CED Resolution

CED Resolution on the use of Nitrous Oxide Inhalation Sedation – Update

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// INTRODUCTION

The main objective of the Council of European Dentists (CED), which represents over 340,000 dental practitioners across Europe, is to promote high standards in dentistry and oral healthcare for European citizens. It is therefore committed to continually reviewing and updating its strategic plan in order to ensure that the profession is able to meet oral healthcare needs in Europe both now and in the future. The CED guiding vision regarding the future of dentistry is that every European has access to quality safe oral health care given by well-educated, skilled and fully competent dental practitioners, in a comfortable and cost-effective manner, using the latest and most appropriate technology.

Pain and anxiety management is of paramount importance in dentistry. As many as 10 to 30% of adults and children may have some form of fear or anxiety related to dental treatment. There is substantial evidence that these patients will benefit from sedation with nitrous oxide (N_20) and that this form of sedation is extremely safe and efficient in the trained "dental practitioner's hands." The application of N_20 broaden, because of the expansion of the range and complexity of treatment cases, such as apicectomies, periodontal surgery, implantology, pre-prosthetic surgery, orthodontic mini-implants, small oral tumors' removal etc.

The CED decided to bring the Resolution from 2012 into alignment with current professional best practice. This resolution aimed to support benefits, safety and usefulness of the use of N_20 in the dental office and that such a tool should be maintained in the dental practitioner's armamentarium for use under certain conditions by appropriately trained and certified dental practitioners.

// DEFINITION AND USAGE

Conscious Sedation can be defined as: *"A technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained throughout the period of sedation. The drugs and techniques used to provide conscious sedation for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely".*[i]

Nitrous oxide gas is no stranger to either anaesthesia or dentistry and its use links both sciences in history. The technique in which low concentrations of nitrous oxide gas is titrated with oxygen has been used for years (as early as 1889) in many countries (USA, Great Britain, Australia, and Scandinavia) and is recognised as clinically successful and cost effective compared to General Anaesthesia.

// EFFICACY OF NITROUS OXIDE INHALATION SEDATION AS AN ADJUNCT TO BEHAVIOURAL MANAGEMENT

The European Academy of Paediatric Dentistry, the American Academy of Paediatric Dentistry and the British Society of Paediatric Dentistry all recommend a “titration” technique that involves increasing the dose of N_20 in oxygen by 5 to 10% increments in the oxygen mix every 1 minute or so and according to the patient's response until the desired sedative effect is achieved.

Nitrous oxide inhalation sedation, when it is supported by behaviour management techniques is efficacious for children and adults. A 2008 Cochrane review reported favourable changes in behaviour or anxiety when N_20 was used. Furthermore, this has been described as the “standard technique” for paediatric dentistry (NICE 2010) and might be successful in up to 90% of cases provided the patients are carefully selected.

// GENERAL INDICATIONS FOR N20-0XYGEN SEDATION IN DENTISTRY

The patients in need of N_20 conscious sedation belong to the following groups: 1) Anxious or fearful patients; 2) those with low coping ability, (e.g. behaviour management problems, dental fear, anxiety and needle phobic patients, prominent gag reflex; 3) special needs patients that communicate; 4) those with special treatment needs, (e.g. emergency treatment, complicated and prolonged treatment, minor oral surgery in conjunction with local anaesthesia, special procedures, etc).

In all cases the patient needs to be informed about the procedure, all available options, potential risk and side effects. Procedure should be in place to ensure that the patient or the carer has provided a valid consent.

// MAIN CONTRA-INDICATIONS/CAUTIONS FOR N20 SEDATION IN PATIENTS WITH:

1) Inability to communicate; 2) Inability to nose breath; 3) Severe psychiatric or Behavioural/personality disorders; 4) B12 or folate deficiency/disorders; 5) Chronic obstructive pulmonary disease (COPD); 6) Neuromuscular disorders, e.g. multiple sclerosis; 7) Cancer undergoing chemotherapy with Bleomycin drugs; and 8) In patients during the first trimester of pregnancy.

