

NAVA：呼吸中枢监测

内 容

- 自主呼吸基本原理
- NAVA原理
- NAVA：呼吸中枢监测

脑干：产生节律性呼吸基本中枢

- 中脑
- 脑桥
- 延髓

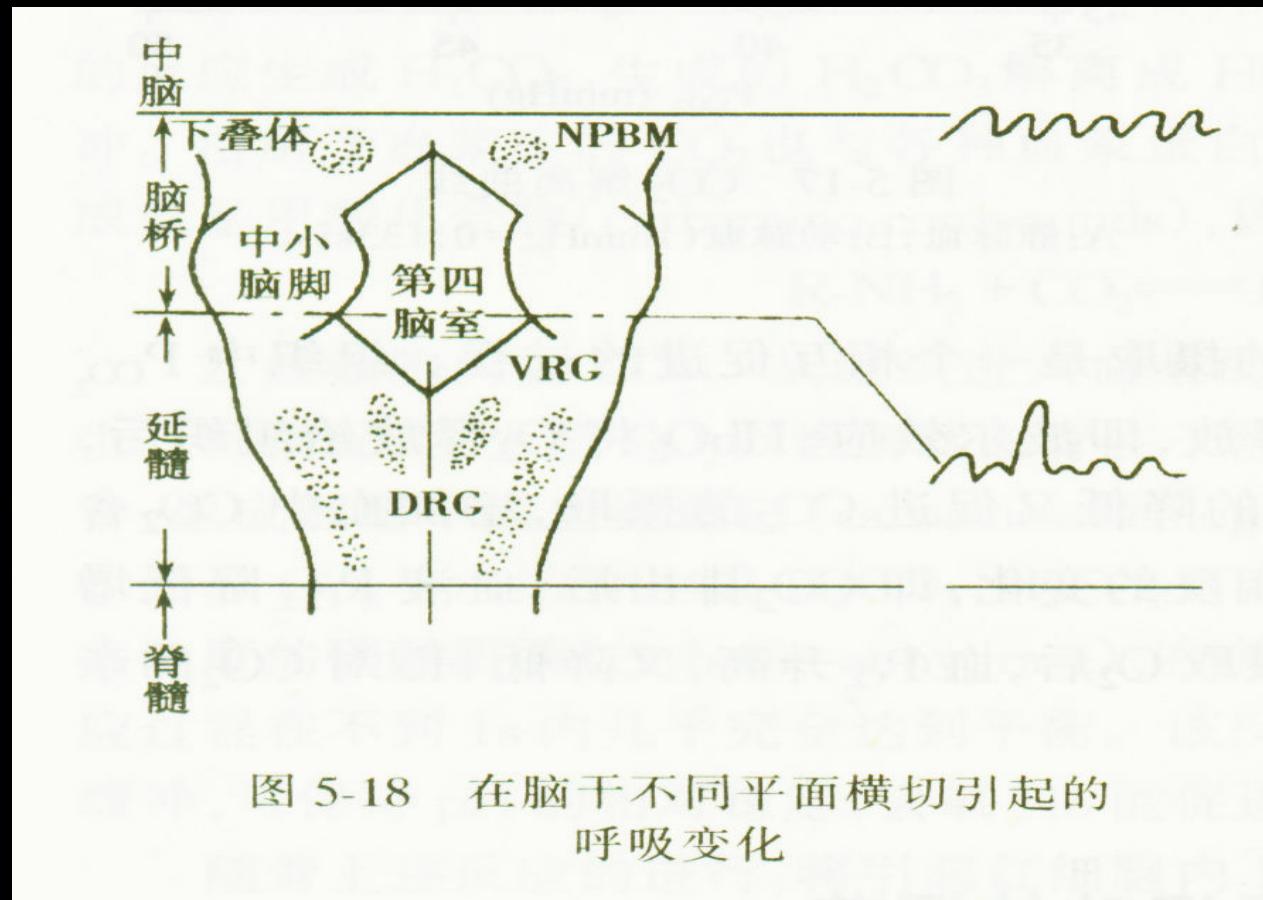
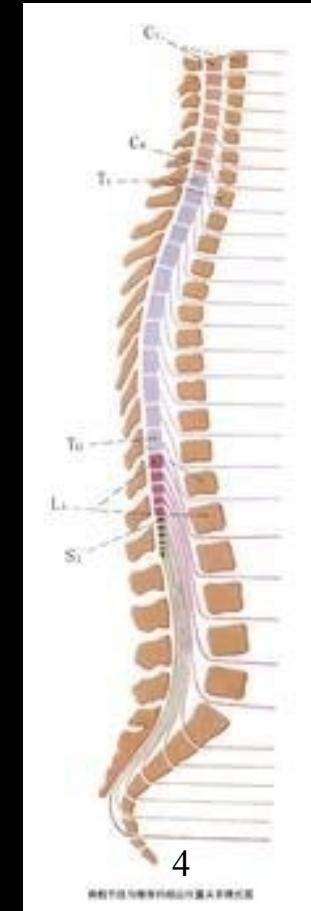


