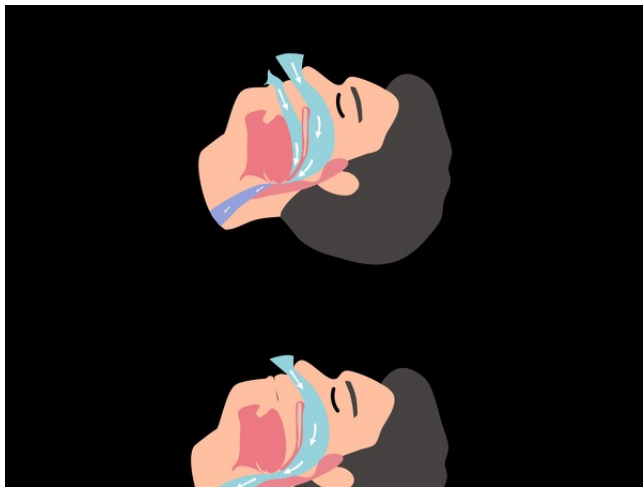




Automatically-Adjusting Mandibular Advancement Device for Obstructive Sleep Apnea

TECHNOLOGY NUMBER: 2025-512



OVERVIEW

Automatically-adjusting mandibular advancement device for responsive Obstructive Sleep Apnea therapy.

- Dynamically adjusts jaw position based on breathing, minimizing discomfort and side effects
- Real world applications: OSA therapy for CPAP-intolerant patients, user-friendly sleep devices, improved adherence, travel-friendly OSA solution

BACKGROUND

Obstructive Sleep Apnea (OSA) is a prevalent sleep disorder characterized by repeated airway collapse, resulting in interrupted breathing and poor sleep quality. Standard treatments include continuous positive airway pressure (CPAP) machines and mandibular advancement devices (MADs) that hold the lower jaw forward to prevent airway closure. However, CPAP intolerance is common due to discomfort and inconvenience, affecting millions globally. Conventional MADs, although less obtrusive, maintain the jaw in a fixed position throughout the night, often causing jaw pain, permanent tooth movement, and permanent bone changes. Additionally, these static designs do not accommodate natural fluctuations in breathing, possibly leading to overuse or insufficient treatment during variable apneic events. This mismatch leads to low patient adherence and limited effectiveness, highlighting the need for an adaptive, patient-responsive

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Medical Devices
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device that can offer effective OSA management with minimal side effects and maximized comfort.

INNOVATION

The invention presents a dynamic mandibular advancement device (MAD) that uses an embedded polyvinylidene fluoride (PVDF) sensor and a responsive actuation mechanism to treat Obstructive Sleep Apnea (OSA). Unlike static MADs, this system detects airflow vibrations in real time; if an apneic event over ten seconds occurs, the device automatically advances the jaw to open the airway, then returns it to baseline after sustained normal breathing. This targeted, real-time approach restricts mandibular advancement to only necessary moments, greatly reducing discomfort, jaw pain, and long-term dental consequences. No comparable market device features intraoral sensing and automated jaw adjustment. The innovation offers significant advantages in comfort and patient compliance, targeting over 30 million individuals unable to tolerate CPAP. Applications include home and clinical OSA management, travel-ready sleep devices, and a scalable approach to improving quality of life for OSA sufferers.