

(Fig 3). A great deal of the damage is caused using pre-moistened wipes – which can be very aggressive, wet and foamy. Wipes should be as ‘dry’ as possible when applied to the sedation equipment and great care taken to ensure liquids do not enter the interior of any item. Staff should never spray cleaning liquids directly onto the equipment.

The 3rd Ed of Conscious Sedation in Dentistry issued June 2017 (Ref 6) has revised Section 2.1.1 Inhalation Sedation and added the following: “This includes manufacturer recommended user maintenance, cleaning and infection prevention and control measures”.

This is a step in the right direction, but one that does not completely address the problem. Great care should be taken when writing an infection control protocol which should include the breathing system and inhalation sedation ‘hardware’ i.e. flowmeter, mobile 4-cylinder stand and Miniscav™ if present. Advice should be sought from the Manufacturer or Distributor.

#### Teaching Materials & Resources

It is a sad reflection that in the U.K. there is no dedicated textbook for Inhalation Sedation. Paragraphs or sections can be found in several available publications (Ref 7) These include:

- Basic Guide to Dental Sedation Nursing 2011
- Sedation in Dentistry 1998
- Child Taming: How to manage children in Dental Practice 2003
- Practical Conscious Sedation 1<sup>st</sup> 2004 & 2<sup>nd</sup> Ed 2017.

The information and images contained in these books varies significantly in terms of useful or relevant information – some of which is inaccurate, including images of ‘out of date’ or even redundant equipment. There is a distinct requirement for a publication dedicated to inhalation sedation, re-inforced by the growing use of this equipment, especially in Community dental settings. Any textbook employed for training purposes should be referenced for current relevance to available equipment.

There is an excellent book published in the USA; Handbook of Nitrous Oxide and Oxygen Sedation

by Clark and Brunick, now in its 4th Edition. First published in 1999, it has a refreshing approach to the subject of inhalation sedation equipment, having actively involved all three, of the then, main manufacturers; Porter, Matrx and Accutron. Now of course, there are only two, Porter having purchased the Matrx Nitrous Division in 2008. The only downside to this book is the very ‘American’ nature of some of the content eg. green colour coding for oxygen instead of UK white, as an example.

Considering the above, it can be prudent to gain information directly from the equipment Manufacturer or Distributor, who are the most likely source, having up-to-date- information and advice readily available.

#### References

1. NEBDN Dental Sedation Nursing Training in Conscious Sedation: Intended Learning Outcomes.
2. Conscious Sedation in the Provision of Dental Care. Department of Health. 2003.
3. HTM 02-01 Medical Gas Pipeline Systems Part A: Design, installation, validation and verification. Chapter 10 and Appendix L. 2006.
4. HSE EH40/2005 Workplace Exposure Limits 2nd Ed. March 2013.
5. BS6834:1987 (older systems). Current Standard BS EN ISO 80601-2.13: 2012.
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7. Books; Basic Guide to Dental Sedation Nursing. Nicola Rogers. Wiley-Blackwell 2011.  
Sedation in Dentistry. Girdler & Hill Wright. 1998.  
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## Dental Nursing

THE JOURNAL FOR A CAREER IN DENTAL NURSING

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**Cover image:** Tidal marks behind the perspex cover of a MDM caused by inappropriate cleaning methods

#### Learning outcomes

After reading this ‘Guide to Training requirements for inhalation sedation, you should:

- Understand the importance of training for inhalation sedation.
- Be aware of the different types of sedation equipment available and the importance of identifying them.
- Understand the different types of scavenging and be able to identify whether it is active for dental purposes.
- Be aware of the importance of a correct cleaning regime to prevent equipment damage.
- Know whether a textbooks contents are current and the importance of seeking correct advice.

# GUIDE TO...

## TRAINING REQUIREMENTS FOR INHALATION SEDATION



This guide is supported by an educational grant from RA Medical Services Ltd  
Inhalation Sedation Specialists

## GUIDE TO... Training requirements for Inhalation Sedation

This guide is intended to serve as educational material for dental nurses, specifically, in; care & use of inhalation sedation delivery equipment and scavenging of nitrous oxide.

