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An Overview of Techniques of Acoustic Analysis for the Detection of Obstructive Sleep Apnea

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Abstract

The primary focus of this review article is to investigate acoustic analysis techniques for detecting Obstructive Sleep Apnea (OSA). OSA causes the upper airway to collapse partially or entirely during sleep, which reduces oxygen saturation. The existing diagnostic techniques for obstructive sleep apnea, such as polysomnography, are hindered by the challenges related to their cost, invasiveness and limited accessibility. Alternative non-invasive and economical diagnostic methods are therefore required. The purpose of this review study is to analyze the strengths and limitations of the current acoustic analysis techniques as more accessible, non-invasive and cost-effective approaches to detect OSA. Acoustic analysis, which examines the acoustic features of speech, snoring, and breathing, has the potential to serve as a diagnostic method for OSA. This study thoroughly examines the possibility of snoring and speech acoustic traits as diagnostic indications for obstructive sleep apnea, using both automated classification methodologies and acoustic analytic tools (MDVP and PRAAT). By analyzing the existing research outcomes, this article offers a comprehensive overview of the advancements in acoustic analysis for OSA detection. Further research is needed in speech and OSA analysis, considering clinical factors and acoustic properties to establish a comprehensive understanding.

Keywords: *Acoustic analysis, Obstructive sleep apnea, Speech, Voice analysis, Non-invasive*