



ORIGINAL ARTICLE

Cervical vestibular evoked myogenic potentials in children[☆]



Alcione Botelho Pereira^{a,*}, Gabriela Souza de Melo Silva^a,
Aída Regina Monteiro Assunção^b, Ciriaco Cristóvão Tavares Atherino^b,
Fernando Madalena Volpe^c, Lilian Felipe^d

^a Universidade Veiga de Almeida (UVA), Rio de Janeiro, RJ, Brazil

^b Hospital Universitário Pedro Ernesto (UERJ), Rio de Janeiro, RJ, Brazil

^c Teaching and Research Management, Fundação Hospitalar do Estado de Minas Gerais, Belo Horizonte, MG, Brazil

^d Universidade Federal Fluminense (UFF), Niterói, RJ, Brazil

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KEYWORDS

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Abstract

Introduction: Cervical vestibular evoked myogenic potential is a test used in neurotological examination. It verifies the integrity of vestibular function through a muscular response evoked by an acoustic stimulation which activates the saccular macula. Normal standards in adults have been established, however, there are few published data on the normal responses in children. **Objective:** To establish normal standards for vestibular myogenic responses in children without neurotological complaints.

Methods: This study's design is a cohort with cross-sectional analysis. The sample consisted of 30 subjects, 15 females (50%) and 15 males (50%).

Results: The age of the subjects ranged between 8 and 13 years, with a mean of 10.2 (\pm 1.7). P1 peak showed an average latency of 17.26 (\pm 1.78) ms and a mean amplitude of 49.34 (\pm 23.07) μ V, and the N2 peak showed an average latency of 24.78 (\pm 2.18) ms and mean amplitude of 66.23 (\pm 36.18) μ V. P1–N2 mean amplitude was 115.6 (\pm 55.7) μ V. There were no statistically significant differences when comparing by gender or by laterality.

Conclusion: We established normal values of cervical myogenic vestibular responses in children between 8 and 13 years without neurotological complaints.

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* Corresponding author.

E-mail: alcipere@terra.com.br (A.B. Pereira).

PALAVRAS-CHAVE

Equilíbrio postural;
Criança;
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Diagnóstico

Potencial evocado miogênico vestibular cervical em crianças**Resumo**

Introdução: O potencial evocado miogênico vestibular cervical (cVEMP) vem sendo empregado como exame complementar em estudos otoneurológicos. Avalia a função vestibular através da resposta muscular originada a partir de uma estimulação acústica que ativa a mácula sacular. O exame foi padronizado em adultos, entretanto, há escassez de dados publicados sobre as respostas obtidas em crianças.

Objetivo: Estabelecer valores de normalidade das respostas miogênicas vestibulares em crianças sem queixas otoneurológicas.

Método: Estudo de coorte histórica com corte transversal, de 30 sujeitos sem queixas otoneurológicas, 8 a 13 anos.

Resultados: A amostra foi composta de 15 meninos e 15 meninas, com idade média de 10,2 ($\pm 1,7$ anos). A curva P1 apresentou uma latência média de 17,26 ($\pm 1,78$) e uma amplitude média -49,34 ($\pm 23,07$), enquanto a curva N2 apresentou uma latência média de 24,78 ($\pm 2,18$) e uma amplitude média de 66,23 ($\pm 36,18$). A amplitude P1-N2 foi 115,6 ($\pm 55,7$). O índice de assimetria foi de 21,3% ($\pm 18,6$). Não foram encontradas diferenças estatisticamente significativas quando comparados os sexos. Da mesma forma, não se observou efeito significativo da lateralidade nos resultados.

Conclusão: Foram estabelecidos os valores de normalidade das respostas miogênicas vestibulares cervicais em crianças entre 8 e 13 anos sem queixas otoneurológicas.

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Introduction

The cervical vestibular-evoked myogenic potential (cVEMP) has been utilized as a supplementary test in neurotological disorders and in the evaluation of vertigo. This is a test that assesses the vestibular function through a reflex muscle response in response to a high-intensity acoustic stimulation that activates the saccular macula.

The reflex that originates in the sacculus is transmitted to neurons in the ganglion of Scarpa, advances through the inferior vestibular nerve, vestibular nucleus and vestibular-spinal tract, and terminates in the motor neurons for the sternocleidomastoid muscle.¹⁻³

It is estimated that childhood vertigo represents 1% of the consultations in pediatric neurology. This problem is also found in 13% of children referred for audiologic evaluation.⁴ That percentage may be even higher, due to difficulties in establishing the diagnosis and obtaining an adequate history from a child with dizziness, due to a difficulty in describing the discomfort. However, pediatric vestibular disorders are of great importance, because they can cause a number of effects, such as delayed motor and learning development, potentially interfering in language, speech, writing and reading.^{4,5}

Among the complementary tests in an otoneurologic evaluation, advantages of VEMP are that it is an objective, reliable, noninvasive, inexpensive, easy to perform, and rapid test that causes the patient no discomfort.^{2,6-8}

The test has been standardized in adults, and its normal values have been defined.⁸⁻¹¹ However, there are few published data on the responses obtained in children. There is no Brazilian standardization for this test in the pediatric population, which limits its applicability in clinical practice.

The aim of this study was to establish normal values for vestibular myogenic responses in 8–13 year old children without otoneurologic complaints.

Methods

The study was approved by the Research Ethics Committee (Opinion number 421.510). All parents/guardians signed the Free Informed Consent for participation of their children in the research. This is a cross-sectional historical cohort study. The study group consisted of 30 subjects of both genders without otoneurologic complaints, who were aged 8–13 years.

Exclusion criteria were: no agreement of parents/guardians and children to participate in the study; the patient did not fit to the studied population; cervical rotation difficulty; external-middle ear malformation; dizziness, tinnitus or other otoneurologic complaints; presence of conductive hearing alteration (type B tympanogram and absence of stapedial reflexes); and hearing loss.

All children's parents and/or guardians were informed about the study objectives and, after due authorization, the examination was performed.

The subjects were submitted to cVEMP in a quiet and comfortable room, previously reserved for the examinations. The tests were performed by two female speech therapists.

To perform cVEMP, an Interacoustics Eclipse device with a module for cVEMP was used. Stimuli were sent through Ear Tone ABR insertion headphones.

The volunteers remained seated in a chair and, after rubbing the skin with an abrasive paste (Neurograff

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