

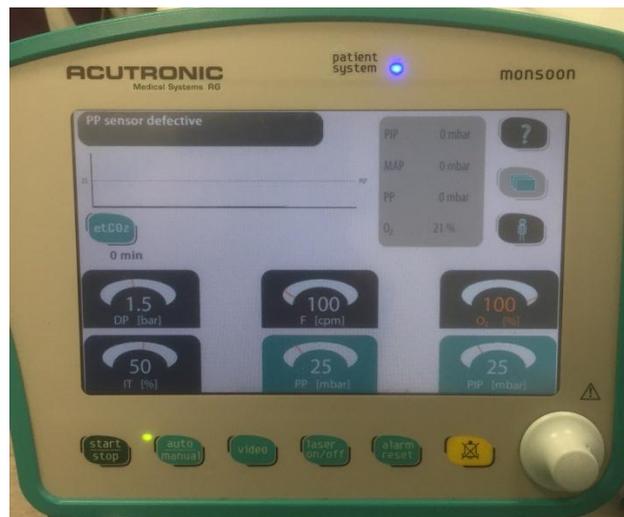
## Jet Ventilation with the Acutronic Monsoon

Ok, you have been asked to do an ENT case in which the surgeon would really like a jet ventilator and may use a laser.....

### 1. Don't Panic!

Funnily enough, the default settings can be used in most circumstances.

	Adults	Ranges
FiO <sub>2</sub>	1.0	0.21 – 1.0
Freq(CPM)	100min <sup>-1</sup>	4 – 1600min <sup>-1</sup>
Inspiratory Time (IT)	50%	15 – 75%
Driving Pressure (DP)	1.5 bar	0.1 – 3.5 bar
Pause Pressure (PP)	25 mbar	0 – 100 mbar
Peak Inspiratory Pressure (PIP)	25 mbar	0 – 100 mbar



### Ventilator Adjustments

	FiO <sub>2</sub>	Driving Pressure	Frequency (CPM)	Inspiratory Time
↑PO <sub>2</sub>	++	+	+	+
↓PO <sub>2</sub>	--	-	-	-

PCO<sub>2</sub> levels will inevitably rise during Jet Ventilation

Ventilator settings should therefore focus on maintaining oxygenation not CO<sub>2</sub> clearance

CO<sub>2</sub> clearance may seem counter intuitive:

Increasing Driving Pressure may lead to CO<sub>2</sub> retention if the Frequency (CPM) is set too high to allow adequate time for expiration.

Increasing Frequency (CPM) can reduce tidal volumes if Driving Pressure and % Inspiratory-time remain constant.

**During laser firing, for your own peace of mind, reduce the FiO<sub>2</sub> to as near to 21% as practicable**

(Experienced practitioners say you can use 100% O<sub>2</sub> as there is nothing around to ignite, but at this stage you may not want the discussion!)

### Subglottic Jet Ventilation

WRH stock the 40cm long Acutronic Medical Systems LaserJet catheters. They have an external diameter of 3.4 mm and two lumens, one for delivering gas and one for monitoring airway pressure and ETCO<sub>2</sub>.

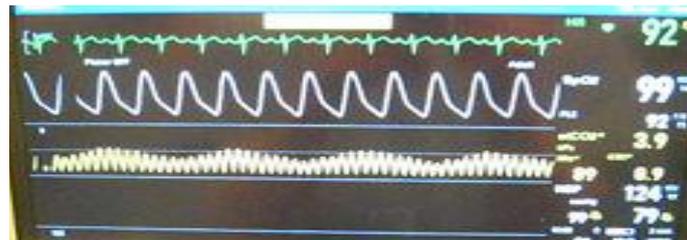


The correct tube length can be gauged by estimating the distance from a patient's lips to their upper trachea. This is done by approximating the tube alongside the patient's airway prior to insertion. The red cuff surrounding the tube can then be positioned at the correct point to coincide with an appropriate position at their lips before insertion. In laryngectomy patients the red position marker will be much more distal because the distance from their stoma site to mid trachea is very short.



The LaserJet catheter comes with a stylet, often this is removed prior to insertion because the catheter is rigid enough without it. Great care must be taken to ensure that the LaserJet catheter tip is positioned correctly in the upper-mid trachea in order to minimise the risk of barotrauma.

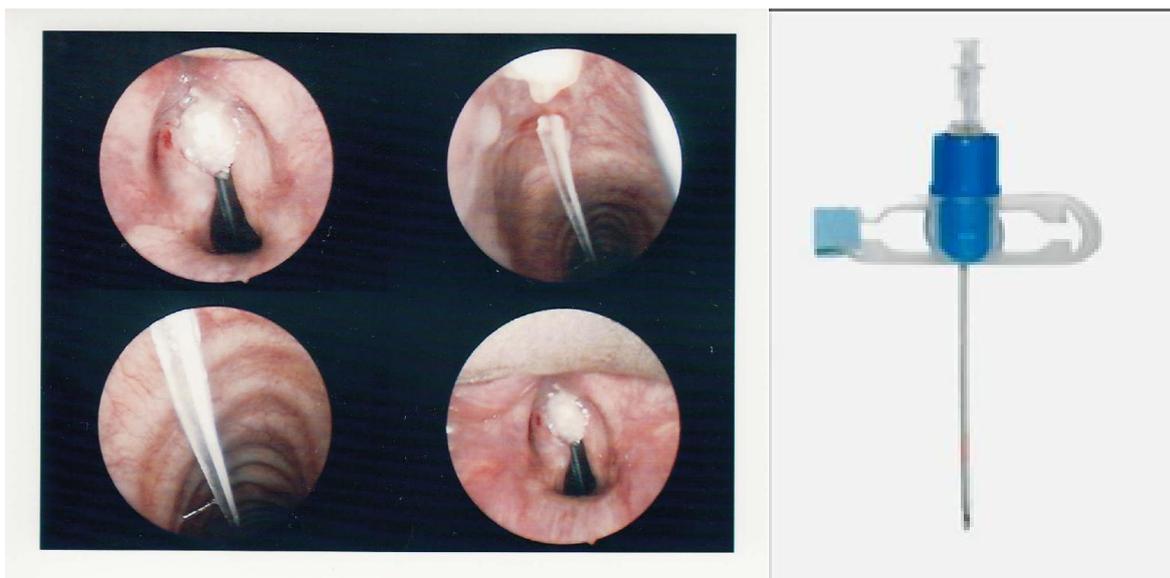
ETCO<sub>2</sub> is monitored throughout Jet Ventilation to confirm maintenance of catheter position. However, this will not provide accurate numerical estimation of ETCO<sub>2</sub> (as shown in photo below) due to the small tidal volumes and the slow response of sidestream carbon dioxide analysers. Interrupting jet ventilation to obtain a more accurate ETCO<sub>2</sub> reading can be achieved by turning the jet ventilator off and giving a conventional positive pressure breath via facemask or compressing the patient's chest to cause a tidal expiration.



### Advanced Subglottic Action

OK, I hear you say, what happens in the circumstance where I need subglottic ventilation and I cannot see the larynx to place the LaserJet Tube?

Well, you could place a Ravussin cannula and connect to the Monsoon (which should give this bronchoscopic view):



Ravussin cannulae are available in three sizes: 13G, 14G and 16G for adults, children and infants respectively.

**Dr James Leedham Dr Aidan Norman March 2016**

**Reference**

C.E.Conlon. High Frequency Jet Ventilation. Anaesthesia Tutorial of The Week 271. WFSA 2012.