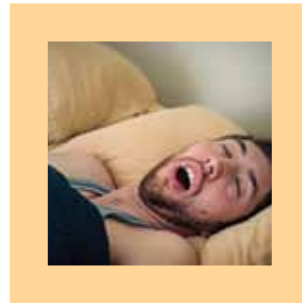




IRISH SLEEP SOCIETY

Cumann Codhladh na hÉireann

Guidelines for the Assessment and Management of Patients with Sleep Disorders





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Introduction

Humans spend up to one third of their lives asleep, yet surprisingly little is known about the biological role of sleep, and little attention has been paid until recent years to sleep disorders as an important cause of ill health. There is general agreement that sleep is beneficial. Shakespeare's Macbeth described sleep as the “chief nourisher in life's feast”, and the age-old remedy for the sick person is to get “plenty of sleep”. Some classical writers, however, have viewed sleep with deep suspicion. Sir Thomas Browne wrote “Sleep, in fine, is so like death, I dare not trust it with my prayers”, and Tennyson described sleep as “death's twin brother”.

The modern practice of sleep medicine and the investigation of sleep-related disorders owe much to the discovery of electroencephalography in 1928, which demonstrated clear differences between wakefulness and sleep. In 1953 rapid-eye-movement (REM) sleep was described and it was proposed that dreaming was a function of this sleep stage, which led to the concept of two distinct sleep states, namely non-REM and REM. The physiological roles of non-REM and REM sleep appear fundamentally different in that there is evidence that non-REM sleep, especially slow-wave sleep, is primarily concerned with restorative functions, whereas REM sleep appears to be more concerned with synthetic functions in the brain.

Sleep-related disorders are remarkably common and insomnia affects most people at some stage in life, usually stress-related. Chronic insomnia is highly prevalent and can have major adverse effects on quality of life and functional status. Management is often difficult and requires careful and detailed assessment of the sufferer by an experienced practitioner. Sleep-related medical disorders are also highly prevalent, particularly sleep apnoea syndrome, which affects at least 4% of the adult population. Sleep apnoea is associated with significant morbidity and mortality, and has been clearly associated with an increased risk of heart attack and stroke, in addition to a significant risk of automobile accidents and injury in the workplace because of the associated daytime sleepiness. However, the condition is readily treatable, and affected patients can respond dramatically well to the continued home use of nocturnal continuous positive airway pressure (CPAP).



*Early descriptions of sleep apnoea:
Charles Dickens. "The Fat Boy Joe"*

The growth and development of sleep medicine in Ireland has been a gradual process over the years. The first clinical sleep laboratory was established in St. Vincent's Hospital, Dublin, in 1985, and over the intervening years several other laboratories have been established throughout the country. Sleep medicine is a multi-disciplinary specialty involving different medical specialists including Respiratory Physicians, Neurologists, ENT Surgeons, Psychiatrists and Dental specialists, in addition to Technicians, Scientists and Nurse Specialists. The high prevalence of sleep disorders and the multi-disciplinary nature of patient care make the development and implementation of guidelines desirable in order to promote the highest standards of patient care.

I am very pleased to introduce the first edition of the Irish Sleep Society guidelines for the assessment and management of patients with sleep disorders and acknowledge the major contribution of the Society Executive Committee members and other specialists in the preparation of this document. These guidelines are designed to be practical and intended to facilitate the development of sleep disorders' investigation and treatment facilities in accordance with best practice standards. The document has been written *de novo* but has drawn on international experience and other guideline documents such as those produced by the American Academy of Sleep Medicine. The guidelines are intended to be a "live" document and will be regularly updated as clinical practice evolves.

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Section 1. Obstructive Sleep Apnoea (OSA) Guidelines

Definition:

Obstructive Sleep Apnoea Syndrome (OSAS) is a complex disorder characterised by brief interruptions of breathing during sleep. Airflow into and out of the lungs is reduced or diminished due to closure of the upper airway, despite continued respiratory effort. The most common presenting symptoms are excessive daytime sleepiness, loud snoring and witnessed apnoeas. The condition is diagnosed by an objective measure of abnormal nocturnal respiration coupled with a compatible clinical picture.

Pathophysiology of OSAS:

This condition is characterised by intermittent upper airway obstruction during sleep due to multiple factors, including physical narrowing of the upper airway, muscle fatigue of the upper airway muscles and/or a neurochemical imbalance of respiratory drive. These events are associated with recurring episodes of arterial oxygen desaturation. Apnoeas are typically terminated by a brief micro-arousal resulting in sleep fragmentation and diminished amounts of slow-wave and REM sleep. These mechanisms have been reviewed in detail by White et al

Epidemiology:

No data are available at present on the prevalence of OSAS in the Irish population, but international data indicate that at least 4% of the middle aged adult population have OSAS. These data imply that there may currently be over 50,000 sufferers in Ireland. ISS recommends that research be conducted in this area as soon as possible to more accurately determine the extent of this syndrome in the Irish population.

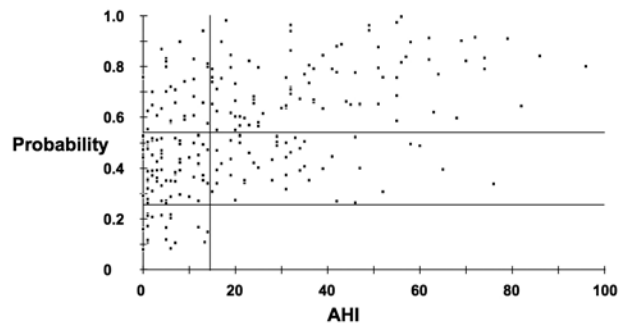
Risk Factors for development of OSAS:

Obesity, in association with increased neck circumference ($\geq 17''$)
Upper airway abnormality – Nose, Tongue, Jaw, Pharynx, Larynx
Endocrine disorders including Acromegaly, Non insulin-dependent Diabetes Mellitus (NIDDM), Hypothyroidism
Cardiovascular disease, especially systemic hypertension
Postmenopausal state (females)

Consequences for non-treated OSAS:

Hypertension
Cardiac disease
Stroke
Diabetes, poor diabetic control
Sudden death
Road traffic accidents (RTA)

Why the need for diagnostic sleep studies?



Clinical probability of OSAS based on history and examination compared with AHI obtained from full overnight sleep studies in 250 consecutive patients referred to St Vincent's University Hospital with suspected OSA. Deegan ERJ 1996.

Symptoms and Clinical Features of OSAS:

The following symptoms are associated with OSAS, but may not all be present in each patient.

Table 1 Major Symptoms and Clinical Features associated with OSAS

Daytime Symptoms	Night-time Symptoms	Clinical Features
Asymptomatic	Snoring (often loud) / Snorting	Narrowed upper airway/ Craniofacial anatomy/retrognathia
Excessive daytime sleepiness (EDS more likely to be reported by men)	Witnessed apnoea	Systemic hypertension
Fatigue (this is more likely to be reported by women)	Fragmented/Restless sleep	Obesity
Neurocognitive dysfunction	Nocturia/Enuresis	Cardiac arrhythmias
Personality changes	Night time sweating	
Depression	Nightmares/Unpleasant dreams	
Automatic Behaviour	Recurrent arousals	
	Morning headache/Respiratory failure	
	Nocturnal choking/Gasping	
	Impotence	

ISS Priority screening for OSAS:

Since OSAS can contribute to road traffic accidents as well as contributing to long term poor health ISS recommends that the following categories of patients be considered for screening for OSAS:

Persons reporting road traffic accidents due to sleepiness

Commercial drivers

Diabetics, type II in particular

Clear-cut upper airway abnormalities (very large tonsils, significant retrognathia in whom upper airway surgery is being considered)

Neuromuscular disorders (at risk of nocturnal hypoventilation)

COPD (FEV1 <1.5l)

Unexplained Cardiomyopathy/Stroke/Cardiovascular disease

Such screening should initially be based on a detailed history and examination and, if supportive clinical features are present, an overnight sleep study is indicated.

Assessment of daytime sleepiness:

Excessive daytime sleepiness (EDS) is one of the most common symptoms of OSAS, but can also be associated with other medical conditions. In the context of OSAS, ISS recommends that the Epworth Sleepiness Scale (ESS) be routinely used to assess the patient's subjective perception of daytime sleepiness.

The ESS is a subjective questionnaire, which scales the patient's perception of daytime sleepiness between 0-24. It asks the patient to number appropriately the likelihood of falling asleep in certain daily situations. Some of these situations are very passive, (i.e. lying down, watching TV), others are very active (i.e. driving, conversation).

