

# 神经源性膀胱科内讲课

# 尿道括约肌

- **内括约肌：可塌陷的近端尿道和膀胱颈**  
随膀胱储尿量增加，内括约肌不断增高压力，从而使近端尿道压力高于膀胱内压力。  
膀胱收缩时，膀胱颈和近端尿道括约肌向上向外牵拉，使其扁平结构转变为圆形结构，阻力下降。
- **外括约肌：横纹肌，收缩使尿道阻断。**

# 正常的膀胱-尿道功能

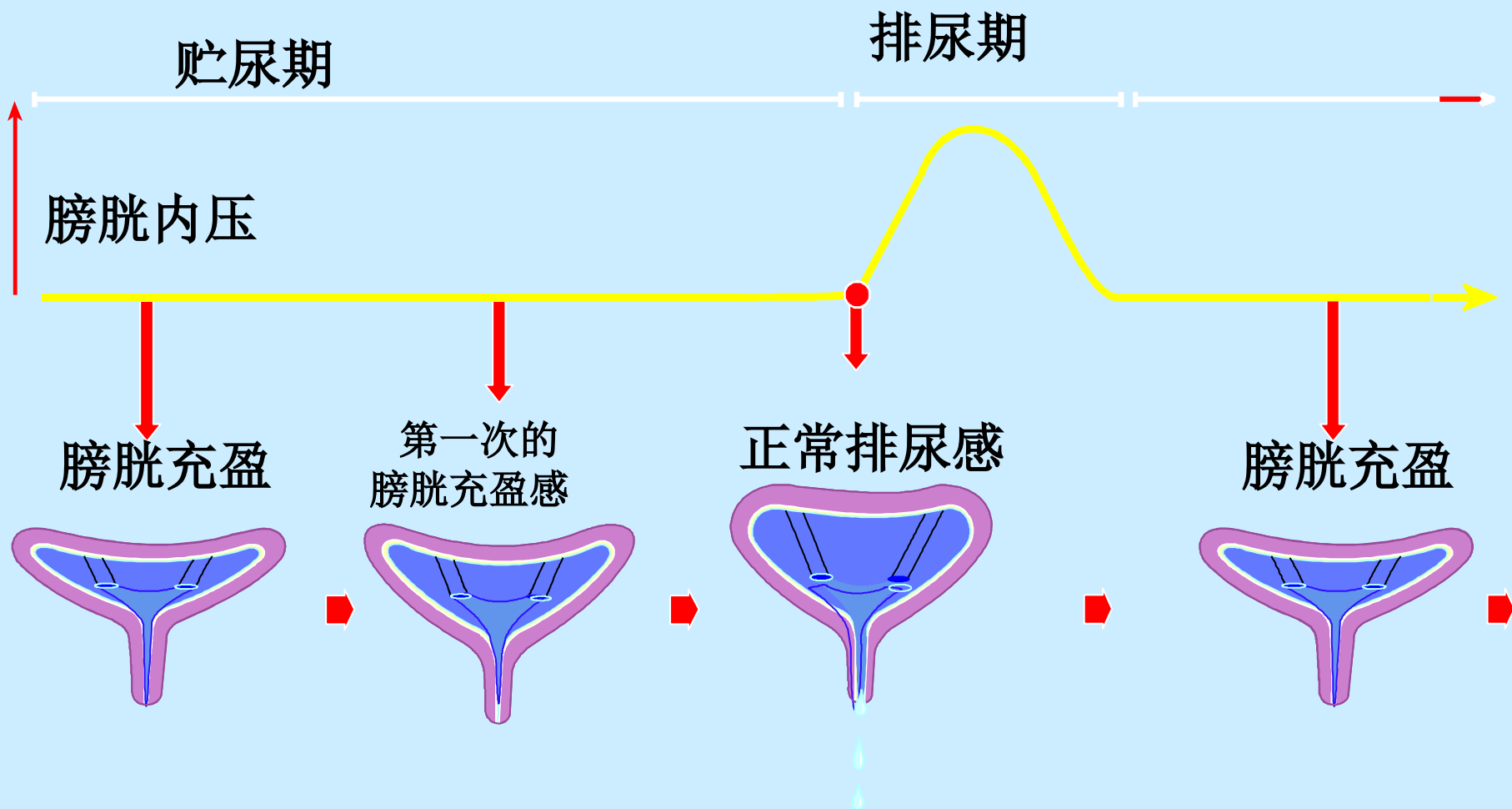
## 贮尿

- 膀胱内低压力
- 括约肌关闭

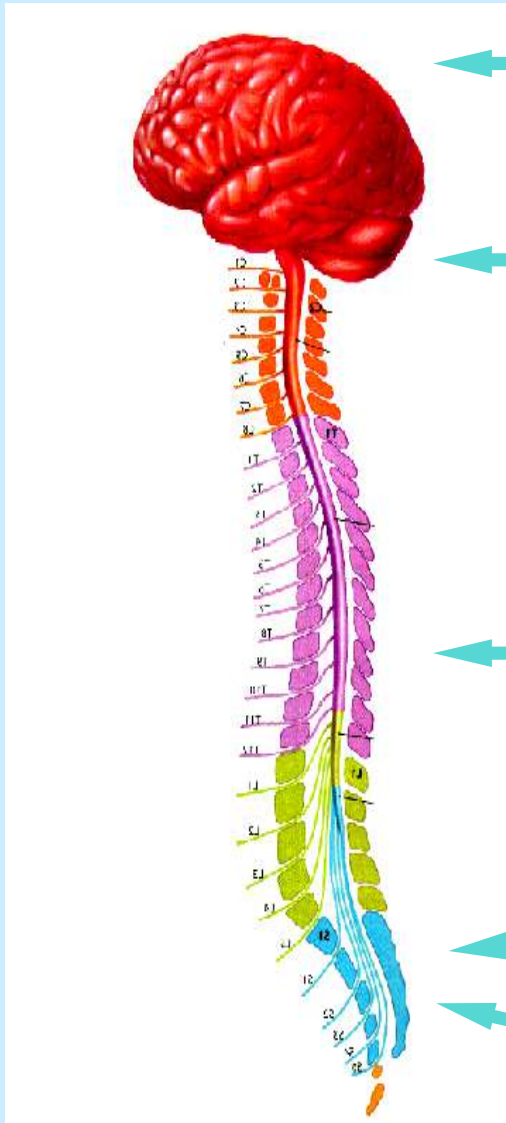
## 排尿

- 随意启动
- 逼尿肌收缩
- 括约肌开放
- 协同能力

