

Tech Transformations: Modern Solutions for Obstructive Sleep Apnea

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Abstract: Recent advancements in the screening, diagnosis, and management of obstructive sleep apnea (OSA) have significantly improved patient outcomes. For screening, the use of home sleep apnea testing (HSAT) has become more prevalent, offering a convenient and cost-effective alternative to traditional in-lab polysomnography. HSAT devices have shown good specificity and sensitivity, particularly in patients with a high pre-test probability of OSA. In terms of diagnosis, advancements in wearable technology and mobile health applications have enabled continuous monitoring of sleep patterns and respiratory parameters. These tools provide valuable data that can be used to identify OSA more accurately and promptly. Additionally, machine learning algorithms are being integrated into diagnostic processes to enhance the accuracy of OSA detection by analyzing large datasets and identifying patterns indicative of the condition. Management of OSA has also seen significant progress. Continuous positive airway pressure (CPAP) therapy remains the gold standard, but new developments include auto-adjusting CPAP devices that optimize pressure settings based on real-time feedback. Mandibular advancement devices and hypoglossal nerve stimulation are emerging as effective alternatives for patients who are CPAP-intolerant. Furthermore, lifestyle interventions such as weight management, positional therapy, and exercise have been shown to complement medical treatments, leading to better overall outcomes. This review article highlights these advancements that collectively contribute to improved patient adherence, reduced symptoms, and enhanced quality of life for individuals with OSA.

Keywords: Obstructive Sleep Apnea, OSA, Advancements in OSA, Digital Health in OSA, Wearable Technology in OSA, Machine Learning in OSA, Home Sleep Apnea Testing (HSAT), Continuous Positive Airway Pressure (CPAP), Mandibular Advancement Devices, Hypoglossal Nerve Stimulation

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1. Introduction

Obstructive Sleep Apnea (OSA) is a prevalent condition characterized by repeated episodes of partial or complete obstruction of the upper airway during sleep, leading to disrupted sleep and various health complications. Over the past decade, significant advancements have been made in both the diagnosis and management of OSA, driven by technological innovations and a deeper understanding of the condition [1].

Digital therapeutics for sleep apnea encompass a range of technology-driven interventions designed to improve the management and treatment of obstructive sleep apnea (OSA). These interventions often utilize digital platforms, such as smartphone applications and telemedicine, to enhance patient engagement, adherence to therapy, and overall treatment outcomes [2].

While there have been lot of research & development happening in the segment of sleep apnea, literature regarding these advancements remain fragmented like the patient journey of sleep apnea. This article aims to summarize the recent trends and technological advancements in sleep apnea diagnosis and management including the companies that have ventured into this space.

2. Method and Methodology

2.1. Literature Search

A comprehensive literature search was conducted to identify studies published in the last 12 years (2013-2024) focusing on advancements in the screening, diagnosis, and management of obstructive sleep apnea (OSA). The following databases were searched: PubMed, MEDLINE, EMBASE, Cochrane Library, and Google Scholar. Keywords used in the search included "obstructive sleep apnea," "OSA," "advancements in OSA," "digital health in OSA," "wearable technology in OSA," "machine learning, in OSA" "home sleep apnea testing," "HSAT," "continuous positive airway pressure," "CPAP," "mandibular advancement devices," and "hypoglossal nerve stimulation."

2.2. Inclusion and Exclusion Criteria

Studies were included if they:

1. Were published between January 2013 and December 2024.
2. Focused on human subjects.
3. Discussed advancements in the screening, diagnosis, or management of OSA.
4. Were peer-reviewed articles, clinical trials, or systematic reviews.

Studies were excluded if they:

1. Were not available in English.
2. Focused on pediatric populations exclusively.
3. Were case reports, editorials, or opinion pieces.

Besides literature search, google search was made on existing companies in this space using the mentioned keywords along with the suffix 'companies'.

2.3. Data Extraction and Synthesis

Data from the selected studies were extracted using a standardized form, which included information on advancements in different aspects of sleep apnea journey, and key findings. The extracted data were then synthesized to provide a comprehensive overview of the recent advancements in the field of OSA.