More objective measures, such as the Multiple Sleep Latency Test (MSLT) can be considered when OSAS has been eliminated. The ISS recommend that the ESS be validated within the Irish population and that further research be undertaken to develop alternative low intensity tools for assessing daytime sleepiness

Diagnosis of OSAS:

To make a diagnosis of OSAS a complete clinical assessment including both history and physical examination should be undertaken, looking in particular at daytime sleepiness and coping strategies for EDS, in addition to an objective recording of nocturnal respiration and other related variables. The ISS recommends that the clinical assessment should be comprehensive and include (as well as the ESS) the following:

Clinical Assessment

Investigations of the patient's primary reason for presentation to the clinic (e.g. snoring, concern over apnoea or effect of excessive sleepiness)

It is highly desirable to also interview the bed partner who can provide important additional information based on direct observation of the patient while asleep

In order to assess the severity of sleepiness, the lifestyle, sleep and work routine: occupation, sleep duration, exercise pattern as well as sleep hygiene factors (shift work/sleep patterns) should be investigated.

Factors such as caffeine/alcohol/cigarette consumption and drug use, all of which contribute to weight gain and poor sleep should be assessed.

Driving safety assessment to include coping strategies at presentation should be assessed. If there is a concern about the subject's ability to drive, in particular if they drive professionally, then there is an obligation by the Health Care professional to advise the subject to avoid driving and if they must drive then to be aware of the need to pull over and sleep for 20 minutes or to take a caffeinated drink. ISS recommends that it is also the duty of the health care professional to ensure that they arrange for investigation and treatment as rapidly as possible.

Past medical history

Family history, especially of OSAS/other sleep disorders/ endocrine/cardiac diseases

Clinical Examination

Measure of BMI (height and weight)

Neck circumference

Mandible size (qualitative assessment)

Nasal patency

Upper airway and oral examination, including jaw and tongue position when supine

Blood pressure

Cardiac and respiratory examinations

Diagnostic Criteria for OSAS

A Task Force of the American Academy of Sleep Physicians, which also involved representatives of other major international sleep and respiratory scientific societies, has developed criteria for the diagnosis of sleep apnoea. According to these criteria, the patient suspected of OSAS must fulfil criterion A or B, plus criterion C, as follows.

- A. Excessive daytime sleepiness that is not better explained by other factors
- B. Two or more of the following that are not better explained by other factors (choking or gasping) during sleep
 - Recurrent awakenings from sleep
 - Unrefreshed sleep

Daytime fatigue
Impaired concentration

- C. Overnight monitoring demonstrates five or more obstructed breathing events during sleep. These events may include any combination of obstructive apnoeas/hypopneas or respiratory effort-related arousals.

Key Points

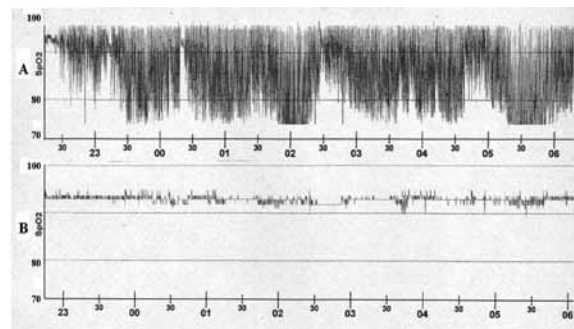
- Obstructive sleep apnoea (OSA) is characterised by recurring breathing pauses during sleep, usually due to obstruction at the oropharynx
- OSA syndrome (OSAS), which combines OSA with relevant clinical features such as daytime sleepiness, has a prevalence of at least 4% in the general adult population, and is twice as common in males as females
- Although most patients with sleep apnoea snore, only a small proportion of snorers have OSAS
- OSAS is a major independent risk factor for cardiovascular diseases such as hypertension, ischaemic heart disease and stroke
- Driving accidents are up to 10 times more common in patients with OSAS

Objective Recording of Nocturnal Respiration

The objective assessment of nocturnal respiration during an overnight study must include as a minimum, oro-nasal airflow, respiratory and abdominal effort, and continuous oxygen saturation by pulse oximetry. This type of study is referred to as a limited sleep study or a multi-channel respiratory recording with most proprietary systems available also including clinically relevant variables such as heart rate and rhythm, body position and snoring noise.

The gold standard overnight sleep assessment is Polysomnography (PSG), which incorporates the above signals in conjunction with EEG (electroencephalography), EOG (electrooculography), and EMG (electromyography) to relate the sleep/wake pattern with the respiration signals. PSG is recommended for patients with sleep related conditions such as narcolepsy, and periodic limb movement disorder (PLMD).

ISS recommends that attended in-hospital PSG study is the gold standard. However, PSG set up with manual analysis by adequately trained technical/clinical personnel without full overnight in-hospital supervision is also acceptable.



Oximetry recordings in OSAS, (A) before and (B) after CPAP

Sensors for Airflow and Effort

ISS supports the new international guidelines (AASM Manual for the Scoring of Sleep and Associated Events), which recommend that both oronasal thermal sensor and nasal air pressure transducer be used together to assess airflow.

These new guidelines provide literature evidence that supports the sensor best suited to detect absence of airflow for identification of an apnoea is an oronasal thermal sensor and the sensor for identification of a hypopnoea is a nasal air pressure transducer.

In addition, the recent international guidelines and the ISS recommend that the sensors for detection of respiratory effort should be either based on calibrated or uncalibrated inductance plethysmography, rather than strain gauges, piezo sensors or thoracic impedances devices.

Home-Based Limited Studies

Home-based limited sleep studies should be viewed as one option among a range of options for the investigation of a patient with a suspected sleep disorder, which also include full PSG studies in a dedicated sleep laboratory.

Home-based limited studies offer the potential to reduce the demands on sleep laboratories but require careful quality control in terms of patient set-up, quality and range of recordings, and expert analysis by adequately trained technical staff who apply accepted manual scoring rules. The over-arching principle, supported by ISS, is that home-based limited studies must be initiated by an established sleep disorders clinic and that such home-based studies remain under the direct supervision of the clinic concerned.

The ISS recommends that a full PSG be performed in all patients when the limited study is negative for OSAS in the presence of a high clinical suspicion.

Since the assessment of sleep disorders requires the expert integration of clinical evaluation together with the findings from sleep studies, a physician with training

and experience in sleep disorders must be involved in the clinical diagnosis of all patients.

Analysis and Scoring of Overnight Sleep Studies

ISS recommends that all studies, both PSG and limited, must be manually scored and automated reports should not be accepted for clinical interpretation. ISS recommends that The AASM Manual for the Scoring of Sleep and Associated Events along with the Rechtschaffen and Kales (R&K) guidelines be applied to the analysis of sleep staging in PSG studies. The AASM guidelines can also be applied to the manual analysis of all respiratory events recorded during both PSG and limited studies.

Dual Channel Airflow System (New Scoring Guidelines)

ISS endorses the following rules, based on the latest AASM scoring guidelines

Score an apnoea when all of the following criteria are met

- There is a drop in peak thermal sensor excursion by $\geq 90\%$ of baseline
- The duration of the event lasts at least 10 seconds
- At least 90% of the events duration meets the amplitude reduction criteria for apnoea

An obstructive apnoea is associated with continued or increased inspiratory effort throughout the entire period of absent airflow. An obstructive apnoea is usually accompanied by a $>3\%$ oxygen desaturation event.

A central apnoea is associated with absent inspiratory effort throughout the entire period of absent airflow.

A mixed apnoea is associated with absent inspiratory effort in the initial portion of the event, followed by resumption of inspiratory effort in the second portion of the event.

Score a hypopnoea when all the following criteria are met

- The nasal pressure signal excursions (or those of the alternative hypopnoea sensor) drop by $\geq 30\%$ of baseline
- The duration of this drop occurs for a period lasting at least 10 seconds

- There is a $\geq 4\%$ desaturation from pre-event baseline/
There is a $\geq 3\%$ desaturation from pre-event baseline and the event is associated with an arousal
- At least 90% of the events duration must meet the amplitude reduction of criteria for hypopnoea

In children, an apnoea can be < 10 seconds if the airflow reduction criteria are met.

Single Channel Airflow (Old Scoring Guidelines)

ISS recommend the following definitions:

An obstructive apnoea (cessation of breathing) in adults is defined as a minimum 10-second reduction in airflow to between 20-25% of the baseline airflow volume, with paradoxical respiratory effort.

An obstructive apnoea is usually accompanied by a $>3\%$ oxygen desaturation event.

An obstructive hypopnoea (reduction in breathing) in Polysomnography (PSG) studies is defined as a reduction of 50% in airflow signal **AND** an EEG arousal, **OR** $>3\%$ oxygen desaturation.

In limited studies where sleep and EEG arousals are not recorded, an obstructive hypopnoea is defined as a reduction of 30% or more in airflow **AND** $>3\%$ oxygen desaturation **OR** 50% reduction in airflow without desaturation in the presence of compatible clinical symptoms.

ISS strongly recommends that only one method of manual scoring of apnoeas and hypopnoeas be used and that the selected method is indicated on the final report used for the clinical interpretation.

The Apnoea/Hypopnoea Index (AHI) is defined as the number of apnoeas and hypopnoeas per hour of sleep (PSG) or per hour of study time (limited study).

The grading of severity of OSAS based on the frequency of abnormal respiratory events during sleep:

- Mild 5 - < 15
- Moderate > 15 - 30
- Severe > 30

The ISS recommends the above American Academy of Sleep Medicine (AASM) severity grading criteria for PSG studies, but advise caution when applying these to limited sleep study results.

