HFOV theory & application

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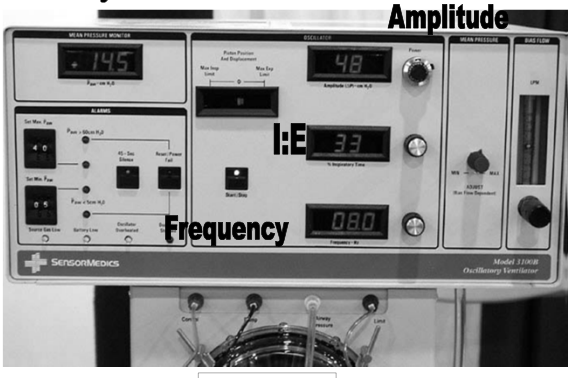
3100A Ventilator

- **Approved in 1991 for Neonatal Application for the treatment of all forms of respiratory failure.**
- **Approved in 1995 for Pediatric Application, with no upper "weight limit". For treating selected patients failing conventional ventilation.**

Mean Airway Pressure



HFOV 3100 B

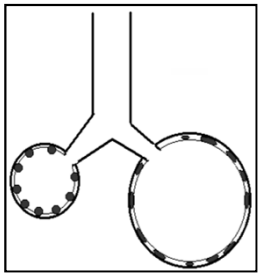
Optimized Lung Volume Strategy:

Decrease Tidal Volumes to less or equal than dead space and increase frequency.

Benefits:
- enhanced gas exchange due to combined gas transport mechanisms
- no excessive volume swings
- reduced regional over-inflation and stretching
- reduced Volutrauma

Ventilator Induced Lung Injury

- Stretch Injury
  - ***Alters capillary transmural pressures***
  - ***Relaxation changes in transmural pressure causes breaks in capillary endo and epithelium***
  - ***Increases leak of proteinacious material***
    - Promotes Atelectasis



Why use HFOV?

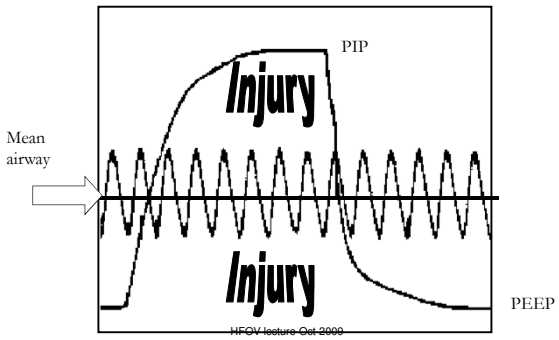
- Maintaining a constant mean airway pressure (Paw) prevents the incidence of over-inflation-deflation which produces lung injury. This is know as lung protection strategy.

HFV vs CV

Ventilator Type	*f*, Breaths/min	Inspiration	Expiration
CV	approximately 5- 60	Active	Passive
HFPPV	approximately 60-100	Active	Passive
HFJV	approximately 100-200	Active	Passive
HFOV	Up to approximately 2,400	Active	Active

HFOV Principle:

Pressure curves CMV / HFOV

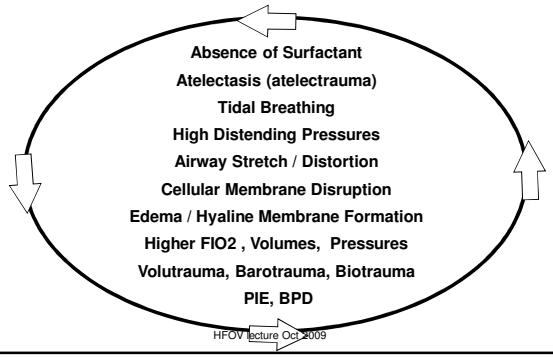


How does HFOV work?

- HFOV provides a small tidal volume which is usually equal to or less than anatomical dead space.
- HFOV uses very fast respiratory rates, usually 600 to 900 breaths per minute (bpm),(small birth weight infants)(10 – 15Hz) for neonates. The frequency is expressed in Hertz's (Hz). One Hz equals 60 bpm, 15 Hz equals 900 bpm.

