# 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

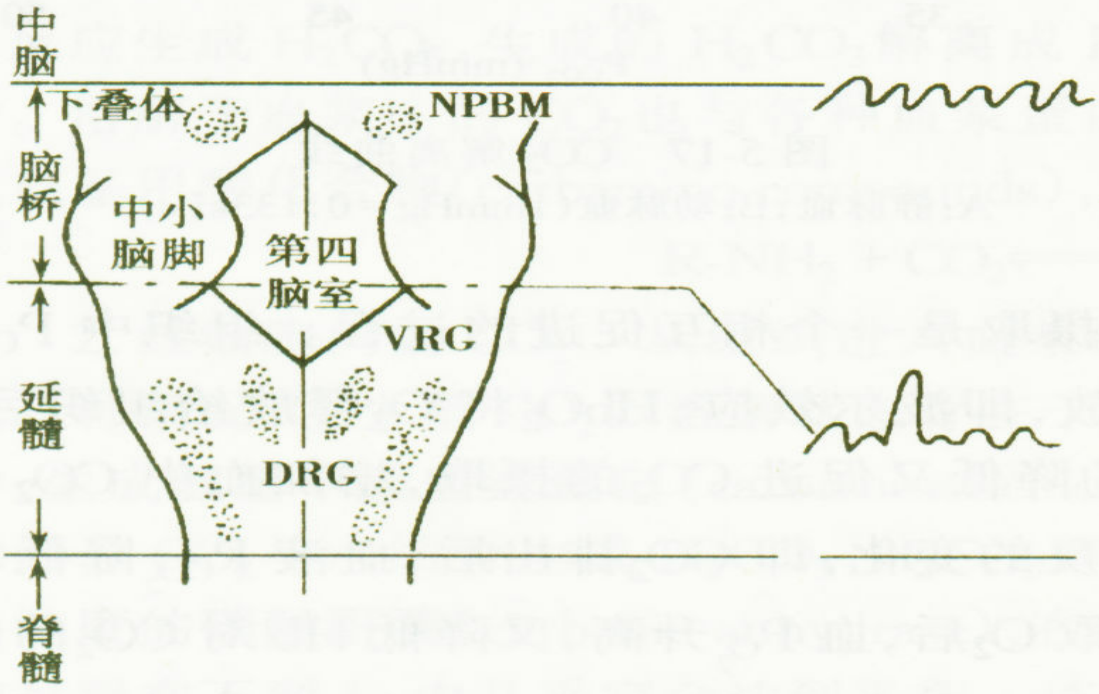
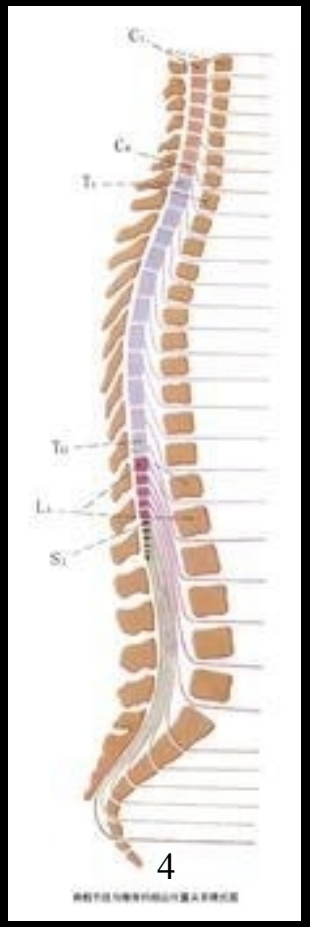



