Dear Editor

Since the 1930s, vestibular dysfunctions have been associated with sensorineural hearing loss (SNHL) in children [1] and, decade after decade, these disorders have been reported in the literature in this population [2-10] until the present day [11]. The prevalence of vestibular dysfunction in children and adolescents with SNHL is estimated at around 41%–74% [12-14], provoking otoneurological symptoms and motor disorders in these children.

Repercussions of the vestibular dysfunction on neuro-motor development and motor performance of children with sensorineural hearing loss

Currently, the literature reports motor disorders in children with SNHL, including delays in the acquisition of neuromotor development milestones [15-18] and changes in static and dynamic balance. These issues have been documented from the 1950s [19] to the present day [20-23]. In addition, disturbances in motor skills that depend on balance to be performed with skill, such as, for example, the gait [24-26], are also described.

In addition to referring imbalances and gait difficulties, children with vestibular dysfunction also present otoneurological symptoms and manifestations such as falls, dizziness, vertigo, and bumps, thus harming the performance of motor skills and typical age games, such as riding a bicycle, jumping rope, playing “hopscotch,” and even using toys from the playground [27-29]. This makes children with SNHL not comparable to children with normal hearing in terms of motor performance [30].

Another complication is that little children do not understand dizziness or vertigo as an “abnormal symptom” and the smaller these children are, the greater their difficulties in reporting what they feel, as they still do not master the language [29,31]. In addition, during vestibular symptoms, children often cry and seek help, clinging to their mother or nearby objects. This behavior is frequently misinterpreted by parents and family members as manifestations of pain, hysterical crises, or tantrums [28], which can contribute to the creation of stigmas for children with SNHL.

All these otoneurological symptoms and motor disorders can negatively influence the functionality and motor performance of children with SNHL during recreational and sports activities. This can affect social relationships and favor the development of emotional disturbances and the isolation of these children [32], which is worrisome, since there is evidence showing that children with SNHL have more depressive symptoms, less participation in sports and recreational activities in school, and worse quality of life compared to their normal-hearing peers [33-36].

Despite all these problems above and the evidence that demonstrates them since the 1930s, there is still no screening protocol for these children, in terms of vestibular assessment and rehabilitation of motor disorders, which is very worrying, given the needs of the children with SNHL and its prevalence worldwide. Furthermore, there is evidence that, without follow-up or treatment, vestibular and motor disorders continue into adolescence and adulthood in those with SNHL [37-40], demonstrating the need to implement programs to assess vestibular function and motor skills in children with SNHL, and

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How to Help Deaf Children Who Do Not Understand Their Vestibular Symptoms and Motor Disorders as Abnormal?

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rehabilitation if necessary.

Advances in literature on the topic

The vestibular screening could be incorporated into well-established neonatal hearing screening programs, with the aim of assessing the function of the two organs of the inner ear, especially in children with severe and profound SNHL. This has already been started in Flanders, in the north of Belgium [41], and has successfully identified vestibular disorders at an early stage in babies [42,43], favoring early auditory and motor intervention, being an example to be followed by other countries.

It is important to mention that even children with SNHL who demonstrated normal vestibular function should be monitored in terms of motor performance, as evidence shows that children with SNHL and normal vestibular function had worse balance compared to their normal-hearing peers [44-46]. This demonstrates that auditory input is not neutral in children's motor skills [47], and there are questions about the postural control model, and whether it would be time to include auditory input as a sensory stimulus also responsible for regulating the human body balance [48].

How can we move advance on this topic?

So, how can we help children with SNHL who do not understand their vestibular symptoms and motor disorders as abnormal?

A first action would be the implementation and inclusion of vestibular screening in neonatal hearing screening programs. In addition, it is also important to include vestibular assessment in neonatal intensive care units, and after identifying children with vestibular dysfunction, refer them for assessment of the motor development, guidance to parents, and rehabilitation with pediatric physical therapists, if necessary.

Regarding the methods of assessing the vestibular system, De Kegel, et al. [44] and Gadsbøll, et al. [49] reported that the asymmetry of the vestibular evoked myogenic potential (VEMP) and the video head impulse test (v-HIT) could be good predictors of balance disorders in children with SNHL, respectively, in addition to being easy, fast, and comfortable tests for children (as young as 3 years of age) [49]. Therefore, these methods could be used to evaluate children's vestibular function in screening programs designed for children.

Children with SNHL and normal vestibular function could be monitored monthly, to identify, together with the help of the parents, motor delays in these children resulting from hearing loss, and if they need intervention, that this occurs early. In addition, an assessment of age-typical motor skills is valid for school-aged children and adolescents, as an effective and timely physical therapy approach with vestibular rehabilitation [50] should be initiated so that children with SNHL take advantage of neural plasticity and the window opportunities from childhood.

Although the systematic presence in schools of health professionals specialized in child development and rehabilitation is not an established policy in many countries, there is a need to implement screening techniques for monitoring children with SNHL. In addition, it is necessary to devise measures and strategies to prevent and/or reverse problems related to balance, favoring adequate growth and neuro-motor development for these children.

Physical therapists are especially important in multidisciplinary health teams because these professionals have skills for vestibular and balance rehabilitation in the child population [50-53]. These professionals could support children with SNHL and vestibular dysfunction from infancy, working with them in neonatal intensive care units, through adolescence, whether in schools or outpatient clinics. Their role would involve adapting and optimizing motor development, balance, and motor skills, thereby enhancing functionality and improving the quality of life for these children at every stage of their growth.

Conflicts of Interest

The author has no financial conflicts of interest.

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