

Mastering the Vital Skills



by Douglas G. Smith, MD,
ACA Medical Director

Part 2 of this series on the transfemoral (above-knee, or AK) amputation level examined surgery and postoperative care. This article will look at the importance of mastering a set of vital skills before a prosthesis is prescribed. It will also look at whether life without a prosthesis might be the right choice for certain individuals. Part 4 of this series will examine high-tech and low-tech sockets, suspension systems and parts.

Before the Prosthesis

Amputations in the thigh and hip place much more challenging demands on a person than do those in the calf or foot. For an individual with a transtibial (below-knee, or BK) amputation who retains good use of the knee, a prosthesis can make it easier to transfer and to get from a sitting to a standing position. Having a natural knee joint with all of its wonderful power makes a prosthetic device helpful even for someone who never remasters walking. The prosthesis can provide a point of contact with the ground for balance and support, and the person still retains the knee power needed for transfer activities. In the lower amputation levels, the person often starts working with a prosthesis very soon after surgery.

But it just doesn't work that way for transfemoral amputees. A prosthesis for an amputation in the thigh or hip does not really help with transfers or in rising from a sitting to a standing position because the leg no longer has knee strength. Since the prosthesis doesn't help with lifting power, we ask that people demonstrate or develop sufficient strength in their other limb, torso, pelvis and arms. That strength is needed to get the body up and over the prosthetic device, and added strength in the thigh and pelvis are fundamental to making a transfemoral prosthesis work safely.



Because people with high-level amputations in the thigh and hip areas are at greater risk of falls and injury, they should safely master a set of vital skills before a prosthesis is ordered. They should be able to do the following:

- Transfer independently, both in and out of bed and on and off of the toilet
- Go from a sitting to a standing position independently
- Walk in parallel bars or with a walker for at least 25 feet.

To illustrate how difficult it is to lift yourself using only one knee, try this: Sit in a chair. Now, raise one foot off of the floor and try to lift yourself out of the chair using the other leg. Hard, isn't it? Most people can't accomplish this without using their arms to push themselves up out of the chair. Can you see how important it is to have the power of both knees to push yourself up?

People with transfemoral amputations have not only lost their knee with its marvelous lifting power, but they are faced with learning to use a prosthesis that works very differently than the leg that they lost. Because there are no muscles or motors inside the prosthesis, body weight can go through the prosthesis to the floor only when the knee is fully straight or, for some knee units, within 5 to 10 degrees of full extension. When rising to a standing position, people with a transfemoral amputation must bear all of their weight on the sound leg, which greatly affects their balance. If they try to put weight onto their amputated limb while their prosthetic knee is still bent, the prosthesis may buckle and collapse. Once they are fully upright with their knees extended, however, weight can then be transferred through the amputated limb.

We never say that these people absolutely cannot obtain or use a prosthesis. But we do ask that they demonstrate the strength and skills necessary to use one safely.

Some people have asked me whether having a prosthetic leg will help them accomplish the vital skills. "Actually, a prosthesis will *not* make it easier to perform these skills," I have to tell them. "If

you can't do them without your prosthetic leg, you won't be able to do them with it." I sometimes call a transfemoral prosthesis "a bit of an anchor" because its weight, bulk and long lever actually make it tougher to master these skills. Amputees shouldn't simply be given a transfemoral prosthesis and sent off with it. The training is much more demanding than it is for lower-level amputations.

The time frame for meeting the vital preprosthetic goals can vary tremendously, depending on the individual and his or her general health and physical fitness. Young, healthy people who lose a limb to trauma or tumors often master these skills within one or two days. Most elderly people also master these skills in a very short time. Patients who have severe multiple trauma or major medical problems, especially those who've had strokes, heart attacks or are limited by other medical conditions, might need much more time to heal and rehabilitate. Unfortunately, some people are just not capable of accomplishing these goals because of disease or infirmity.

"When Can Grandpa Get His Leg?"

Deciding precisely when to prescribe a prosthesis for a person with a transfemoral amputation can be difficult. Usually, the person and his or her family are eager to get a prosthetic leg to help the new amputee move forward with his or her life. They don't understand why the prosthetic fitting should wait until the person has mastered the vital skills – independent transfers, going from a sitting to a standing position, and walking in the parallel bars for 25 feet.

