



## Clinical specialties in orthotics and prosthetics

# Orthoses to support people with neuromuscular conditions

### What are neuromuscular conditions?

The term 'neuromuscular conditions' broadly means any illness or disease affecting the nervous system and muscles of the body. Common examples include:

- Cerebral palsy
- Stroke
- Spinal cord injury
- Post-polio syndrome
- Muscular dystrophies
- Spinal muscular atrophy
- Charcot Marie Tooth disease
- Multiple sclerosis

### What are orthoses?

An orthosis (also known as a splint or brace) is an externally applied device, designed and fitted to the body. An orthosis may protect and support a body part after injury or surgery, compensate for muscular weakness, accommodate or prevent deformity, redistribute pressure or correct the alignment of body parts. Orthoses are named by the body part over which they act. Orthoses comprise many types of materials and may be commercially produced and customised, or custom-made.

Orthoses for arms, legs or the torso may benefit people with neuromuscular conditions. The type of orthosis, how it works and how it is used will depend on the underlying condition, the characteristics of the client and their individual goals.

### How do orthoses help people with neuromuscular conditions?

#### Compensating for muscle weakness

Many people living with a neuromuscular condition can experience muscle weakness. As a result, movement can become uncontrolled and lead to abnormal joint alignment. This can affect walking and other functional activities.

For example, stroke often results in weakness in the muscles that allow a person to lift the toes and bend the ankle. Weakness in this muscle group results in 'foot drop' where the toes drag during walking. This increases the likelihood of tripping and can result in permanent shortening of the calf muscle. The muscle shortening has negative effects on walking, and may even cause the knee to thrust backward (hyper-extend) which can damage the knee joint.

In this example, an orthosis that might help is an ankle foot orthosis (AFO). It prevents the ankle from going into a 'foot-drop' position. The key purpose of an orthosis in this example is to aid safe and efficient walking, reduce falls and improve independence.



A Thermoplastic  
Ankle Foot  
Orthosis (AFO)

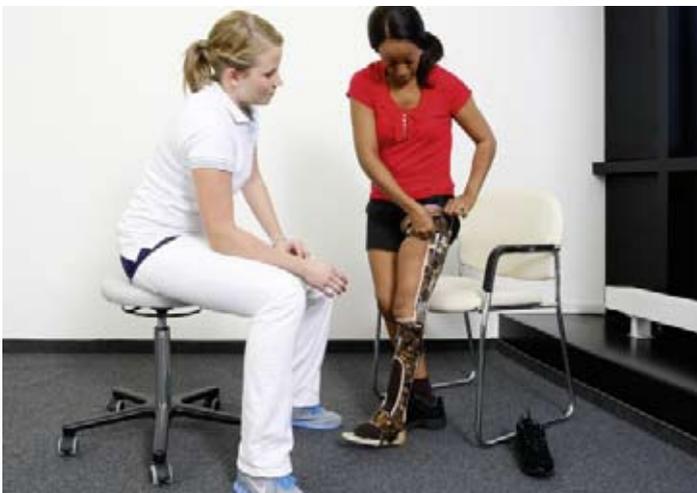
A Carbon Fibre  
Ankle Foot  
Orthosis (AFO)

Image Courtesy of Orthomotion

Some people with neuromuscular conditions may experience weakness in the muscles that move and stabilise the knee, for example, those with post-polio syndrome or spinal cord injury. Weak thigh muscles may result in uncontrolled bending of the knee which can result in a fall. A knee-ankle-foot orthosis (KAFO) can help compensate for these weaknesses. Conventional KAFOs restrict knee movement to improve stability for walking (either stiff-kneed or free moving) while other KAFOs can include technology that ensures the knee is stiff when weight is being put through the leg and moves freely when the leg needs to bend.



## Orthotists – supporting the Australian community



A Knee Ankle Foot Orthosis (KAFO)  
Image Courtesy of Ottobock

### Accommodating, protecting and preventing deformity

People with muscle weakness and/or spasticity (increased muscle stiffness due to abnormal nerve input) often experience joint deformities, commonly of the foot. Over time these deformities change from being flexible to fixed (unable to be corrected).

In areas of the body where there are many bones – such as the feet – deformity can result in calluses and areas of increased localised pressure. Orthoses for the foot are usually custom made to ensure exact contouring over bony areas to re-distribute forces. This also protects the structures of the foot from further abnormal forces and deformity.

For example, people with foot deformity due to spina-bifida or cerebral palsy often require a custom-made AFO to support foot and ankle position. In this type of orthosis the foot section is intimately contoured to the foot to allow for pressure re-distribution, and ankle motion can be appropriately restricted to protect the foot and ankle from further damage.

For some people with neuromuscular conditions, an orthosis is worn while sitting or lying down. The goal of these orthoses is to prevent muscle shortening which can result in joint deformity and loss of movement. These orthoses are often called 'positioning' orthoses.

### Who provides orthoses for neuromuscular conditions?

Orthotists (*pron. or-tho-tists*) are tertiary qualified allied health practitioners who specialise in the clinical assessment, provision and ongoing review of orthoses including education, therapy and orthosis maintenance. In Australia, orthotists are trained in both disciplines of orthotics and prosthetics at either a Bachelor or Master's level. Orthotists work autonomously and within the multidisciplinary team.

### How do I access orthotic treatment for a neuromuscular condition?

If you require an orthosis you will be referred to an orthotist. **Certified Orthotist/Prosthetists (c-OP AOPA)** can also be located using the 'Find a practitioner' search function on the AOPA website ([www.aopa.org.au](http://www.aopa.org.au)).

### If you need to use an orthosis you will be referred to an orthotist who will:

- Perform a clinical assessment
- Support you to determine the most suitable orthosis to meet your goals and requirements,
- Complete the measurement/casting, manufacture and fitting
- Provide ongoing clinical support and education including regular reviews
- Adjust and/or replace the orthosis to maintain an optimal fit
- Liaise with relevant members of the healthcare team



orthoticmotion

Disclaimer – This fact sheet does not replace clinical advice. If you require orthotic services AOPA recommend speaking to your practitioner. This fact sheet was developed based on interpretation of current evidence as of August 2016. References available on request.