USING THE AFO-FC AS THERAPEUTIC TREATMENT FOR PATIENTS DIAGNOSED WITH EQD

Curt A. Bertram, CO, FAAOP
Hanger Clinic Hartland, WI

INTRODUCTION

For years pediatric patients diagnosed with cerebral palsy have been managed with standards of practice and beliefs that are now being challenged by new paradigms and research. Clinicians have held to beliefs and practices such as: the talocrural joint (TCJ) and subtalar joint (STJ) need be in neutral alignment; the gastrocnemius (GN) must be strong if the child has a equinus deformity; "tone reducing modifications" reduce tone and spasticity; accommodating an equinus contracture (EQD) and wedging under the heel can increase the contracture; AFOs have little effect on hip stability; it's acceptable to force alignment; articulating AFOs help reduce plantarflexion contractures; AFOs prevent foot deformities; navicular redness is a sign of poor modification of the plaster mold; and AFOs should be vertical in the sagittal plane alignment when placed in the patient's shoe.

METHOD

The complexity of stance and its degrees of freedom have limited the success of SAFOs and have demanded too much from the articulating AFO. There has been much ado lately about the research of Elaine Owen and Beverly Cusick and the results in using the AFO-FC (Footwear Combination) and tuning them to achieve better outcomes. This presentation involves a single case study of a 17-year old male with an EQD being treated with a combination of using Elaine Owen's AFO-FC tuning methodology and Beverly Cusick's research in EQD management. Elaine Owen has shown that a properly tuned AFO-FC will restore the rockers of the gait cycle and establish optimised gait cycle (GC) kinematics and kinetics. Beverly Cusick has shown that through heel loading, proper segmental alignment and eliminating the tonic recruitment of the GN you can improve the muscles function and restore its phasing to one of mobility rather than one of stability during the GC. Through careful attention to the proper use of these new paradigms, the GC kinetics and kinematics can be optimized to improve outcomes.

RESULTS

JK was treated with an AFO-FC as his mother rejected surgery, Botox and continued serial casting to reduce his EQD. JK had a residual EQD and resistance one (R1) of -17 degrees of dorsiflexion (DF) after 6 weeks of serial casting. The AFO-FC was then tuned to achieve a shank to floor (SFA) of 10 degrees of inclination. JK was then evaluated both statically and dynamically to achieve a stable gait in both stance and swing. After several months his R1 reduced to -5 degrees of DF. He reports that he is walking faster and is more comfortable as his AFO-FC is not making any "red marks" on his foot and is not causing him any discomfort.

DISCUSSION

These initial results are encouraging and help to suggest that the AFO-FC can be an effective treatment for the patient with an EQD. JK was an ideal candidate in that he did not have a hip or knee flexion PROM limitations. This allowed the tuned AFO-FC to achieve improved knee and hip kinematics and allowed optimised KE and HE at terminal stance. The improved kinematics established positive kinetics at the knee assisting in lengthening the GN. JK continues with this treatment and as his PROM at the TCJ improves the AFO-FC is adjusted to capture this improving PROM while maintaining a proper SFA and stable gait.

CONCLUSION

The AFO-FC can be a powerful and therapeutic tool in treating EQD. Through proper tuning, the AFO-FC can manipulate the GRF vector and create extension moments at the knee and hip. In addition to these moments the repetitive knee extension and the forward progression of the femur on the tibia assist in lengthening the GN even if the ankle angle is in PF. Through this tuning effective heel loading and PF moment are created at the ankle at LR. This establishes proper sensory input and decreases the sudden onset of a GN contraction. Through this heel loading the GN returns to its role in providing mobility during the GC rather than it being recruited for stability. In addition to the KE the AFO-FC establishes a HE moment during terminal stance, creates hip stability, helps with posture, and moves the COM posterior. Lastly, a properly tuned AFO-FC preserves the forward momentum in the GC and reduces energy expenditure.

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