

November/December 1998 Volume 7 Number 6

## **Collaborative expertise and ongoing research mean better care for children and adolescents who use a prosthesis**

In the last year, research efforts at Gillette Children's have reinforced its national reputation as a leader in prosthetic care. In 1998, Gillette researchers presented their findings at the Association of Children's Prosthetic-Orthotic Clinics' annual meeting. The studies re-emphasize that prosthetic care goes beyond simply designing and fitting new prostheses for a patient as they grow. Certain patient populations, including those with spina bifida and septicemia-related limb loss, should be closely monitored for complications associated with amputations.

### **Monitoring of skin conditions in spina bifida patients can help prevent amputations**

Patients with spina bifida, a congenital disorder characterized by varying levels of paraplegia and insensate skin, often have hydrocephalus and cognitive deficits including poor initiation, judgment and problem-solving skills.

One study at Gillette Children's looked at seven spina bifida patients with ambulatory problems to help identify risk factors for amputation and assess their prosthetic use.<sup>1</sup> All seven patients were ambulatory prior to amputations. Six of them required amputation because of chronic non-healing pressure sores and two, including one of the previous six, required amputations because of joint derangement. Study subjects with chronic sores required below-knee amputations; joint derangement patients required above-knee amputations.

At the time of the study, six patients were successfully using prostheses to walk community distances. Three of them ultimately had bilateral amputations. The age of the patients at the time of first amputation ranged from 10 to 36 years. Patients with chronic sores tended to be older. Five of the seven subjects required revisions of their initial amputations.

The cause of chronic non-healing pressure sores could be inattention to proper skin care due to cognitive deficits and/or inherent vascular compromise. These findings suggest that the skin integrity of all spina bifida patients should be monitored closely by their care providers, and all wounds should be treated aggressively to help prevent amputations.



*Dr. Robert Fielden, pediatric orthopaedic surgeon, checks the fit of 2-year-old Alexis' leg prosthesis. The child has a congenital absence of the fibula.*

## Latex sensitivity and prosthetic patients

In addition to the risk for chronic derangement and pressure sores, patients with spina bifida are at risk for developing latex or other rubber allergies. All persons with spina bifida (or anyone with latex sensitivity) should avoid exposure to latex products. Although latex is not prevalent in prosthetic materials, certain supplies and components used in manufacturing prostheses do contain latex. Until now, however, a comprehensive listing of prosthetic materials with latex has not been available to prosthetists designing limbs for spina bifida patients.\*

In examining the issue of latex and prosthetics, Gillette prosthetists found that many prosthetic manufacturers had never heard of latex sensitivity.<sup>2</sup> The study's authors plan to work with other members of the Association of Children's Prosthetic-Orthotic Clinics to increase manufacturer awareness of the problem and promote the use of alternative materials.



*Members of Gillette Children's prosthetics team discuss Alexis' progress with her mother during a routine visit to Gillette's prosthetic clinic. Team members from left, clockwise: Dick Stricker, C.P., Mark Gormley, M.D., Joy Windorski, R.N., Robert Fielden, M.D. Not pictured: Pat Prigge, C.P. and Lorraine Blom, case aide.*

## Dental Abnormalities and Lost Blood Supply

In the past, no known research has associated tissue death in septicemia with impaired dental development. However, at Gillette, researchers began to notice that patients with necrosis and related amputations were later faced with dental abnormalities. Subsequently, a long-term study of several patients now suggests a strong link between lost blood flow to the extremities and adverse effects on adult tooth buds.<sup>3</sup>

An initial review in 1991 looked at six quadrimembral amputees secondary to septicemia. These patients included four males and two females with disease onset ranging from 5 months to 5 years of age. The organisms present in four of the patients were meningococcal, while one had pneumococcus and one had beta streps. Limb losses varied from one to four. No specific patterns were found in the 1991 study other than varying degrees of scarring on the body or face, and difficult emotional transitions for the patients.

Six years later, five of the patients were located for follow-up. All five had dental issues of concern. Three had poor, delayed or absent root development in the secondary teeth, as well as problems with tooth surfaces. The other two had surface problems only, including poorly enameled surfaces and staining. There was no firm correlation between the age of onset, organism or the systems involved in the septicemia incidents. However, all five subjects had a history of skin, skeletal and now dental problems.

This data suggests the critical importance of specialized dental care for patients with limb loss related to septicemia.

*\*For further information on latex-containing prosthetic materials, please contact Gillette Children's Assistive Technology Department at 229-3800.*

1 Gormley M, Fielden R, Windorski J, Stricker R, Prigge P & MacDonald R. *Acquired amputation in spina bifida.*

2 Prigge P & Stricker R. *Alternatives for the Spina Bifida Population.*

3 Windorski J, Gormley M, Fielden R, Borkon B, Stricker R, Prigge P, MacDonald R. *Dental problems associated with quadrimembral amputees secondary to septicemia.*