles will be explored later on.

DESIGNING TRAINING PLANS

The following factors should be considered when designing specific resistance programs. These factors are highly dependent upon the general adaptation model and should be discussed with your physio as you progress through your rehab.

Frequency – how often we apply the load

Intensity – the greater the intensity, the less frequent you should load your body. Understanding sets, reps and rest periods to achieve different fitness goals is equally as important as the exercise selection and will be discussed below.

Type of training – what are your training goals? Load can take the form of resistance training in the gym where the goal may be to improve muscle mass or strength; or continuous loading such as running or swimming with the aims of loading your cardiovascular system or fat loss.

Manipulation of the reps (how many times you perform the exercise in one go), sets, (the number of cycles in one session), load (how heavy the resistance) and rest periods over a period of time (weeks to months) will have an effect on the outcome of your training. The table below highlights reps, sets, load and rest periods for different training outcomes when designing your program.

If your goal is to increase strength, then you will need a very heavy resistance that you can perform fewer reps with. This will stimulate micro damage within the muscle tissue promoting increased muscle size and ability to withstand greater loads. Developing speed requires your muscle tissue to fire quickly. Using a slightly lighter resistance but moving it at a faster pace will increase the muscles ability to contract faster, therefore increasing speed. In contrast, increased endurance requires a lighter resistance but moved for greater repetitions and reduced rest periods. This will stimulate energy producing structures within the muscle called mitochondria. This increases the muscles resistance to fatigue.

Strength, speed, and endurance are all necessary requirements in returning to sports after injury. However, we also need to include correct technique in our training. Retraining patterns of movement and co-ordinating stability muscles with the larger muscles at the right time involves high levels of attention (or thought). Initial adaptations are as a result of improved circuitry or neural firing patterns. This is called 'neuromuscular adaptation' and sets the framework from which strength, speed and endurance training is built.

	Reps	Sets	Load (%)	Rest
Neuromuscular adaptations	High reps >20	High frequency	low	Little requirement
Strength	1-4	5-6	90 - 100	3-4 minutes
Mass	6-12	3-4	75 - 85	30 – 60 seconds
Speed	4-5	5-6	60 - 70	1-2 minutes
Endurance	15 - 25	1-2	>60	30 seconds

STRENGTH TRAINING & REHABILITATION

Strength training within the rehabilitation parameters needs to consider several factors. These include:

- Your injury or pathology
- The stage of your recovery
- Your training history
- Your training goals

Therefore, your strength training program will be individually prescribed by your physio /ERI and follow a progressive pathway:



End stage rehabilitation will then focus on increased resistance to fatigue (endurance training, plyometric loading and return to high level activity – [Resilience training](#))

ALWAYS SPEAK TO YOUR PHYSIO BEFORE COMMENCING STRENGTH TRAINING WITH AN INJURY