2.3. Keywords

- Obstructive Sleep Apnea
- OSA
- Advancements in OSA
- Digital Health in OSA
- Wearable Technology in OSA
- Machine Learning in OSA
- Home Sleep Apnea Testing (HSAT)
- Continuous Positive Airway Pressure (CPAP)
- Mandibular Advancement Devices
- Hypoglossal Nerve Stimulation

3. Advancements across continuum of care

There have been gaps noted in the screening, diagnosis, management, therapy adherence, treatment, and monitoring of sleep apnea across the spectrum of patient journey. To address these underlying issues, there have been innumerable advancements at each of these steps.

1. **Screening and Diagnosis:** Digital tools, including smartphone-based applications and wearables, are being developed to aid in the screening and diagnosis of OSA. These are portable devices that allow patients to undergo sleep studies in the comfort of their own homes. These devices typically record sleep sounds and respiratory movements, using deep learning algorithms to detect sleep apnea events and calculate the apnea-hypopnea index (AHI). While promising, these tools require further validation against the gold standard of polysomnography [3].

Some of the notable HSAT devices currently in the market are as follows:

- **WatchPAT-** A compact, wearable device consisting of wrist, finger and chest components that uses the proprietary Peripheral Arterial Tone (PAT) technology to non-invasively measure arterial tone changes in peripheral arterial beds which are indicative of respiratory events. It records multiple parameters including oxygen saturation, heart rate, actigraphy (body movements), and snoring [4].

Advancements:

- ✓ Capable of estimating all respiratory arousals, including cortical arousals, with high accuracy.
- ✓ Utilizes advanced algorithms to automatically analyze data and generate detailed sleep reports.
- ✓ Data can be uploaded to a cloud platform for remote analysis and review by healthcare providers.

- **ApneaLink Air:** A compact device that records nasal airflow, respiratory effort, pulse, and oxygen saturation [5].

- **NightOwl-** A small, wearable device that attaches to the fingertip and measures oxygen saturation, heart rate, and pulse wave amplitude. It provides a comprehensive sleep report through a connected app [6].

Advancements:

- ✓ Uses cloud-based algorithms to analyze data and generate detailed reports.

- **Sonomat-** A foam mattress with embedded sensors that detect respiratory movements and breath sounds. It uses these signals to classify sleep stages and detect OSA events [7].

Advancements:

- ✓ High accuracy in detecting OSA with non-contact monitoring.

- **Beddr SleepTuner-** A small sensor that attaches to the forehead to measure oxygen saturation, heart rate, and sleep position. It provides insights into sleep quality and potential OSA events [8].

Advancements:

- ✓ Portable and easy to use, with data accessible via a smartphone app.

- **Sleepiz-** The Sleepiz One+ is a contactless home sleep apnea monitoring device designed to make apnea detection easy and comfortable for patients and clinicians [9].

Advancements:

- ✓ Uses highly accurate radar signals to measure vital signs such as breathing rate and pulse rate continuously without any physical contact.
 - ✓ Measurements can be accessed through a web interface and are pushed to clinicians for analysis.
 - ✓ The device is CE-marked and classified as a Class IIa medical device under EU regulations.
- **Apple Watch Series 10-** This has several advanced health features, including the ability to detect signs of obstructive sleep apnea (OSA).
Advancements:
 - ✓ Breathing Disturbance Monitoring- It uses built-in sensors to monitor respiratory patterns and detect irregularities [10].
 - ✓ Sleep Apnea Notifications- If the watch detects frequent breathing disturbances over a 30-day period, it sends a notification suggesting the possibility of sleep apnea. This alert includes a summary of the detected events and a PDF report that can be shared with healthcare providers [10,11].
 - ✓ Integration with Health App- All sleep and respiratory data are synced with the Health app on the iPhone, allowing users to review their sleep patterns and breathing disturbances. The app provides detailed insights and trends over time [10].
 - ✓ FDA Clearance- The sleep apnea detection feature has received clearance from the U.S. Food and Drug Administration (FDA), ensuring its reliability and accuracy [11].
 - **Drug-Induced Sleep Endoscopy (DISE)-** A procedure where a patient is sedated to mimic sleep, allowing for dynamic visualization of the upper airway to identify the site of obstruction [12].
Advancements:
 - ✓ The integration of digital advancements, such as enhanced imaging, AI, telemedicine, and VR/AR, has further improved the accuracy, efficiency, and accessibility of this procedure. These innovations have enhanced its accuracy and utility in guiding surgical interventions.
2. **Therapy Adherence:** Digital therapeutics also focus on improving adherence to positive airway pressure (PAP) therapy, which is the standard treatment for OSA. Telemedicine interventions have been shown to increase PAP adherence by providing continuous monitoring and feedback, which can be more effective than traditional follow-up methods. Smartphone applications can also support adherence by offering educational content and reminders, as well as tracking usage data [13]. This has led to significant advances in management.