图 5-18　在脑干不同平面横切引起的呼吸变化

# 脊髓：传导中枢呼吸兴奋

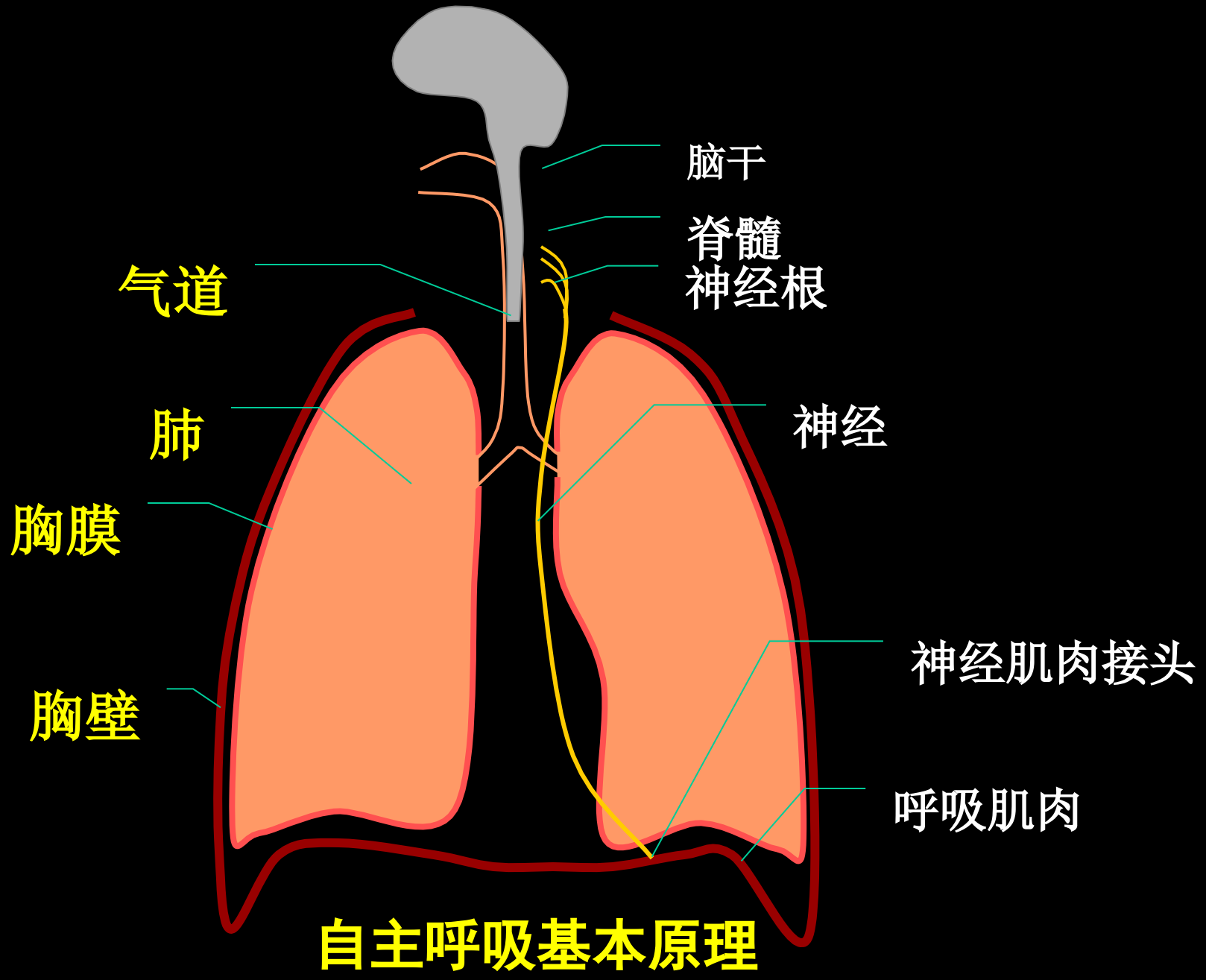
- 延髓与脊髓间离断，自主呼吸停止，脊髓不能产生自动节律性呼吸
- 是联系脑和呼吸肌的中继站
- 颈3~5支配膈肌，胸2~6支配肋间肌
- 胸6以下横断脊髓，对呼吸运动无影响。颈6以下横断，肋间肌失去作用，但膈肌能正常收缩；在颈2切断，呼吸肌由于与延髓中枢分离而不再产生收缩