Key Points

- Even expert clinical assessment by history and physical examination alone has inadequate power to distinguish OSAS from non-OSAS patients
- Overnight polysomnography remains the gold standard for investigation of OSAS but is expensive and time consuming
- Cardiorespiratory monitoring without sleep staging is accurate in identifying moderate to severe OSAS patients but may not detect some non-OSAS sleep disorders
- Future technological developments will permit many patients to be investigated at home by means of portable monitoring systems

Treatment of OSAS

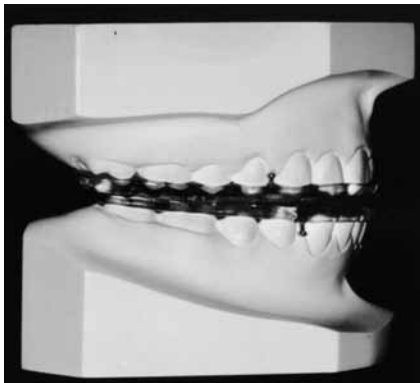
Depending on the severity of symptoms and the AHI level, there are a number of options available for treatment. In general, weight reduction, alcohol and sedative avoidance, and sleep hygiene measures are recommended for all patients including the avoidance of the supine position. In some patients, particularly those with mild disease, a decision will be made to choose no other specific therapy.

Three main options of therapy are currently available. These include CPAP (continuous positive airway pressure), ENT surgery, and mandibular advancement devices.

The ISS recommends that the clinical circumstances and the patient's own preference be involved in the major decision processes for choosing any of the above options.

Mandibular Advancement Devices

Mandibular advancement devices are not recommended as first line treatment for moderate to severe OSAS, but can be offered in mild OSAS or where CPAP treatment has failed due to intolerance/non-compliance (see Section 2 for more information). Mandibular advancement devices can also be effective in non-apnoeic simple snorers.



Mandibular Advancement Device

ENT surgery may improve CPAP tolerance where nasal obstruction is surgically possible, but is not considered a first line treatment for OSAS unless a clearly identifiable and resectable obstructing lesion is identified such as gross tonsil hypertrophy (see Section 3 for more information).



CPAP Therapy

In general, for patients with moderate to severe OSAS, CPAP is the first-line treatment of choice.

A CPAP device is a quiet pump, which blows air continuously through the nose, via a well fitting nasal mask, which is strapped to the patient's nose. The applied pressure can be adjusted to achieve a positive fixed pressure of between 4 and 20 cm H₂O, depending on the individual patient's pressure requirements. The consequences of recurring upper airway collapse resolve once effective positive pressure is applied. Sleep architecture improves, respiratory efforts decrease, snoring is abolished, arterial blood oxygen saturation is higher and pulse rate stabilises. A large number of patients can obtain substantial clinical improvement, particularly with daytime somnolence, using this therapy on a continuing nightly basis. The benefits continue for as long as the mask is worn and CPAP pressure remains adequate (optimal pressure) for the patient.

Optimal Pressure

The optimal pressure in CPAP therapy is defined as the lowest pressure that eliminates different respiratory events in all positions and sleep stages, resulting in normalised sleep architecture. Automatic titrating systems (APAP) are engineered to continuously adjust the pressure to the “optimal” level (4 – 20 cmH₂O). APAP devices mainly use the flow signals to detect apnoea, hypopnoea, or flow limitation.

Titration is the process of making a trade-off between eliminating all obstructive events by increasing the pressure and reducing side effects by using the lowest possible effective pressure. However, the pressure required to prevent upper airway collapse varies considerably between patients and cannot be predicted from clinical features and/or disease severity. Thus, the initiation of CPAP therapy is complex and requires one or more titration studies to determine the optimum pressure level for each individual patient.

CPAP Titration Study

The Gold standard for CPAP titration is manual titration during a PSG study. However, APAP devices can provide an automatic titration and are most frequently the device of choice when determining a fixed (optimal) treatment pressure. The titration study can be performed overnight supervised/unsupervised in-hospital or at the patient’s home. To ensure an optimum choice of pressure is prescribed based on the APAP titration study, the ISS recommends that at the least measurement of pulse oximetry, but preferably limited sleep studies is performed at the same time. Most APAP devices are regulated by an internal algorithm that responds on a breath by breath basis to changes in the patient’s airflow. At the end of the study the sum of all the pressures recorded during the night are calculated and a pressure called the 95th centile is displayed on the report. This is usually the recommended fixed pressure for home treatment with CPAP. However, it is vital that the graphic summary of

the study is reviewed as well, so that periods of artefact or mask leak are identified and eliminated as these may adversely affect the 95th centile value. Therefore, the prescribed fixed pressure may not always be the same as the 95th one.

APAP devices are not recommended for

- The diagnosis of OSAS
- Use on patients with Congestive Heart Failure, significant lung disease (e.g. COPD), abnormal arterial oxygen saturation due to conditions other than OSA (e.g. obesity hypoventilation syndrome), patients with central sleep apnoea, or patients who do not snore (naturally or due to palate surgery)
- Split night studies

CPAP Education and Treatment

ISS strongly recommends that initiation on CPAP must include a detailed educational and mask fitting session with adequately trained clinical personnel. This ideally should take place in the hospital/sleep laboratory. Group education sessions have been shown to be effective and individual mask fitting sessions allow the patient time to select the best fitting mask and to adapt to the sensation of air pressure delivery from the CPAP device. Side effects are common, but mostly avoidable, especially in the early stages of treatment and patients must be given support and advice on how to manage these. Providing patients with written information and contact help phone numbers is vital to ensure that patients will continue with treatment, especially during the first 6-8 weeks at home.

ISS recommends that CPAP/APAP is only available upon prescription from a clinician treating respiratory sleep disorders.

All CPAP/APAP devices and consumables (mask interfaces etc) should be CE marked and compliant with international standards (eg IEC 60601-1 General Requirements for Safety of Medical Electrical Equipment)

Follow up for Patients on CPAP

Once established on long term CPAP/APAP therapy, patients require regular follow up to assess efficacy of treatment.

ISS recommends that where formal assessment has taken place in hospital with a supervised overnight titration on an APAP device then it is acceptable to perform clinical follow up as an outpatient. This follow up should include an assessment of ESS, review of objective CPAP/APAP compliance, and discussion of side effects.

ISS recommends that where the objective diagnosis has been established with limited home-based sleep studies and where APAP has also been performed at home that patients should have a follow-up sleep study to ensure efficacy of treatment, in addition to the clinical assessment of ESS, objective CPAP/APAP compliance, and discussion of side effects.

CPAP Suppliers/Manufacturers

ISS recognises the important role of CPAP manufacturers/suppliers in the provision of equipment and consumables but recommends that this role be limited to technical support. The choice of masks, selection and review of prescribed pressures, and selection of optimum pressure device should remain the primary responsibility of the sleep centre responsible for each individual patient.

Funding for CPAP Therapy

ISS recommends that the HSE cover the cost of the device rental and mask/headgear in full to patients in receipt of a medical card and that all other patients be covered as part of the drug refund scheme.

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Key Points

- Nasal CPAP is the treatment of choice in most patients with OSAS but compliance is lower in patients with mild disease and in relatively asymptomatic patients
- CPAP frequently produces dramatic improvements in daytime alertness levels and is associated with major improvements in cardiovascular morbidity and mortality, in addition to reduced accident risk
- Auto-adjusting pressure devices APAP are indicated in some OSAS patients, particularly where high fixed pressures are required
- Weight loss improves OSAS, but is difficult to achieve
- No pharmacological therapy currently available produces clinically relevant improvements in OSAS
- Surgical intervention has an unacceptably low success rate in OSAS, except in patients with a clearly identifiable obstructing lesion in the upper airway
- Yearly follow-up is recommended by the ISS

Section 2. Dental Oral Appliance Therapy Guidelines for Snoring / OSA

Definition:

Oral appliance therapy involves the use, fabrication and fitting of dental devices for suitable patients to improve airway patency.

These types of devices adjust the position of the lower jaw to a more anterior and inferior position. This increases the diameter of the pharynx and upper airway reducing the potential for obstruction to develop. These appliances are commonly referred to as mandibular advancement devices (MAD).

Oral appliance therapy should only be provided in the absence of dental pathology, oral pathology and jaw dysfunction.

Oral appliances, ideally customised, require a sufficient number of supporting teeth and/or dental implants for adequate retention of the device.

Tongue retaining oral devices (TRD) for the edentulous patient have been reported in the literature.

Clinical Protocol

Provision of an oral appliance therapy is recommended only after patient consultation with the relevant sleep physician who has responsibility for making the medical diagnosis.

Literature has demonstrated that oral devices can be considered as first-line treatment for snoring and mild Obstructive Sleep Apnoea (OSAS), but they are not recommended for moderate to severe OSAS patients. They can however be prescribed in cases where patients do not respond to CPAP therapy or are CPAP intolerant.

