

Energy Storing AFO



2.0 Stirrup Design

An “Energy Storing” AFO refers to the ability of the Orthosis to replace the function of the calf muscle for propulsion and for standing balance.

Calf strength can be tested by the patient standing on one foot and raising the heel off the floor without assistance.

Orthosis Characteristics:

Our orthosis has an internal carbon fiber, Pre-Preg structure of a flat posterior spring. The resistance of the spring produces an increasing resistance with each degree of bend. This allows for the patient to control how much they bend the orthosis, and in-turn control the amount of return force they receive from the orthosis.

This orthosis Design 2.0 has a shorter posterior spring that runs from the posterior calf to the posterior ankle. It then splits into two stirrups that run down the side of the heel into the foot plate. The design also has a foot plate extension under the heel. This design reduces the “knee flexion moment” at heel strike, allowing for a more natural gait pattern. This design also produces a faster increase to the loading of the posterior spring and a faster recoil for the patient to be able to use the return force of the orthosis.

In order for the internal core structure to be affective at providing function for the patient, there are some basic characteristics that must be present. The foot must be able to be positioned/pointed in the forward direction of the bend of the knee. Excess Valgus/Varus positioning of the ankle can complicate the ability of the orthosis to function. The orthosis must extend proximal to the medial tibial flare, just below the knee cap. This provides a consistent purchase to the patient. This is where the recoil force of the bend of the spring is returned to the patient for propulsion or standing stability.

The correct strength of resistance of the orthosis is determined by the evaluation of the patient by a trained practitioner.

Functional Gains:

This design provides the patient with a number of functional abilities. One is the ability to vary their cadence, the ability to walk faster or slower. A prime ability of this design, is the ability to stand and balance in one spot with out moving their feet. Another function provided is the ability to go up and down stairs with a reciprocal gait, one foot over the other foot. This design also allows the patient to negotiate uneven terrains. Even to the extent of rocky inclines and declines.

Note:

This orthosis is optimal for walking with a near normal gait pattern. This is beneficial to the patient in walking and jogging. The shorter range of motion of this design is limiting to rotation activities and makes getting up from the floor more difficult.



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