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Opinion

Children With Upper Limb Absence Can Benefit From Early Prosthetic Fitting

Parents can be overwhelmed when coping with a missing hand on an infant. Whether the limb absence is congenital, traumatic, or surgically removed for medical reasons, parents may look to others for advice and guidance on what medical care will benefit the infant.

Unfortunately, it is common for parents to hear statements such as "Your child doesn't need a prosthesis" or "Your child will be fine with only one hand. A prosthesis will only get in the way." While those statements are meant to be encouraging, parents often intuitively feel that there must be more options for their infant in this two-handed world. I know this from personal experience and am writing as both a physical therapist and a mother whose youngest child — my daughter Amber — was born with an upper limb absence.

It is difficult to determine the number of annual pediatric upper limb loss cases that occur, because no international registry compiles that information. However, on the Centers for Disease Control and Prevention's "Facts About Upper and Lower Limb Reduction Deficits" webpage, the agency estimates that about one in every 1,900 births are affected by an upper or lower limb reduction defect.

It is likely that most physical therapists will encounter a child with upper limb loss in their professional or personal life. Often a physical therapist is the first person to address an infant's or child's developmental and functional needs. For therapists who don't usually work with children or don't have experience with upper limb loss, it may be daunting to think about treating a child with limb loss. However, physical therapists are well-positioned to assist these patients. They are trained on brain and motor development as well as injury prevention. A physical therapist is equipped to assess a child's needs and focus on which interventions could best prevent adverse brain, musculoskeletal, and motor development.

> "It means that a child will be able to participate in the same activities as their peers, develop high self-esteem, and have an excellent quality of life."

From my viewpoint as a therapist and parent, success with habilitation or rehabilitation means that a child with upper limb loss will be able to develop bimanual upper limb skills with symmetrical musculoskeletal upper body development; reduce compensatory movements; and prevent acute and chronic musculoskeletal overuse injuries. It means that a child will be able to participate in the same activities as their peers, develop high self-esteem, and have an excellent quality of life. Early prosthetic fitting and training provides a child with unique tools and support that make it possible to achieve all of these goals.

To guide a physical therapist, information extrapolated from brain development literature informs when to fit a prosthesis and what protocol to follow, such as noted in my October 2020 article "Early Upper-Limb Prosthetic Fitting and Brain Development: Considerations for Success," published in JPO: Journal of Prosthetics and Orthotics. Some important considerations:

- The brain is most plastic during the first three years of life, and there are critical periods in development when sensory, movement, and vestibular stimulation actively shapes the brain circuitry.
- A child must use both upper limbs to develop bimanual upper limb neuronal connections.

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- Use of a prosthesis can restore length and provide grasping ability to allow incorporation of the affected limb into bimanual activities.
- The use of a prosthesis influences how the brain develops — and brain development influences upper limb prosthetic use.
- Therapy needs to be tailored to a child's brain and motor developmental abilities and progress as those abilities change.

To acclimate a child to wearing an upper limb prosthesis, a passive prosthesis should be fitted around six months of age. This helps with a range of basic actions such as batting at objects, sitting balance, crawling, pulling up to standing, and holding items such as a ball or teddy bear.

When a child reaches 18 months and is refining the ability to grasp and pinch with the intact hand, the time is right to introduce a myoelectric prosthesis with an active grasp hand. This allows them to use the affected upper limb for grasping and pinching and adds bimanual prehension to the brain's motor control scheme.

"Although some people may think that a child with an upper limb absence 'will be fine without a prosthesis,' I would assert that by fitting and training a child early with a prosthesis, critical developmental opportunities will not be missed "

By the time a child is 3 years old, the need for a body-powered or activity-specific prosthesis may be identified. These types of devices stand up to activities that could damage a myoelectric prosthesis, allowing a child to engage in sports and recreation that involves impact to the body or exposure to wet or dirty environments.