On referral, dental evaluation is carried out to determine an individual patient's suitability for appliance therapy. Customisation of appliances is necessary to meet specific anatomical and treatment requirements.

Dental Assessment

ISS recommends that a complete extra-oral and intra-oral examination be required to determine the absence of pathology or significant anatomical or physiological anomalies in the stomatognathic system.

Patient Examination should involve review and documentation of the following parameters:

Oral or dental pathology

Jaw Function evaluation to include, line of movement, range of movement and muscle palpation for evidence of spasm or dyskinesia.

Temperomandibular joint anomalies

Gag reflex

Static and dynamic occlusal evaluation of the dental arches to include tooth position and mobility.

Tongue size anomalies

Throat form anomalies

Angle Classification of skeletal jaw form.

Additional special tests:

Trial advancement bite registration test.

Mounted casts of upper and lower arches

Orthopantomograph (OPG) and standard periapical radiographs where necessary.

Types of Appliances

There are two main categories of oral appliances for the dentate or partially edentulous patient. Both categories aim to protrude and depress the mandible

The “Monobloc” appliance category is a one-part bimaxillary appliance.

The “Titratable” category is a two-part adjustable bimaxillary appliance.

Depending on the clinical diagnosis an appliance may be prescribed on a provisional basis as an interim or diagnostic device, or alternatively on a definitive long-term basis. Liaison with dental laboratory professionals to optimise the provision of mandibular advancement appliance services is essential whether provisional or definitive in nature.



Mandibular Advancement Device

Key Points

- Mandibular advancement devices position the lower jaw in an anterior and inferior position
- Oral / dental health is an essential requirement for this type of treatment
- Oral appliance therapy is only recommended after consultation with the relevant sleep physician who has responsibility for the medical diagnosis
- Customisation of the oral appliance is made for the individual patient
- A specific follow-up protocol is essential to monitor efficacy and acceptance
- Ongoing communication with the referring physician to monitor treatment outcome is necessary

Follow-up:

ISS recommend that after the dental device has been fitted, the dentist must conduct a follow-up evaluation of treatment in terms of appliance efficacy and tolerance. This evaluation should include:

Ongoing monitoring of appliance acceptance and wear compliance by the patient at specified interval of three months to a year.

Comparison with baseline parameters such as temporomandibular joint function, occlusion, gingival health, tooth mobility.

Subjective evaluation of efficacy as provided from bed-partner’s response where appropriate, and post treatment Epworth Sleepiness Scale.

Scheduling of the return visit to the referring sleep physician so that objective efficacy testing and follow-up through either polysomnography or limited sleep studies as deemed appropriate by the relevant sleep physician can be completed.

Evaluation and documentation of the treatment planning decisions, outcomes, and any subsequent modifications, which may arise following the delivery of these appliances, should be communicated to the other medical professionals involved in patient management.

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Section 3. Surgical Guidelines for Snoring / OSA

3a. Otolaryngological (ENT) Surgical Guidelines

The evidence to date in the literature does not support the widespread use of surgical interventions in the management of unselected patients with OSAS (Sundaram et al, 2005). However, a variety of surgical options are available for carefully selected patients including tonsillectomy, adenoidectomy, septoplasty, turbinate reduction and removal of nasal polyps. Tonsillectomy in patients with grossly enlarged tonsils frequently results in major improvements in OSAS severity but the degree of benefit varies depending on the presence of other contributing factors such as obesity. Surgical relief of nasal obstruction, such as correction of deviated nasal septum, provides inconsistent benefit in reducing OSAS severity but the resulting improvements in nasal airway patency can improve the efficacy and tolerance of CPAP.

Other surgical procedures include: uvulopalatopharyngoplasty (UPPP), genioglossus advancement, radiofrequency ablation, and mandibular osteotomy. However these surgical options are only of potential value in carefully selected patients and procedures such as maxillo/mandibular osteotomy are complex and only suited to highly specialised centres. UPPP procedures can be performed to different degrees ranging from conventional surgical resection of the posterior soft palate and surrounding redundant tissues (UP3) to limited resection of the posterior palate (UP2), often by a laser-assisted technique (LAUP). However, the evidence of efficacy for UPPP is inconsistent, particularly for LAUP, and at best indicates a less than 50% long-term success rate. Furthermore, LAUP is a very painful procedure and UPPP can be complicated by nasopharyngeal reflux. A recently introduced limited procedure to stiffen the soft palate, the Pillar procedure, is relatively simple and non-invasive, but efficacy is not yet proven.

The ISS recommends that a multidisciplinary approach be adopted in the assessment of OSAS patients being considered for surgical intervention and that surgery be performed only in carefully selected patients. Upper airway surgery is rarely appropriate in patients with moderate or severe OSAS unless there is a clearly identifiable obstructing lesion such as enlarged tonsils. ISS also recommends that randomised and controlled studies be performed to accurately evaluate ENT surgical outcomes.

Role of the ENT specialist in Screening Patients for Snoring/OSAS/other sleep disorders:

ISS recommend that the ENT surgeon's role in screening patients who present for ENT surgery for relief of snoring or suspected OSAS should include a thorough history and examination in addition to appropriate investigations:

Clinical Assessment:

- Epworth Sleepiness Scale
- Snoring Symptoms Inventory
- Partner VAS / Partner Questionnaire
- Body Mass Index & neck circumference
- Nasal obstruction
- Oral cavity & Oropharynx
- Freidman tonsil score
- Mallampati score of pharyngeal congestion

Sleep Nasendoscopy can help to identify the level of obstruction i.e. soft palate, tongue base or larynx. Croft and Pringle first described this procedure in 1991. The patient is sedated until snoring is achieved and the procedure allows visualisation of the vibrating structures and also the site & extent of upper airway collapse. A classification system was developed in 1993 and was further modified in 1995.

However, it is unlikely that sedation-induced sleep correlates well with natural sleep and there is currently no standardised sedation protocol; thus the true efficacy of this procedure is still debated.

Clinical Investigations, where available:

Sleep studies - may be limited / ambulatory in those suspected of non-apnoeic snoring

Nasopharyngoscopy / Mueller Manoeuvre

Acoustic Rhinomanometry

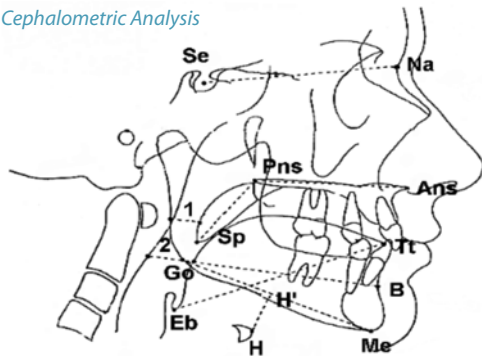
Sleep Nasendoscopy

Acoustic Analysis / Snore Sound Characteristics

Radiological investigations – Cephalometry, Somnofluoroscopy, CT, MRI

OSAS patients undergoing surgery will require extra care during recovery and where possible they should be encouraged to use their CPAP device.

Cephalometric Analysis



Patients with OSA have smaller upper airways than normals (Rivlin 1984)

3b. Bariatric Surgery

Obesity is a major risk factor for OSAS and weight loss is associated with considerable reduction in OSAS severity in obese patients. Voluntary weight reduction is often unsuccessful in obese OSAS patients and the reasons are complex and incompletely understood.

Bariatric surgery represents a potential management option for OSAS in severely obese patients who fail to lose sufficient weight by conservative means and who are intolerant or unwilling to comply with long-term CPAP therapy. A variety of surgical techniques are available including gastric banding, gastric bypass, and gastroplasty. Systematic review of the literature regarding efficacy of bariatric surgery in alleviating OSAS indicates that most such patients experience substantial weight reduction associated with either resolution or substantial improvement in OSAS as measured by AHI. However, bariatric surgery can be associated with complications and a post-operative mortality of up to 1% has been reported in a systematic review. Furthermore, such patients are at increased anaesthetic risk because of the co-existence of OSAS with obesity, particularly in the recovery period from anaesthesia. ISS recommends that bariatric surgery in obese OSAS patients be performed only in specialized centres with experience and expertise in the surgical and anaesthetic management of such patients.

References

Ref: Buchwald H, Avidor Y, Braunwald E, Jensen MD, Pories W, Fahrback K, Schoelles K. Bariatric surgery: a systematic review and meta-analysis. *JAMA*. 2004 Oct 13;292(14):1724-37.