// NITROUS OXIDE INHALATION SEDATION SAFETY

Nitrous oxide is non-irritant to the respiratory tract, has rapid onset and a fast recovery (both within minutes). The gas has low tissue solubility and the minimum alveolar concentration (MAC) is so high that it is a poor anaesthetic at normal atmospheric air pressure.

Dedicated, purpose-designed machines for the administration of inhalation sedation for dentistry must be used, capable of delivering N_20 to an upper limit of 70% and never less than 30% oxygen by volume, although in most cases adequate relative analgesia is achieved with concentrations of nitrous oxide that do not exceed the 50% by volume. Such machines must conform to current European Standards and be maintained according to manufacturers' guidance with regular, documented servicing and must contain a fail-safe device (i.e. if the oxygen pressure falls, the supply of nitrous oxide automatically stops); flow-meter for individual set of gas flow and nitrous oxide concentration; emergency air-valve; non re-breathing tubes with low breathing resistance, and an effective scavenging system for exhaled and excess gas. However, in case of certain Class IIIB and Class IV Laser devices are used, during conscious sedation techniques, a risk of flash point ignition exists. Therefore, a closed-circuit delivery/scavenging system is required.

Employers need to maintain a safe working environment to manage any potential risk, for example concerning pregnant workers. Local guidance on managing occupational hazards is recommended.

The dental office must be equipped with all the necessary resuscitation devices and drugs.

// EDUCATIONAL & TRAINING STANDARDS FOR THE UNDERGRADUATE STUDENT

Nitrous oxide inhalation sedation should only be administered by accredited dental practitioners and at all times assisted by other dental personnel who have been appropriately trained in theoretical, practical and clinical skills, and competent to meet any complication. Provided that these requirements are fulfilled, there is no contraindication for administration in the dental practice setting (Dental Sedation Teachers Group, 2000). Therefore, all EU Dental Schools' Curricula have to incorporate N20 – Oxygen oriented lectures, seminars, e-learning modules of at least 10 (ten) hours and practical application of the technique on selected cases.

Of key importance is that the students become certified at the end of the whole programme (theory- exam-practical skills-clinical skills) and understand the need to maintain and develop the skills through regular usage.[ii]

// REQUIRED MINIMUM TRAINING STANDARDS FOR THE GRADUATE DENTIST/CPD

A theoretical at least 12 hours course should include: anxiety and behaviour management strategies, chemical, physiological and biological aspects of nitrous- oxide, technical aspects of different sedation units, patient safety, occupational hazards, emergency and basic life support. It is strongly recommended that anaesthesiologists or sedationists are involved in the teaching. A reference manual is provided and a successful assessment (on the essential requested knowledge) must be taken.

In addition to the theory, practical skills must be trained using "role-playing" as the educational model. After training, the trainee should be mentored and provide evidence of five assessments; five observations; and five treated cases.

Of key importance is that the trainees become certified at the end of the whole programme (theory- exam-practical skills-clinical skills) and understand the need to maintain and develop the skills through regular usage.

// AREAS SETTINGS FOR THE PROVISION OF EDUCATION AND TRAINING

Education and training must be given by accredited professionals people and, depending on the country it should be performed in University Clinics, Hospital Clinics or approved training centers.

// SUMMARY

- Inhalation sedation utilising nitrous oxide-oxygen has been a primary technique in the management of dental fears and anxieties for more than 150 years and remains so today.

- The technique is safe, valuable and effective for dental procedures and will allow the majority of apprehensive dental patients to be successfully sedated and treated in a much more comfortable and stress-free environment.

- Administered properly, by accredited dental practitioners with high quality, up to date and well-maintained equipment escorted by appropriately trained assistants, the technique has an extremely high success rate and must be maintained in the armamentarium of dentistry as a fundamental tool for the pain and anxiety management of patients undergoing dental treatment in the Dental office.

- The usage of inhalation sedation utilising nitrous oxide-oxygen has to comply with relevant national legislation and professional guidelines.

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Adopted by the CED General Meeting on 22 of November 2019

[i] Craig DC. Royal College of Anaesthetists, Royal College of Surgeons of England. Conscious sedation for dentistry: An update. Br Dent J. 2007;203:629–31.

[ii] Revised CED Resolution on the review of Annex V.3/5.3.1 of Directive 2005/36/EC