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REVIEW ARTICLE

Effect of caffeine on vestibular evoked myogenic potential: a systematic review with meta-analysis<sup>☆</sup>

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KEYWORDS

Vestibular function tests;  
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Evoked motor potential;  
Vestibular nerve

Abstract

**Introduction:** Caffeine can be considered the most consumed drug by adults worldwide, and can be found in several foods, such as chocolate, coffee, tea, soda and others. Overall, caffeine in moderate doses, results in increased physical and intellectual productivity, increases the capacity of concentration and reduces the time of reaction to sensory stimuli. On the other hand, high doses can cause noticeable signs of mental confusion and error induction in intellectual tasks, anxiety, restlessness, muscle tremors, tachycardia, labyrinthine changes, and tinnitus. **Objective:** Considering that the vestibular evoked myogenic potential is a clinical test that evaluates the muscular response of high intensity auditory stimulation, the present systematic review aimed to analyze the effects of caffeine on vestibular evoked myogenic potential. **Methods:** This study consisted of the search of the following databases: MEDLINE, CENTRAL, ScienceDirect, Scopus, Web of Science, LILACS, SciELO and ClinicalTrials.gov. Additionally, the gray literature was also searched. The search strategy included terms related to intervention (caffeine or coffee consumption) and the primary outcome (vestibular evoked myogenic potential).

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**Results:** Based on the 253 potentially relevant articles identified through the database search, only two full-text publications were retrieved for further evaluation, which were maintained for qualitative analysis.

**Conclusion:** Analyzing the articles found, caffeine has no effect on vestibular evoked myogenic potential in normal individuals.

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## PALAVRAS-CHAVE

Testes de função vestibular;  
Café;  
Potencial evocado motor;  
Nervo vestibular

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## Efeito da cafeína no potencial evocado miogênico vestibular: uma revisão sistemática com metanálise

### Resumo

**Introdução:** A cafeína pode ser considerada a droga mais consumida por adultos em nível mundial, podendo ser encontrada em inúmeros alimentos, como no chocolate, café, chá, refrigerante e outros. Em geral, a cafeína em doses moderadas, produz ótimos rendimentos físico e intelectual, aumenta a capacidade de concentração e diminui o tempo de reação aos estímulos sensoriais. Por outro lado, doses elevadas podem causar sinais perceptíveis de confusão mental e indução de erros em tarefas intelectuais, ansiedade, nervosismo, tremores musculares, taquicardia, alterações labirínticas e zumbido.

**Objetivo:** Considerando que o potencial evocado miogênico vestibular é um teste clínico que avalia a resposta muscular decorrente de estimulação auditiva de alta intensidade, a presente revisão sistemática objetivou analisar o efeito da cafeína sobre o potencial evocado miogênico vestibular.

**Método:** A formulação deste trabalho consistiu na busca dos estudos nas seguintes bases de dados: MEDLINE, CENTRAL, *ScienceDirect*, *Scopus*, *Web of Science*, LILACS, SciELO e ClinicalTrials.gov. Adicionalmente, a literatura cinzenta também foi pesquisada. A estratégia de busca incluiu termos relacionados à intervenção (consumo de cafeína ou café) e ao desfecho primário (potencial evocado miogênico vestibular).

**Resultados:** A partir de 253 registros potencialmente relevantes identificados através da busca nas bases de dados, apenas duas publicações em texto completo foram recuperadas para avaliação mais aprofundada, sendo estas mantidas para a análise qualitativa.

**Conclusão:** Diante dos artigos encontrados a cafeína não tem efeito sobre o potencial evocado miogênico vestibular em sujeitos normais.

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## Introduction

Caffeine can be considered the most consumed drug by adults worldwide, and can be found in several foods, such as chocolate, coffee, tea, soda and others.<sup>1</sup> It is also present in many supplements, diuretics, weight loss products and alertness maintenance products.<sup>2</sup> In addition to all these uses, caffeine is often used prior to performing physical exercises, aiming to delay fatigue and improve physical performance.<sup>3-5</sup>

Until the early 1990s, there were few review studies available in the literature that indicated the possible ergogenic effects of caffeine (an effect that increases the capacity for bodily or mental work, especially by eliminating fatigue symptoms, aiming at improving performance).<sup>4,6,7</sup> Therefore, it was only after a few years that great importance started to be given to the study of caffeine as a possible ergogenic resource, which contributed to a greater production of studies in this area.<sup>5,8-11</sup>

After coffee intake, it is estimated that caffeine takes 30–45 min to reach its peak plasma concentration,<sup>12</sup> with a plasma half-life of approximately 3–7 h.<sup>3</sup> Its action can reach all tissues, because it is transported by the bloodstream, later being metabolized by the liver and excreted by the urine as its co-products.<sup>5,8</sup>

It is believed that caffeine has central and peripheral mechanisms of action that can trigger important metabolic and physiological changes, which could improve athletic performance.<sup>5,13-16</sup> Regarding the neurophysiological aspects, caffeine acts as a stimulant, increasing the central nervous system activity by blocking adenosine receptors in brain and spinal cord neurons. At the same time, the adenosine bound to these receptors results in a calming effect, which is determined by the administered dose and the individualized metabolism.<sup>17,18</sup>

In general, caffeine in moderate doses (200–300 mg), results in increased physical and intellectual productivity, enhances concentration capacity and reduces the time of

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