Sundaram S, Bridgman SA, Lim J, Lasserson TJ. Surgery for obstructive sleep apnoea. *Cochrane Database Syst. Rev.* 005 Oct19 (4):CD001004

Key Points

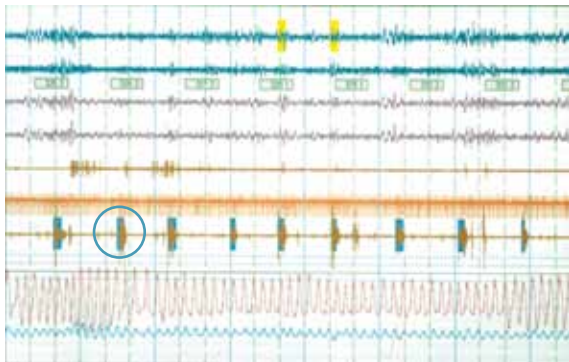
- Surgical intervention to the upper airway in unselected patients has an unacceptably low success rate
- Careful patient selection can improve surgical success rates, particularly where a resectable anatomical obstruction is identified such as tonsillar hypertrophy
- Relief of nasal obstruction, where indicated, may improve CPAP compliance
- Bariatric surgery represents a viable option in severely obese OSAS patients who are unable to lose weight by conservative means and who do not accept long-term CPAP therapy
- Patients with significant OSAS should be advised to inform their anaesthetist of their condition when any anaesthetic is being considered

Section 4. Restless Leg Syndrome & Periodic Leg Movement Disorder Guidelines

Definition

Restless Leg Syndrome (RLS) is a complex lifelong sensorimotor disorder. Patients experience an intense, disagreeable creeping sensation in the lower extremities, especially in the evenings, which is relieved by moving the legs. There are both primary and secondary forms of RLS.

Periodic Leg Movement Disorder (PLMD) is characterised by repetitive leg movements during non-REM sleep, most commonly the extension of big toe, dorsiflexion of ankle, or knee, or hip every 20-40 seconds. PLMs may cause EEG arousals, which reduce sleep quality and results in excessive daytime sleepiness. PLMs are noted in at least 80% patients with RLS. As a result the occurrence of both waking and sleeping periodic leg movements PLMD is now recognized as opposed to pure sleep associated PLMs.



PSG recording showing bursts of repetitive PLMs during NREM sleep

Primary and secondary forms of RLS & PLMD

The same constellation of symptoms may occur in the setting of several disorders and physiologic changes, notably iron deficient anaemia, pregnancy and polyneuropathy. This has led to the term “secondary” RLS. A positive family history is a defining, but not mandatory, feature of the primary form of RLS.

Primary form

Positive family history

“Secondary” form

Peripheral neuropathy

Uraemia with anemia

Iron deficiency anaemia

Pregnancy

Thyroid drugs, myelopathy,
varicose veins

Epidemiology and aetiology

In population based studies the prevalence for RLS ranges from 0.6% to 15%. A recent study found a 27% prevalence of RLS in pregnant females. In 17% they were limited to the duration of pregnancy, reflecting the role of iron deficiency. Abnormal traffic of iron and related changes in dopamine receptor function are major aetiologic factors in primary RLS. Iron deficiency should be treated. PLMD can occur at any age, more frequently in the elderly.

Differential diagnosis

Peripheral neuropathy

Lumbosacral radiculopathy

Hypnogenic myoclonus (sleep starts)

Nocturnal leg cramps

Venous/arterial insufficiency

“Painful legs and moving toes syndrome”

“Growing pains”

Akathisia

Diagnosis of RLS & PLMD

The clinical history and otherwise normal examination are generally sufficient to make a diagnosis of RLS. But objective measures can be used also. Actigraphy measures the surrogate marker PLM and is extensively used in therapeutic research. Polysomnography can measure leg PLM activity overnight during a sleep study recording. ISS recommend that bilateral leg EMG should be measured if PSG is used to make a diagnosis of RLS, but objective measures may also be used.

Carry out FBC, creatinine, glucose, ferritin, folate, B12, to check for iron deficiency, uraemia.

Diagnostic criteria based on clinical assessment

The urge to move legs, with unpleasant sensations (legs)

An increase or onset of symptoms with rest or inactivity

Decreased symptoms on movement, eg, stretching

An increase in symptoms during the evening and night

A variable course of symptoms

A normal physical examination in idiopathic RLS

Complaint of sleep disturbance

Supportive clinical features

A response to dopaminergic therapy

Objective evidence of periodic leg movements during wakefulness or sleep

Therapeutic guidelines.

The available agents have been reviewed and rated by the RLS Task Force 2004 Standards of Practice Committee of the American Association of Sleep Medicine (Hening W, et al. RLS Task Force 2004 Standards of Practice AASM Sleep 2004;27:560-83) . Newer agents have extended the armamentarium, most recently rotigotine.

Overall management

Provide education and support to patients diagnosed.

Limit therapy to patients with sleep disturbances and consider age, severity, and motivation for treatment.

Treat anaemia if present

Use dopamine agonist for any stage of RLS — mild, moderate, and severe

Problems with l-dopa

Loss of efficacy over time.

Rebound phenomenon: Recurrence of symptoms later in the night or in the early morning after the initial response.

Augmentation: Symptoms earlier in the day, with an increased intensity and extension to other regions

82% of patients on l-dopa develop augmentation

These problems may relate to the difficulty in achieving steady state plasma levels without the need for frequent dosages. The elimination half-life (EHL) for l-dopa is approximately one hour, increasing two – threefold with the addition of carbidopa and entacapone (Stalevo combines all three).

Dopamine agonists (DA)

Theoretical advantages: Reduced tendency to rebound and augmentation, with longer EHL. The availability of sustained release formulations may enhance this capacity of the DA to achieve steady state plasma levels, eg, the new transdermal preparation of rotigotine (Neupro). Several have obtained Irish Medicines Board (IMB+) approval of their indication for RLS, including pramipexole and rotigotine, but the full array are in general use and may have to be deployed when problems of diminished efficacy are successively encountered.

Pramipexole (Mirapexin) (IMB+)

0.75 - 1.5 mg (salt weight) 1 hr before bed; EHL 8 hr

98 % decrease in PLMS

84% decrease in RLS

Total sleep time, number of awakenings and sleep efficiency, unchanged

REM suppressed

Unwanted effects (UE): Nausea, fatigue, dose related

Augmentation 8.5 – 18%

Ropinirole (Adartrel) (IMB+)

1 – 4 mg single daily dose, building from 0.25 mg; EHL 6 hr.

This agent is more commonly marketed as Requip for Parkinson's disease, also available in a once daily sustained release preparation (Requip Modutab).

Multiple studies show improved RLS and associated sleep measures.

UE: Nausea, somnolence.

Montplaisir J, Karrasch J, Haan J, et al. Ropinirole is effective in the long-term management of Restless Legs Syndrome: a randomized, controlled trial. *Mov Disord.* 2006; 21(10):1627-1635

Rotigotine (Neupro) (IMB+)

Transdermal patch

1 - 3 mg/24 hr; EHL 7 hr after discontinuation

Clinical remission in 47.3% vs 22.8% placebo

UE: nausea, application site reactions, fatigue and headache.

Baldwin CM, Keating GM. Rotigotine transdermal patch: in restless legs syndrome. *CNS Drugs.* 2008;22(10):797-806.

Bromocriptine (Parlodel)

2.5 – 5.0 mg daily; EHL 12-14 hr

UE: Nausea, hallucination.

Cabergoline (Cabaser)

1 – 4 mg daily

Long EHL: 65 hr

UE: Pleural effusion / fibrosis, ergot side effects, including hallucination

Pergolide (Celance)

0.5 mg 2 hr before bed; EHL 27 hr

Reduced PLMS with arousal (2.3 / 8.9), RLS decreased

No change in total arousals, or REM, but sleep time increased

UE: Nausea, headache, rhinitis, vomiting, abdominal pain, dizziness

Augmentation 15 – 27%. Fibrosing endocardial valvulopathy has emerged as a significant risk and requires regular monitoring of inflammatory markers and echocardiography.

Pharmacological treatment: sequential trials

First-line pharmacological treatment

L-dopa

Combined with enzyme inhibitors

(+ benserazide = Madopar; + carbidopa = Sinemet; carbidopa + entacapone = Stalevo).

Anticipate early augmentation and rebound

Typically recommended only for mild symptoms

Dopamine agonists

Use in ascending order of toxicity; pergolide requires special caution (see above)

Ergot derivatives generally more toxic (cabergoline, bromocriptine, pergolide)

Second-line pharmacological treatments

Benzodiazepines, opioids, anticonvulsants

Add clonazepam as needed for sleep - watch for exacerbation of OSAS

Empiric iron therapy not justified unless ferritin <50mcg/l

Key Points

- RLS is a complex lifelong sensorimotor disorder
- PLM are repetitive leg movements during Non-REM sleep
- PLM's are noted in 80% patients with RLS
- Clinical history is usually sufficient to diagnose RLS
- Objective measurements (PLM during PSG sleep study) required to diagnose PLM
- Provide patient education and support upon diagnosis
- Treat anaemia if present
- Limited pharmacological treatment to patients with sleep disturbances, but consider age, severity and motivation to therapy as well

Section 5. Assessment and Management of Insomnia Guidelines

Definition



Insomnia is a symptom, not a condition. Classification systems exist but no single system is agreed in common practice. It refers to difficulty in initiating or maintaining adequate sleep, or non-restorative sleep.

