

consumer sleep technology accuracy

Understanding Consumer Sleep Technology Accuracy: A Deep Dive into Your Sleep Data

consumer sleep technology accuracy is a topic of increasing interest as more individuals turn to wearable devices, apps, and smart home gadgets to monitor and improve their sleep. These technologies promise insights into sleep stages, duration, quality, and even potential sleep disorders. However, a crucial question remains: how reliable is the data these devices provide? This article will explore the multifaceted landscape of consumer sleep technology accuracy, examining the underlying technologies, the factors influencing their precision, and what users can expect. We will delve into the science behind sleep tracking, the limitations of current consumer-grade devices compared to clinical polysomnography (PSG), and offer guidance on interpreting sleep data responsibly. Understanding these nuances is essential for anyone relying on these tools to make informed decisions about their health and well-being.

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Introduction to Sleep Tracking Technologies

The proliferation of consumer sleep technology has democratized sleep monitoring, making it accessible to the average person. From smartwatches and fitness trackers to bedside devices and smartphone apps, the options for tracking sleep are vast and varied. These devices aim to provide users with a quantifiable understanding of their nightly rest, identifying patterns and potential areas for improvement. The underlying promise is simple: better data leads to better sleep. However, the complexity of human sleep, a dynamic and intricate biological process, presents significant challenges for even the most sophisticated consumer devices.

These technologies leverage various sensors and algorithms to interpret physiological signals associated with sleep. The goal is to approximate the detailed insights typically gathered in a clinical sleep lab. While advancements have been remarkable, it's vital to understand that consumer-grade devices are designed for general wellness and awareness, not for definitive medical diagnosis. The accuracy of their readings is a subject of ongoing research and development, with a clear distinction often drawn between the capabilities of these personal devices and gold-standard medical assessments.

How Consumer Sleep Trackers Work

Consumer sleep trackers primarily rely on a combination of sensors to gather data during sleep. The most common sensor is the accelerometer, which detects movement. The assumption is that less movement correlates with deeper sleep, while more movement might indicate lighter sleep or wakefulness. However, this is a simplification, as some sleep stages can involve subtle movements, and some individuals may be restless even in light sleep.

Many advanced trackers also incorporate heart rate sensors (photoplethysmography or PPG) and sometimes heart rate variability (HRV) monitoring. Changes in heart rate and its rhythm are closely linked to different sleep stages. For instance, heart rate typically slows down during deep sleep and can become more erratic during REM sleep. Furthermore, some devices may include microphones to detect snoring or ambient noise, which can also influence sleep quality and duration.

Accelerometer-Based Tracking

The foundation of most sleep tracking lies in accelerometers. These devices measure the magnitude and direction of movement. Algorithms are then employed to interpret these movement patterns. For example, prolonged periods of stillness are often interpreted as sleep. Periods of significant movement are flagged as wakefulness or restless sleep. The effectiveness of this method is heavily dependent on the sophistication of the algorithm and the individual's natural sleep movements.

Heart Rate and Heart Rate Variability (HRV) Monitoring

Heart rate monitoring adds another layer of data to sleep analysis. As mentioned, heart rate patterns change predictably across different sleep stages. During deep sleep (NREM stage 3), heart rate and breathing are at their lowest. During REM sleep, heart rate can become more variable and sometimes even increase, mirroring patterns seen during wakefulness. HRV, the variation in time between heartbeats, also provides insights into autonomic nervous system activity, which is highly regulated during sleep and can differentiate between sleep stages.

Other Sensor Integration

Some higher-end consumer devices may integrate additional sensors. Ambient light sensors can help determine when you fall asleep and wake up based on your bedroom environment. Microphones can detect environmental disturbances like snoring or external noises that might be impacting sleep quality. Advanced sleep systems may even include temperature sensors or breathing rate monitors, though these are less common in typical wearables.

Accuracy of Sleep Stage Detection

The primary challenge and most debated aspect of consumer sleep technology is the accuracy of sleep stage detection. Sleep is typically divided into two main types: Non-Rapid Eye Movement (NREM) sleep and Rapid Eye Movement (REM) sleep. NREM sleep is further divided into stages N1 (light sleep), N2 (deeper light sleep), and N3 (deep or slow-wave sleep). Each stage has distinct physiological characteristics.

