

***University of the Pacific School of Dentistry
Guidelines for the Use of
Nitrous Oxide/Oxygen Inhalation Agent***

I. Introduction

This standard operating procedure and policy statement is developed for use in all clinics, on-site and remote, of the University of the Pacific School of Dentistry, and in all related facilities at which employees of the School of Dentistry perform functions related to their employment. This policy statement is for all employees, regardless of age, sex, fertility or pregnancy and is based on currently available research, recommendations and requirements of the appropriate regulatory agencies, the American Dental Association, the California Dental Association and, in addition, on clinical testing within our institution. These guidelines meet or exceed the recommendations and requirements of Cal/OSHA and their policies on workplace exposure to nitrous oxide and other inhalation agents.

It is recognized that Nitrous Oxide/Oxygen analgesia, when used appropriately, is an important, extremely safe and effective adjunct in the armamentarium of behavior management modalities for appropriately selected patients and administered by faculty, trained in its administration and limitations.

II. Equipment and Facilities

The overall care, maintenance and testing of all equipment related to nitrous oxide/oxygen and its administration are under the auspices of Buildings Operations and may be subcontracted as appropriate. The daily use of the equipment and its testing is under the direction of the operator/attending faculty member who has been trained in its use.

The facilities must be designed for and must demonstrate adequate air turnover and ventilation and must have the capability for high volume (greater than 40 liters per minute [LPM]) and low volume scavenging systems (i.e. high and low velocity suctions such as saliva ejector ports and suction ports). All new construction involving changes in ventilation systems and physical plant must be tested to demonstrate compliance.

The administration equipment must have a fail-safe system such that no concentration of less than 30% oxygen may be administered. The administration units are factory sealed and certified and require little or no maintenance and may be tested annually. All rubber or silicone items including but not limited to reservoir bags, tubing, vacuum tubing, connectors, pop-off valves, masks and scavenger must be examined for cracks by visual inspection or leaks through pressure testing or other appropriate load-type tests. These may be accomplished by blocking output at the terminus (i.e. at each connector) and turning the equipment on at full volume. The flush valve must be operated to show full

function and may be used during pressure tests.

A variety of nasal masks must be available allowing for variability in patient size and shape and must fully cover the nares and seal the area. A scavenging system must be intimately included with this nosepiece.

Recording of the above tests will be described in the section on Documentation.

III. Patients

Any student or faculty member may make the recommendation of patients for administration of nitrous oxide if the patient meets recorded criteria. The actual decision for administration is to be made by the faculty member trained in its administration. The following criteria may be used as a general guideline:

1. anxious, fearful patient free from other medical, physical or psychological contraindications such as middle ear infection, tympanic membrane graft, chronic obstructive pulmonary disease or schizophrenia
2. communicative and able to respond appropriately to questions
3. patients or their legal guardian from whom informed consent may be received patient who demonstrates a patent upper airway, free from nasal congestion or upper respiratory illness and who can demonstrate appropriate nasal breathing patterns

Informed consent must be received and recorded in the chart with indications and expected outcomes for its use. The use of nitrous oxide/oxygen analgesia must also be a part of and recorded in the comprehensive treatment plan.

IV. Personnel

A. Faculty

Faculty must be certified as having trained in the administration and monitoring of Nitrous Oxide/Oxygen analgesia during a postgraduate program. Only those faculty, as determined by the Associate Dean for Clinical Affairs, may supervise and administer. This person may provide general supervision during the procedure and must be immediately available if complications or needs arise such as change in status or behavior of patient. It is the responsibility of this faculty member to guarantee that the policies and guidelines are followed. Violations or deviations from this document are to be recorded by this faculty member and forwarded to the Associate Dean for Clinical Affairs for review and possible disciplinary action.

B. Staff

Only those employees whose responsibilities require that they operate chairside or within a 4 foot radius of the patients mouth are to be included in this document. Monitoring personnel and others in the area, outside of this radius, are exempt from any of the limitations or guidelines contained in this document.

Failure by faculty members or staff to follow these policies may lead to disciplinary action including suspension and dismissal.

V. Testing

In compliance with current Cal/OSHA guidelines, the following testing schedule will be implemented:

1. Initial testing of equipment and room ventilation
2. Initial personal monitor testing
3. Repeat of personnel monitoring when equipment or procedures change, resulting in change in exposure
4. Daily equipment checks
5. Monitoring for possible hazardous concentrations of nitrous oxide will be performed when it is reasonable to suspect that levels exceed those permitted in 8CCR 5155(c)

The Director of Safety and his/her designee or subcontractor is responsible for and maintains records of the tests. The responsible faculty member performs daily checks.