Pulmonary Injury Sequence

of the neonatal patient:



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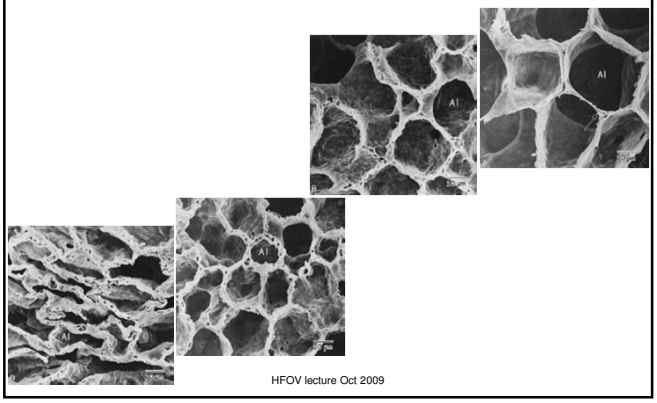
Open Lung Ventilation



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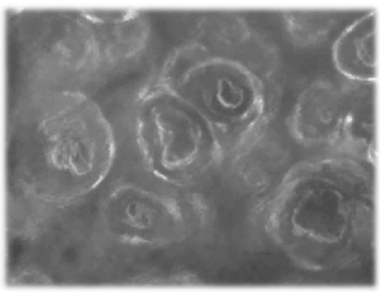
CMV



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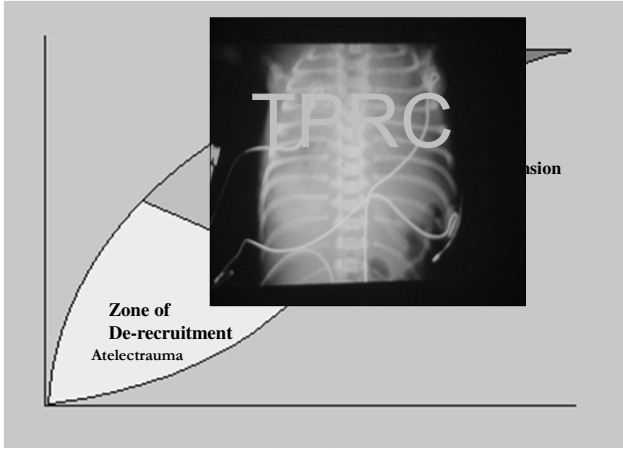

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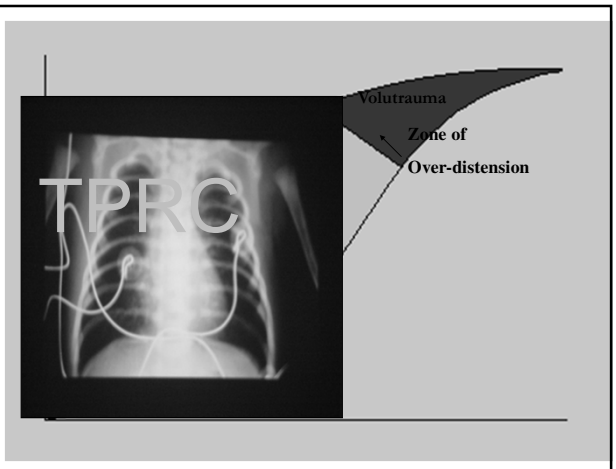

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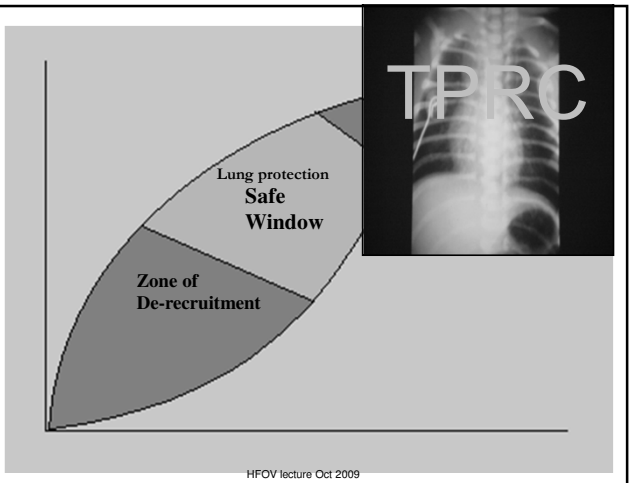

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