Consumer devices attempt to infer these stages based on movement and heart rate data. While they can often differentiate between wakefulness and sleep, and sometimes between lighter sleep and deeper sleep, distinguishing between the specific NREM stages and REM sleep is considerably more difficult without the direct brain activity measurements (electroencephalography or EEG) provided by clinical polysomnography.

Distinguishing Wakefulness and Sleep

Most consumer sleep trackers are relatively accurate at identifying when you are awake and when you are asleep. This is largely due to the accelerometer's ability to detect significant movement. If you are moving around, the device will likely register you as awake. When you are still for an extended period, it will begin to interpret that as sleep onset. This basic function is generally reliable for most users.

Challenges in Differentiating Sleep Stages

The real challenge lies in accurately categorizing the different sleep stages. REM sleep, for instance, is characterized by rapid eye movements, muscle atonia (paralysis), and brain activity that resembles wakefulness. Detecting REM sleep accurately requires sophisticated algorithms that can interpret subtle physiological cues like heart rate patterns and muscle twitches, which are not always distinct enough in consumer devices. Similarly, differentiating between N1, N2, and N3 can be difficult. N3, or deep sleep, is associated with slow brain waves and minimal movement, but some individuals might be less active during lighter sleep stages, leading to potential misclassification.

Limitations of Movement and Heart Rate Data

Relying solely on movement and heart rate data presents inherent limitations. A person could be lying perfectly still in bed but not actually asleep (e.g., reading or meditating). Conversely, someone might experience leg twitches or periodic limb movements during sleep that are not indicative of wakefulness but can be misread by accelerometers. Heart rate alone isn't always definitive either, as it can be influenced by factors other than sleep stage, such as stress, recent exercise, or illness.

Factors Affecting Sleep Tracker Accuracy

Several factors can influence the accuracy of consumer sleep technology. User-specific physiology plays a significant role, as does the way the device is worn. Environmental conditions and the specific algorithms used by the manufacturer also contribute to the data's reliability. Understanding these variables can help users interpret their sleep reports with a more critical and informed perspective.

User Physiology and Sleep Habits

Individual differences in how people sleep can affect tracker accuracy. Someone with very restless sleep may have their "sleep" time inflated due to frequent movements being misinterpreted as wakefulness. Conversely, a very still sleeper might have their wake-up times inaccurately recorded if they lie in bed for a while before getting up. Athletes with high resting heart rates might also present unique challenges for algorithms trained on broader populations.

Device Fit and Placement

The fit and placement of a wearable sleep tracker are crucial for accurate readings. A device that is too loose may slide around on the wrist, leading to inaccurate movement data. If the heart rate sensor is not in good contact with the skin, it can produce erroneous readings. Similarly, bedside devices need to be positioned correctly to capture breathing patterns or movements effectively.

Algorithm Sophistication and Updates

The algorithms used by sleep tracking companies are proprietary and vary significantly in their sophistication. Manufacturers continuously update these algorithms to improve accuracy. However, different algorithms may prioritize different metrics or employ different assumptions, leading to discrepancies between devices. The scientific rigor behind these algorithms is not always transparent to the consumer.

Environmental Factors

External factors can also impact sleep tracking. For example, a noisy environment or fluctuating room temperatures might cause a user to wake up or move more, which the tracker will record. While some devices attempt to account for environmental noise, their ability to precisely disentangle external disturbances from intrinsic sleep patterns is limited.

Consumer Sleep Tech vs. Polysomnography (PSG)

To truly understand the accuracy of consumer sleep technology, it's essential to compare it to the gold standard: polysomnography (PSG). PSG is a comprehensive overnight sleep study conducted in a clinical setting. It involves placing electrodes on the scalp to measure brain waves (EEG), sensors around the eyes to track eye movements (EOG), and electrodes on the chin to monitor muscle activity (EMG). These direct measurements provide a detailed, objective assessment of sleep stages and can identify a wide range of sleep disorders.

Consumer devices, by contrast, rely on indirect physiological measures. While they can offer valuable trends and insights for general wellness, they lack the detailed physiological data captured by PSG. Therefore, their accuracy in classifying sleep stages is considerably lower.

Polysomnography (PSG): The Gold Standard

Polysomnography is the benchmark against which all other sleep assessment methods are measured. It captures multiple physiological signals simultaneously, including brain activity, eye movements, muscle tone, breathing patterns (airflow, effort, oxygen saturation), and heart rhythm. This comprehensive data set allows sleep specialists to accurately diagnose sleep disorders like sleep apnea, insomnia, and narcolepsy, and to precisely define sleep architecture.