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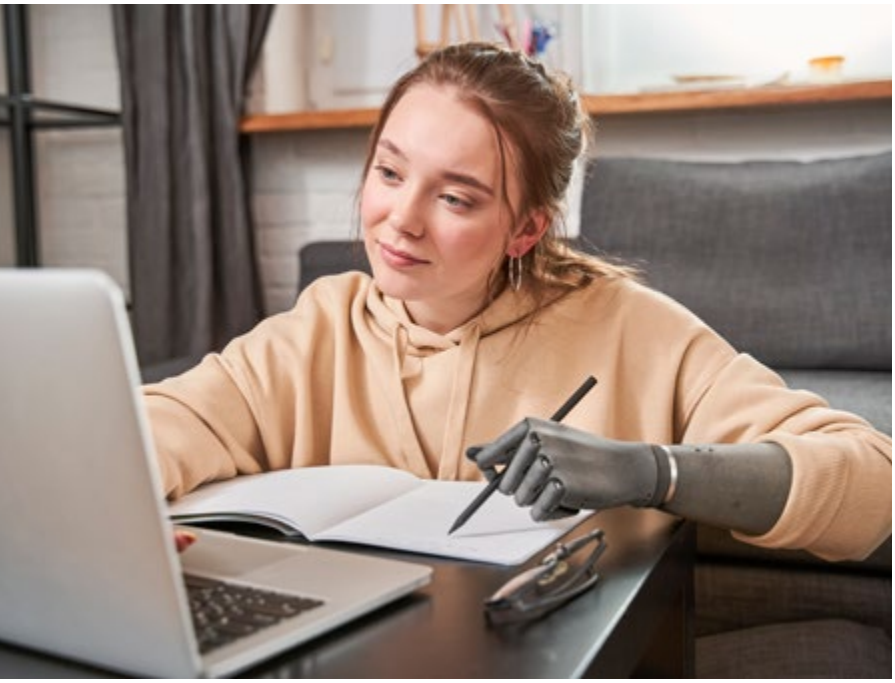

a child early with a prosthesis, critical developmental opportunities will not be missed. Therapy should occur during all stages of growth and with each change of prosthetic device. Consistent therapeutic follow-through will steadily improve a child's functional use of their prosthesis. Improved function will give a child the ability to participate in age-appropriate activities that help develop high self-esteem.

In addition, wearing an upper limb prosthetic device can help a child develop proper body mechanics during activities. This can reduce orthopedic changes in the spine and upper body joints and reduce the potential for soft tissue overuse injuries in the future.

There are multiple benefits to fitting a child early with age-appropriate prosthetic devices and providing therapy as their development needs change. From my experience as a physical therapist and as Amber's mom for 17 years, I know that this approach has a positive, long-term impact on a child's quality of life.

JENNIFER PETERSON, PT, MA

(Editor's note: Interested in reading more about limb absence and prosthetics? Look for a feature article in the April issue of APTA Magazine.)

An Unconventional Path Away From Burnout

Ask anyone in physical therapy what some of the important issues impacting the profession are, and I guarantee most of those lists will include clinician burnout. I would go as far to say that even when other issues are listed, they, too, lead to burnout.

That's an important nuance. These "other" issues — things such as payment (reimbursement to some), productivity standards, expectations for more standardized care, student debt, and stagnating wages — are massive, systemic problems that point past the individual and even the profession as a whole, and point toward a nationwide health care and educational system. The expectations place on the health care system is often in contrast with best practice and creates barriers to prioritizing quality care above other stakeholders. Through this lens, burnout extends beyond an individual shortcoming.

Recent graduates are feeling burnout almost immediately, facing increasing workloads and the realities of life with COVID-19. Add an average student debt burden that a majority of the patients would cringe at, and you have the recipe to lose some bright minds from the field.

I was that new graduate clinician suffering from burnout. The important word is "was." I found my way back from burnout; however, my solution to this growing problem was anything but conventional.

Many will say burnout is a resiliency issue; others will suggest that burnout can be addressed through healthy self-care habits. While these concepts may be helpful, they don't address the effects of a changing health care system beyond the field of physical therapy. Every profession is hurting, and everyone is overworked.

Resiliency and self-care cannot solve the problems within our profession alone because they are prescribed in reaction to complicated, systemic problems. These skills are coping mechanisms that exist to help clinicians survive, not overcome, the demands of work within the system — if they choose to stay. Sadly, many are choosing to leave.

I almost left the profession eight months after starting to practice, when I had serious doubts about