图 5-18 在脑干不同平面横切引起的呼吸变化

脊髓：传导中枢呼吸兴奋

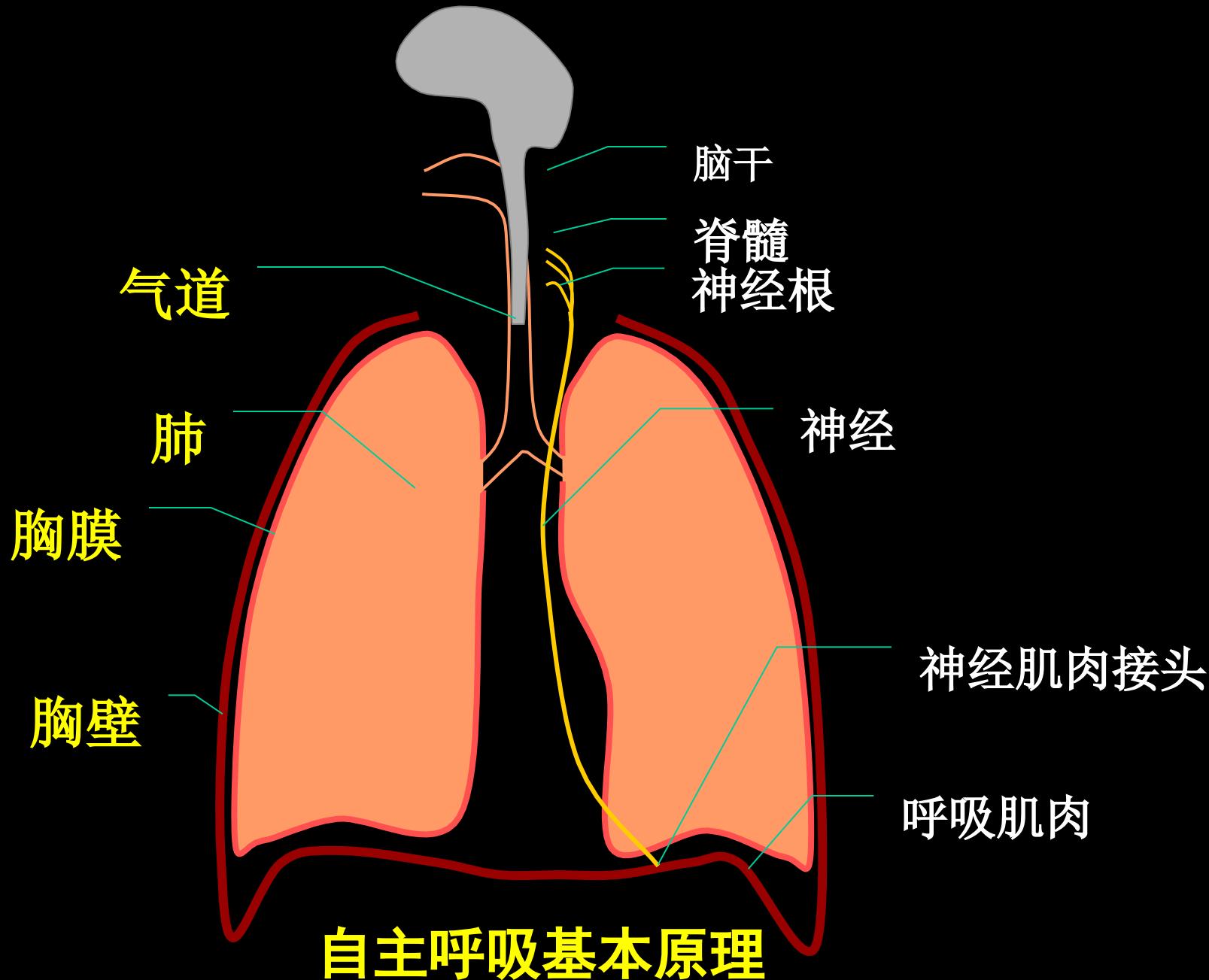
- 延髓与脊髓间离断，自主呼吸停止，脊髓不能产生自动节律性呼吸
- 是联系脑和呼吸肌的中继站
- 颈3~5支配膈肌，胸2~6支配肋间肌
- 胸6以下横断脊髓，对呼吸运动无影响。
。颈6以下横断，肋间肌失去作用，但膈肌能正常收缩；在颈2切断，呼吸肌由于与延髓中枢分离而不再产生收缩



