

# Taking the History and Performing the Physical Examination in a Child with Hearing Loss



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## KEYWORDS

- Sensorineural hearing loss • Children • Physical examination • History
- Vestibular function • Conductive hearing loss

## KEY POINTS

- Hearing loss is one of the most common disorders of childhood and has far reaching impact on communication.
- A working knowledge of the physical features associated with syndromic causes of hearing loss is essential.
- Findings on history and physical examination may help tailor the use of diagnostic and ancillary testing yielding a cost-effective approach.
- Early rehabilitation is essential and should not be delayed while determining the underlying cause.
- Vestibular and balance function should be assessed in all children presenting with hearing loss.

## INTRODUCTION

*Don't tell me the sky is the limit when there are footprints on the moon*  
—Paul Brandt (1972), Canadian songwriter from the song,  
*There's a World Out There*, 1999

The limits of the evaluative, diagnostic, and treatment algorithms for pediatric hearing loss are ever changing. What has driven the expansion in these domains

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Disclosures: No disclosures (S.L. Cushing). B.C. Papsin is a member of the speaker's bureau with Cochlear Americas.

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Otolaryngol Clin N Am 48 (2015) 903–912

<http://dx.doi.org/10.1016/j.otc.2015.07.010>

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### Abbreviations

ANSD	Auditory Neuropathy Spectrum Disorder
BOR	Branchio-oto-renal syndrome
CI	Cochlear implantation
CMV	Cytomegalovirus
CT	Computed tomography
SNHL	Sensorineural hearing loss
USH1	Usher syndrome type 1
VEMP	Vestibular evoked myogenic potentials
WS	Waardenburg syndrome

beyond previous limits has been the development and evolution of a variety of diagnostic, surgical, and rehabilitative technologies. The relationship between hearing loss and technology extends back to the industrial revolution when exposure to loud machinery hastened the acquisition of deafness in workers. The technologies of war, and specifically, societies' attempt to accurately document and compensate for damage from hearing loss after the First World War led Fletcher and Munson (1933)<sup>1</sup> to carefully document normal hearing thresholds for the first time. This ability to identify and measure hearing loss was, and remains, essential to its treatment. In the past, noise exposure, and the hearing loss that ensued, was primarily the concern of soldiers, laborers, hunters, and musicians, and safety measures have been put in place to reduce these exposures, minimizing their impact on hearing. However, in this modern day, the evolution of technology continues to put us at risk. In fact, when measured, both the level and the constant nature of noise within our environment are truly remarkable.<sup>2</sup> Consider the daily commute for example, which brings with it the noise associated with traffic and construction. Our days are filled with noise, over which we have little control, as well as considerable noise we volitionally introduce ourselves to, most frequently in the name of entertainment. We do this knowingly as consenting adults, but also expose our infants and children, for example, by introducing white noise machines, which promise the elusive goal of improved sleep at the potential expense of our child's hearing.<sup>3</sup> Technology is obviously not responsible for all forms of hearing loss, particularly in children. In fact, the relationship between hearing loss and technology is deeply entwined in that it is also responsible for some of the most significant advances in the treatment of hearing loss, and it is this relationship that provides the perspective for this article.

The most significant introduction of technology in the therapeutic domain for hearing loss has been the advent of cochlear implantation (CI). Before the introduction of CI, the treatment options and therefore outcomes in severe to profound sensorineural hearing loss (SNHL) were limited. Although there were means available for measuring hearing loss, there was however less of an impetus to identify it early. However, the introduction of CI as an effective treatment option, where performance is ultimately tied to early identification and implantation within critical developmental periods, has driven the development and implementation of early identification strategies such as newborn hearing screening. Similar examples can be found in many domains surrounding pediatric hearing loss and are highlighted throughout this article. This article does not provide a laundry list of all possible features detected on history and all findings on physical examination in the child presenting with hearing loss. Rather, this article aims to arm the clinician with an approach to the child with hearing loss that focuses on the information that is relevant to today's limits in the domains of diagnosis, treatment, and the prediction of outcome. It focuses on how this entwined

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