# 排尿循环



# 膀胱的神经支配



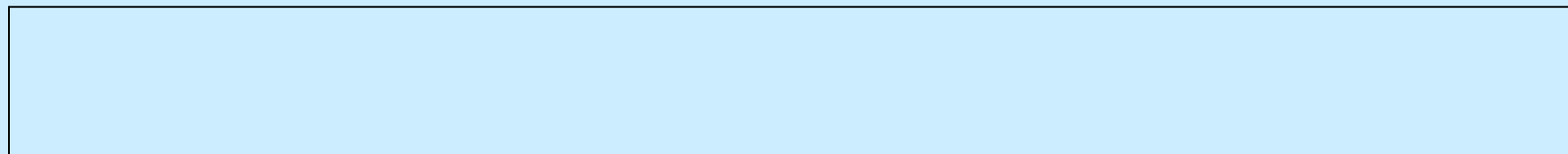
大脑皮质：允许 & 注意力

脑干：开关和协调

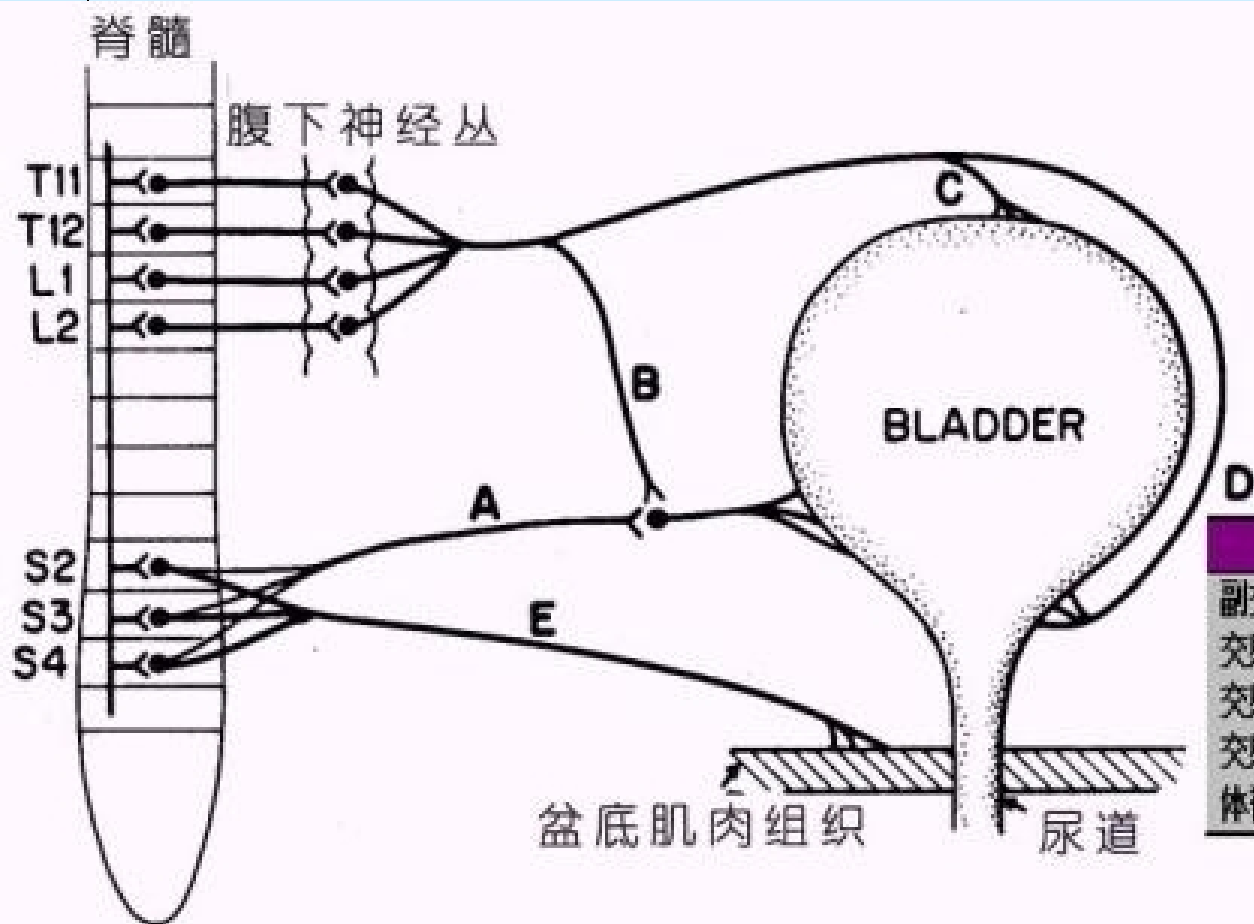
T<sub>11</sub> - L<sub>1,2</sub>：交感神经纤维：贮尿