Positive Airway Pressure (PAP) Therapy

- Features: Continuous Positive Airway Pressure (CPAP) remains the gold standard for OSA treatment. Newer devices are quieter, more comfortable, and equipped with advanced features like auto-adjusting pressure and humidification.
- Examples:
 - **ResMed AirSense 10:** Offers auto-adjusting pressure and integrated humidification [14].
 - **Philips DreamStation:** Features advanced data tracking and connectivity options [15].

- **Bongo Rx:** A nasal device that creates positive airway pressure by using the patient's own breathing. It is designed for use during sleep to keep the airway open. Advancements: Compact, travel-friendly, and does not require a power source [16].

Oral Appliances

- Features: Custom-fitted devices that reposition the lower jaw and tongue to keep the airway open during sleep.
- Advancements: Improved materials and designs have increased comfort and efficacy.
- Examples:
 - **SomnoDent:** A mandibular advancement device with a high compliance rate [17].
 - **ProSomnus:** Offers precision-fit and adjustable features [18].

Hypoglossal Nerve Stimulation (HGNS)

- Features: An implantable device that stimulates the hypoglossal nerve to maintain airway patency during sleep.
- Advancements: Enhanced patient selection criteria and long-term efficacy data have solidified its role in OSA management.
- Examples:
 - **Inspire:** An FDA-approved device that monitors breathing patterns and delivers mild stimulation to the hypoglossal nerve [19].

Behavioral and Lifestyle Interventions

- Features: Weight loss, exercise, and positional therapy are critical components of OSA management.
- Advancements: Digital health platforms and mobile apps provide personalized coaching and monitoring.
- Examples:
 - **Sleepio:** An app offering cognitive behavioral therapy for insomnia, which can complement OSA treatment [20].
 - **myAir by ResMed:** Tracks PAP therapy usage and provides feedback and support [21].

Medicines

- Tirzepetide, marketed as Zepbound, has been approved by the FDA for treating moderate to severe obstructive sleep apnea (OSA) in obese adults. This dual GLP-1 and GIP receptor agonist helps reduce body weight, which in turn improves OSA symptoms. Clinical trials have shown significant reductions in the apnea-hypopnea index (AHI) and body weight, making it a promising option for managing OSA in obese patients [22,23].

3. **Physical Therapy:** Some digital therapeutics include applications that guide patients through physical therapy exercises aimed at strengthening the upper airway and respiratory muscles. These applications provide video tutorials and scheduling functions to facilitate home-based therapy, although further studies are needed to confirm their efficacy [24].

4. **Remote Monitoring:** Remote monitoring systems, often integrated with smartphone applications, allow for real-time tracking of therapy compliance and provide feedback to both patients and healthcare providers. This approach has been shown to improve compliance with devices such as CPAP which are commonly used [13,25,27].

4. Advancements in Technology

Recently the market has been flooded with sleep apnea devices and digital therapies. All this has been possible due to advancements in the following underlying technology:

Enhanced Sensors

- Precision: Improved sensors provide more accurate measurements of heart rate, oxygen saturation, and respiratory rate, all of which are crucial for detecting sleep apnea [26].