I clearly remember two very loving and caring young women who pleaded with me to prescribe a prosthesis for their grandfather, a transfemoral amputee who'd previously had a stroke and was confined to a wheelchair. They were convinced that a prosthetic leg would enable him to transfer and walk, allowing him to leave the nursing facility. "If you'd only give him a leg, then he can walk and come home," they told me. I talked with

them about the three steps, and then we tried to see how safely their grandfather could do a simple transfer from his wheelchair to a low examination table. He was unable to do it without all three of us helping him.

So, I emphasized the three-skills set. If he mastered them, then we could talk about prescribing a prosthesis. But when they returned six weeks later, they fully realized that their grandfather just wasn't going to be able to do it. And after talking with other amputees and watching people use a transfemoral prosthesis, they finally understood why it would not be wise for their grandfather to have a prosthetic leg. For him, it would be "an anchor." Attempts at walking would likely result in falls and possible fractures. And because he spends so much of his time in a wheelchair, the top of the socket would press uncomfortably into his groin and buttock, increasing the risk that he'd develop pressure sores.

The lesson they learned is that the prosthesis does not make it easier for transfemoral amputees to transfer or go from a sitting to a standing position. They need a significant amount of strength in their arms, their other leg, their pelvis and their trunk to rise to a standing position and to use a transfemoral prosthesis effectively and safely. And that's why the three preprosthetic goals were developed. They establish criteria for when it will be safe for a person to begin working with a prosthesis.

Inaccurate Assumptions and Unclear Expectations

Another unfortunate misconception may occur if amputees or their family members believe that the doctor or the insurance company is preventing them from obtaining a transfemoral prosthesis because of cost. I'm not saying that this doesn't happen at times, but it is not automatically the reason why. Usually, the reason the doctor hasn't prescribed a prosthesis for them is that they have not yet mastered the preprosthetic skills.

When people think the doctor and healthcare system are "just being mean,"

it creates an adversarial mindset. “They know what I need; they just won’t give it to me.” Everyone benefits when amputees and their families know about the need to master the vital skills. Even for individuals who master these skills in the first few days following surgery, understanding these concepts is important. Everyone has a better understanding of what ought to be accomplished to safely undertake a prosthetic fitting.

Providing a prosthesis too soon for an individual with a high-level amputation can backfire with devastating results. It can be emotionally shattering for a person to get a prosthesis and be unable to use it. It’s also very hard on the person’s loved ones. The common misconception is that the device will solve all of the problems. But when the device arrives and the problems still persist, they look at each other in confusion, asking, “Who failed?” In reality, nobody failed. Inaccurate assumptions can lead to unclear expectations. There is perhaps a misunderstanding over whether the amputee must do something to make the device work or whether the device will do the work for the amputee. The person makes the device work; the prosthesis doesn’t make the person walk.

Unfortunately, it has become increasingly common for physicians who don’t fully understand amputation rehabilitation and prosthetic devices to write a prescription that simply says “artificial leg.” They may write that prescription for a transfemoral patient who hasn’t mastered the preprosthetic skills or they may write an inappropriate prescription for a device that is either too simple or too complex. Then the prosthetist and therapist are faced with the ethical dilemma of attempting to build and fit a limb and to train a person who is physically unprepared to meet the challenges of using this new device. Or, it’s left to the prosthetist and therapist to explain to the disappointed patient and his or her family why it isn’t the right time to begin using a prosthesis. Or, worse, the person ends up in a frustrating situation of failure.

When people realize that prosthetic devices for amputations at the

transfemoral and hip areas demand more of their users, they understand that it’s not simply a matter of “get up and go.” Much more training and physical therapy are required than for amputations below the knee. Remember the person in Part 1 whose amputation was revised upward from transtibial to transfemoral? He said it was “10 times more difficult” being a transfemoral amputee. When it comes to physical therapy and training, it can take 10 times longer to make the transition and really learn to use a transfemoral prosthesis.

Prosthetic devices for people with amputations in the thigh are fascinating engineering models. They replace two joints – the knee and the ankle. But they demand a lot more of their users. Only through very open discussions can people realize that the most ethical, the safest, and the most helpful course is to be absolutely clear about the need for mastering the vital skills.