# 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。


脑干
脊髓
神经根
气道
肺
神经
胸膜
神经肌肉接头
胸壁
呼吸肌肉
自主呼吸基本原理

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VCV

APRV

ASV

PPS

PCV

PSV

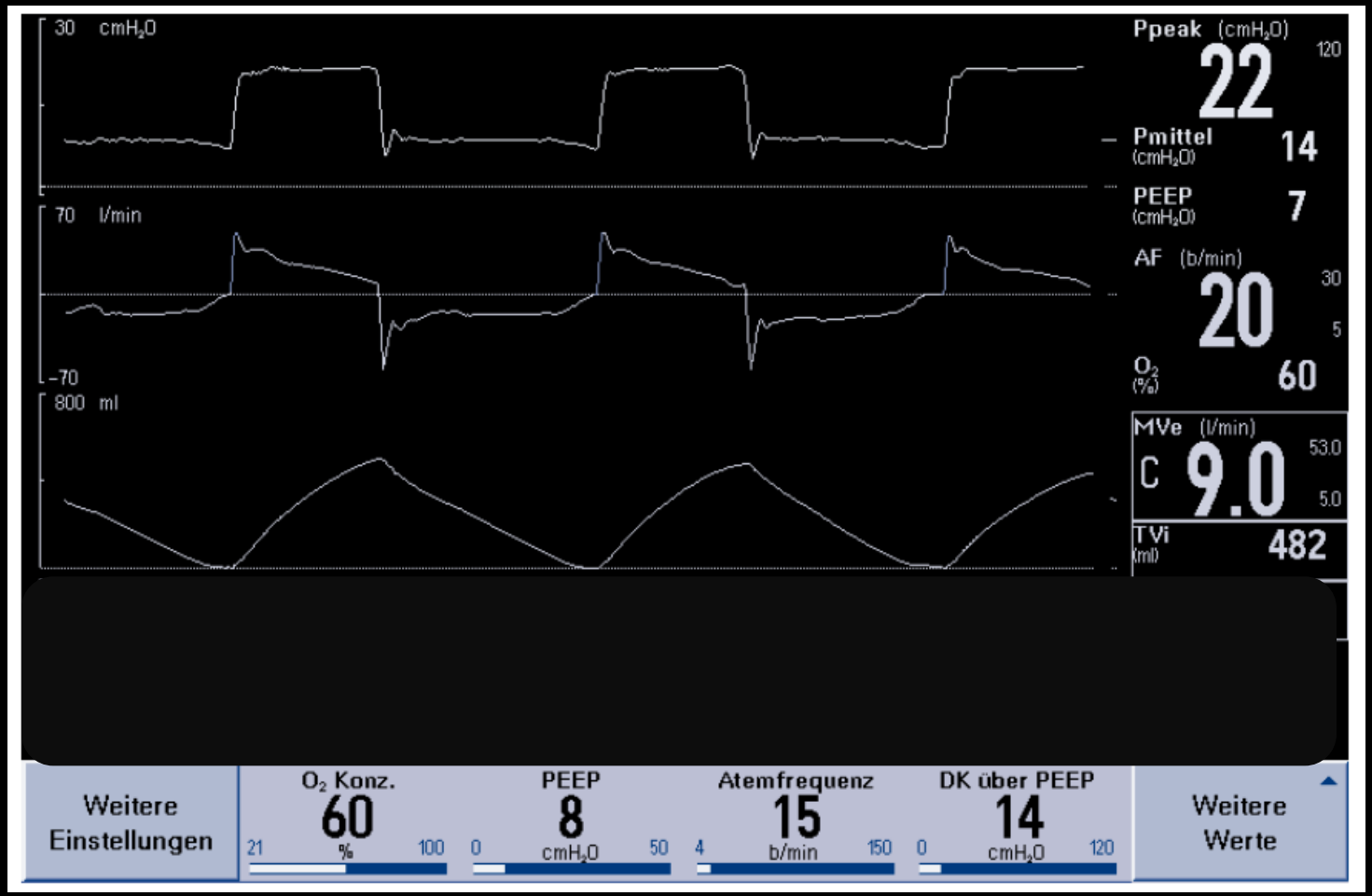
BIPAP

CPAP

SIMV

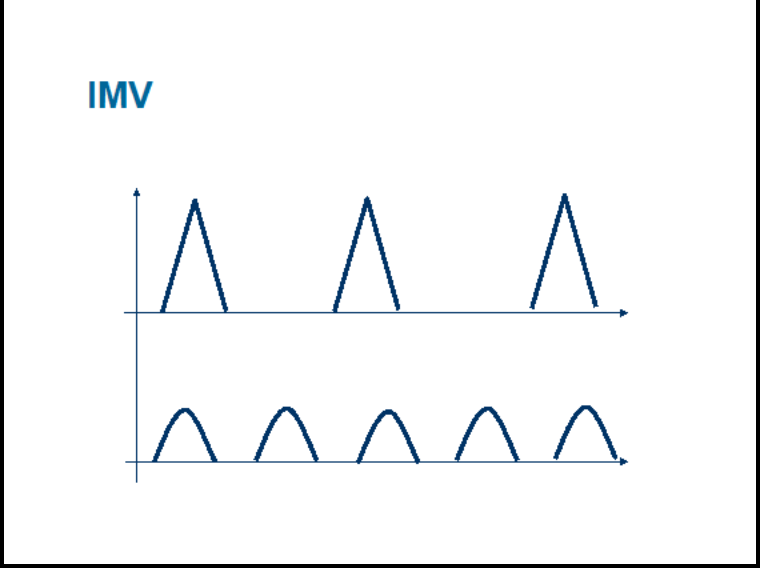
NAVA

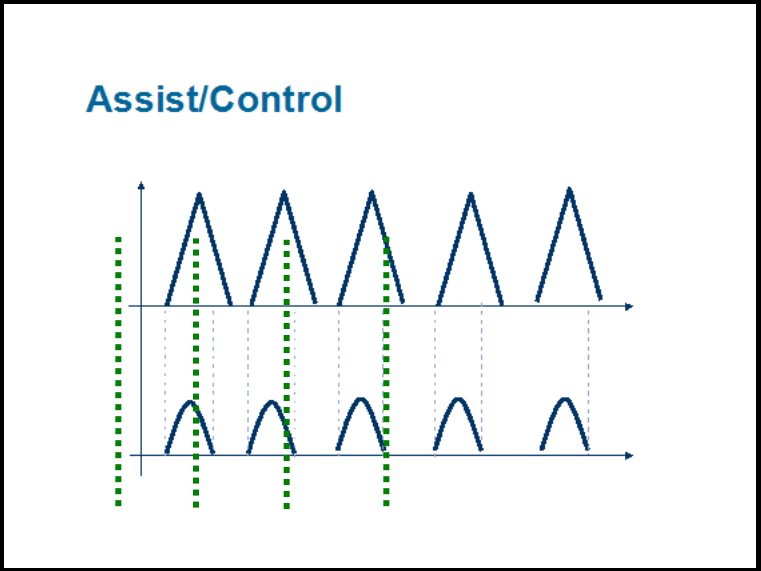
# 控制通气模式：自主呼吸?