大脑皮层：呼吸调整功能

在中脑水平切断，呼吸无明显改变，表明
大脑皮层不是产生节律性呼吸的必需部位。

但大脑皮层对呼吸具有调整作用，在一定
限度内可随意屏气或加深加快呼吸。



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VCV

APRV

ASV

PCV

PPS

PSV

BIPAP

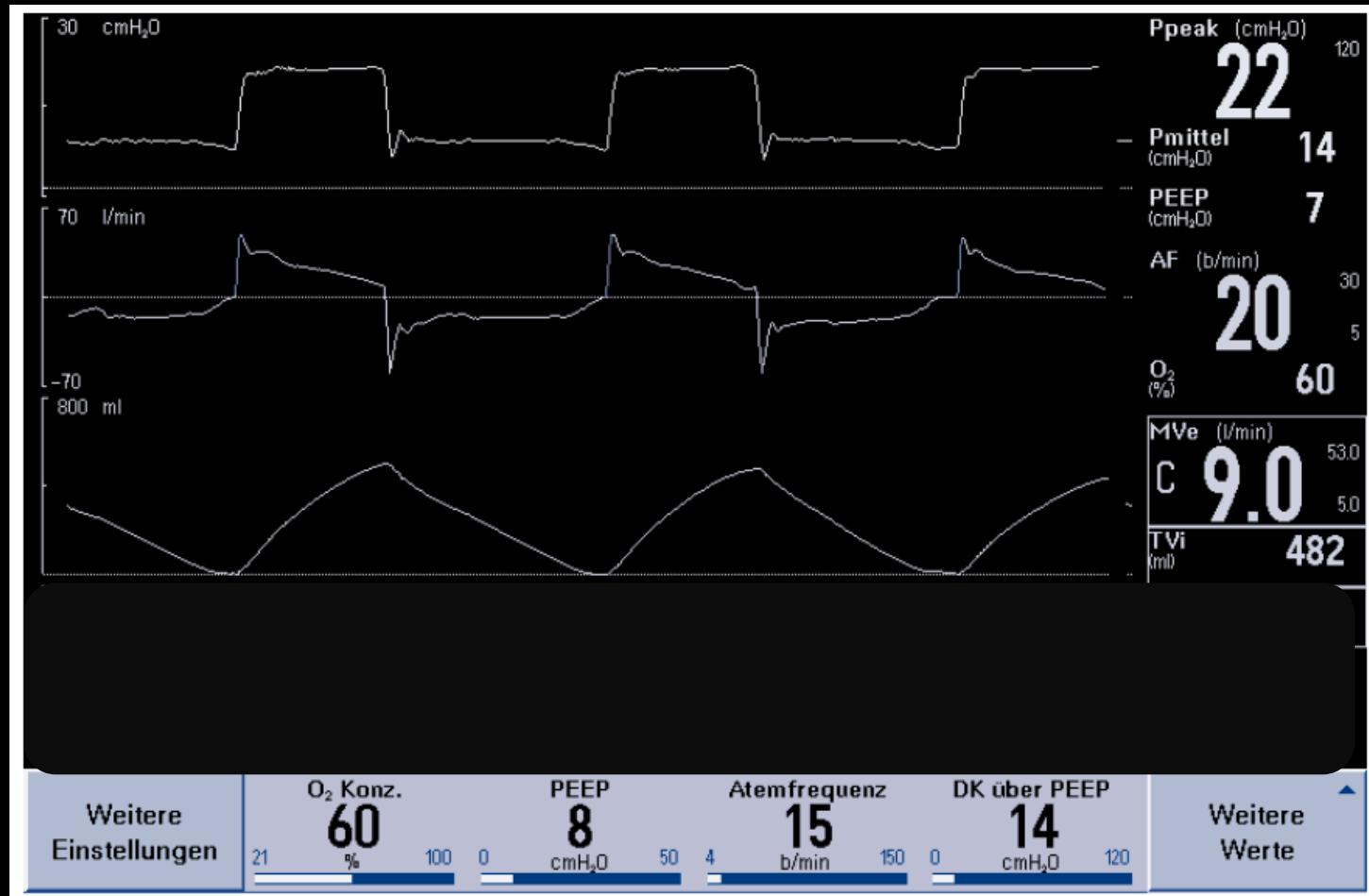
CPAP

SIMV

NAVA



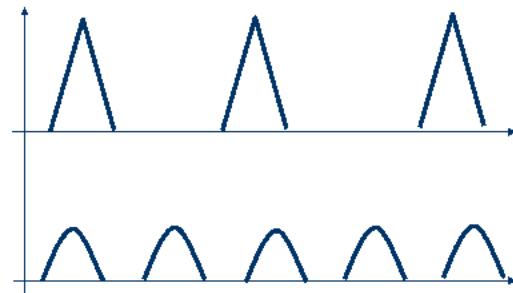
控制通气模式：自主呼吸？



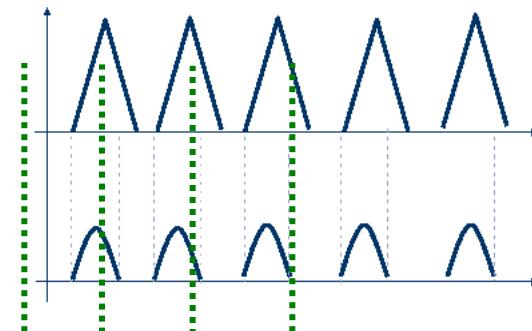
Sinderby C. Yearbook of Intensive Care and Emergency Medicine.
2009; 10: 385-393.

