








DESIGN FEATURES THAT IMPACT EFFECTS OF AFOs

Feature	Examples	Considerations	
Pre-fabricated and Custom AFO	<p>Pre-fabricated or Off-the-Shelf: May be purchased with or without a prescription. May allow modifications to be made to meet individual needs.</p> 	<p>Custom: Individually designed and sized to meet needs of the person. Requires a prescription.</p> 	<p>Pre-fabricated design</p> <ul style="list-style-type: none"> ○ Lowest cost ○ Main benefit is improving swing phase deficits ○ Good option for early gait training before final AFO is chosen ○ Limited benefit with more complex gait abnormalities or spasticity <p>Custom design</p> <ul style="list-style-type: none"> ○ Higher cost ○ Best choice with greater complexity of individual needs. ○ Best for control of triplanar foot deformities ○ A custom AFO leads to improved outcomes across the ICF.
Proximal Shell: The proximal shell position controls forward or backward progression of tibia in stance.	<p>Anterior shell: material of the shell covers a portion of the anterior tibia</p>  	<p>Posterior shell: material of the shell covers a portion of the posterior tibia</p> 	<p>Anterior Shell</p> <ul style="list-style-type: none"> ○ Provides stance phase knee stability by limiting tibial forward progression when AFO is solid and very stiff. ○ Limits dorsiflexion in stance ○ May increase dynamic balance compared to posterior AFO ○ May lead to knee hyperextension <p>Posterior Shell</p> <ul style="list-style-type: none"> ○ Beneficial for more complex gait abnormalities impacting both knee flexion and extension in stance. ○ May allow greater dorsiflexion than an anterior AFO during stance based on AFO stiffness
Trimlines: The contact position of the material that can be cut more anteriorly or most posteriorly. Trimlines impact the stiffness of the AFO.	<p>Anterior trimlines: material extends more anteriorly, providing increased control and allowing less motion</p> 	<p>Posterior trimlines: material provides less contact, providing decreased control and allowing more motion</p> 	<p>Trimlines</p> <ul style="list-style-type: none"> ○ The more anterior the trimline, the stiffer the AFO. ○ The trimlines can be cut to be more posterior over time as strength, control, and/or balance are gained. ○ More posterior trimlines may allow for greater gains in gait speed and muscle activation due to decreased AFO stiffness. ○ Trimlines posterior to the malleoli decrease ankle medial/lateral control. ○ Trimlines anterior to the malleoli increase medial/lateral control.

<p>Joints: Allow ankle motion to occur. Some joints allow the use of stops or springs or have recoil mechanisms to assist motion.</p>	<p>Flexible joint: Allows DF and PF</p> 		<p>Double metal joint: Can allow, restrict, or assist motion</p> 		<p>Joints</p> <ul style="list-style-type: none"> ○ Joints vary in weight with double metal joints being heaviest ○ Joints mainly impact sagittal plane motion. but flexible joints may allow unwanted eversion/ inversion ○ A double metal joint allows changes to be made over time as strength, control, and/or balance are gained. ○ Fine tuning is often required with a double metal joint
<p>Stops: Limit range of motion to restrict movement when strength, range of motion, and/or motor control are decreased.</p> <p>Springs: Assist movement when strength and/or control are decreased.</p>	<p>PF stop: Created when posterior materials contact</p> 	<p>DF stop: Created when anterior materials contact</p> 	<p>DF stop, PF stop, and spring for DF: A double metal/double action joint can allow options to be customized</p> 		<p>Stops</p> <ul style="list-style-type: none"> ○ A PF stop can decrease genu recurvatum and equinovarus ○ A DF stop can increase stability by decreasing stance phase knee buckling ○ Stops can be set to accommodate limits of ankle range of motion <p>Springs</p> <ul style="list-style-type: none"> ○ A spring assists DF in swing due to spring recoil ○ Can assist with eccentric control of PF during loading response to decrease foot-slap
<p>Materials: Impact the stiffness and performance of the AFO.</p>	<p>Plastic</p> 	<p>Carbon fiber</p> 	<p>Metal uprights</p> 		<p>Plastic</p> <ul style="list-style-type: none"> ○ Strong, lightweight, and less expensive ○ Easily shaped and molded. ○ Sensitive to extreme temperatures <p>Carbon Fiber</p> <ul style="list-style-type: none"> ○ Lighter weight with increased rigidity ○ Stores and releases energy to assist PF <p>Metal uprights</p> <ul style="list-style-type: none"> ○ Heavier weight ○ Accommodates fluctuating edema or skin issues
<p>Straps: Maintain contact between the AFO and the leg and serve to create a counter force. A strap may also be used to limit motion.</p>	<p>Ankle strap: Secures ankle into the AFO</p> 	<p>Below the knee strap: Secures leg into the AFO anteriorly</p> 	<p>Posterior Strap: Allows adjustments for amount of DF desired</p> 		<p>Straps</p> <ul style="list-style-type: none"> ○ At least one strap is required ○ An ankle strap limits heel pistoning and may assist with heel rise at terminal stance. ○ A control or T-strap (see strap on metal upright photo above) can assist in controlling ankle varus or valgus ○ An ankle strap in a figure of 8 pattern may decrease equinovarus by maintaining better contact ○ A shoe with good ankle contact may provide sufficient control without an ankle strap



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