Machine Learning Algorithms

- Smart Analysis: Advanced machine learning algorithms analyze the collected data to identify patterns and anomalies that may indicate sleep apnea. This enhances the accuracy of detection and reduces false positives.
- Advanced machine learning algorithms analyze breathing patterns to adjust pressure in real-time in Smart CPAP machines [26].

User-Friendly Interface

- Ease of Use: The setup process for sleep apnea detection is straightforward, and the user interface is designed to be intuitive, making it easy for users to understand their sleep health [27].

IoT (Internet of Things)

- Remote Patient Monitoring: Devices are connected to apps or cloud platforms for remote monitoring and reporting [28].

Fluid Dynamics

- Utilizes vortex airflow principles to optimize airway pressure [29].

Compact Engineering

- Designs focus on minimalistic masks and quieter motors [30].

Neurostimulation & Electrical Stimulation Technology

- Uses electrical pulses to stimulate the hypoglossal nerve or target specific group of muscles, preventing airway collapse. Eg. Inspire Therapy [19].

Photoplethysmography (PPG)

- Measures changes in blood flow via light to detect breathing irregularities [26].

Infrared Imaging

- Non-intrusive monitoring of body movements during sleep [31].

Computer Vision Algorithms

- Analyze motion patterns to detect apnea events [26].

Data Analytics

- Track device usage, pressure settings, and sleep patterns [32].

Cloud Integration

- Store data for remote access by healthcare providers [32].

Push Notification Systems

- Provide reminders to improve adherence [13,25,27].

Gamification Features

- Encourage consistent device usage [33,34].

Telemedicine Integration

- Enable real-time consultations with specialists [13,25,27].

Biotechnology

- Create safer and more effective implantable devices with biocompatible materials [35].

5. Companies in the field of OSA

Technological advances over the past decade have rendered more convenient, accurate, and user-friendly options for both diagnosing and managing OSA, ultimately improving patient outcomes and quality of life. Following is a summary of the companies that have ventured in this space of sleep apnea representing noteworthy innovations in the field of sleep medicine.

Table 1. Summary of companies in sleep apnea

Company Name & Country of Origin	Indication	Features
3B Medical ³⁶ China	Advanced CPAP and BiPAP devices designed to treat Sleep Apnea	<ul style="list-style-type: none"> • Luna G3 CPAP System • Auto-Adjusting Pressure • BiPAP Options • Quiet Operation • Compact and Portable • Comprehensive Data Tracking
AeroCare ³⁷ United States	Holdings is a notable provider of medical devices	<ul style="list-style-type: none"> • Comprehensive CPAP and BiPAP Solutions • Home Respiratory Therapy Services • Durable Medical Equipment (DME) • National Network • Acquisition by AdaptHealth
ApniCure ³⁸ United States	Obstructive Sleep Apnea	<ul style="list-style-type: none"> • Provent Therapy • EPAP Technology • Alternative to CPAP • No Need for Electricity • Convenience for Mild to Moderate Sleep Apnea • Treatment for Other Sleep Disorder