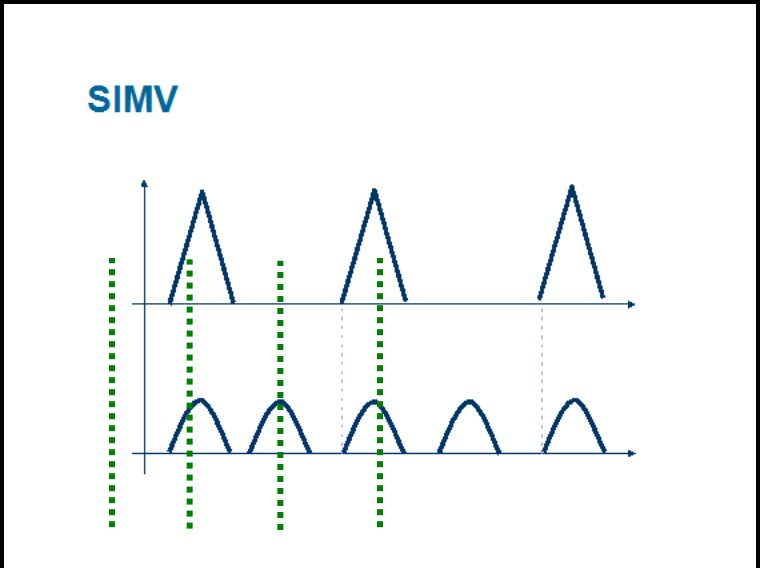



Sinderby C. Yearbook of Intensive Care and Emergency Medicine. 2009; 10: 385-393.