Transient insomnia is usually related to circumstances and ubiquitous. However, up to 80% of insomnia is chronic, lasting greater

than 3 months. Chronic insomnia is most frequently secondary to or co-morbid with medical and psychiatric conditions and/or substance misuse. Drugs associated with causation of insomnia include alcohol, caffeine, tobacco, ecstasy, cocaine, amphetamines, theophylline, antidepressants, attention deficit disorder drugs, clonidine, propranolol, atenolol, albuterol, salmeterol, methyl dopa, levodopa, quinidine, corticosteroids, oral contraceptives, progesterone, thyroxine, phenytoin, amphetamines, decongestants, weight loss products, and pain relievers containing caffeine.

Chronic insomnia also occurs as primary idiopathic insomnia, psychophysiologic arousal or a manifestation of uncommon primary sleep disorders, e.g. restless legs syndrome and circadian rhythm disturbances in less than 20% of cases.

One third of insomnia symptoms are associated with a mental disorder. It is an independent risk factor for development of depression and an increased risk of its recurrence and chronic course. It is associated with difficulties and accidents at work and more absenteeism.

Insomnia is also associated with an impaired quality of life, daytime psycho-motor impairment, heart disease, immune dysfunction, and several endocrine and metabolic derangements. Chronic insomnia confers an important three fold increased risk of suicide attempt, and sleep must be targeted in the treatment of acute depression.

Epidemiology

While estimates vary approximately 10% -15 % of the general population report major current insomnia. 5% of primary care patients seek treatment for their insomnia. Recognition of the problem is poor. Women are consistently more likely than men to have insomnia, pregnancy or menopause are frequent triggers.

Increased age, separated, divorced, or widowed status is a population risk factor.

The elderly pattern of early bedtimes, sleep fragmentation at night, and daytime napping is not a form of pathological insomnia but a common focus of complaint.

Assessment of Insomnia

Screening for insomnia is indicated in routine health examinations. Detailed screening for associated co-morbid psychiatric conditions is of proven value. Insomnia may be co-morbid with a number of psychiatric conditions, mood disorders, anxiety disorders including nocturnal panic, or a history of drug or alcohol use.

ISS recommend that full physical and mental state examinations along with a full sleep history are required when chronic insomnia is complained of.

Diagnostic tools

Sleep diaries are useful. Give the patient a sleep diary and ask that it be completed daily after awakening in the morning for 2 weeks. Ask for recording of bedtime, total sleep time, time it took to fall asleep, the number of times awakening at night, use of sleep medications, time out

of bed in the morning, and a rating of subjective sleep quality and daytime symptoms. A sample sleep diary is also available at <http://www.sleepeducation.com/pdf/sleepdiary.pdf>. Collateral history from a bed partner is often valuable but not always confirmatory. Characteristic and associated factors should be identified, and screening questions should be asked regarding:

Current medication use

Pain

Gastro-oesophageal reflux disease

Nocturia, prostate disease

Dementia

Hyperthyroidism

Parkinson's disease

Restless leg syndrome or Periodic limb movement disorder

Narcolepsy

Snoring and other symptoms of sleep apnoea or respiratory insufficiency

Other investigations

Polysomnography or Multiple Sleep Latency Tests are not indicated for insomnia evaluation. There is little evidence of the routine benefit of portable sleep studies or actigraphy either. Additional psycho-physiological measures (other than history taking of constitutional heightened arousal), however useful are mostly unavailable.

Treatment of Insomnia

Key educational objectives include avoiding the following: eating late, daytime naps, cold bedding, noisy, overheated or un-darkened bedrooms. Regular sleeping schedules, earplugs, evening fluid restrictions are helpful. Correction or alleviation of underlying causes of insomnia is essential where possible. Alleviate underlying pain, depression, anxiety disorders, and physical symptoms

(such as wheeze, dyspnoea, nocturia etc) where possible. Medication is most commonly used to treat insomnia and has a value in short term use. However it is both frequently inappropriately withheld or overused. Behavioural therapies are often not adequately tried but are as or more effective in chronic insomnia, and confer longer lasting improvement. In the intermediate term (i.e. 3-8 weeks), meta-analysis indicates that behavioural treatment for insomnia is just as effective as medication treatment. Over the long term (i.e. 6-24 months), patients receiving non-pharmacological therapies enjoy long lasting relief while many of those treated with medication return to their baseline insomnia levels.

Non Pharmacologic Options

It is imperative to try and decrease the overall level of physiologic and emotional arousal, and not just to improve the night-time sleep. Cognitive behavioural therapy is the best evidenced treatment package and focuses on correcting common faulty beliefs and sleep expectations, misconceptions, performance anxiety before sleep, and the counterproductive effort for sleep of the insomniac.

Stimulus control is effective, better available, simple and low in cost. It consists of the behavioural instructions of: going to bed only when sleepy, using the bed and bedroom only for sleep and sex. Whenever one is unable to fall asleep after 15-20 minutes, instruct as follows: get out of bed and go into another room and only return when sleepy, get up at the same time every morning regardless of the quality of sleep during the night, do not take naps during the day, and have a light bedtime snack.

Sleep hygiene instruction is not evidenced as effective alone but may be as a component of other measures. Paradoxical intention and sleep restriction instructions are recommended as options. Daytime exercise (which increases body temp) improves sleep quality, duration and onset latency and additionally 30 minutes morning daylight exposure is important. In spite of being popular, use of relaxation techniques such as progressive muscle

relaxation and biofeedback do not predict improvement used alone but may lower arousal and assist in the evening wind down before sleep.

Pharmacologic Principles:

Patients should be advised when treatment is started that it will be of limited duration (between 2 and 4 weeks) at the lowest effective dose. Prescribers should explain when the dosage is progressively decreased or stopped the likelihood of transient rebound or persisting insomnia exists and is not an indication for continuance. If medication use is to be extended it should be for documented and proportionate reasons. If use is extended, medication should be taken discontinuously (drug free intervals) wherever possible.

Over the counter insomnia treatments

The rationale for choosing OTC sleep aids includes ready availability, low cost, and favourable perceptions of safety or naturalness. Antihistamine based compounds are commonly used, however because of changes in sleep architecture, notably a reduction in REM sleep caused by anti-cholinergic effects, a reduction in cognitive function, day time sedation, and increased risk of accidents, development of tolerance, and interference with medication, are therefore not recommended or only for limited term use by ISS.

As robust data does not exist to support the hypnotic effect and safety of acute treatment of herbal extracts of Valerian on patients suffering insomnia and as paradoxical reactions and hepatotoxicity have been described ISS do not recommend this medication. ISS do not recommend Melatonin or Kava based preparations as neither are evidenced as effective or safe.

Prescribed agents licensed as hypnotics

Licensed hypnotics include cyclopyrrolones, imidazopyridines and pyrazolopyrimidines and benzodiazepines and all act on the benzodiazepine receptor. One additional agent has been licensed for

use in Ireland during 2009, melatonin, in a prolonged release form at a 2 mg dose for the short term treatment of primary insomnia in patients over 55 years old. Cyclopyrrolones, imidazopyridines and pyrazolopyrimidines also are short acting, with fewer propensities to daytime sedation, cognitive impairment, dependence and rebound insomnia, but are occasionally abused. The choice of benzodiazepine (and dose) depends on the type of sleep disorder: Long term use with these agents is not well supported by trial data, and tolerance is commonly reported, so their continuous use offends good prescribing principles.

Patients who have difficulty in falling asleep can be treated effectively with short or intermediate-acting hypnotic. Patients experiencing situational insomnia or periods of wakefulness during the night, or early awakening, need a hypnotic with an intermediate half-life, or alternately a short acting hypnotic taken during the night.

Long-acting hypnotics, in general should not be prescribed to ensure there is no sedative hangover during the day. For patients dependent on hypnotics, especially the elderly, careful evaluation of risk benefit ratios to stoppage should be undertaken before being stopped. Abusive use of hypnotics warrants discontinuation with adjunctive addiction counselling. All stoppages should follow tapering regimens to circumvent withdrawal reactions.

Prescribed agents also used but not licensed as hypnotics

Sedative antidepressants in low doses are in common use but with the qualified exception of trazodone are poorly supported by data and carry significant side effect burdens. There have been several studies reporting trazodone as being effective in treatment insomnia for patients on SSRIs or SNRIs. Antihistamines are not recommended due to daytime sedation despite widespread use. Sedative neuroleptics are only appropriate when secondary indications apply.

