Can We Prevent Most Amputations?

The Amputee Coalition says "Yes!"

The mission of the Amputee Coalition is to reach out to and empower people affected by limb loss to achieve their full potential through education, support and advocacy, and to promote limb loss prevention.

by Scott McNutt

A study printed last year in the Archives of Physical Medicine and Rehabilitation projected that the number of Americans with limb loss would more than double from 2005 to 2050, from 1.6 million to 3.6 million. The main cause of this sharp increase, unsurprisingly, is rising levels of diabetes mellitus. Unchecked, hundreds of thousands of lower-limb amputations will be the outcome of this disease in the coming decades.

Can these hundreds of thousands of amputations be prevented? The Amputee Coalition of America believes they can. This is a key reason why prevention is now explicitly included in the Coalition's new mission statement:

The mission of the Amputee Coalition is to reach out to and empower people affected by limb loss to achieve their full potential through education, support and advocacy, and to promote limb loss prevention.

How can amputations be prevented? First, we must start with the most significant causes of limb loss: Between 1988 and 1996, there was an average of 133,735 hospital
Save for congenital limb difference, in most cases, means and methods exist to prevent and reduce the incidence of limb loss in the United States. What’s lacking is a coherent effort to promulgate a consistent message that safety measures can be taken to prevent traumatic amputations and preventive care is available for those who need it.

The vast majority of remaining amputations occur because of trauma, mostly from motor vehicle accidents and workplace injuries. Most of these could be prevented through either following current laws and safety measures or implementing new ones.

Reducing Amputations From Complications of Diabetes
Dr. John Giurini, podiatric foot and ankle specialist and a member of the American College of Foot & Ankle Surgeons, says that advances in vascular surgery techniques have made more people with diabetes candidates for reconstructive surgery, thus eliminating the need for amputation in those cases. However, he goes on to note that diabetes rates are on the rise, so “any gains that might have been seen in the reconstruction/limb salvage arena are being counterbalanced by the increased incidence of diabetes.” Thus, emphasizing education and preventive care for people with diabetes is critical.

“We have an aging population and we have issues with obesity, so that increases the risk and incidence of diabetes, so the rate of diabetes is going up,” says Giurini. “In pockets of the country where specialized procedures are being performed, we do see lower amputation rates and higher salvage rates. But this is a message that has to get across to the entire country: We have to do a better job educating our patients and our population about the risk of diabetes, and everything that can lead to the incidence of diabetes rising, and preventive steps that can be taken including weight management, diet, exercise and regular foot exams. A large number of amputations could be prevented by better preventive care and patients taking better care of themselves and doctors being more diligent about educating their patients on what to look for – treating complications and problems early.”

However, when education and preventive care don’t succeed, Giurini says advances in surgical techniques at least offer patients with diabetes choices.

“Education and prevention are always better than trying to undergo surgical intervention to try to salvage the feet,” he says. “That being said, if a patient does get in trouble, there are surgical techniques that could lead to limb salvage. Amputation isn’t always the only option. If you do develop a problem, you need to see a specialist who is well-versed in the care of the diabetic foot who could potentially perform surgical intervention and attempt limb salvage. In today’s medical and surgical arenas, there are options to try and salvage the feet.”

Dr. Giurini is right that preventive care would reduce the incidence of amputation from diabetes complications. The American Diabetes Association (ADA) estimates that between 45 and 85 percent of amputations among people with diabetes in the U.S. could be prevented through a comprehensive foot care program. A host of scholarly studies agree.

Dr. David Armstrong, DPM, PhD, director of the Southern Arizona Limb Salvage Alliance (SALSA) at the University of Arizona and a member of the ADA’s professional practice committee, supports this contention.

“There is no question,” says Armstrong. “There is evidence that this is happening now. Amputations are still rampant, but some of the initial data is promising, showing that we have been making a bit of a difference. I have been preaching this for some time, and [amputations] are still unconscionably high, but probably 80 percent or more could be prevented.”

Armstrong’s team is already reducing the number of amputations in its area. In just its first 9 months of operation, SALSA has seen greater than a 50 percent reduction in high-level amputations – and this is in Pima County, an area with some of the highest rates of diabetes in the country. This success rate isn’t from any medical breakthrough or miracle treatment.

“It’s not through anything exotic,” says Armstrong. “There have been advances, but really the things that make the biggest difference have been our ability to put together effective teams.”

The team approach conceived of by Armstrong’s group ensures that the feet, foot wounds and circulation to the feet are attended to through a concerted, comprehensive effort that reduces cross-referrals and things that introduce inefficiencies in delivery of care.
“What we found is that the irreducible minimum is what we call the ‘Toe and Flow,’” explains Armstrong. “We must have someone to take care of the medical and surgical aspects of the foot and potentially the wound on the foot and preventing it if possible, and then someone taking care of the blood flow into the foot. When someone puts a team together in almost any permutation, good things happen.”

More progress in the battle against diabetes shows in Armstrong’s teamwork with professor Andrew J.M. Boulton and others to standardize the ADA’s Comprehensive Diabetic Foot Exam program. The comprehensive diabetic foot exam is designed to screen people without obvious wounds. With standardization, foot exams and referral patterns are now consistent across specialties, which has helped forge cooperation among professional organizations.

“We did that last year and it’s been a big success, endorsed by a whole host of different bodies,” says Armstrong.

The success of the “Toe and Flow” program and the diabetic foot exam in turn has fostered inter-organizational initiatives.

“Since we have put this “Toe and Flow” idea out there, the two organizations most involved in this area, the Society for Vascular Surgery and the American Podiatric Medical Association, have joined forces now,” says Armstrong. “We are also building a registry of places where we can build these ‘Toe and Flow’ units across the country.”