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



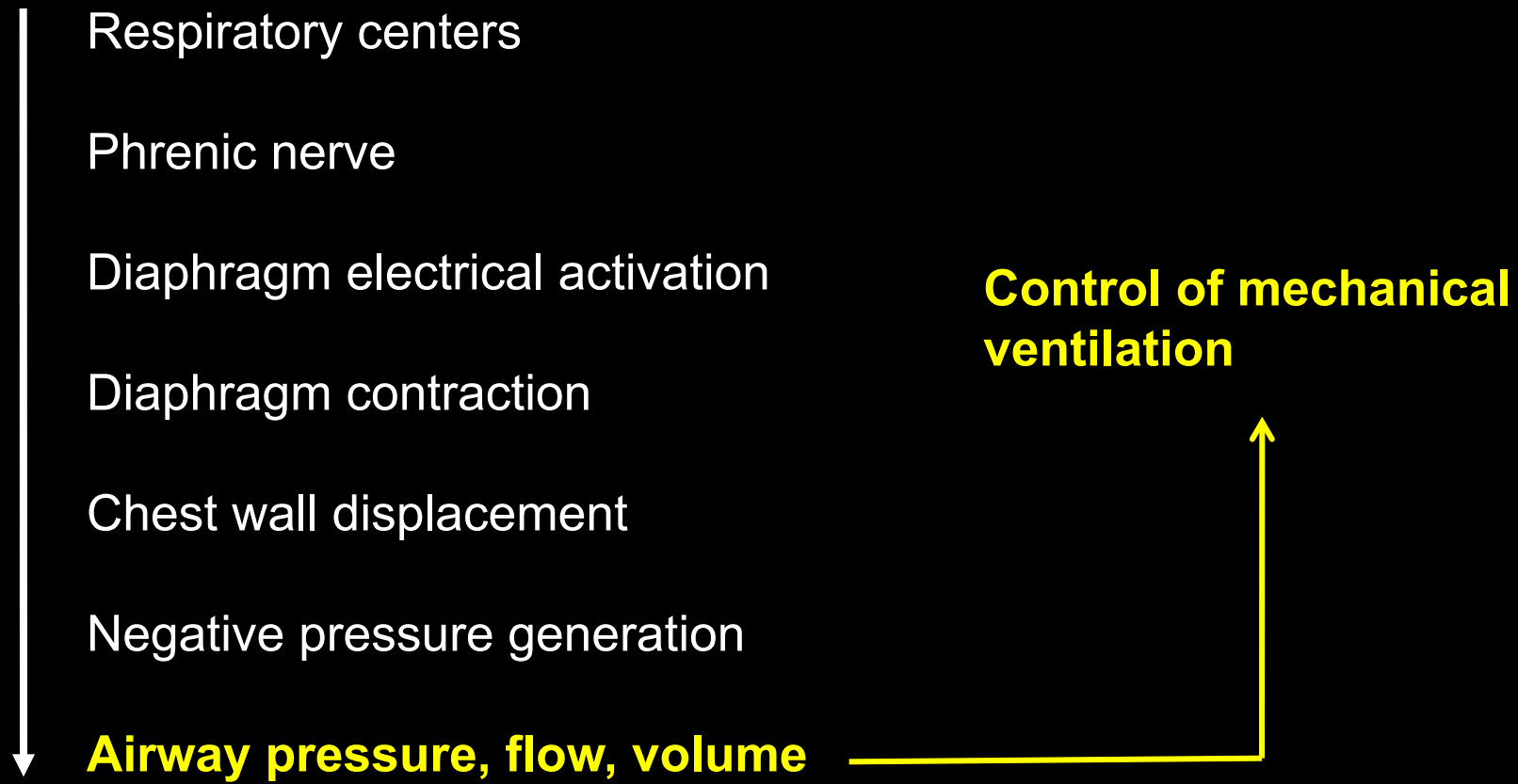



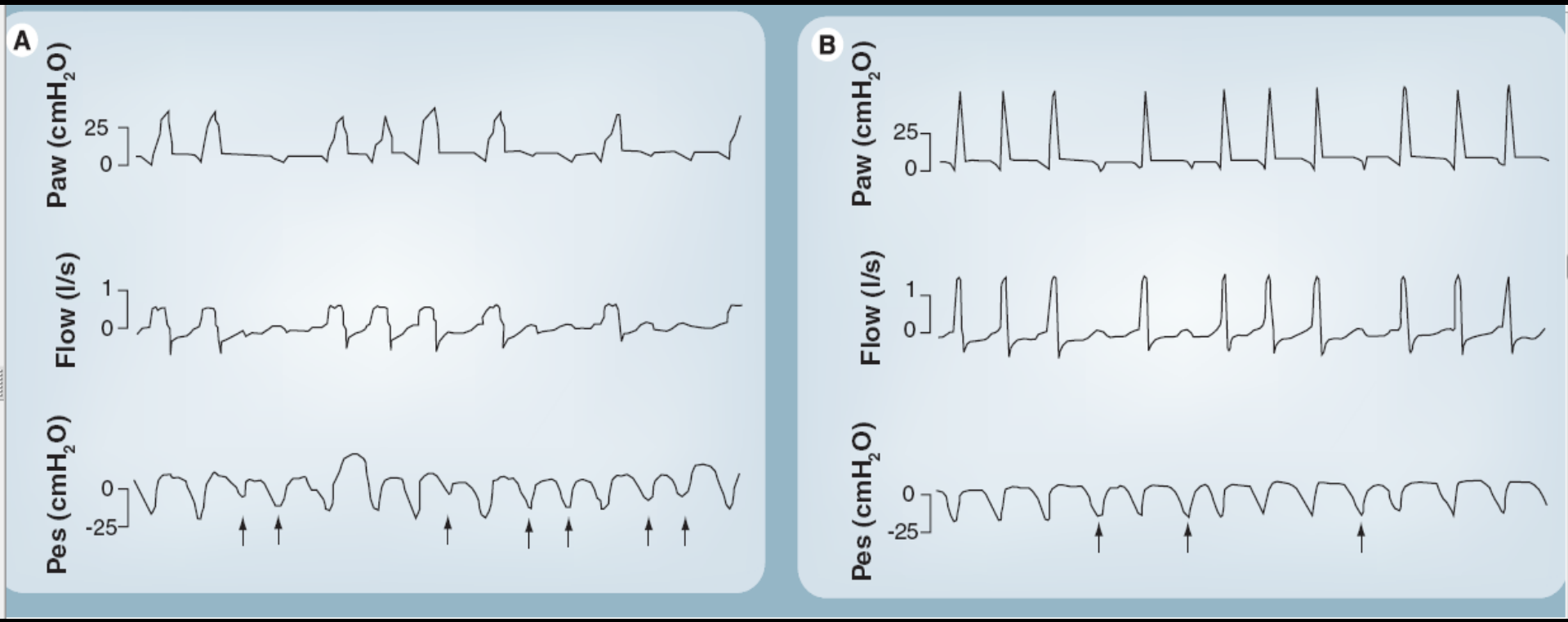

Inspiration: Flow triggered