For some considerable time, there has been something of a growing concern that certain elements of training for dental nurses in Inhalation Sedation are lacking, with vital areas either being incompletely taught or not taught at all. This includes topics such as:

- Inability of staff to identify and name the type of sedation equipment they are using (i.e. different manufacturer/machine types)
- Unable to identify the type of breathing delivery system being using or even re-assemble correctly after cleaning
- Ignorance of medical gas cylinders – handling of cylinders, storage etc. This subject often appears to be omitted from any form of training
- Dental Scavenging – this is the area which appears to be least understood.
- Damage caused by inappropriate cleaning of equipment

The underlying basis for this could well be twofold; Syllabus content and method of training employed. The NEBDN Syllabus; Training in Conscious Sedation for Dental Nurses<sup>1</sup> is designed to cover all methods of sedation, not just inhalation.

Section 2.5 states the candidate; should be able to: demonstrate the preparation of the notes, equipment and treatment area required prior to the administration of conscious sedation and at the end of the procedure should be able to demonstrate the approved procedure for cleaning and disinfecting the treatment area between patients.

Section 2.6 also lists the requirement:

- Select the equipment required for administration of intravenous, inhalational, oral and intranasal sedation

- Check an inhalational sedation machine and scavenging system
- Connect a breathing system, select an appropriate nasal mask and adjust the gas flow rate and mixture on an inhalational sedation machine.

These requirements, whilst theoretically listing most of the functionality staff should display once trained, are extremely dependant on the teaching of such to assure competency. Unfortunately, this is a widely differing area and as a result, some dental nurses have been found to be deficient in knowledge for even some of the most basic areas. This is a direct consequence of the inequality of some training and can lead directly to inappropriate or even mal-use of the equipment and scavenging. An unfortunate situation and one that should be remedied as quickly as possible. It is not perceived as a fault on the part of the dental nurse, but more of a result of training deficiencies.

### Delivery Equipment

In the UK and Eire, we are fortunate to have a comprehensive selection of inhalation delivery equipment available. This complies with requirements in Section 9 Conscious Sedation in the Provision of Dental Care which states the only equipment used should be 'Dedicated, purpose-designed machines for the provision of inhalation sedation'.<sup>2</sup>

Six different types of these sedation flowmeter currently exist in use; MDM, DMDM, MXR, Ultra PC™, Digital Ultra Flowmeter™ and MC1 are all available in the UK. A few examples of older models such as the Quantiflex Mark I and II, McKesson 882 & 883 can also still be found, but these are no longer in production and are in the process of being retired due to age and condition. At the very least, dental staff should be



Fig 1: MDM mounted on mobile 4-cylinder stand.

able to recognise and name the flowmeter type and mounting they are using.

Sedation flowmeters are either supplied by a piped medical gas system – or mounted on a mobile 4-cylinder stand (Fig 1), usually termed a 'stand-alone' system. As with the flowmeter, there are several types that can still be found in use; Cyprane, Fraser Harlake, Matrx & Matrx by Parker. Only the last three types are currently supportable, although the Fraser Harlake equipment range is also in the process of being phased out due to age. In addition, a quantity of the McKesson type of mobile 4-cylinder stand are also in use.

For pipeline fed flowmeters, staff should be aware of how to connect/disconnect probes from wall

outlets and manage smaller systems; including changing regulators. Larger clinics and hospitals will probably have a central facility with auto-change manifolds and this will usually be out of their jurisdiction.

A major issue with training – or lack of – is centred around the mobile 4-Cylinder Stand. This employs the use of E sized medical gas cylinders; oxygen and nitrous oxide and due to the gaseous capacity of these, must be frequently replaced.

The differing manufacturer types, and the consequential differences in design and functionality result in a variety of issues. A major one of these is fitting the cylinder to the stand yoke assembly. This is a poorly taught area, resulting in many problems during actual use. It is vital to be able to fit a cylinder correctly and understand the requirements for intact pin index pins and bodok seals and how the gauges work. Storage of medical gas cylinders is also an area that is not always completely understood i.e. how different sizes can be stored and regulations for the storage area.