Apnex ³⁹ United States	Innovative approach to treating obstructive sleep apnea	<ul style="list-style-type: none"> • Hypoglossal Nerve Stimulation (HGNS) System • Clinical Efficacy • Patient Tolerance • Quality of Life Improvements • FDA Clearance • shut down after early clinical trial results were disappointing
Awarables ⁴⁰ United States	Innovative solutions in the Sleep Apnea space	<ul style="list-style-type: none"> • AcuPebble Device • Home-Based Diagnosis • Real-Time Data Analysis • FDA Clearance • Patient Comfort • Listed as out of business
Belun Technology ⁴¹ Hong-Kong	Convenient and accessible Diagnostics for obstructive sleep apnea	This system facilitates convenient and accessible diagnostics for obstructive sleep apnea, enhancing sleep disorder diagnosis in India.
BiLab ⁴² South Korea	Diagnosis and management of Sleep Apnea.	<ul style="list-style-type: none"> • Multi-Channel Impedance Plethysmography • Electrical Impedance Tomography (EIT) • AirTom-VM • Home Sleep Test (HST) Device • Innovative and Safe Technology
BioSerenity ⁴³ France	Diagnose and Monitor Sleep Disorders	Creates Smart Clothing embedded with sensors to diagnose and monitor sleep disorders, integrating AI for data analysis.
BMC Medical ⁴⁴ China	Sleep Apnea Treatment Space	<ul style="list-style-type: none"> • RESmart GII CPAP System • Comprehensive CPAP Solutions • User-Friendly Design • Advanced Technology • Global Reach
Circadia ⁴⁵ United States	Managing Sleep Apnea and improving Sleep Health	<ul style="list-style-type: none"> • Circadia Sleep System • AI-Powered Insights • Non-Contact Monitoring • Integration with Smart Home Devices • Focus on Circadian Rhythms
Circadiance ⁴⁶ United States	Sleep Weaver line of Products	<ul style="list-style-type: none"> • Soft Cloth CPAP Masks • SleepWeaver Advance Small • Breathable and Non-Allergenic Material • High Patient Satisfaction • Innovative Design
Cryosa ⁴⁷ United States	Treatments for obstructive Sleep Apnea (OSA).	<ul style="list-style-type: none"> • Cryosa™ System • Clinical Trials • Experienced Team

		<ul style="list-style-type: none"> • Funding and Development • Patient-Centric Approach
Dozee ⁴⁸ India	Contactless health monitor	Contactless health monitor that can be placed under the mattress to track heart rate, respiration, stress levels, and sleep cycles. It generates clinical-level reports, including indicators for sleep apnea, aiding in early detection and management
Dormir Bien ⁴⁹ France	Home Sleep testing	<ul style="list-style-type: none"> • Introduces Fastnap Sleep Band for home sleep testing • Focuses on diagnosing sleep apnea and monitoring sleep quality • Products are TGA and FDA-approved
Eaze ⁵⁰ Berlin, Germany	Cognitive-Behavioral therapy	<ul style="list-style-type: none"> • Offers digital sleep training using cognitive-behavioral therapy • Provides personalized digital sleep psychology guidance
Ebb Therapeutics ⁵¹ United States	Innovative Sleep Solutions	<ul style="list-style-type: none"> • Ebb Insomnia Therapy • Drug-Free Solution • Clinical Validation and Evidence-Based • Potential for Combination with CPAP • Improved Daytime Alertness
Fatigue Science ⁵² Canada	Innovative Solutions in the Field of Sleep and Fatigue Management	<ul style="list-style-type: none"> • Predictive Fatigue Management • Readiband Technology • Data-Driven Insights • Integration with CPAP Therapy • Corporate Solutions
Fisher & Paykel Healthcare ⁵³ New Zealand	Specializing in CPAP machines and masks	Focus on patient comfort and have developed unique humidification technologies to enhance therapy adherence.
Fresca Medical ⁵⁴ United States	Innovative approach to treating obstructive Sleep Apnea	<ul style="list-style-type: none"> • CURVE Positive Airway Pressure System • SmartValve Technology • FDA Clearance • Improved Compliance • Focus on Patient Comfort
Good Nidra ⁵⁵ India	Program for diagnosing and treating Sleep Apnea.	<ul style="list-style-type: none"> • Utilizes the STOPBANG Questionnaire to assess patients' risk for sleep disorders. • Conducts at-home sleep studies with the assistance of trained sleep technicians. • Employs devices over a two-day period to determine optimal treatment settings.