Pressure triggered

Expiration: by Ti settings

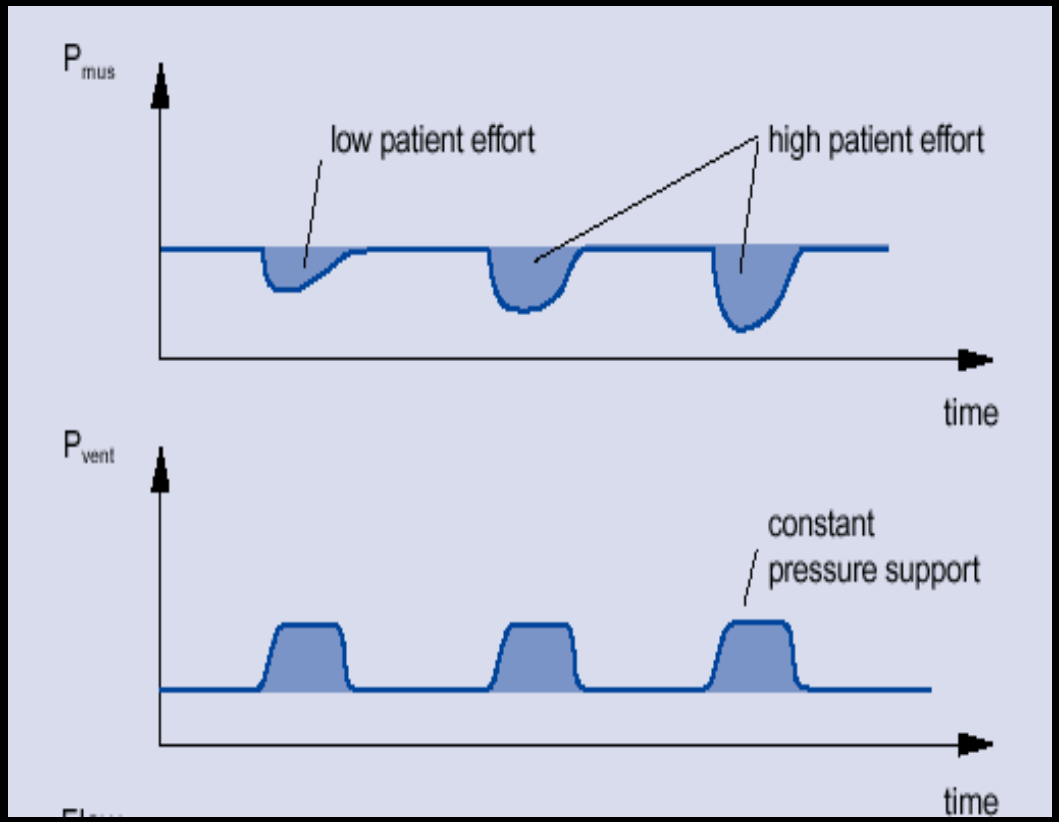
# Classical breath trigger concepts during support of spontaneous ventilation