IMV, SIMV, SIPPV (or A/C or PTV)

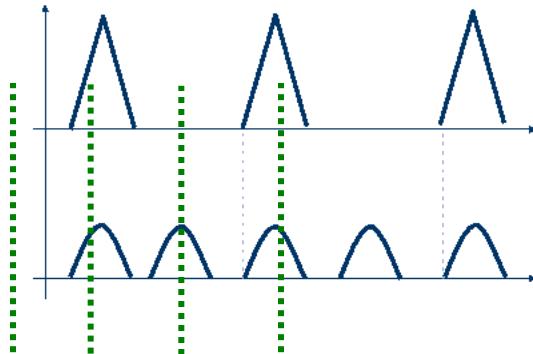
IMV



Assist/Control



SIMV



Inspiration: Flow triggered
Pressure triggered

Expiration: by Ti settings

Classical breath trigger concepts during support of spontaneous ventilation

Respiratory centers

Phrenic nerve

Diaphragm electrical activation

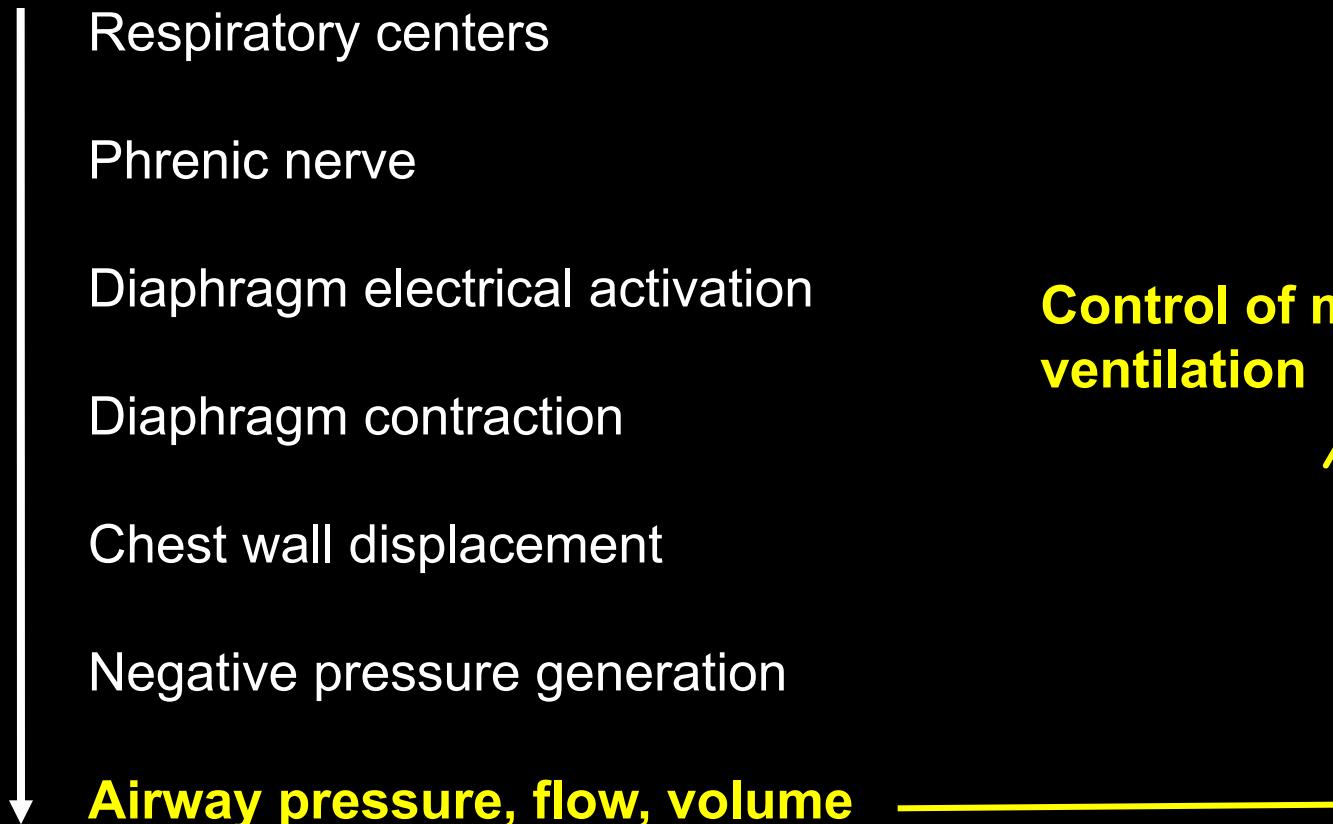
Diaphragm contraction

Chest wall displacement

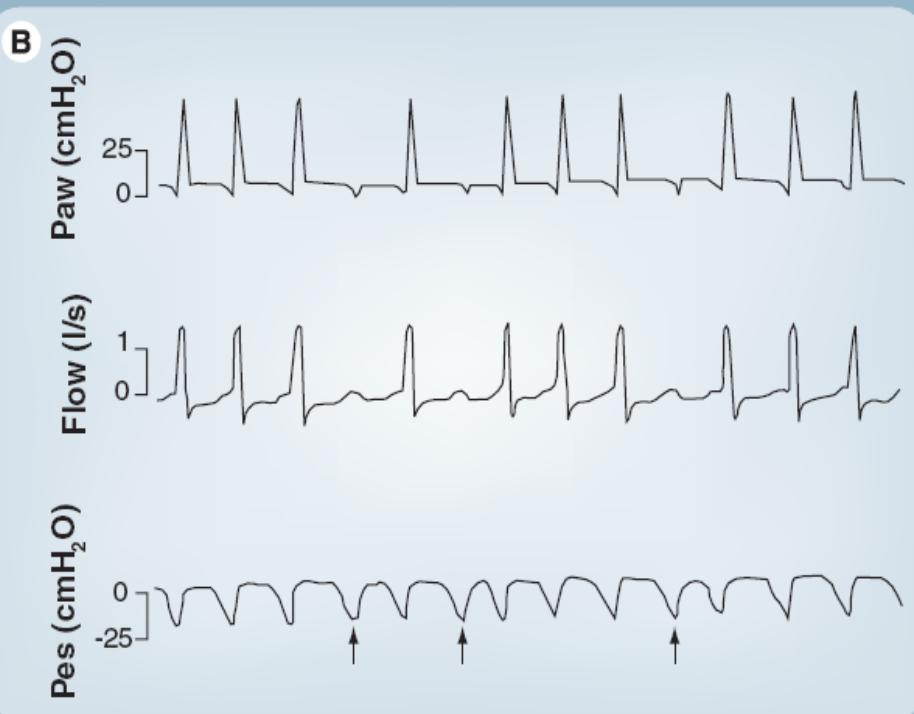
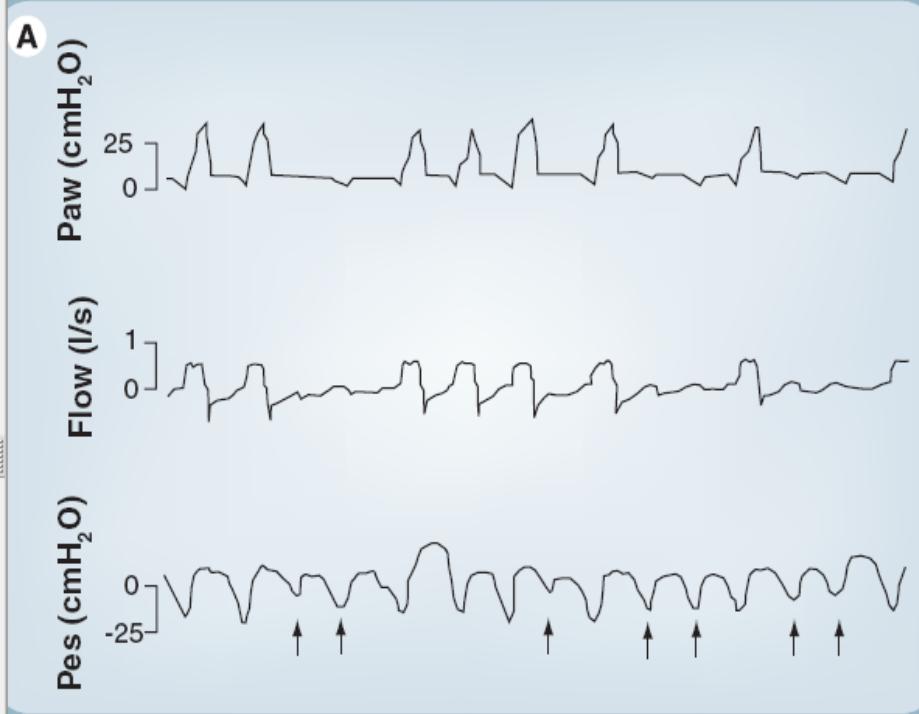
Negative pressure generation