		<ul style="list-style-type: none"> • Provides Continuous Positive Airway Pressure (CPAP) devices. • Offers continuous monitoring and support to ensure effective management of sleep apnea.
Hapni ⁵⁶ United States	Sleep Apnea Services	<ul style="list-style-type: none"> • Online medical platform specializing in sleep apnea services • Focuses on diagnostic accuracy and treatment
ImThera Medical ⁵⁷ United States	Treating obstructive sleep apnea (OSA) through hypoglossal nerve stimulation.	<ul style="list-style-type: none"> • aura6000 System • FDA Approval for Clinical Studies • Clinical Efficacy • Patient Tolerance and Safety • Minimally Invasive Procedure
Inspire Medical ⁵⁸ United States	Treat obstructive sleep apnea	<ul style="list-style-type: none"> • Inspire Therapy • Neurostimulation • Minimally Invasive Implant • Patient-Controlled System • Alternative to CPAP • Improvement in Sleep Apnea Symptoms
Invicta Medical ⁵⁹ United States	Treatments for Sleep Apnea	<ul style="list-style-type: none"> • Restera Neurostimulation System • Minimally Invasive Treatment • Clinical Efficacy • Patient Comfort • Cost-Effective Solution
Itamar Medical ⁶⁰ Israel	Diagnosing Sleep Apnea	Develops devices like WatchPAT for diagnosing sleep apnea. Their technology facilitates home sleep tests, making diagnosis more accessible
KeePAP ⁶¹ United States	Notable device in the sleep apnea space.	<ul style="list-style-type: none"> • Responsive Positive Airway Pressure (PAP) • Personalized Therapy • Compact Design • Clinical Efficacy • Regulatory Approvals
Metamason ⁶² United States	Treating Sleep Apnea	<ul style="list-style-type: none"> • Custom CPAP Masks • Miia Nasal CPAP Mask • Telemedicine Integration • Recognition and Awards
Neurobit Technology ⁶³ Singapore	Advanced AI-driven Solutions in the Sleep Apnea Space	<ul style="list-style-type: none"> • Neurobit PSG • Neurobit Score • On-Premise Data Security • AASM Compliance • Interoperability

		<ul style="list-style-type: none"> • Focus on Biomarkers
NightBalance ⁶⁴ Netherlands	Positional Obstructive Sleep Apnea	<ul style="list-style-type: none"> • Sleep Position Trainer (SPT) • Non-Invasive Solution • Improvement in Sleep Apnea Symptoms • Smart Technology with Personalized Feedback
NuCalm ⁶⁵ United States	Stress-Induced Insomnia, Sleep Disturbances or Anxiety	<ul style="list-style-type: none"> • NuCalm Relaxation Technology • Neuroacoustic Software • Portable and Non-Invasive • Reduced Sleep Anxiety • Stress Reduction for Better Sleep
Nyxoah ⁶⁶ Belgium	Treatment of Obstructive Sleep Apnea	<ul style="list-style-type: none"> • Genio System • Minimally Invasive • Focused on Safety and Comfort • Alternative to CPAP
Oventus Medical ⁶⁷ Australia	Treat obstructive sleep apnea (OSA) and snoring.	<ul style="list-style-type: none"> • O2Vent Optima • 3D Printing Technology • Proprietary Airway Technology • FDA Clearance • Patient Comfort
Peerbridge Health ⁶⁸ United States	Sleep and Heart health management	<ul style="list-style-type: none"> • Collaborates with Better Night for comprehensive sleep and heart health management • Provides wireless ECG patch for diagnosis • Focuses on coordinated patient care.
Philips Respironics ⁶⁹ Netherlands	Sleep Therapy Devices	Company provides a comprehensive range of sleep therapy devices, including the DreamStation series, known for user-friendly features and connectivity.
ProSomnus ⁷⁰ United States	innovative oral appliance therapy for sleep apnea	<ul style="list-style-type: none"> • Custom Oral Appliances • MG6™ Medical Grade Material • Non-Invasive Therapy • Travel-Friendly Design • High Patient Satisfaction • FDA Cleared
RemeSleep ⁷¹ United States	Personalized sleep care for conditions like Sleep Apnea and Insomnia.	Holistic approach includes at-home diagnostics, management programs, and lifestyle interventions. With a team of sleep and respiratory experts, they offer CPAP/BIPAP devices, research-backed solutions, and technology-driven care to enhance sleep quality and overall well-being.
ResMed ⁷² United States	Sleep Apnea devices	<ul style="list-style-type: none"> • Smartwatch app for Apple and Android • AI-enabled health concierge called "Dawn"

