

CORRESPONDENCE

using halothane *via* the tracheostomy. Bronchoscopy revealed marked tracheomalacia and tracheal collapse during spontaneous ventilation. The tracheostomy was, therefore, left in place, and the child was subsequently discharged home without further adverse events.

To my knowledge, there are no reports of respiratory compromise secondary to oral midazolam administration. In addition, during the past 5 yr, I have used oral midazolam premedication in more than 100 children with sleep apnea presenting for tonsillectomy, and I have not seen worsening of upper airway obstruction. Respiratory compromise has been reported in healthy children after nasally administered midazolam.^{1,2} Peak plasma concentrations after intranasal midazolam are generally higher than those after oral administration.¹ This complication illustrates that, although oral midazolam premedication is generally extremely safe, selected patients with airway abnormalities might be at greater than usual risk for respiratory compromise.

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ParaGraph Muscle Stimulator: New Approach to Placement

To the Editor:—The ParaGraph Muscle Stimulator (Vital Signs, Totowa, NJ) is a new type of neuromuscular stimulator that uses a piezoelectric motion sensor. The sensor, when correctly applied, allows for the electronic interpretation and a computer screen display of the movement of a stimulated muscle. This permits monitoring of muscle relaxation without direct contact with the patient's extremity, a distinct advantage because an extremity is frequently not available during surgery.

The literature provided with the ParaGraph Muscle Stimulator* suggests placing the electric stimulator pad over the ulnar nerve at the wrist and the motion sensor over the bulk of the thenar eminence. We have found more satisfactory results by placing the motion sensor over the intersection of the hypothenar eminence and digit minimi (fifth digit). Stimulation of the ulnar nerve causes more motion of

* ParaGraph Operator's Manual. Vital Signs, Inc. 1993.

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In Reply:—As inventors and developers of the ParaGraph muscle relaxation monitor, we support the findings of Roberts and Dorsch regarding the placement of the piezo-electric motion sensor of the ParaGraph monitor.

Historically, the piezo-electric motion sensor was placed on the thumb to record movement of the adductor pollicis muscle to facilitate clinical comparison with an isometric mechanomyogram. The

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the fifth digit than the thumb. Another approach is to place the stimulating pad more lateral, so the median nerve is stimulated. This will cause the thumb to move more.

It is important to visually assess the response to stimulation before administering muscle relaxants, to determine where the motion sensor and stimulating pad should be placed.

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mechanomyogram is the clinical standard for measurement of muscle relaxation. It requires the hand be fixed to an arm board and the thumb to be placed in a ring so that force generated by the thumb in response to stimulation can be quantified. These research studies required placing the ParaGraph motion sensor over the thumb, to compare its response with the mechanomyogram. However, during routine clinical use, the motion sensor should be placed over the

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