S<sub>2-4</sub>：副交感神经纤维：排尿

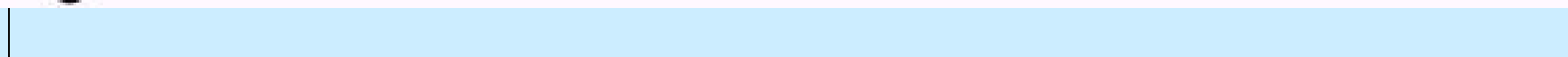
S<sub>2-4</sub>：阴部神经：控制外括约肌

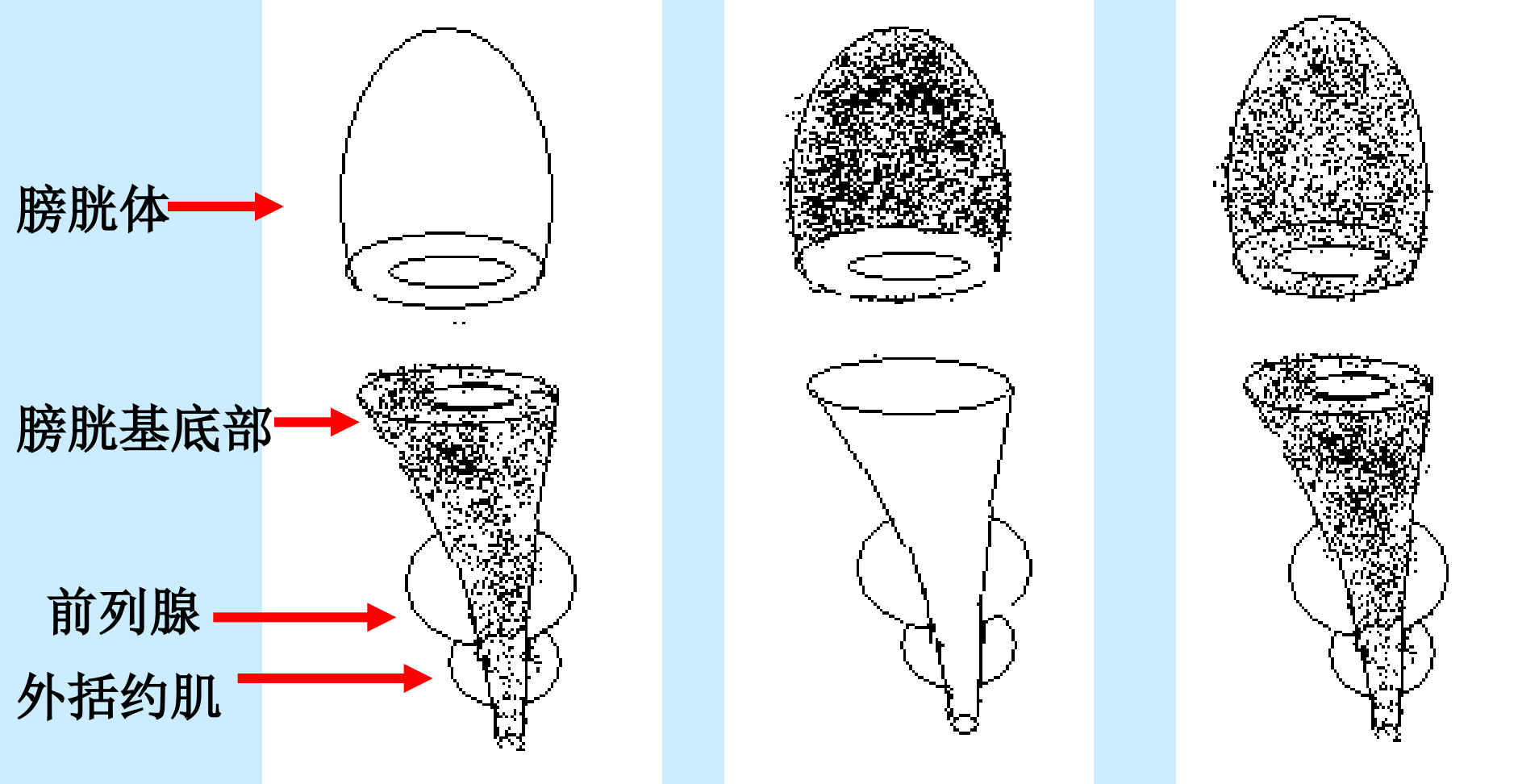


## 排尿的外周神经



神经类型	功能
副交感胆碱能 A	膀胱收缩
交感神经 B	膀胱舒张(通过抑制副交感神经)
交感神经 C	膀胱舒张( $\beta$ 受体)
交感神经 D	膀胱颈和后尿道收缩( $\alpha$ 受体)
体神经(阴部神经) E	盆底肌收缩(尿道外扩约肌)





