

Overcoming Obstacles to Orthotic Intervention for Post-Stroke Recovery

Adjustable Dynamic Response (ADR) Technology Leads the Way



■ Taffy Bowman, CPO

Orthotic intervention is common practice for post-stroke recovery and rehabilitation. Lower-limb orthoses have been shown to improve gait velocity, cadence, step and stride length¹, as well as decrease energy costs² in patients who have suffered from a stroke. Despite acceptance of lower-limb orthoses in post-stroke rehabilitation, it is not uncommon for orthotists to face obstacles when providing orthotic care for this patient population.

Obstacles may include changing patient physiology and needs that affect orthotic design, lack of consensus among rehabilitation professionals on the most appropriate orthotic intervention, and insurance limitations or restrictions. Overcoming these obstacles is necessary for assisting patients in achieving their maximum potential and best outcomes. Adjustable dynamic response (ADR) technology offers orthotists a tool to help overcome many of the common obstacles associated with orthotic intervention and the post-stroke recovery population. The following patient scenario will be used to contrast traditional orthotic intervention with ADR orthotic intervention.

Post-Stroke Patient Scenario

You are called to the local rehabilitation hospital to evaluate Mr. Smith (fictitious name) for a lower-limb orthosis approximately one week prior to his discharge. He is 65 years old, five feet, seven inches tall, and weighs 200 pounds. Mr. Smith suffered from a stroke six weeks ago and has secondary left hemiparesis. The therapist has been utilizing a trial KAFO from the therapy gym's brace closet to stabilize Mr. Smith's knee and ankle for gait training during therapy. The physical therapist has tried wrapping his foot into dorsiflexion with an ACE® wrap but could not gain enough knee stability and did not have an AFO in the brace closet that would fit him. The therapist is seeing the patient progressing well and certainly would prefer using an AFO versus a KAFO. However, the physical therapist feels that sending the patient home with only an AFO could put him at risk for falling.

The attending physician enters the therapy gym while you are evaluating Mr. Smith with the therapist. The physician asks the therapist to walk Mr. Smith both with and without the trial KAFO so he can see the status. Without the orthosis, the patient is able to initiate sufficient hip flexion to advance his limb but has significant foot drop and subsequent toe drag throughout swing. Mr. Smith demonstrates adequate knee stability during

stance for approximately 15 feet when suddenly his knee gives way and the therapist pulls on the gait belt to prevent him from falling.

With the trial KAFO, Mr. Smith ambulates 50 feet with no issues of knee buckling but demonstrates significant hip hiking and circumduction to gain clearance of the affected side. He is not able to obtain smooth rollover of the foot/ankle due to the AFO section being set at a 90-degree angle. The stiff-legged gait pattern presents an awkward appearance, but it seems to be most effective at allowing for maximum stability of the patient.

The physician is not happy with the thought of prescribing a KAFO due to his experience with high rejection rates from patients as well as knowing the patient most likely will need only an AFO in a matter of weeks. The therapist feels the same but does not feel comfortable sending the patient home without an orthosis that provides adequate safety for the patient. They look to you for your recommendation.

Scenario #1: Traditional Orthotic Intervention

You have seen many patient presentations similar to Mr. Smith's and know that a KAFO is the best option for assuring his safety. You recommend a traditional KAFO with drop-lock knee components and double-action ankle joints to give you some options while allowing or limiting ankle motion. You proceed with casting and measuring for the orthosis and deliver it prior to his discharge.

In another six weeks, you are called to the outpatient therapy gym to discuss Mr. Smith's current status. His outpatient therapist believes he no longer needs the KAFO and would like him to have an AFO. You have your office check his insurance, only to discover that he is not eligible for another orthosis at this time. You tell the therapist you will have your lab remove the KO section of the KAFO but you will need to keep it for a couple days before you can return it. Upon returning the AFO, the therapist notices Mr. Smith continues to walk with a stiff-knee, step-to gait pattern. Mr. Smith has already begun to develop poor gait habits, and the therapist will need to work at retraining Mr. Smith to achieve a more normal gait pattern.

Scenario #2: ADR Orthotic Intervention

You are happy to be asked for your input and see this as the perfect opportunity to discuss Ultraflex's exclusive Adjustable Dynamic Response (ADR) technology as well as Ultraflex's new feature, known as the UltraQuick Release™ (UQR). You

explain to the doctor and the therapist the advantages of ADR and how it allows patients to have a gait that is more biomechanically similar to normal (see figure 1) compared to traditional components.