Airway pressure, flow, volume

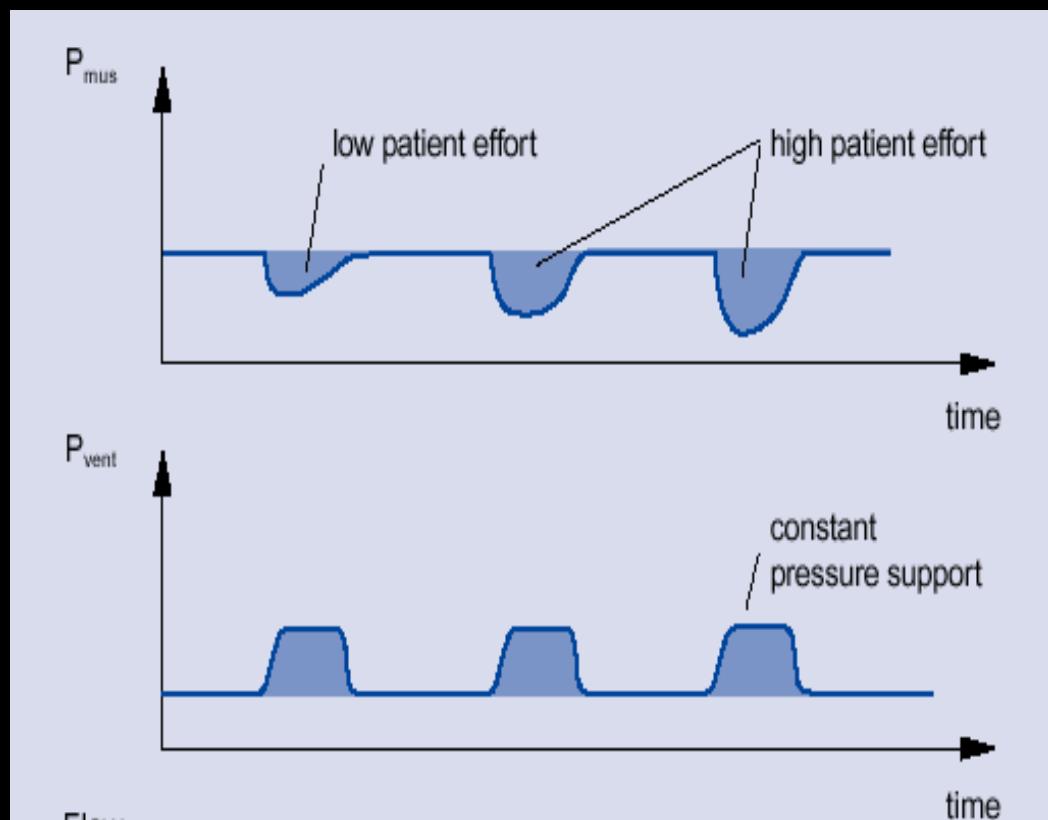
**Control of mechanical
ventilation**



Ineffective effort

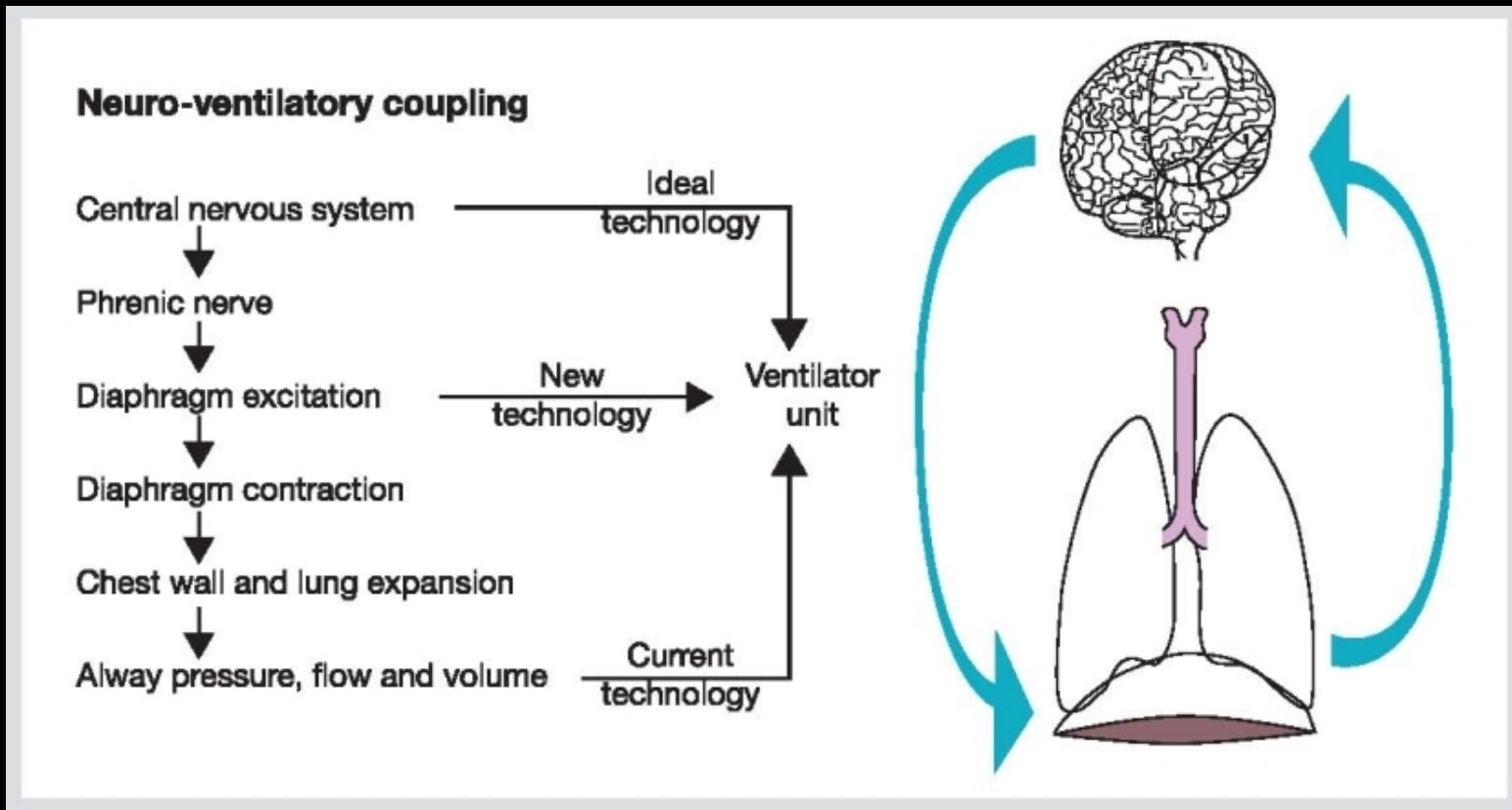