VI. Documentation

- A.** The use of Nitrous Oxide/Oxygen analgesia must be documented in the chart as stated previously. This must include:
- indications and pre-administration instructions
 - informed consent
 - concentration/time graph
 - outcome and analysis
 - post-administration instructions
- B.** The daily testing of the equipment is not required to be recorded separately but the procedures must be performed prior to the first administration of the day by the appropriate faculty member.
- C.** Testing results will be maintained by the Director of Safety and reported to the Total Quality Management Committee. Appropriate action will regarding these results. It is the goal of the TQM Committee to improve quality in the workplace

including the decrease in exposure to all faculty members and employees.

VII. Exposure Limits

Although it is recognized that no policy or guidelines may comprehensively cover all situations in every clinic, the goal of this document is to limit exposure by setting general rules for the use of Nitrous Oxide/Oxygen analgesia. Current state requirements limit exposure to 50 parts per million (ppm) time weighted average (TWA) for an eight hour work day. Based on testing within our departments on a variety of patients and settings, we are attempting to limit exposure to approximately 25 ppm TWA. The following rules apply to the operator and any personnel within 4 feet of the patient's mouth. The personnel involved are responsible for monitoring their exposure and reporting to the faculty member involved any changes in staffing which may be necessary because of prolonged or excessive exposure, but it is the ultimate responsibility of the faculty member to assure safe operation of the equipment as well as an individual's time at the unit.

These policies for personnel within the designated four-foot radius of the patient's mouth are as follows:

1. Personnel may not be scheduled for more than five (5) hours during an eight (8) hour period at a position as described above
2. If a patient is in an intermittently agitated state and is uncooperative even with the sedation provided, one should not work chairside for a period greater than 20 minutes. If feasible, the personnel involved should avoid working with another nitrous oxide/oxygen analgesic case within the same eight-hour period
3. If a patient is very agitated and is screaming or exhibits signs of nasal blockage, discontinue use of nitrous oxide/oxygen analgesia within five minutes of the initial attempt at sedation

VIII. General Guidelines and Recommendations

A list of general procedures to be followed prior to and during the administration of Nitrous Oxide/Oxygen analgesia is outlined below.

A. Pre-Administration

1. Pressure test and visually inspect all equipment for leaks and cracks. Check that all

connections are secure. Turn scavenging system to 40 LPM.

2. Informed consent for the use of Nitrous Oxide/Oxygen analgesia is recorded in chart.
3. Patient is escorted into operatory and comfortably seated in chair. Medical history is reviewed for contraindications to the procedure. An appropriate nasal mask is fitted.

B. Administration

1. The patient's required flow rate is determined. The reservoir bag should be observed to determine the patient's inhalation and exhalation with 100% Oxygen. The bag should be full but should demonstrate slight creases during exhalation. It should contract slightly during inhalation. A bag, which is totally full and under pressure demonstrates that the patient is not using all the inhaled nitrous oxide or shows that the patient does not need a flow rate as high as indicated.
2. Appropriate scavenging system is in place with auxiliary system either in place now or during procedure. The auxiliary system may include an intraoral suction turned to maximum flow or another extraoral high flow device placed close to the patient's mouth and nose.
3. Concentrations of nitrous oxide and oxygen must be titrated and recorded to the individual needs of the patient and requirements of the procedure.
4. A rubber dam must be used in appropriate cases. Because of pooling of gases behind the mask, the intraoral suction must be used here. In addition, flow rates and concentrations must be lowered to allow for rebreathing. The dam must not obstruct the scavenging ports nor displace the nasal mask, allowing for leaks. The mask must be frequently checked for correct positioning and fit.
5. At the completion of the procedure, 100% oxygen for a period of 5 minutes should be administered to the patient. Scavenging systems must be functional and in use during this period and discontinued after.

C. Post-Administration

1. Post-administration instructions are given to the patient and recorded in the chart.
2. The equipment is dismantled and sterilized or cleansed in the appropriate manner according to the infection control guidelines.

IX. Summary

This document provides guidelines and recommendations for the safe and effective administration of Nitrous Oxide/Oxygen analgesia. It is the goal of the School of Dentistry to provide a safe workplace; therefore it is expected that this document may undergo revision as regulatory agencies or safe practice and equipment change.

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