I s deafness a disease? Is it even a disability? Can or should it be “cured”?2

Such questions have been the root of many debates over the nature of deaf culture since the advent of cochlear implantation in the late 1950s. As implants become more reliable and provide increasing quality of hearing to profoundly deaf children and adults, many in the deaf community have grown to view implantation as a threat to both their way of life and the integrity of the community. As a result, factions of deaf society have waged a war against cochlear implants. “I would be remiss not to equate cochlear implants with genocide” stated a 1992 deaf position article.1

While such quotations represent an extremist view in the community, widespread concerns that cochlear implantation would diminish the deaf community’s size and cohesiveness, and that cochlear implantation represents a desire by the hearing population to “cure” deafness existed well into the 1990s.2 Many in the deaf community fear that cochlear implants would result in decreased resource availability and accommodations for the deaf, and hence pose a threat to deaf culture.

For the purpose of this article, deaf culture can be characterized as a community largely composed of profoundly deaf individuals that views deafness as a difference rather than a disability.2 They characterize lack of hearing as “deafhood” rather than “deafness”, with some in the community going as far as calling deafness a “birthright of silence”.3 This community provides resources, education and training to its deaf members, allowing them to function within the deaf community (i.e. through sign language) and in the hearing world (i.e. through lip reading). If one were to consider implantation to be a treatment for profound deafness, most of those implanted at a young age are likely to not partake in the deaf community as they would now be integrated into mainstream education.4

As evidence mounts in favour of cochlear implantation, a shift has been seen to a point where the vast majority of eligible children are implanted, particularly if born to hearing parents. In response to the growing prevalence of implantation, in 2007, the Canadian Association of the Deaf (CAD) released a position paper on cochlear implantation issues in Canada and locally. They asserted that while the CAD has little concern about autonomous adult implantation, they do not believe empirical research has provided sufficient evidence for the efficacy of cochlear implants in supporting first-language acquisition in deaf children, who are unable to make the choice for themselves.5 As the body of scientific literature in the field overwhelmingly supports early childhood implantation, the CAD’s position appears to focus on the right of every deaf child to learn sign language, regardless of whether they received an implant, allowing them to grow up “bilingual and bicultural”. It is difficult however to assert whether this position reflects an effort by the CAD to mitigate the loss of deaf culture by trying to increase the involvement of implanted children in the deaf community.

THE RIGHT TO CHOOSE: WHEN TO IMPLANT?

With newborn hearing screening program offered in eight provinces and three territories as of 2008, children with significant hearing deficiencies are identified earlier than ever.6 Therefore, armed with an early diagnosis, parents are driven to make a decision regarding cochlear implantation in eligible children earlier in the child’s life, with an increasing body of evidence indicating significant advantages to early implantation. Notably, implantation in children under two years old has been extensively shown to provide significant improvement in language perception and vocabulary, often allowing recipients to enter first grade with language skills comparable to children with normal hearing.7,8 Recent evidence indicating that implantation as early as six months old leads to better long-term improvements in language, social skill development and significant advantages in parent-child bonding, has resulted in some centres implanting infants even earlier.9 While the current guidelines advise implantation at around two years old, studies have shown little additional risk of implanting patients at a significantly younger age, hence further shifting the trend towards earlier implantation.

Is this trend towards early implantation significant in terms of informed consent? The main decision to implant has shifted away from the patient when early childhood implantation started becoming common. This has left parents with the full responsibility of choosing implantation as well as the degree of deaf education the child will receive if implanted. However, with children implanted earlier, parents are faced with shorter timelines during which to educate themselves about the procedure. Therefore, while implanting at six months versus two years does not significantly alter the child’s ability to contribute to the decision, it may decrease the amount of time the parents have to consider the choice and could arguably pressure parents into rash decisions.