Classical breath support during support of spontaneous ventilation



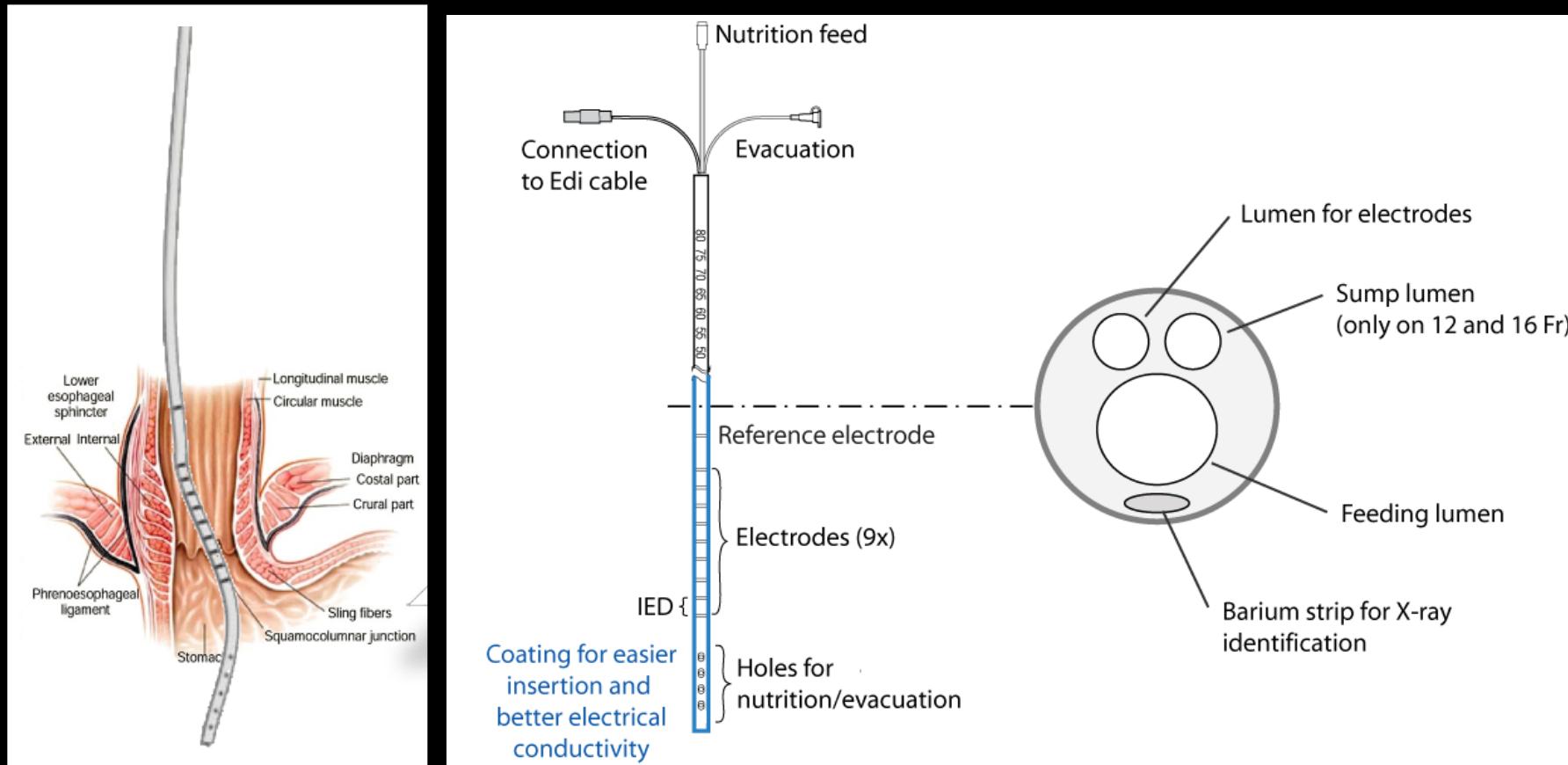
the magnitude of the
delivered breaths

理想的通气模式

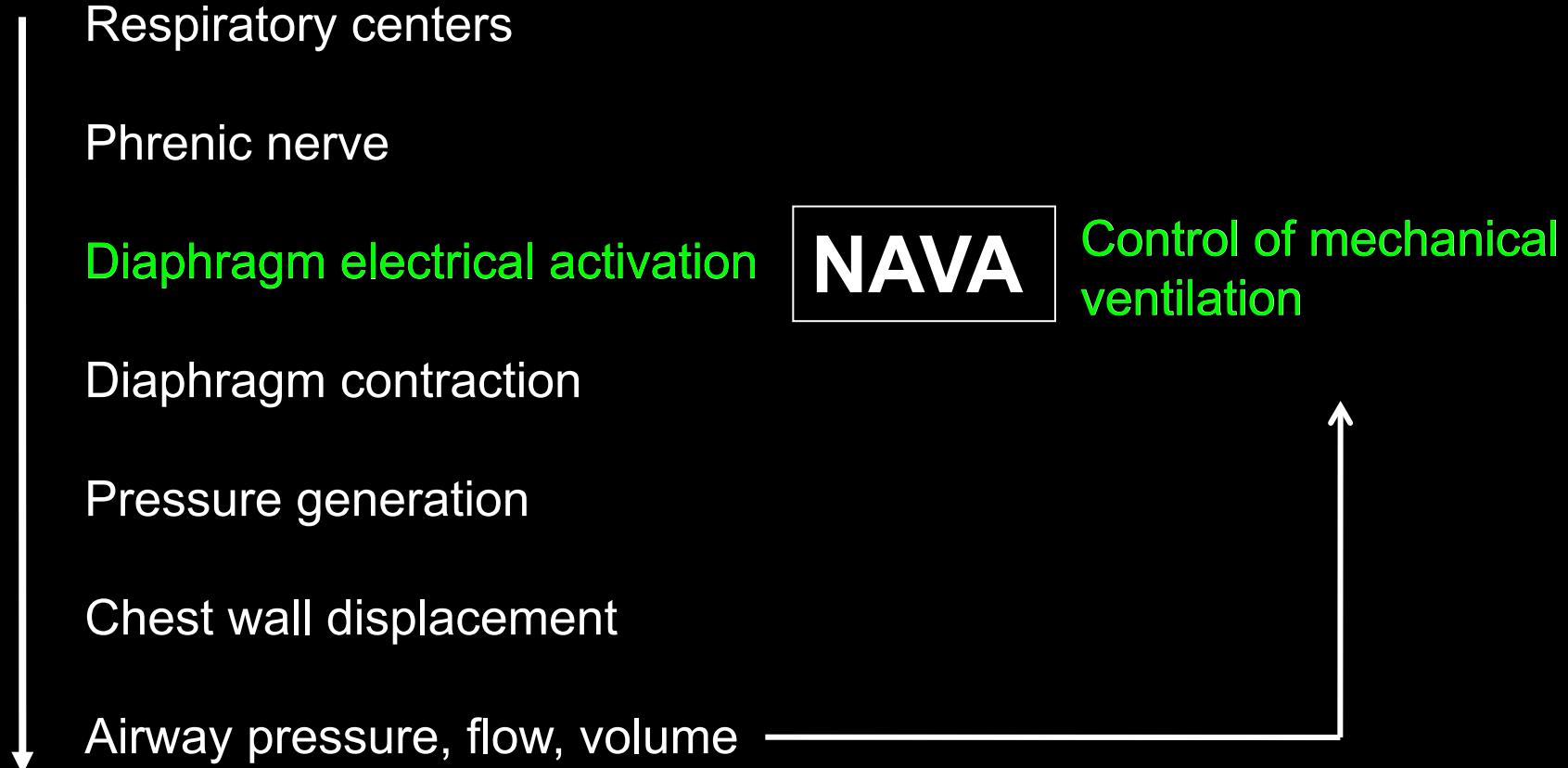


Nature 1999

NAVA: 神经电活动辅助通气



Neurally Adjusted Ventilatory Assist (NAVA)



Adapted from Sinderby, Nature Med 1999

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