# Ineffective effort

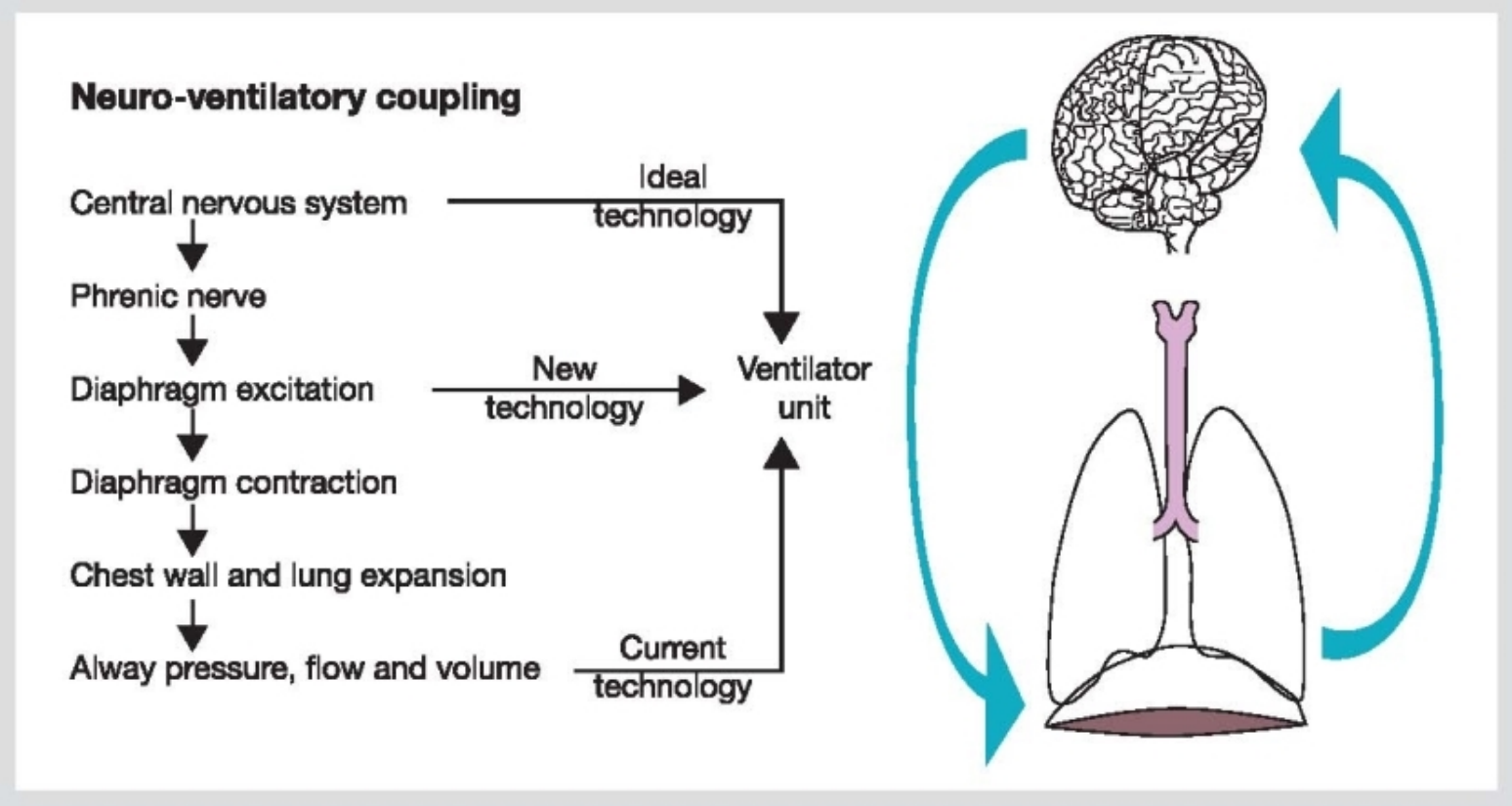


# Classical breath support during support of spontaneous ventilation



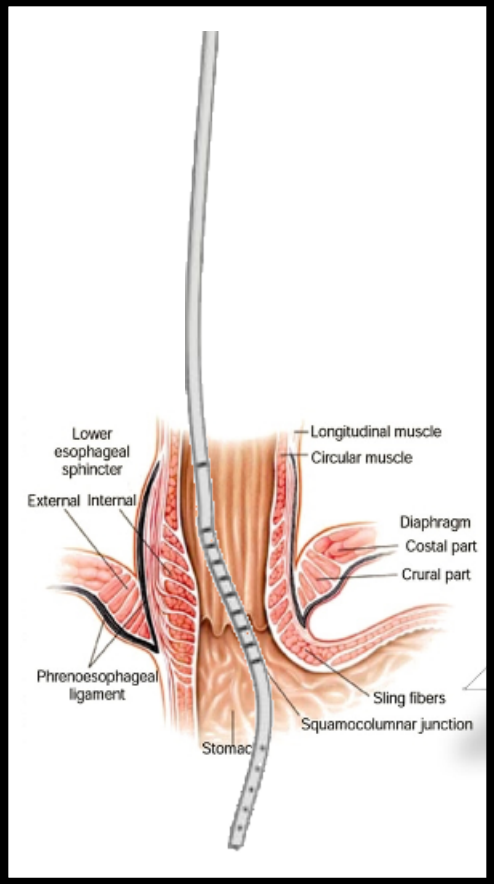

the magnitude of the delivered breaths