### Active Scavenger Breathing Systems

Breathing Systems – as outlined in the Dental Nursing Guide to Scavenging of Nitrous Oxide issued August 2013 & HTM 02-01 (2006)<sup>3</sup> – should be Active. The accepted definition of this is an active draw on the nasal mask of 40-45 L/min. The H & S Executive have specified a maximum exposure limit for nitrous oxide of 100 PPM (Parts Per Million) over an 8-Hour TWA (Time Weighted Average). Compliance with this cannot be achieved without correct scavenging, making it even more vital to ensure that staff are correctly taught in this subject.

In addition, Regulation 10 of COSHH imposes a duty on employers to monitor the exposure of employees.<sup>4</sup>

There are several active breathing systems available (Fig 2). These are recognisable as they have smaller bore, thicker walled solid tubing's as opposed to the older type of passive system which comprised clear corrugated hose. The three main Manufacturers of systems available in the UK are; Porter, Matrx and Accutron.

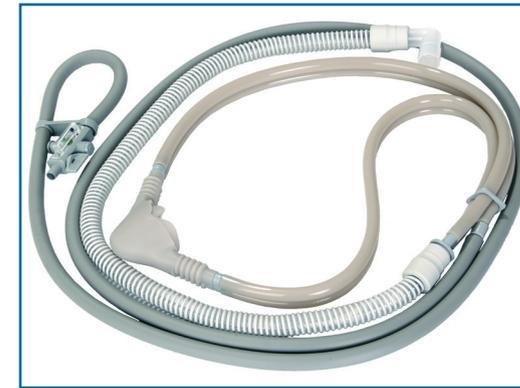


Fig 2: Porter Brown breathing system.

The older passive type of breathing circuit (Matrx) was discontinued in 2009, but had been steadily replaced by the active systems from 1996 onwards. Prior to that, a large percentage of delivery systems had been of the 'non-scavenging' type with an exhaling valve on the nasal mask, thereby allowing all exhaled waste gases to pass to surgery atmosphere. It is an unfortunate reflection, that even in the second decade of the 21st century, some of both types of systems; passive and non-scavenging, are still in daily use.

However, even active scavenging systems, if not correctly vented, can cause surgery pollution. The active draw of 40-45 L/min is vital to ensure correction operation and compliance with COSHH, but, due to the lack of training in this subject, mis-match can also be observed. A common error is to connect to an AGS System via an airbrake – or use a Purair 130. These two methods will only allow a draw on the breathing system of no more than 0.5 L/min<sup>5</sup> allowing for significant leakage – and resultant surgery pollution – from the nasal mask as the patient exhales.

Staff should be taught the following:

- To identify and name the type of breathing system they use
- Identify the manufacturer and type of nasal masks
- Understand the difference in functionality between a single and double nasal mask

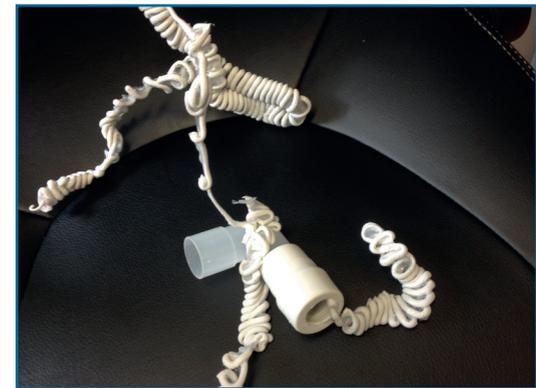


Fig 3: Damaged hose clip and damaged hose.

- Know what can be 'mix and matched' between the systems
- Ability to dis-assemble and re-assemble correctly for cleaning purposes and understand the various components of the different systems
- Understand the various methods of how a breathing system can be vented and know whether it is being correctly or incorrectly used.

### Cleaning of inhalation sedation equipment

In recent years a great deal of damage has been observed to inhalation sedation equipment as a direct result of inappropriate staff cleaning methods.

Damage includes; liquid in the oxygen/nitrous oxide flow tubes, decal tidemarks, internal damage to diaphragms and valves (including the failsafe's). Degradation of seals and pitting of surface metals. These are detrimental to the performance of the equipment and costly to repair