Limitations of Consumer Devices Compared to PSG

Consumer sleep trackers are fundamentally limited by the sensors they employ. They do not measure brain waves, making definitive identification of REM sleep and the nuances of NREM stages impossible. Their reliance on proxies like movement and heart rate means that their classifications are inferences rather than direct measurements. Consequently, studies comparing consumer trackers to PSG often show significant discrepancies in sleep stage scoring, particularly for REM and deep sleep. While some devices may achieve high accuracy in differentiating between wakefulness and sleep, their ability to precisely map out the entire night's sleep architecture is limited.

When to Rely on Consumer Data

Consumer sleep technology is best used for tracking general sleep trends, identifying potential disruptions, and monitoring the impact of lifestyle changes on sleep duration and perceived quality. For example, if a user notices a consistent decrease in their reported deep sleep after starting a new evening routine, it might prompt them to investigate further. However, it should never be used as a substitute for professional medical advice or diagnosis, especially when suspecting a sleep disorder.

Interpreting Your Sleep Data

Interpreting the data generated by consumer sleep technology requires a nuanced approach. While these devices provide fascinating insights, it's crucial to avoid treating every number as an absolute truth. Understanding the limitations of the technology and focusing on trends rather than exact figures is key to gaining meaningful benefit.

Users should look for patterns over time. A single night's data might be anomalous due to illness, stress, or external disturbances. Consistent trends, however, can indicate underlying issues or positive changes. For example, a consistent pattern of low deep sleep over several weeks might warrant a conversation with a healthcare provider. Similarly, if a new sleep hygiene practice consistently leads to an increase in reported sleep duration or a reduction in wakefulness, it's a good indicator of its effectiveness.

Focus on Trends, Not Single Data Points

The most valuable information from consumer sleep trackers comes from observing trends over days, weeks, and months. A single night with a low percentage of deep sleep might be due to a late meal, a stressful day, or a disrupted schedule. However, if your tracker consistently reports low deep sleep over a prolonged period, it's a signal that might warrant further investigation. Similarly, improvements in sleep efficiency or duration that are consistently observed after implementing new sleep habits are strong indicators of positive change.

Understanding Sleep Metrics

It's important to understand what each metric represents. Sleep duration is the total time spent asleep. Sleep efficiency is the percentage of time spent asleep while in bed. Wakefulness includes both planned periods of being awake and unplanned awakenings during the night. Deep sleep and REM sleep are the stages that consumer devices often estimate with varying degrees of accuracy. Knowing that these are estimations and not direct measurements is crucial for appropriate interpretation.

When to Consult a Healthcare Professional

Consumer sleep trackers are valuable tools for self-awareness but should never replace professional medical advice. If you experience persistent symptoms of poor sleep, such as excessive daytime sleepiness, difficulty falling asleep or staying asleep, loud snoring, or gasping for air during sleep, it is essential to consult a doctor or a sleep specialist. These devices can provide supplementary data for your doctor, but a formal diagnosis requires clinical evaluation and, often, PSG.

The Future of Consumer Sleep Technology Accuracy

The field of consumer sleep technology is rapidly evolving, with ongoing research and development focused on improving accuracy and expanding capabilities. Advancements in sensor technology, artificial intelligence, and machine learning are poised to make these devices more sophisticated and insightful. The goal is to bridge the gap between consumer-grade tracking and clinical-grade diagnostics, offering users more reliable and actionable data.

Future iterations of sleep trackers may incorporate more advanced biosensors capable of capturing signals closer to those used in PSG, such as subtle changes in brainwave activity or more precise respiratory rate monitoring. AI-powered algorithms will become even better at interpreting complex physiological data, learning individual sleep patterns, and adapting to unique user profiles. Integration with other health tracking devices and platforms will also likely become more seamless, providing a more holistic view of one's overall well-being and its impact on sleep.

Advancements in Sensor Technology

Future consumer sleep technologies are likely to feature more sophisticated sensors. This could include improvements in PPG sensors for more accurate heart rate and HRV readings, as well as the potential integration of non-invasive EEG-like sensors that can detect rudimentary brainwave patterns. Innovations in motion sensing technology may also lead to more refined detection of subtle movements and sleep posture, further enhancing the ability to differentiate sleep stages.