		<ul style="list-style-type: none"> Personalized sleep tracking and therapy insights
Sana ⁷³ United States	Innovative approach to improving sleep quality and managing sleep disorders, including Sleep Apnea.	<ul style="list-style-type: none"> Sana Sleep Mask Neurostimulation Technology Portable and User-Friendly Clinical Validation Focus on Mental Health
Signifier Medical Technologies ⁷⁴ United Kingdom	Neuromuscular Electrical Stimulation	<ul style="list-style-type: none"> eXciteOSA® Device- increased tongue muscle endurance. FDA Approval Neuromuscular Stimulation Clinical Efficacy Non-Invasive and Comfortable
SleepCogni ⁷⁵ United Kingdom	Obstructive Sleep Apnea	<ul style="list-style-type: none"> SleepCogni Device - Sleep Therapy Solution CBT-Based Approach for Sleep Health Wearable Technology for Real-Time Feedback Non-Surgical Solution for Sleep Apnea Future Research and Development
Sleepiz ⁷⁶ Switzerland	Contactless sleep monitoring devices	Developing contactless sleep monitoring devices that measure vital signs without any body contact, aiming to simplify sleep apnea diagnosis.
Smart Nora ⁷⁷ Canada	Detects early sounds of snoring	A non-invasive anti-snoring solution that detects early sounds of snoring and gently moves the pillow to stimulate throat muscles, allowing for natural breathing to resume.
Snoring Owl ⁷⁸ India	Integrated approach to obstructive sleep apnea	Platform that covers screening, diagnosis, management and monitoring for sleep apnea including lifestyle modification services
Sommetrics ⁷⁹ United States	Innovative Solutions in the Sleep Apnea	<ul style="list-style-type: none"> Non-Invasive Sleep Apnea Treatment MyoValve Device Proven Efficacy CPAP Alternative Portability and Ease of Use Focus on Sleep Apnea Diagnosis
SomnoMed ⁸⁰ Australia	Innovative Oral Appliances	<ul style="list-style-type: none"> Specializes in innovative oral appliances Provides non-invasive alternatives to traditional CPAP therapy Caters to mild-to-moderate obstructive sleep apnea

Somnology ⁸¹ Australia	Sleep monitoring device	Provides the SomnoRing, a medical-grade sleep monitoring device that tracks oxygen saturation and other vital signs, assisting in the diagnosis and management of sleep apnea.
Vivos ⁸²	Oral Medical Devices	Treat mild, moderate, and severe OSA in adults, 18 years of age and older along with positive airway pressure (PAP) and/or myofunctional therapy, as needed.
Zelegent ⁸³ United States	Innovative solutions in the treatment of snoring and Sleep Apnea.	<ul style="list-style-type: none"> • Elevoplasty™ Procedure • Elevo Kit Snoring Intervention Device • Clinical Efficacy • Collaboration with Cook Medical • Focus on Minimally Invasive Solutions

5.1. Impact on OSA Management

- **Early Detection:** By identifying potential sleep apnea early, these home sleep apnea test device innovations help users seek timely medical advice and intervention, potentially preventing complications associated with untreated OSA.
- **Treatment adherence:** The ability to continuously monitor sleep and respiratory health provides ongoing insights, which can be valuable for both patients and healthcare providers in managing OSA.
- **Improved patient outcomes:** Technological advances in telemedicine may strengthen inter-departmental collaboration to improve overall care of OSA patients.

6. Conclusion

The past decade has seen remarkable progress in the diagnosis and management of obstructive sleep apnea. Innovations in digital tools and medical devices have made it easier to diagnose OSA accurately and manage it effectively. As technology continues to evolve, we can expect further improvements in patient outcomes and quality of life for those affected by this condition. However, further research and validation are necessary to establish their effectiveness and integration into clinical practice.

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