Restorative Dentistry Under General Anesthesia Utilizing a Non-Intubation Technique


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The management of the unmanageable dental patient for restorative procedures has long been the bane of the dental practitioner. The handicapped, emotionally disturbed, mentally retarded, very young or frightened patients were often abused or neglected. Some members of the dental profession, recognizing this inequality, have seen fit to acquire particular skills in the field of anesthesiology so that they might be able to offer these patients good dentistry on an ambulatory basis in the dental office.

The result of these special skills and training has been the creation of dental anesthesiology teams whose work is usually confined to the dental office. These offices contain all the drugs, anesthesia equipment, recovery spaces and trained personnel that may be necessary for proper management of the case.

Numerous anesthetic techniques have been employed with endotracheal intubation the usual choice. The authors during their early experience routinely utilized the endotracheal route. However, the need for simplicity in ambulatory anesthetic procedures rapidly became apparent. Toward that end we wish to outline an anesthetic technique that we find highly satisfactory. It has been employed in over 1,600 cases of one to two hours duration. This technique permits the performance of all the necessary dental procedures while giving the patient the physiological benefits of a simple, effective anesthesia.

Basic Armamentarium

1. McKesson Nargraf dental anesthesia machine with vaporizer, Y attachment, rubber breathing bag, breathing tubes, face mask and nose piece.

2. Parenteral equipment — 5% dextrose in water, dispensing units, needles and syringes, intravenous stand, armboard, syringe holder, two 3-way stopcocks.

3. Drugs — nitrous oxide-oxygen, trichlorethylene, thiopental sodium 2%, succinylcholine (20 mg/cc vial, 0.2% drip solution).

Procedure

The patient is premedicated with Seconal® sodium and scopolamine.
The dosage is predicated upon many factors such as age, weight, length of procedure, degree of fear and apprehension. The route of administration is oral although with very young children the rectal route may be necessary. The premedicated patient is usually a cooperative, drowsy or lightly sleeping patient. The patient is placed supine on an operating table and the anesthetic begun.

The child patient is inducted by face mask nitrous oxide-oxygen, blowing gently over the face. Shortly thereafter, trichlorethylene is brought into the mixture. An intravenous injection is made after consciousness is lost and small increments of thiopental sodium are slowly injected. Barbiturate dosage is primarily determined by the patient’s age. Lack of cooperation, undue fear, nausea, etc. may necessitate some modification of this dose.

**Average Barbiturate Dosages**

<table>
<thead>
<tr>
<th>Age</th>
<th>Dose</th>
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<tbody>
<tr>
<td>1. Under 3 years</td>
<td>1. 20 mg. to 40 mg.</td>
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<tr>
<td>2. 3 to 5 years</td>
<td>2. 40 mg. to 60 mg.</td>
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<tr>
<td>3. 6 to 10 years</td>
<td>3. 60 mg. to 80 mg.</td>
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<tr>
<td>4. 10 to 12 years</td>
<td>4. 80 mg. to 100 mg.</td>
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<tr>
<td>5. Over 12 years</td>
<td>5. Dose necessary to produce desired depression</td>
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At no time is an attempt made to produce barbiturate depression. The object is one of controlled medication to reinforce the nitrous oxide-oxygen, trichlorethylene anesthesia.

Adults below 18 years of age are usually inducted in the same manner as the children. This is more satisfactory in view of the extreme apprehension these patients have about injections. After consciousness is lost, veni-puncture is made and barbiturate administered until the eyelid reflex is lost. The rate of administration is about 2-3 cc. every 30 seconds. Well premedicated adults over 18 will generally accept the venipuncture. The full anesthetic value of nitrous oxide-oxygen, trichlorethylene is attained after the desired barbiturate depression has been established.

When the level of light to moderate surgical anesthesia has been reached, the face mask is removed and a nasal inhaler placed on the patient. The nasal inhaler is secured by a head harness. This maintains the nosepiece in proper position on the nose throughout the procedure. The patient’s mouth is now opened, a prop inserted, throat partitioned off by the use of a throat curtain and cotton rolls under both sides of the tongue and the restorative procedure begun.