The Role of AI and Machine Learning

Artificial intelligence and machine learning will play a pivotal role in enhancing the accuracy of consumer sleep technology. These technologies can analyze vast datasets of physiological signals and learn to identify complex patterns associated with different sleep stages more effectively. AI can also personalize sleep analysis, taking into account individual variations in physiology and sleep behavior to provide more tailored and accurate insights. As algorithms become more sophisticated, they will be better equipped to filter out noise and extract meaningful data.

Towards More Clinically Relevant Data

The ultimate aim for many in the industry is to develop consumer devices that can provide data with a higher degree of clinical relevance. While a full PSG replacement is unlikely in the near future for mass-market devices, there's a clear trend towards improving the accuracy of sleep stage detection and identifying potential sleep abnormalities that can be flagged for further medical investigation. This could empower individuals to take proactive steps towards better sleep health and seek professional help earlier.

when needed.

FAQ

Q: How accurate are wearable sleep trackers at detecting REM sleep?

A: The accuracy of wearable sleep trackers in detecting REM sleep varies significantly. While some advanced devices can estimate REM sleep with reasonable accuracy for general trend analysis, they generally fall short of the precision achieved by clinical polysomnography (PSG) which directly measures brainwave activity. Relying solely on wearable data for definitive REM sleep measurement is not recommended.

Q: Can consumer sleep trackers diagnose sleep apnea?

A: No, consumer sleep trackers are not designed to diagnose sleep apnea. While some devices can detect snoring or periods of restlessness that might be associated with breathing disturbances, they lack the medical-grade sensors and diagnostic capabilities required for a definitive diagnosis. Individuals suspecting sleep apnea should consult a healthcare professional for a proper sleep study.

Q: How do smartphone sleep tracking apps compare in accuracy to wearable devices?

A: Generally, wearable devices tend to offer higher accuracy than smartphone sleep tracking apps. Wearables typically utilize multiple sensors like accelerometers and heart rate monitors, providing richer physiological data. Smartphone apps often rely solely on motion detection and sound analysis, which are less precise in differentiating sleep stages or detecting subtle physiological changes.

Q: Is it better to use a smartwatch or a dedicated sleep tracker for accuracy?

A: The accuracy depends more on the specific technology and algorithms used by the manufacturer rather than whether it's a smartwatch or a dedicated sleep tracker. Many smartwatches incorporate advanced sleep tracking features, rivaling dedicated devices. It's important to research individual product reviews and studies that compare their accuracy against PSG for specific models.

Q: Why is deep sleep measurement often reported as less accurate by consumer devices?

A: Deep sleep (NREM stage 3) is characterized by slow brain waves and minimal muscle activity. Accurately detecting this stage requires precise measurement of brain activity (EEG), which most consumer devices do not possess. They infer deep sleep based on reduced movement and heart rate, which can be confounded by other factors, leading to less reliable readings compared to more sophisticated sleep stages.

Q: Can sleep tracker data be used to monitor the effectiveness of sleep improvement strategies?

A: Yes, consumer sleep trackers can be very useful for monitoring the general effectiveness of sleep improvement strategies. By tracking trends in metrics like sleep duration, time to fall asleep, and wakefulness over time, users can observe whether changes in their lifestyle, such as establishing a consistent bedtime or improving sleep hygiene, are leading to positive shifts in their sleep patterns.

Q: How often should I recalibrate or update my sleep tracking device for better accuracy?

A: Most modern sleep tracking devices receive automatic firmware and software updates from the manufacturer, which often include algorithm improvements aimed at enhancing accuracy. It's advisable to ensure your device is connected to Wi-Fi or its companion app regularly to receive these updates. Manual recalibration is usually not required unless prompted by the manufacturer.

Q: Are there specific sleep trackers that are scientifically validated for accuracy?

A: While many consumer sleep trackers undergo internal validation, few have been rigorously validated against polysomnography (PSG) in independent, peer-reviewed scientific studies. Some research studies may focus on specific brands or models. It's beneficial to look for published research that specifically evaluates the accuracy of the sleep tracker you are considering.

Q: What is the acceptable margin of error for consumer sleep technology accuracy?

A: There isn't a universally defined "acceptable margin of error" for all consumer sleep technology. However, research comparing consumer devices to PSG often highlights significant variability, especially in sleep stage classification. For basic sleep/wake detection, accuracy can be quite high (e.g., 80-90%), but for

differentiating REM and deep sleep, accuracy can drop considerably, sometimes below 50% in less advanced devices.

