



# An Orthotronic Walking Device Improves Walking Capabilities of Traditional KAFO Users.

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## INTRODUCTION

Over the last century Knee Ankle Foot Orthoses (K.A.F.O.) could be described as primitive scaffolding structures used to hold the paralytic limb in a fully extended position thereby allowing weight bearing and ambulation with a stiff orthotic leg but leaving the patient to compensate for the orthosis' lack of functionality.

Stance control orthoses (SCO) rigidly lock for the stance phase and allow a free motion during swing resulting in an improvement by allowing a more physiologic gait pattern (2-5). However many patients and experienced Clinicians experience the limitations and risks this "FULL-ON" or "FULL-OFF" approach provides.

An orthotronic walking device enables patients to alternately descend slopes and stairs as well as walk on uneven terrain with enhanced safety and confidence (1, 6). This is the first systematic patient trial to study the benefits of such an orthotronic walking device in comparison to regular KAFOs and SCOs.

## METHOD

A total of 11 patients, 5 KAFO and 6 SCO users, were enrolled. For KAFO/SCO use no validated outcome measures exist. Therefore the Prosthesis Evaluation Questionnaire (PEQ) was modified creating an Orthosis Evaluation Questionnaire (OEQ) which was administered at baseline for the existing orthosis and after 3 months of use of the orthotronic walking device (C-Brace®, Otto Bock HealthCare, Germany). In addition, a questionnaire rating the importance and comparative safety and difficulty to perform 45 activities of daily living (ADL) with both orthoses was filled out at this final follow-up. Statistical analysis was conducted using the Wilcoxon signed rank test with  $p < .05$  and a power of 80%.

## RESULTS

Eight males and three females, 6 poliomyelitis survivors, 3 incomplete paraplegics, one femoral nerve lesion and one stroke survivor with a mean age of  $57.2 \pm 15.9$  years were enrolled. The average rating of all OEQ questions did not differ significantly between the orthoses, however, significant benefits of the C-Brace®

were seen in the OEQ sub-scores for ambulation ( $p = .003$ ), paretic limb health ( $p = .02$ ), sounds ( $p = .008$ ), and well-being ( $p = .02$ ). The results of the ADL questionnaire showed that 91% of ADLs were rated safer and 76% less difficult to perform with the C-Brace®, whereas no ADL was rated safer and only two activities less difficult while using traditional knee ankle foot or stance control orthoses.

## DISCUSSION

Knee flexion in the weight bearing condition is absolutely necessary for alternate stair and slope descent. Stance yielding contributes to shock absorption and appears to offer something to patients beyond a mere mechanical improvement. The results of the present study indicate that the orthotronic walking device C-Brace® may overcome the functional limitations of the current KAFO and SCO systems.

## CONCLUSION

Study results have shown that the orthotronic walking device C-Brace® may improve function and satisfaction as well as perceived difficulty and safety of activities of daily living.

## CLINICAL APPLICATIONS

Traditional KAFO and SCO users may improve safety, function and participation by using the orthotronic walking device C-Brace® that allows for microprocessor controlled knee flexion during weight bearing.

## REFERENCES

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