The patient is now receiving nitrous oxyde (75%) oxygen (25%), trichlorethylene and 5% dextrose in water by vein. The objective from this point on is to maintain the status quo until the restorative procedures are terminated. This necessitates the fullest utilization of nitrous oxide-oxygen and trichlorethylene. The anesthesiologist often assists the respirations to increase the solubility of these agents in the blood stream.
If the patient should lighten, the anesthesiologist may resort to additional increments of thiopental or should the case be nearing its terminus it is often more expeditious to utilize the muscle relaxing properties of succinylcholine. This permits quietude of the patient without necessitating depression so near the end of the anesthetic thus facilitating the recovery period. Succinylcholine is only used in this manner with the older adult patients. It is obvious that assisting or controlling the respirations may be necessary should the patient’s respiratory exchange become inadequate as a result of the succinylcholine.

Upon termination of the anesthetic, whether it be 60, 90 or 120 minutes, the patient’s reflexes return rapidly and fully. The lungs are washed out with 100% oxygen and the nose piece removed. The patient is then taken to a recovery bed where he remains until sent home.

It is obvious that the above is but the briefest outline of the anesthetic technique but the essential points have been described. The apparent simplicity of the technique belies the many problems that can arise should the anesthetist becomes careless. Constant diligence and attention to detail are necessary for success. Of no small consequence in the final success is the ability of the dental operator. He must be gentle, attentive to any obstruction of the airway and cooperative.

The development of this technique has raised many questions, some of which we shall try to answer.

Questions

1. Q. Why use this technique when an endotracheal technique is so effective.
   A. The endotracheal technique is more traumatic and potentially dangerous. The post operative sore throats, laryngeal edema, tracheitis, etc. are always a potential complication. The risk of infection is more likely. Nose piece anesthesia eliminates all of these hazards. In the occasional case where we are unable to maintain a satisfactory airway with the nosepiece we perform endotracheal intubation.

2. Q. Can an adequate airway be maintained with nose piece alone?
   A. It can if both the anesthesiologist and operator are careful. By proper extension of the head, careful partitioning of the throat and placement of the tongue it is possible to maintain an excellent airway. By squeezing the breathing bag the patient’s chest can be elevated at will even when the respiratory musculature is paralyzed by a muscle relaxant.

3. Q. Isn’t the stomach distended by controlled or augmented respirations when no endotracheal tube is used?
   A. No. By careful placement of the throat partition, assiduous
suctioning of the oral cavity and adequate anesthetic level to dry up the secretions, aspirations ceases to exist. In the well premedicated, properly anesthetized patient tooth debris and amalgam particles will actually stick to the hard palate.

4. Q. Does the operator have complete access to all parts of the oral cavity?

A. Yes. Any restorative procedure (crown and bridge, operative dentistry, endodontic, etc.) can be accomplished successfully. X-rays (periapical and bitewings) may be taken.

5. Q. Are there any alterations in physiology due to apparent sub-oxygenation, hypercarbia or disturbance of reflexes by light anesthesia?

A. The pulse and blood pressure stay within normal limits and the color stays pink when the technique is properly done. If the patient airway is maintained (and there is no excuse for not maintaining it) and adequate oxygen is delivered from the machine, the patient will exhibit normal physiological signs. Clinical evidence of carbon dioxide retention has not been evident in the hundreds of cases and there are no important reflexes to stimulate with this technique or procedure.

6. Q. Can anybody utilize this technique?

A. If anything, this technique require more ability and patience than an endotracheal technique, hence the person using it needs considerable skill in the training of the fundamentals of general anesthesia. The rewards of the technique when properly performed more than outweigh the additional difficulties it places on the shoulders of the dental operator and his anesthesiologist.

Summary and Conclusion

A general anesthesia technique for restorative dentistry utilizing a non-intubation technique has been outlined. The rationale, details and results of this technique have been described.

In this era of new drugs and new machines, we have a tendency to lose sight of the more fundamental facts of general anesthesia. The use of nose piece anesthesia has never been fully explored. The described technique is a step into this unexplored area. The dental anesthesiologist must use his wits and training to further investigate this fruitful field. Simplicity is the secret of success and it is our hope that this paper may provoke some new thinking along these old lines.

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. . . a competent art of dental practice must be superimposed upon an established scientific base.


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