Besides Armstrong’s SALSA program at the University of Arizona, another has been started at Georgetown University in Washington, D.C.

“In a really positive way, we see a critical mass, and we feel like we are making a difference now,” says Armstrong.

Other Diseases, Other Preventions

Other diseases account for a small percentage of amputations in the U.S. annually. In some cases, advances in medicine and surgical techniques can and do reduce the number of amputations resulting from those.

For instance, according to the National Meningitis Association, about 3,000 cases of meningococcal meningitis occur each year. Adolescents and young adults are at highest risk. According to the Centers for Disease Control and Prevention (CDC), 10-12 percent of the cases are fatal (about 300 to 360). Approximately 20 percent of the survivors will suffer long-term consequences, including limb loss. But a vaccine is available that could prevent most of these outcomes. The CDC’s Advisory Committee on Immunization Practices has called for routine meningococcal disease immunization for adolescents and young adults. It has been supported in this by health organizations such as the American Academy of Pediatrics, the American College Health Association and the American Academy of Family Physicians.

Cancer claims about 1,200 limbs in the U.S. each year. But from 1988 to 1996, the incidence of cancer-related limb loss decreased an estimated 42.6 percent. This reduction has been attributed to more effective chemotherapy regimens, improved imaging technology and advances in reconstructive surgery. Although some cases of malignant tumors in limbs will continue to require amputation, the number resulting from cancer will likely also continue to decrease. Continued improvements in medical techniques and introduction of technologies like the Repiphysis®, an expandable polymer prosthesis that can be implanted into a child’s leg bone to replace cancerous parts, will no doubt see to that.

Reducing Amputations From Trauma

Amputations from trauma mostly result from motor vehicle accidents and workplace injuries. These cause about 30,000 amputations each year combined. Given the automobile industry’s current struggles and the government’s emphasis on fuel efficiency, it seems unlikely that vehicles are going to be armored to the degree necessary to prevent serious injuries.

While in the near term, it may not be possible to have motor vehicles designed more protectively, simply following current laws and safety practices would reduce the number of traffic accidents and, thus, amputations from accidents. The Task Force on Community Preventive Services, which is supported in its work by the U.S. Department of Health and Human Services in collaboration with public and private partners and the CDC, found that enforcing laws such as required use of safety belts and child safety seats and enforcing laws against drinking and driving “could dramatically reduce” motor vehicle occupant injuries.

Strengthening some safety practices could significantly reduce the number of automobile crashes as well. For example, the Federal Highway Administration estimates that installing advance warning signs and other appropriate signage on roadways could reduce the number of crashes by as much as 35 percent.

Similarly, other government agencies are striving to prevent workplace accidents. A National Institute for Occupational Safety and Health (NIOSH) study revealed that there were 10,850 workplace amputations in 1997, the majority of them finger amputations. The Occupational Health
and Safety Administration (OSHA) has concluded that most amputations occur because of unguarded machinery, lack of adequate training and appropriate practices and procedures to safeguard employees from the unexpected startup of machinery and equipment, and human error.

Nothing earthshaking needs to be done to correct this problem. In a recently released statement, OSHA said, “Following proper safety precautions including machine guarding, following lockout and tagout requirements, and using proper protective equipment would greatly reduce the number of workplace amputations annually.”

Also, state OSHA agencies are introducing programs to reduce workplace amputations. For example, in 2008, the Tennessee Occupational Safety and Health Administration (TOSHA) implemented a special-emphasis program that focuses on amputations. This program is designed to identify and reduce workplace hazards that cause or are likely to cause amputations.

“TOSHA believes employee exposure to unguarded or inadequately guarded machines is a primary cause of amputations,” says John Winkler, TOSHA administrator. “We feel it is very important to help make sure facilities with machines that could cause amputations are properly safeguarded.”

Farm work ranks in the top three industries as the most hazardous type of work in the United States. Amputations are 2.5 times more likely to occur in farming than in any other industry. As much as 11 percent of all agricultural injuries are amputations, which is about 2,400 amputations each year. Farmers who have suffered amputations from farm injuries say most often that getting in a hurry and not following safety rules cost them their limb. Adhering to strict safety precautions would greatly reduce the number of amputations among agricultural workers each year.

As with automobile and industrial accidents, simply following safety precautions would prevent most other types of amputations caused by accidents each year, such as those resulting from fireworks or lawn mowers. According to the U.S. Consumer Product Safety Commission, more than 200,000 people were treated for lawn mower-related injuries in 2007, and more than 600 children undergo amputations annually because of lawn mower-related injuries. The American Academy of Pediatrics recommends that riding mowers be designed to disengage the blades when the mower is backing up, preventing the machine from mowing in reverse, which would reduce the number of injuries from back-overs. Several organizations, including the ACA, offer safety tips for operating lawn mowers without endangering life or limb. Routinely following these safety precautions would considerably reduce amputations from these activities.

**Prevention Is Key**

Save for congenital limb difference, in most cases, means and methods exist to prevent and reduce the incidence of limb loss in the United States. What’s lacking is a coherent effort to get out a consistent message that safety measures can be taken to prevent traumatic amputations and preventive care is available for those who need it. In the coming years, the Amputee Coalition intends to change this. The ACA will launch a national limb loss prevention campaign to raise awareness about limb loss risk factors and how to prevent and reduce amputations.

One of the first steps the coalition will take is to ask Congress to name April National Limb Loss Awareness Month. This will create a time of the year focused on the accomplishments and challenges of the amputee community, which will heighten awareness of the need to reduce and prevent limb loss. That will be only the beginning of the ACA’s awareness campaign, a campaign of which we hope you’ll be a part. Together, we can work for a future in which amputation is rare indeed.