FUNDING OF COCHLEAR IMPLANTS IN ADULTS AND PEDIATRIC POPULATIONS

Currently, three centers (Toronto, London and Ottawa) provide the over 190 cochlear implant surgeries performed annually in Ontario. With wait times for implantation surgery far above the recommended three months for pediatric populations and six months for adults,10 the Ontario government released an additional $3.9 million in funding in March 2011 to cut wait times in half.11 Unfortunately, it is unlikely this one-time funding package will address waitlist issues in the long-run, particularly in the time-sensitive implantation of children as discussed above.

Specifically in London, a single annual budget is provided for
both pediatric and adult implantations. There are several problems that arise from this funding model. Firstly, as implant costs are covered under provincial health funding, patients cannot purchase their own implants in accordance with the Canada Health Act. Secondly, since a lump sum is allocated to the funding of implants per hospital, implantation can be undertaken only until the sum is exhausted in a given fiscal year. Lastly, due to the evidence presented above for early pediatric implantation, infants must be implanted within a certain window of time after the diagnosis. Therefore, as more pediatric implants are performed, adult patients are pushed back on the wait-list for their implants. However, this funding model does empower the healthcare providers in the audiology team to evaluate patients and assign the funding to those they determine require it most.

**UNILATERAL VS BILATERAL IMPLANTATION**

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) published their official position in the Journal of Otolaryngology supporting bilateral cochlear implantation in all eligible children. Bilateral implantations provide advantages in sound localization, speech isolation in noisy conditions and improved development of the auditory system with few additional risks. Additionally, by implanting both ears, the “better ear” (the ear that will function better with the implant) is always implanted, maximizing benefits for the patient. Hence, for the most part, eligible Canadian children who receive implantation undergo simultaneous bilateral implantation as studies have shown no advantage to implanting the second ear on a later date, particularly at an older age.

While pediatric implantation has been shown to be cost effective by several studies, the cost effectiveness of providing bilateral implantation has been questioned due to the use of public funding of the implants. A systemic review done in the United Kingdom comprised of 33 trials, including two randomized control trials showed a far higher cost effective quality-adjusted life-year returns for unilateral implantation versus the bilateral implantation in pediatric and adult populations. With mounting evidence and strong recommendations in favour of bilateral implantation, why is the cost effectiveness of the second implant much lower than that of the first? Firstly, the quality of life measures used to gauge improvements following the second implant are much more uncertain and inaccurate, as Bond’s 2009 review acknowledges. For example, it is difficult to measure the improvement in quality of life gained from increased ability to localize sound or isolate speech. Secondly, with the ability of a unilateral implant to allow children to attend mainstream school and often requiring almost no specific educational assistance, the majority of savings are realized with the first implant and are hence not reflected in the addition of a second implant. Most significantly, the incremental improvement from having nearly no hearing to considerable hearing achieved with a unilateral implant is bound to be considerably higher than the improvement achieved with the second implant.

**CONCLUSIONS**

By many accounts, those who argue that cochlear implantation is unethical, ineffective or simply not the best choice for profoundly deaf children appear to have been unsuccessful in preventing their widespread use. However, as implantation shifts from being a novelty to the norm, the issues of funding and cost efficiency appear to have taken centre stage in Canada, and particularly in Ontario. With early bilateral implantation established as the best therapy for profoundly deaf children, funding must be available to implant all eligible children whose parents choose implantation. If such funding is not available, as seen in some centres, wait lists will persist and grow particularly in adults as pediatric patients are given priority.

Despite the effectiveness of implants, it is important not to discount the services and supports the deaf community provides to its members. Implantation is not a cure; rather, it is a supportive treatment that along with considerable training allows for increased functioning. Therefore, those implanted may still find they can benefit from participation in the deaf community through support and sign language training.

**REFERENCES**

13. Graham J, V. D. Bilateral sequential cochlear implantation in the congenitally deaf child: evidence to support the concept of a 'critical age' after which the second ear is less likely to provide an adequate level of speech perception on its own. Cochlear Implants Int. 2009;10(3):119-41.