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consumer sleep technology accuracy: Advances in technology for the sleep field, An Issue of Sleep Medicine Clinics, E-Book Steven Holfinger, 2023-08-03 In this issue of Sleep Medicine Clinics, guest editor Dr. Steven Holfinger brings his considerable expertise to the topic of Advances in Technology for the Sleep Field. Top experts discuss current development and use of multi-modal sensors and technologies which make accurate sleep monitoring at scale a possibility in today's sleep medicine. - Contains 15 practice-oriented topics including using telehealth platforms to transform sleep care models; are consumer wearable sleep trackers ready for clinical use; potential implications of screen time in an age of augmented/virtual reality; advancements in sleep health to optimize human performance; and more. - Provides in-depth clinical reviews of advances in technology for the sleep field, offering actionable insights for clinical practice. - Presents the latest information on this timely, focused topic under the leadership of experienced editors in the field. Authors synthesize and distill the latest research and practice guidelines to create clinically significant, topic-based reviews.

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technology, when thoughtfully integrated with psychological principles, offers a powerful avenue for enhancing cognitive function and emotional stability. Divided into three sections, the book progresses from foundational sleep science to exploring technological interventions and their practical applications. Sleep Tech Advances critically evaluates the potential benefits and limitations of sleep technology, offering practical strategies and actionable insights for optimizing sleep environments and improving overall well-being. This comprehensive approach provides readers with the knowledge to make informed decisions about their sleep and mental health.

consumer sleep technology accuracy: The Link Between Sleep and Mental Performance: REM Sleep Benefits Ikechukwu Kelvin Maduemezia , 2025-08-27 We've all heard that "sleep is important," but few realize just how deeply it shapes our ability to think, focus, and perform. At the heart of this lies REM sleep—the stage where the brain processes memories, restores creativity, and sharpens problem-solving skills. Without it, even the smartest minds struggle. With it, mental performance can reach extraordinary levels. *The Link Between Sleep and Mental Performance: REM Sleep Benefits* uncovers the science of why quality sleep is the ultimate brain enhancer. Drawing on neuroscience and practical lifestyle strategies, this book shows how sleep isn't just rest—it's a critical tool for unlocking peak mental ability. Inside, you'll learn how to: Understand the different sleep cycles and their impact on brain function Harness REM sleep to boost memory, creativity, and decision-making Recognize the hidden costs of sleep deprivation on mood and focus Build sleep-friendly routines that optimize productivity and performance Apply science-backed strategies to improve both quality and quantity of rest Whether you're a student, professional, entrepreneur, or simply someone looking to think clearer and perform better, this book reveals how mastering sleep can transform your mind. Success doesn't start with working harder—it starts with sleeping smarter.

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consumer sleep technology accuracy: Technosleep Catherine Coveney, Michael Greaney, Eric L. Hsu, Robert Meadows, Simon J. Williams, 2023-06-25 This book draws on a variety of substantive examples from science, technology, medicine, literature, and popular culture to highlight how a new technoscientifically mediated and modified phase and form of technosleep is now in the making - in the global north at least; and to discuss the consequences for our relationships to sleep, the values we accord sleep and the very nature and normativities of sleep itself. The authors discuss how technosleep, at its simplest denotes the 'coming together' or 'entanglements' of sleep and technology and sensitizes us to various shifts in sleep-technology relations through culture, time and place. In doing so, it pays close attention to the salience and significance of these trends and transformations to date in everyday/night life, their implications for

sleep inequalities and the related issues of sleep and social justice they suggest.

consumer sleep technology accuracy: *Measuring Sleep, An Issue of Sleep Medicine Clinics*, E-Book Erna Sif Arnardottir, 2021-11-01 In this issue of *Sleep Medicine Clinics*, Guest Editor Erna Sif Arnardottir brings considerable expertise to the topic of Measuring Sleep. Top experts in the field cover key topics such as home sleep recordings, improving machine learning technology, new classification for sleep severity, the role of questionnaires, and more. - Provides in-depth, clinical reviews on Measuring Sleep, providing actionable insights for clinical practice. - Presents the latest information on this timely, focused topic under the leadership of experienced editors in the field; Authors synthesize and distill the latest research and practice guidelines to create these timely topic-based reviews. - Contains 10 relevant, practice-oriented topics including getting more sleep from the recording; sleep measurement in women and children; consumer devices; free living sleep measurements; and more.

