

An alternative oxygen supply technique for the difficult patient

I. D. PRATHER and J. R. WILSON

*Department of Family Medicine and Physiology, University of North Texas Health Science Center,
Fort Worth, Texas 76107*

Prather ID, Wilson JR. An alternative oxygen supply technique for the difficult patient. *Undersea Hyperbaric Med* 1995; 22(2):183-184.—A modified oxygen delivery system was developed for a patient too claustrophobic for the monoplace chamber or the hood in the multiplace chamber. The adaptation delivered O₂ through the patient's tracheostomy by means of a soft cervical collar, a pediatric tracheostomy cuff, and a T-tube.

glossectomy, cervical collar, pediatric tracheostomy cuff

A 61-yr-old woman referred for hyperbaric oxygen (HBO) therapy for osteoradionecrosis of the mandible presented challenging medical and technical problems. Treatment of squamous cell cancer of the mouth with excision (to include complete glossectomy) and irradiation resulted in contraction of the oral cavity and sclerosing of the soft tissues with complete exposure of the distal 3.5 cm of the right hemimandible. The patient also had a tracheostomy, far advanced emphysema (FEV₁ = 0.64 liter, 26% of predicted), and profound claustrophobia to the extent that she could not tolerate wearing the usual oxygen hood. Initial placement of a tracheostomy cuff coupled to a T-tube arrangement failed because any reduction in the caliber of her tracheostomy site increased the ventilatory resistance beyond her ability.

A gradual desensitization and introduction to the monoplace chamber was undertaken. The patient was premedicated with an anxiolytic (0.5 mg Xanax) and placed in the chamber with the door open. Over the course of several days the anxiolytic dose was increased, the door was closed, and the chamber was pressurized to 1.5 atm abs (151.99 kPa). However, the patient never tolerated more than a 15-min exposure; most exposures ended with the patient pleading desperately to exit the chamber.

The solution was the application of a snug-fitting, soft, cervical collar that was modified to accommodate the configuration of the jaw (Fig. 1). An aperture the size of the tracheostomy was made and aligned to the axis of the trachea. A pediatric tracheostomy cuff was then fixed to the front of the collar. To this was attached a T-tube. One hundred percent O₂ from the Amron built-in breathing system entered the right end of the T-tube through a one-way valve. The exhaust tube was fixed to the left end of the T-tube and, without any valving, exited the overboard dump.

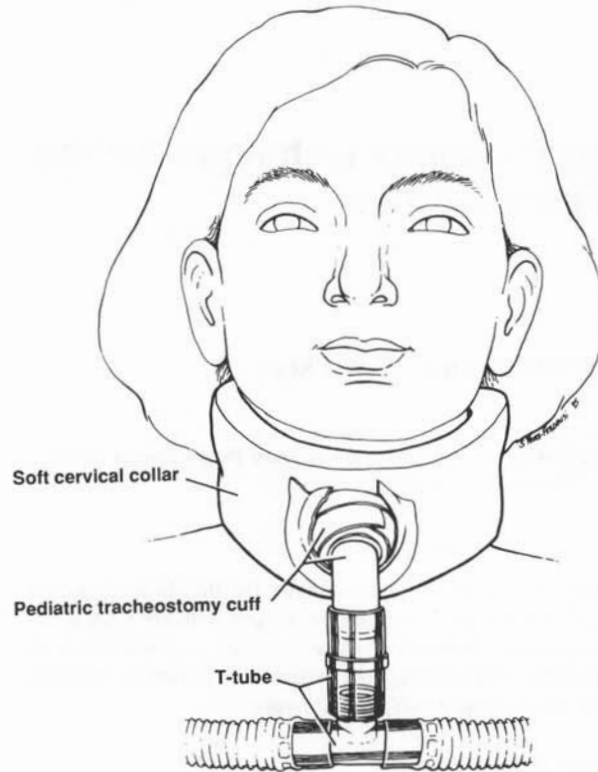


FIG. 1—Modified cervical collar with pediatric tracheostomy cuff and tube.

The patient was quite comfortable with this arrangement and was able to be treated in the multiplace chamber. A nasal clamp was tried and rejected due to patient discomfort. The chamber required only a slight increase in venting frequency to maintain ambient O_2 levels below 23%. Arterial blood gas measurements were taken at 2.4 atm abs (243.18 kPa) and found to have a PO_2 greater than 800 mmHg, exceeding the upper limits of our equipment. The PCO_2 did not fall below 38 mmHg and the patient did not report any sensation of shortness of breath.

Initially it has been planned to attach a re-breather bag in-line on the exhaust side. This increased the weight and cumbersome nature of the apparatus and was discovered to be unnecessary. The cervical collar arrangement represents an easily assembled adaptation of readily available hospital supplies and permits effective and comfortable treatment.

We are grateful for the cooperation and support from the staff of the Hyperbaric Unit at the Osteopathic Medical Center of Texas in providing technical assistance.—*Manuscript received October 1994; accepted March 1995.*