Key Points

- Short term insomnia is common during life transitions and stress
- A full physical and mental state examination along with a full sleep history is required for longer term insomnia
- Detailed screening for associated co-morbid mood disorders, anxiety disorders or a history of drug or alcohol use psychiatric conditions is of proven value
- Chronic insomnia is most frequently secondary to or co-morbid with medical and psychiatric conditions
- Education on good practices around sleep is an essential part of all insomnia treatment. Correction or alleviation of underlying causes of secondary chronic insomnia is also necessary
- Medication has a value in treating short term insomnia. The choice of agent should be guided by the most effective agent at the lowest dose, for the least unbroken period. Prescribers should explain transient rebound is not an indication for continuance
- Long term use with these agents is not recommended but stoppage in persistent users should be carefully evaluated and managed
- Long term primary insomnia can be managed by Stimulus Control: return to bed only when sleepy, get up at the same time, do not take naps and have a light bedtime snack

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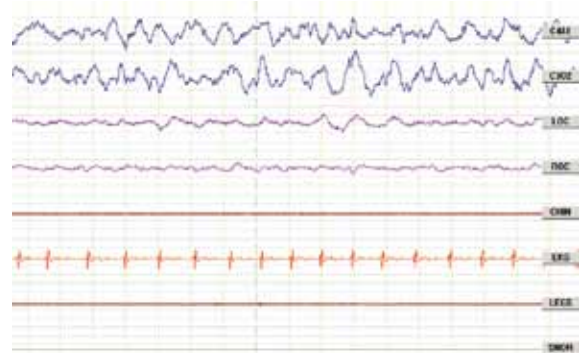
Section 6. Parasomnias in Adults Guidelines

Introduction

Parasomnias are undesirable phenomena that occur predominantly during sleep and are disorders of arousal, partial arousal and sleep state transitions. According to the Classification of Sleep Disorders (ICD-9) they are divided into 4 main categories.

1. Arousal disorders - sleepwalking, night terrors and confusional arousals
2. Sleep - wake transition disorders - sleep starts and sleep talking; rhythmic movement disorder and leg cramps
3. Parasomnias associated with REM sleep – including nightmares, sleep paralysis and REM sleep behaviour disorder (RBD)
4. Other parasomnias - including bruxism and enuresis.

However, parasomnias are relatively uncommon in adults. There are no international guidelines in the literature apart from those relating to polysomnography. Milder cases can probably be managed in primary care. More severe and complex cases should be referred to Sleep Service and / or a neurologist



Parasomnia: Slow Wave Sleep (SWS) prior to sleep walking

Epidemiology

There are no data available estimating the prevalence of parasomnias in the Irish population and international data are incomplete. Arousal parasomnias are common in childhood but normally fade out in adolescence.

Prevalence in Adults

Sleep walking (> 1/month)	0.5 – 3%
Night terrors and confusional arousals	Unknown
Sleep talking (frequently)	3%
Nightmares	5%
Sleep paralysis	11%
REM sleep behaviour disorder	Unknown

Pathophysiology

Sleep walking and night terrors are parasomnias characterized by a sudden arousal from deep or slow wave sleep (SWS) either in the first or in subsequent sleep cycles. The arousal is associated with a dissociated reaction between cortical activity and an elaborated motor activity in sleepwalking and an autonomic discharge in night terrors. The increase in the depth of sleep, assessed by EEG, during the preceding minutes may partially explain this dissociation. The deep sleep of patients who sleep walk and have night terrors is unusually fragmented by frequent brief arousals and this can be seen during polysomnography even in the absence of major events.

Animal experiments have revealed that in RBD, in addition to a lack of typical muscle atonia in REM sleep there is a disinhibition of motor activity in the cortex. In patients with this disorder, the EMG tone on polysomnography remains elevated and there may be excessive jerking.

Arousal Disorders

Symptoms of Sleep-walking

Family history is frequent.

Involves partial arousal from deep sleep.

Usually occurs in the first 1/3 of the night. Lasts 1 – 5 minutes but may be longer.

Communication is difficult or impossible.

Behaviour can be complex and may have symbolic meaning.

Violence or aggressive behaviours are rare.

Injuries may arise but are uncommon.

Facilitating factors: sleep deprivation, CNS depressants, stress, distended bladder and sleep apnoea syndrome.

Symptoms of Night Terrors

Family history is common.

Usually first 1/3 of the night, and may be more than one episode/ night.

Last between 30 seconds and 3 minutes

Patient will sit up and scream and appear to be in a state of terror with tachycardia, tachypnoea, dilated pupils and impossible to reassure.

May evolve into sleep walking or running.

Can be very dangerous as patient tries to escape or inappropriately protect bed partner. Episodes tend to ‘run themselves out’ and memory is of terror and a static image.

Underlying psychopathology is common.

Symptoms of Confusional Arousals

Episodes of marked confusion during and after arousal but without sleepwalking or sleep terrors. The subject awakens only partially and exhibits marked confusion, disorientation and perceptual impairment. Behaviour is often inappropriate.

The confusion lasts several minutes to half an hour.

Predisposing factors include anything that deepens sleep or impairs ease of waking – in adults recovering from sleep deprivation, fever, and CNS depressant medications.

It can also occur in a variety of medical conditions such as metabolic, toxic and other encephalopathies, sleep apnoea syndrome and idiopathic hypersomnolence.

Where there is no obvious cause, a family history is usually found.

Parasomnias associated with REM Sleep

Symptoms of Nightmares

Nightmares generally occur in the second half of the night within REM sleep.

They are a succession of images with threatening content.

Wakes the patient but there is less terror than in night terrors and little prolonged confusion. Last 4-15 minutes. Theme can recommence after a period of wakefulness and be repetitive.

May be precipitated by certain drugs: beta blockers and l-dopa and its agonists.

Withdrawal from REM – suppressant medications and alcohol may be triggers.

Severe obstructive sleep apnoea syndrome and narcolepsy are also associated with nightmares. Nightmares can be associated with past or present stress.

But in 50% of adults no underlying cause, apart from simple day-to-day stress, is found.

Symptoms of REM Sleep Behaviour Disorder (RBD)

Characterized by vigorous movements related to unpleasant and often combative dreams.

Vigorous and violent behaviours of RBD commonly result in injury, which can at times be severe and even life-threatening to both patient and bed partner.

The *acute* form is usually associated with medication toxicity, drug abuse, drug withdrawal, or withdrawal from alcohol abuse.

Chronic form occurs primarily in males – 85%. The chronic form may be idiopathic or associated with neurodegenerative diseases that involve the brain stem structures that regulate REM sleep, such as Parkinson's disease, dementia with Lewy bodies and multiple system atrophy. In some patients it may precede the motor and cognitive symptoms.

Mean age at presentation in 3 large studies ranged from 53 – 62 years. Sometimes there is a prodromal period where sleep talking, yelling and body jerking but no complex behaviours take place.

Pseudo RBD can occur in severe obstructive sleep apnoea syndrome and responds to treatment with nasal CPAP. A close association has also been found between RBD and narcolepsy. There is also an association with periodic limb movements of sleep. It may follow treatment with antidepressant medication, particularly selective serotonin re-uptake inhibitors..

Symptoms of Sleep Paralysis (isolated)

Sleep paralysis consists of episodes of inability to perform voluntary movements either at sleep onset or on waking.

Although it is one of the classic symptoms of narcolepsy, it occurs much more frequently on its own.

Characteristically, limb, trunk and head movements are impossible but patient is able to move the eyes and make some degree of respiratory effort.

Episodes typically are brief and disappear spontaneously or are aborted by someone touching them.

They appear more frequently when patient is 'overtired' or in shift workers and rarely require specific treatment.

Clinical Assessment of Patients

The aims of the clinical assessment are to:

Establish if possible the diagnosis through clinical details.

Estimate the severity of the condition – in terms of frequency and disruption to the patient and partner or family.

Estimate the danger posed by the parasomnia to the patient, bedpartner and possibly children. Document injuries, breakages and note if patient has left bedroom, gone downstairs or if he/she has ever left the house or apartment.

Enquire about family history.

See if there are general underlying factors such as stress or inadequate sleep.

Ascertain after particular events, the precipitating factors e.g. excess alcohol or sleep deprivation due to long haul flight the night before

Enquire about sleep environment both at home and away and ensure it is as safe as possible. If night terrors are taking place, window area should be secure.

If diagnosis is unclear, to organize further investigations through a sleep disorders clinic or neurologist.

Differential Diagnosis

Different parasomnias

Epilepsy

Psychiatric disorder

Background medical problem such as Narcolepsy or Parkinson's disease.

Investigations

The ISS recommends if suspicion of epilepsy - EEG or sleep deprived EEG

Nocturnal polysomnography and audiovisual recording of activity, but it is difficult to capture events in strange environment

There can be an increase in arousals from deep sleep in arousal disorder even in absence of events but not specific from legal point of view

It is very important to verify if obstructive sleep apnoea syndrome is present or not (see section 1)

In RBD, muscle tone is maintained during all or some of REM and there is a general increase in phasic motor activity. Periodic limb movements are also common

MRI of brain is recommended where REM sleep Behaviour Disorder is suspected.

Management of Arousal Disorders

The treatment of the arousal disorders depends on the frequency of the episodes and seriousness of what takes place.

In all cases the ISS recommends:

Attention to adequate sleep duration and avoidance of excessive alcohol and caffeine.

Background issues in terms of stress should be addressed. The safety of bedroom environment should be discussed.

Medical and psychiatric conditions and their medications should be evaluated.

If the events are *mild* and infrequent, it is a good idea to ask patient to keep a diary and see if any precipitating factors become obvious. The frequency of these events should diminish with time in young adults. Self hypnosis has been shown to be helpful.