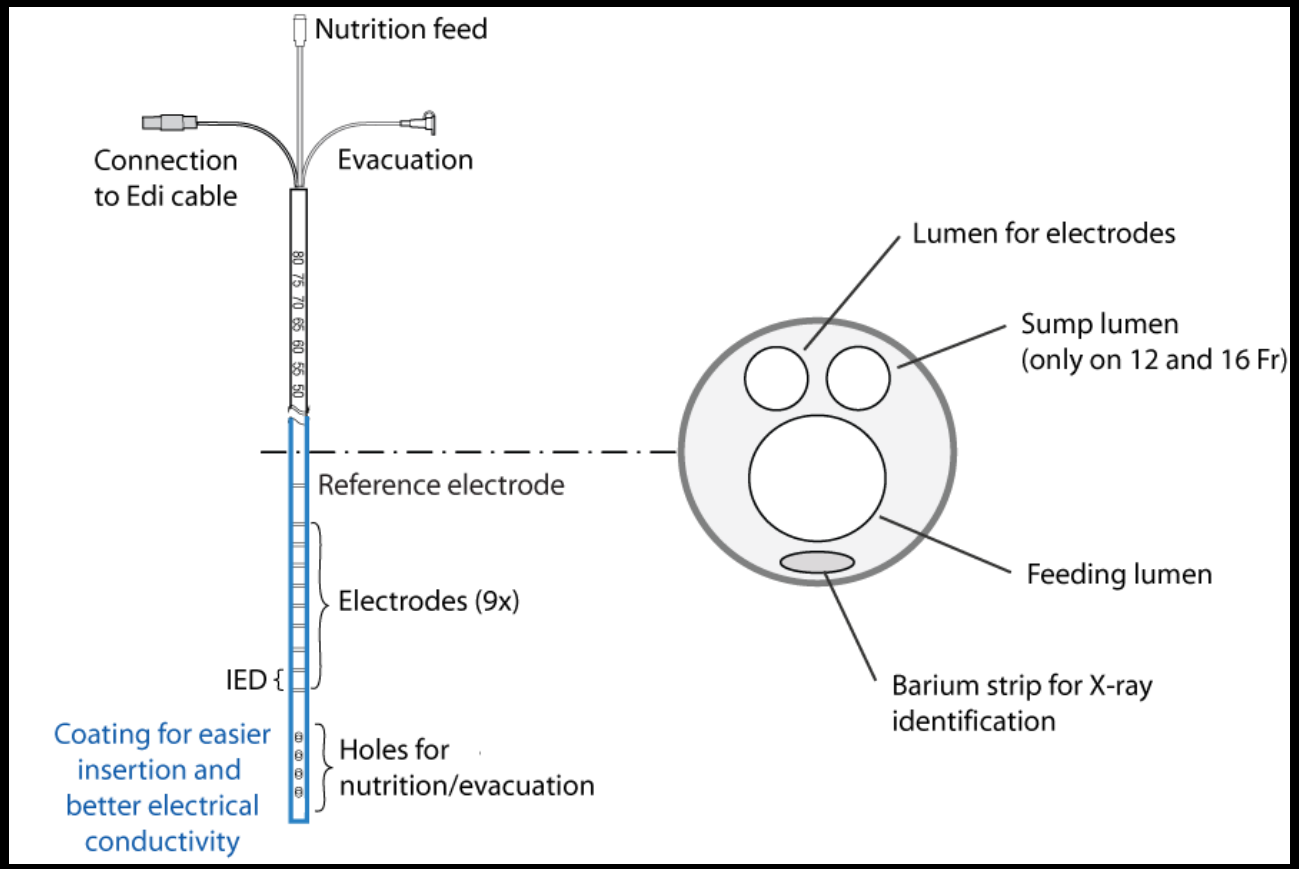
# 理想的通气模式



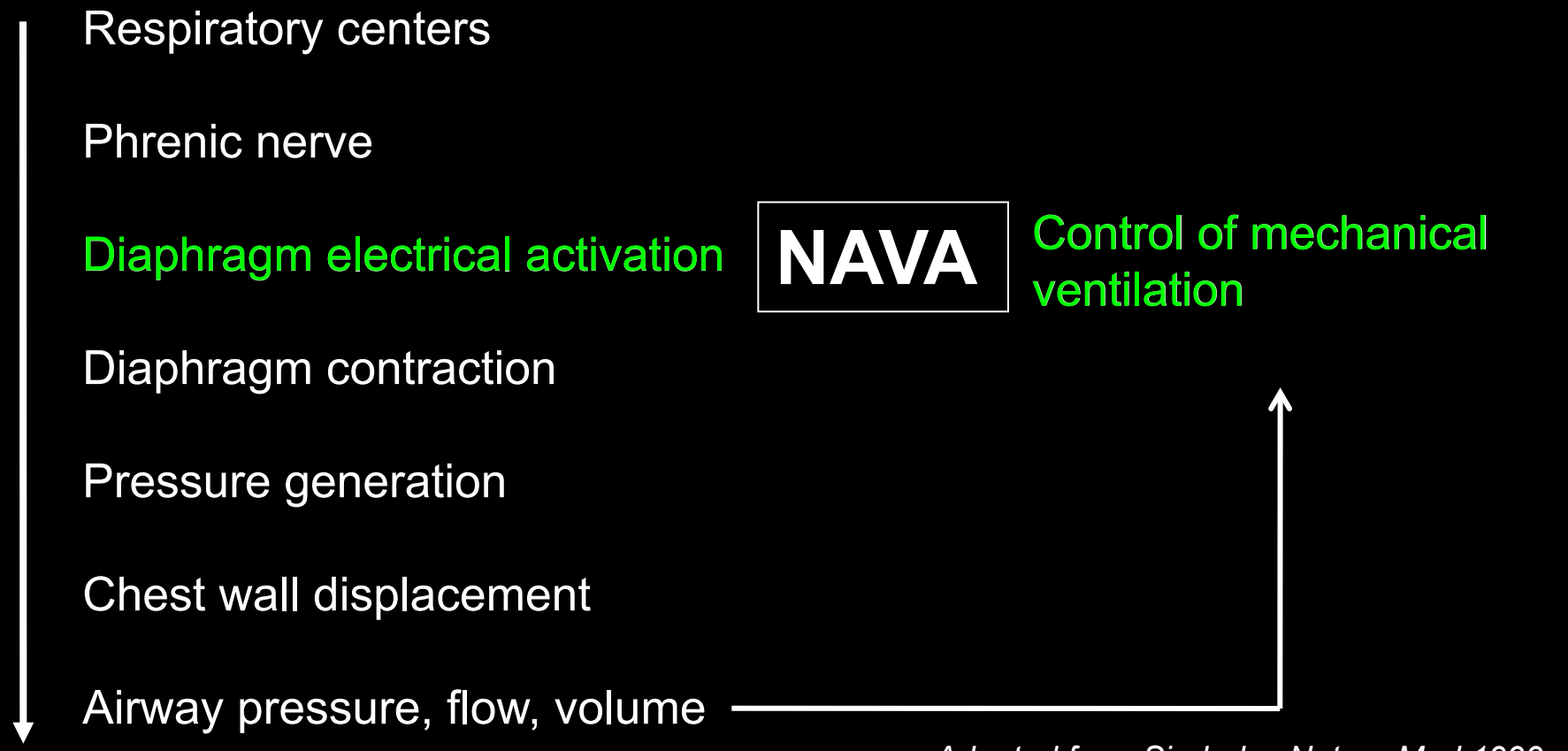

Nature 1999

# 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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