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· New Advances of Soft Computing in Industrial and Management Engineering · Recent Advances in Fuzzy Systems · Intelligent Data Analysis and Applications · Reasoning-based Intelligent Systems · Intelligent Methods for Eye Movement Data Processing and Analysis · Intelligent Decision Technologies for Water Resources Management · Intelligent Decision Making for Uncertain Unstructured Big Data · Decision Making Theory for Economics · Interdisciplinary Approaches in Business Intelligence Research and Practice · Pattern Recognition in Audio and Speech Processing

The KES-IDT conference is a well-established international annual conference, interdisciplinary in nature. These two volumes of proceedings form an excellent account of the latest results and outcomes of recent research in this leading-edge area.

consumer sleep technology accuracy: Sleep and Sport Michael A. Grandner, Amy B. Athey, 2024-07-07 ****Selected for 2025 Doody's Core Titles® in Sports Medicine****The relationship between sleep and both mental and physical performance in athletes has become a key issue over the past several years. *Sleep and Sport: Physical Performance, Mental Performance, Injury Prevention, and Competitive Advantage for Athletes, Coaches, and Trainers* aims to synthesize the growing scientific evidence in this area to help researchers, clinicians, and others interested in sport to understand the fundamentals of sleep health and how these factors relate to athletes. Serving as an important bridge between the sleep and athletics field, this book educates sleep professionals about how their field of expertise relates to various aspects of athletics, while educating sports professionals about the basics of sleep and how it relates to their field of expertise. This is accomplished by explaining some of the basics of sleep health; reviewing the literature on sleep disorders, treatments, and risk factors for athletes; discussing ways that sleep health impacts physical and mental performance; and addressing key specific areas where these fields overlap. In all cases, this text will draw from the existing peer-reviewed literature, in order to provide evidence-based guidance that is objective and well explained. - Highlights the importance of sleep and its relations to various aspects of athletics - Provide useful, actionable, evidence-based suggestions for promoting sleep health in athletes - Contains accessible reviews that point to relevant literature in often-overlooked areas, serving as a helpful guide to all relevant information on this broad topic area

consumer sleep technology accuracy: Telehealth in Sleep Medicine An Issue of Sleep Medicine Clinics, E-Book Jean-Louis Pépin, Dennis Hwang, 2020-08-28 This issue of *Sleep Medicine Clinics* has been compiled by esteemed Consulting Editor, Teofilo Lee-Chiong, and brings together recent sleep medicine articles that will be useful for Primary Care Providers. Topics include: Internet-Delivered Cognitive Behavioral Therapy for Insomnia Tailoring Cognitive Behavioral Therapy for Insomnia for Patients with Chronic Insomnia; Prescription Drugs Used in Insomnia; Hypnotic Discontinuation in Chronic Insomnia; Evaluation of the Sleepy Patient Differential Diagnosis; Subjective and Objective Assessment of Hypersomnolence; Pharmacologic Management of Excessive Daytime Sleepiness; Nonpharmacologic Management of Excessive Daytime Sleepiness; Treatment of Obstructive Sleep Apnea Choosing the Best Positive Airway Pressure Device; Treatment of Obstructive Sleep Apnea Choosing the Best Interface; Treatment of Obstructive Sleep Apnea Achieving Adherence to Positive Airway Pressure Treatment and Dealing with Complications; Oral Appliances in the Management of Obstructive Sleep Apnea; Avoiding and Managing Oral Appliance Therapy Side Effects; Positional Therapy for Positional Obstructive Sleep Apnea; Pharmacologic and Nonpharmacologic Treatment of Restless Legs Syndrome; Drugs Used in Parasomnia; Drugs Used in Circadian Sleep-Wake Rhythm Disturbances; Sleep in the Aging Population; and Sleep, Health, and Society.

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human rehabilitation and biomechanics represent the core of the book. Emerging technology applications in business, security, and infrastructure are also critically examined, thus offering a timely, scientifically-grounded, but also professionally-oriented snapshot of the current state of the field. The book is based on contributions presented at the 2nd International Conference on Human Interaction and Emerging Technologies: Future Applications, IHET-AI 2020, held on April 23-25, in Lausanne, Switzerland. It offers a timely survey and a practice-oriented reference guide to researchers and professionals dealing with design and/or management of the new generation of service systems.

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