Allowing a more natural gait during the most active phase of neurological recovery is often the stated goal of rehabilitation physicians and therapists treating stroke patients. ADR gives them a tool to do this very cost effectively and easily. In addition, the UltraQuick Release will allow for easy conversion from a KAFO to an AFO when the patient has progressed and the time is appropriate. They are excited to have you try this technology on Mr. Smith and willingly agree with your recommendations. You proceed with casting and measuring for the orthosis and deliver it prior to his discharge.

In another six weeks, you are called to the outpatient therapy gym to discuss Mr. Smith's current status. The therapist is pleased that the ADR knee component has allowed Mr. Smith to have up to 30 degrees of knee flexion for both swing and stance and that he did not need to be fitted with a locked knee component. This has allowed the therapist to train the patient's quadriceps for weight acceptance during stance with some knee flexion, while preventing excessive circumduction to clear his foot during swing.

The therapist is now interested in converting the KAFO to an AFO and wants you to be present. You demonstrate the UltraQuick Release feature incorporated into the design and show that it can easily be accomplished—in seconds, without tools—in the clinic setting. The therapist is delighted that you were able to do this on-site and that the KO section can be placed back on if needed. Mr. Smith ambulates with the AFO, and the therapist asks you how the channels work (see figure 2). You demonstrate that by compressing the posterior elastomer channel, you are restraining plantarflexion in initial stance, but still giving the patient motion to simulate first ankle rocker. This allows you to prevent forefoot contact and a knee extension moment or foot slap and mimic more normal gait ankle motion. You then demonstrate that by compressing the anterior elastomer channel, you are restraining dorsiflexion from mid-stance to pre-swing. You are allowing dynamic motion to occur while you are also controlling potential anterior knee instability with the adjustable compression of the elastomer. You also show the therapist that the ankle

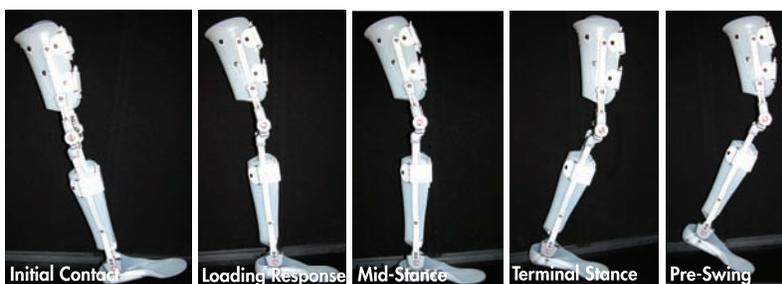


Figure 1: Ultraflex ADR KAFO demonstrating the five phases of stance: Initial contact; loading response; mid-stance; terminal stance; pre-swing.

joint allows 40 degrees of both dorsiflexion and plantarflexion to help when Mr. Smith may be going up and down steps, walking on uneven surfaces, or going up and down ramps.

The therapist is thrilled

with the potential of helping Mr. Smith return to a more normal gait pattern, with the progress ADR has allowed him to make, and with the potential it will offer him as he continues to progress throughout his recovery.

Think Outside the Box

Sometimes it is easier to accept the options we have, thinking it is the best we can do. With ADR, we are challenged to “think outside the box” and look at overcoming post-stroke recovery obstacles with a new approach. Not only does Ultraflex's ADR technology and the UQR feature eliminate many of the common obstacles associated with post-stroke recovery, it also offers patients the opportunity to achieve their best outcomes with one versatile orthosis. ADR offers improved gait biomechanics by allowing motion that is closer to normal to occur throughout the gait cycle while at the same time offering unprecedented stability. As patients progress, muscle augmentation by the elastomer channels can be lessened so that patients recover more fully with fewer learned compensations. Help your patients realize their full potential at each stage of active neurological recovery. Choose ADR to help focus more on the ability of the patient rather than the disability.³

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For more information on Ultraflex Adjustable Dynamic Response Technology, contact Ultraflex's Clinical and Technical Support at 800.220.6670.

References

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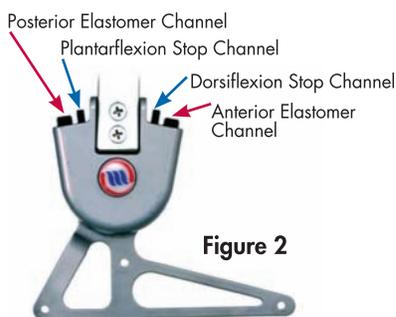


Figure 2