In more *severe* cases, where the diagnosis is clear, treatment with clonazepam 0.5- 2 mg taken 2 hours before sleep can be very useful for a period, with the dose tapered and discontinued after a couple of months of episode free sleep. However, clonazepam can exacerbate obstructive sleep apnoea syndrome so it is important to ensure this is not in the background. It is also quite sedative, particularly in the morning and patients should be warned about driving especially at this time. Tricyclic medication such as imipramine may also help.

Management of REM Sleep Parasomnias

The management of nightmares depends on the clinical background. Attention to lifestyle or medications may be all that is required.

A psychiatric assessment may be useful if a diagnosis such as post-traumatic stress syndrome is being considered.

As in the arousal disorders, clonazepam in similar doses can help in chronic cases. However, as nightmares may be a symptom of severe obstructive sleep apnoea syndrome it is vital that this possibility is clarified with a sleep study as

prescription of clonazepam in this type of patient could be quite dangerous.

REM sleep Behaviour Disorder is also amenable to treatment with clonazepam but again after a sleep study has ruled out significant sleep apnoea syndrome as this mainly male, middle aged to elderly group would be at high risk for the condition. Side effects can be seen especially in older patients with excessive sedation being the main one.

Recent studies have also shown melatonin to be effective in RBD either on its own or in combination with other drugs in resistant cases. A recent retrospective study also suggested that zopiclone may also be useful and has less side effects. Two small retrospective studies have reported benefit with pramipexole.

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Key Points

- The main parasomnias are arousal disorders arising from slow wave (deep) sleep and REM sleep
- Parasomnias are common in children but are seen relatively infrequently in adults
- Nightmares and violent acting out of dreams are seen in both severe obstructive sleep apnoea syndrome and REM sleep behaviour disorder (RBD)
- An assessment of danger to both patient and bed partner should always be carried out

Section 7. Narcolepsy Guidelines

Introduction

Narcolepsy is a chronic neurological condition characterized by excessive daytime sleepiness and cataplexy. These symptoms are often associated with the intrusion into wakefulness of other elements of REM sleep, such as sleep paralysis and hypnagogic hallucinations. The strong association between narcolepsy and the human leucocyte antigen (HLA) type DQBI*O602 indicates a genetic predisposition to the disorder. Recent research suggests that it is due to abnormalities in the hypocretin peptides in the hypothalamus and/or their receptors.

The prevalence of narcolepsy in European communities has been estimated at around 0.05%. Onset is most frequently in the second decade, making it a lifelong disorder.

Symptoms

- Excessive daytime sleepiness.
- Cataplexy
- Sleep Paralysis
- Hypnagogic Hallucinations
- Disturbed nocturnal sleep and associated sleep disorders
- Parasomnias including nightmares, night terrors, sleepwalking and talking are reported more frequently in this group of patients. There also appears to be a higher rate of REM sleep behaviour disorder.
- Miscellaneous Symptoms - Cognitive symptoms such as poor short-term memory and concentration are also reported.
- Psychosocial difficulties and mood disorders
- Accidents and Safety Issues -Work and home accidents are more common than in non-sufferers. Patients with narcolepsy are more likely to smoke and may do so

when sleepy. People with narcolepsy are 4 times more likely than controls to report sleep-related road traffic accidents.



Clinical Assessment

History should be structured and detailed and has the following aims:

Identify symptoms that support diagnosis

Assess severity of condition

Highlight other possible causes of daytime sleepiness such as Obstructive Sleep Apnea Syndrome, remembering that more than one condition may co-exist.

Clarify lifestyle issues that may be exacerbating the condition

Assess the impact of the condition on the patient's life and effects on other family members.

Driving history

Use of structured questionnaires such as Epworth Sleepiness Scale is useful but is NOT a substitute for good history taking.



An epoch of REM during an MSLT test on a patient with Narcolepsy

Clinical Examination

The ISS recommends a full physical examination including calculation of BMI should be carried out looking for other underlying causes of sleepiness e.g. Obesity and obstructive sleep apnea syndrome, hypothyroidism or CNS signs of an intracranial lesion leading to a secondary narcolepsy.

Mood should also be assessed and signs of psychological distress.

Investigations

- Sleep studies: (Recommended by AASM in all possible narcoleptic patients to clarify diagnosis) Full polysomnography with leg EMG.
- Multiple Sleep Latency Test. MSLTs are time consuming and require experience and skill to be accurate. A negative test does not mean that patient does not have narcolepsy and results must be interpreted with caution. Only 71% of narcoleptics with cataplexy have a mean sleep latency of < 8 minutes and 2 Sleep Onset REM Periods on initial testing. Repeated testing fails to bring this figure above 80%. Prior to testing patients should be off all medication for at least 2 weeks and 3 weeks in the case of fluoxetine.

Note: As narcoleptic patients are more prone to other sleep disorders, polysomnography may need to be repeated on several occasions throughout the patient's life.

- A sleep diary should be kept for at least 2 weeks beforehand.
- HLA typing is an expensive test and does not need to be carried out routinely. The HLA type DQB1*0602 is present in 95% of narcoleptic patients (with cataplexy) but it is also present in 18–30% of the normal population and therefore is of more help when it is negative and helps exclude narcolepsy in doubtful cases.

- Magnetic Resonance Imaging of brain is recommended routinely in patients with classic narcolepsy but may be of use in incomplete picture or where secondary narcolepsy is suspected (e.g. Multiple Sclerosis, hypothalamic tumours or rarely head injuries.). It may also be indicated in children or patients > 50 years at onset.
- Measurement of CSF hypocretin is being carried out routinely in some laboratories in the US and in Europe and can be very useful in complex cases.

Differential Diagnosis

Includes:

- Obstructive sleep apnoea syndrome
- Idiopathic hypersomnolence
- Depression
- Delayed sleep phase syndrome.

Be aware that more than one condition leading to daytime sleepiness may be present. Sleep deprivation related to lifestyle issues may also cause hypersomnolence.

Management of Narcolepsy

The ISS considers it is very important to diagnose narcolepsy early and correctly to minimize educational and social impact. Management of Narcolepsy involves not only the use of medications which are effective for both daytime sleepiness and cataplexy but also giving general information (oral and written) on narcoleptic symptoms and specific information on education, work and contraception / pregnancy as required. Discussion on sleep hygiene and the use of strategic napping is also important. Driving ability needs to be checked on every visit. Management will vary over the course of a lifetime and follow up is recommended at yearly intervals to specialist involved in care. Associated conditions should be identified and treated appropriately. Obesity and other eating disorders may need to be addressed.

Treatment of Excessive Daytime Sleepiness (AASM and EFNS guidelines)

Drug	Side effects
Modafinil 200-400 mg / day in single or divided doses	Headache, nervousness Contraceptive issues
Methylphenidate 20-80mg / day (Ritalin or Concerta)	Irritability, headache, insomnia
Dexamphetamine 10-60mg / day	As above, reduced appetite, palpitations
Selegiline 40 mg / day	MAOI interactions, nausea, dizziness, diet induced hypertension
Sodium Oxybate (Xyrem) 3-9g / night in divided doses	Nausea, dizziness, enuresis

AASM = American Academy of Sleep Medicine

EFNS = European Federation of Neurological Societies

Treat other co-existing sleep disorders appropriately
e.g. CPAP for OSAS, AASM standard recommendation

Treatment of disturbed nocturnal sleep

Occasional use of hypnotics such as Zolpidem or Zopiclone may be useful (no objective evidence).

Sodium Oxybate - In time evidence might suggest this is the most appropriate option.

References

Practise parameters for the treatment of narcolepsy and other hypersomnias of central origin. American Academy of Sleep Medicine. Sleep 2007, 30: 12; 1712 – 1730.

EFNS guidelines on management of narcolepsy. European Journal of Neurology 2006, 13:1035 – 1048.

Treatment of Cataplexy

Drug	Side effects
Tricyclics - clomipramine 20 - 150 mg / day (AASM and EFNS guidelines)	Anticholinergic side effects, rebound cataplexy on discontinuation
Venlafaxine 37.5 - 150 mg / day (EFNS guideline)	Include hypertension, palpitations, GI disorders, Headache, weight changes, dry mouth, insomnia, nervousness, somnolence, sexual dysfunction, abnormal dreams etc.
SSRIs (AASM guideline)	Include nausea, sweating, somnolence, fatigue, sexual dysfunction, yawning. Less effective than clomipramine
Sodium Oxybate (Xyrem)	Effective but side effects common especially at higher doses. For patients with severe cataplexy

Key Points

- Consider narcolepsy in any sleepy teenager even if cataplexy does not seem to be present
- Diagnosis depends on outcome of investigation in incomplete cases
- Delayed diagnosis can have very serious effects on education and social development.
- Treatment is safe and effective

Links

www.irishsleepsociety.org Irish Sleep Society, Ireland
www.isat.ie OSAS support group Ireland
www.sleepy-heads.org Narcolepsy support group Ireland

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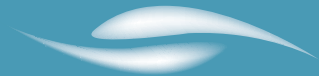
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