Matching People With Technology and Societal Obligations

Appropriately matching the right person with the right prosthetic technology is quite complex. It's probably one of the biggest challenges we're going to have to face in the next decade as technology advances by leaps and bounds – along with its costs. Figuring out who can really benefit from new technology and how society wants to pay for it is not easy. Some people can get a lot of use out of it. Others don't need a lot of technology and prefer simpler mechanics and reliable function.

Similarly, we've struggled for decades over the question of when to prescribe power wheelchairs vs. manual chairs. Recent headlines have emphasized the rising costs of power chairs. Medicare payments for power wheelchairs skyrocketed from \$289 million in 1999 to more than \$1.2 billion in 2003 (Reference 1). And this leap doesn't even include a new technology called the iBOT, which is a wheelchair that can go over inclines and up and down stairs. An iBOT costs \$29,000 (Reference 2), and some say Medicare's obligation for total iBOT costs could reach as much as \$30 billion (Reference 3). So while many people might benefit from technological advances, not all wheelchair users need it, and the costs are significant.

As with wheelchairs, choices about transfemoral prostheses involve matching people with the right device. An analogy I like to use is the VCR. Are you going to use it to record, rewind, fast forward, adjust the TV's settings, set the clock, etc., or are you happy to just push *Play*? Does the person need a prosthesis for a variety of functions or for simple things? Some people love the newest models and can't wait to try out every setting and function. For others, though, there is nothing like the reliability and durability of simpler, tried-and-true systems. They know they can count on "old faithful" to do the job.

As you will see in Part 4 of this series, knee units have made a great technological leap with microprocessors. We're

already struggling to match knee unit technology with each person. Imagine the next leap when we add not just microprocessors but motor control and the power to go from a sitting to a standing position. What if the price goes up another tenfold? How are we going to manage that? We want to help everybody, but economic factors can't be ignored. As William F. Buckley Jr. has noted: "Idealism is fine, but as it approaches reality the costs become prohibitive."



Rehabilitate Without a Prosthesis?

We also should understand that it's okay if some people choose to rehabilitate without a prosthesis. Sometimes, people feel influenced by others or pressure from within themselves to use an artificial leg when they don't want to. It's not mandatory. The prosthesis is there to be used when it makes life easier. But there shouldn't be pressure to use one if you don't want to or aren't quite ready for it. A person has the right to say, "It's not for me."

I'm often fascinated by patients who tell me that they choose not to use a prosthetic leg when they're home alone but use it when they're out with family or friends. For some, it's not that they want or need to use it; instead, they're trying to make everyone around them feel more emotionally comfortable! They feel social

pressure to wear a prosthesis.

Others tell me that they do not feel comfortable in public without a prosthesis because it makes them feel self-conscious and "different." Also, it's not unusual for people with limb loss to experience times when they can't wear a prosthesis because their residual limb is swollen or bruised or there's a blister. For those who would never dream of leaving home without a prosthesis, a blister or soreness that prevents them from wearing a prosthetic leg can be a jail sentence. Each time they cannot wear their leg, they sentence themselves to lockup in their own homes. Peer pressure and social forces truly can be intimidating.

Some think that prosthetic rehabilitation follows amputation surgery just as surely as summer follows spring. But we should not make someone feel like a failure simply because he or she chooses not to use a prosthesis. In an ideal world, rehabilitation should address comprehensive functional living both with and without prosthetics. Prosthetics can be overemphasized, while other important information falls through the cracks. I get the impression that many people really want the freedom to use a prosthesis when it's helpful and not feel that they have to use it when they don't want to. Many people, through choice or circumstance, can benefit from learning to manage their lives with and without a prosthesis. We want to encourage everyone to wear a prosthesis that might be useful. But if you choose not to use one, that's okay too. ■

*"Man never made any material as resilient as the human spirit."
- Bern Williams, author*

References

1. Bloomberg.com (www.bloomberg.com)
2. Independence Technology, a Johnson & Johnson company (www.independencenow.com)
3. *The Hill* newsletter (www.hillnews.com)

Next: The Transfemoral Amputation, Part 4: Great Prosthetic Components Are Good, but a Good Socket Is Great