



## NeuroMuscular Orthotics

Orthotic Management of Complex Neurological & Musculoskeletal Disorders

79 Chadstone Rd  
Malvern East VIC 3145

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ABN: 32125519502

Chananda Wijekoon  
5/4 Rowland Ave  
Magill SA 5072

12<sup>th</sup> Sept 2016

Dear Chananda,

Thanks for attending NeuroMuscular Orthotics on Thursday 8<sup>th</sup> September. As a result of contracting poliomyelitis as a child, you have weakness in the lower limbs, and you are looking for a solution to improve your walking and safety in the short and long term.

Your primary goals are to be able to stand and walk adequate distances to be able to continue your studies, to provide for your family, and to be able to continue to access the workplace and the community in the future.

### **Assessment:**

There is significant and asymmetrical weakness at all levels of the lower limbs.

#### **Right:**

The Right side is slightly stronger, with quite good hip abductors and hip extensors. The hip flexors are Grade 2, and the quadriceps, hamstrings and tibialis anterior are also very weak. You have some strength (Grade 3) in the calf muscle, and in the everters of the foot (Grade 3), so you are generally slightly more stable on this side. As a result of relying more on your right limb, the ligaments have become very lax on this side, and there is some deformity. The knee goes into significant genu-varum, and there is tibial torsion and varum associated with this position. There is also some calf tightness on the right side, and the sub-talar joint everts during swing phase, then inverts and adopts a varus position during stance.

#### **Left:**

The reduction in strength is more significant on the left, consistently from the hips to the feet. The hip abductors are quite weak, and so in walking you lean to the left during stance phase to compensate. There is slightly less clearance of the toes during swing on the left because of the weakness in the dorsiflexors and everters, and the knee is locked into extension or hyperextension to compensate for the lack of strength in both the plantarflexors and quadriceps. When using crutches, you take most of your weight through the arms during left stance phase, so there has probably been less strain on these ligaments and therefore the alignment is not as bad as the Right. There is still some plantarflexor tightness consistent with the Right, and the sub-talar joint is in constant eversion with midfoot break on the Left.



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### Recommendations

To establish a safer gait pattern, and reduce the likelihood of falls as well as protect the joints and ligaments from long term damage, our aims are as follows:

1. To prevent flexion of the knees during stance phase;
2. To allow flexion of the knees and effective limb shortening during swing phase
3. To assist dorsiflexion of the ankles during swing phase to facilitate toe clearance
4. To restore coronal plane alignment at the knees and the sub-talar joints bilaterally
5. To allow some active plantarflexion on the right when in a seated position

To achieve this we recommend bilateral custom-made Stance Control Knee Ankle Foot Orthoses (KAFOs). These are the only orthoses which can achieve all of the above aims. There are some components which will achieve the above aims but only if the knee reaches full extension with every step. Our concern in your case is that with reduced quadriceps strength, the knee will not always reach full extension in terminal swing, and the joint will not lock for stance phase. To manage this risk, we recommend the Ottobock EMAG Active, which has a pre-lock at 15 degrees of flexion, which will be much safer for you to use. We recommend a dynamic carbon fibre spring ankle joint for the left called a Posterior Dynamic Element (PDE) to ensure stability in stance and give maximum push-off for swing. On the right we recommend an adjustable triple action ankle joint, which will give scope to match stance phase stability with swing phase toe-clearance, as well as allowing active plantarflexion wherever possible.

The quote for the recommended treatment is as follows:

Orthotic Treatment Recommendations	Amount \$
Bilateral Stance Control KAFOs with Ottobock EMAG Active	
Follow-up assessment and casting	\$ 437.50
Fabrication of bilateral custom carbon fibre knee orthosis	\$ 8200.00
Bilateral Medial and lateral knee joints including Ottobock EMAG Active	\$ 14443.76
Ankle joint components including PDE and Triple Action Ankle joint	\$ 2296.00
Fitting appointment	\$ 525.00
1st Review appointment	\$ 350.00
2nd Review appointment	\$ 350.00
<b>Total</b>	<b>\$ 26602.26</b>



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### Ongoing Reviews and Repairs:

We recommend that your condition and the orthoses should be reviewed every 4-6 months, and our rate for clinical appointments is currently \$175/hour. There may be additional charges for components, consumables and materials associated with future repairs and alterations made to the orthosis, in order to ensure optimal fit and function. Wherever possible, we work with the orthosis and the components, adapting what we can and continuing to match the function to your physical condition now and in the future.

We will endeavor to train you in the care and maintenance of the KAFOs, so that you can complete basic repairs such as strap and padding replacements when you are unable to visit an orthotist.

We also recommend spending a few sessions with a specialist neuro-physiotherapist to learn to use the Stance Control orthosis. Our colleagues at Steps Neurological Therapy Services in Hughesdale, Victoria, are amongst the most experienced in neurological rehabilitation of individuals using Stance Control KAFOs, and we highly recommend their services.

If we plan to cast, fit and review the orthoses over a 2-week period, we would recommend that you spend a few sessions with these physiotherapists while you are in Melbourne.

Please don't hesitate to contact me if you have any questions regarding our recommendations. If you are able to arrange confirmation of funding approval, then we will plan to book dates for your visit in November 2016.

Kind Regards,



Paul Sprague  
Principal Orthotist  
NeuroMuscular Orthotics