**A**

**B**

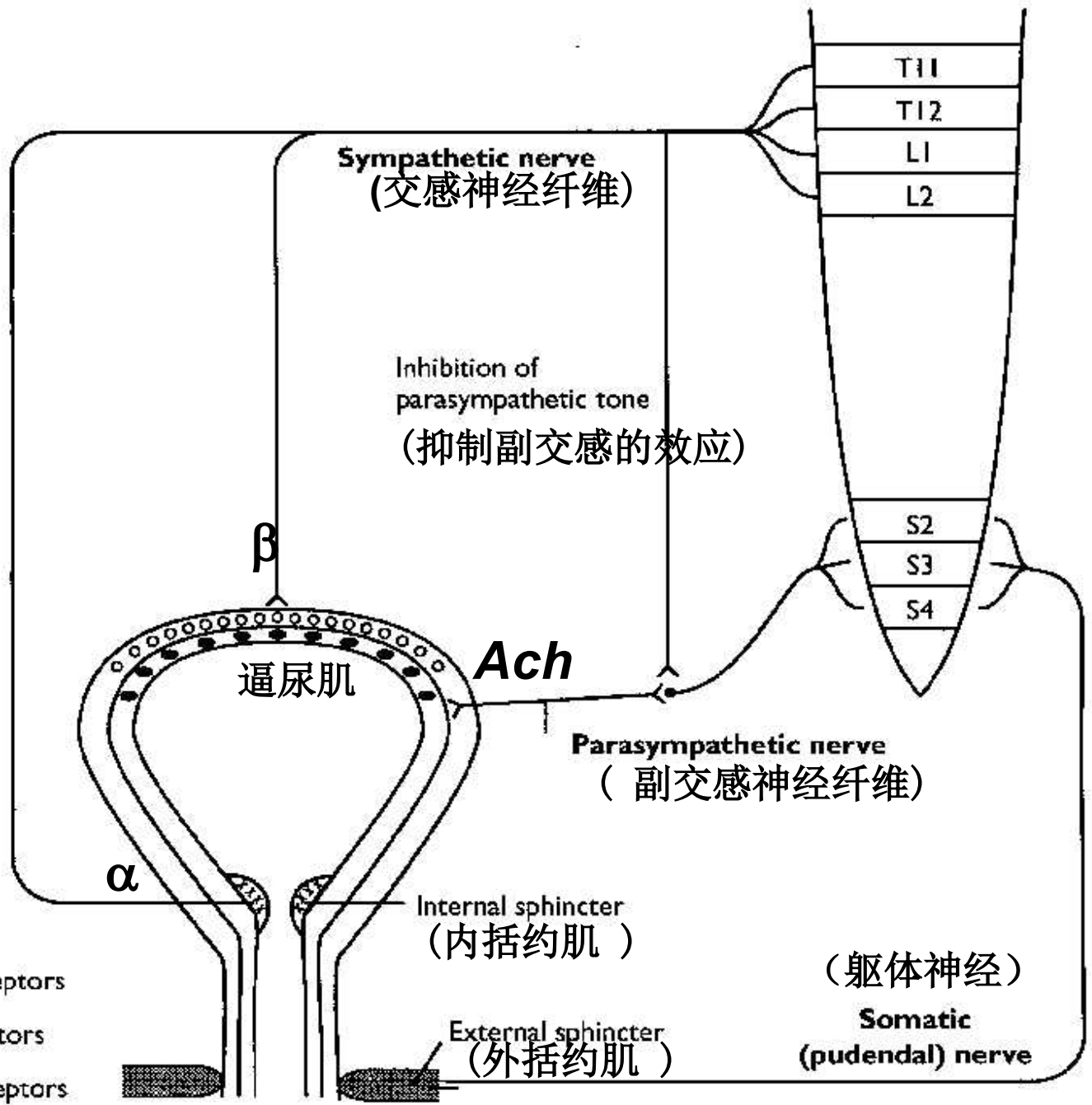
**C**

A: 交感神经激动  $\alpha$  受体, 使膀胱基底部收缩

B: 交感神经激动  $\beta$  受体, 使膀胱体舒张

C: 胆碱能受体激动, 出现排尿

贮尿期



- =  $\beta$ -Adrenergic receptors
- = Cholinergic receptors
- x =  $\alpha$ -Adrenergic receptors



# Urine

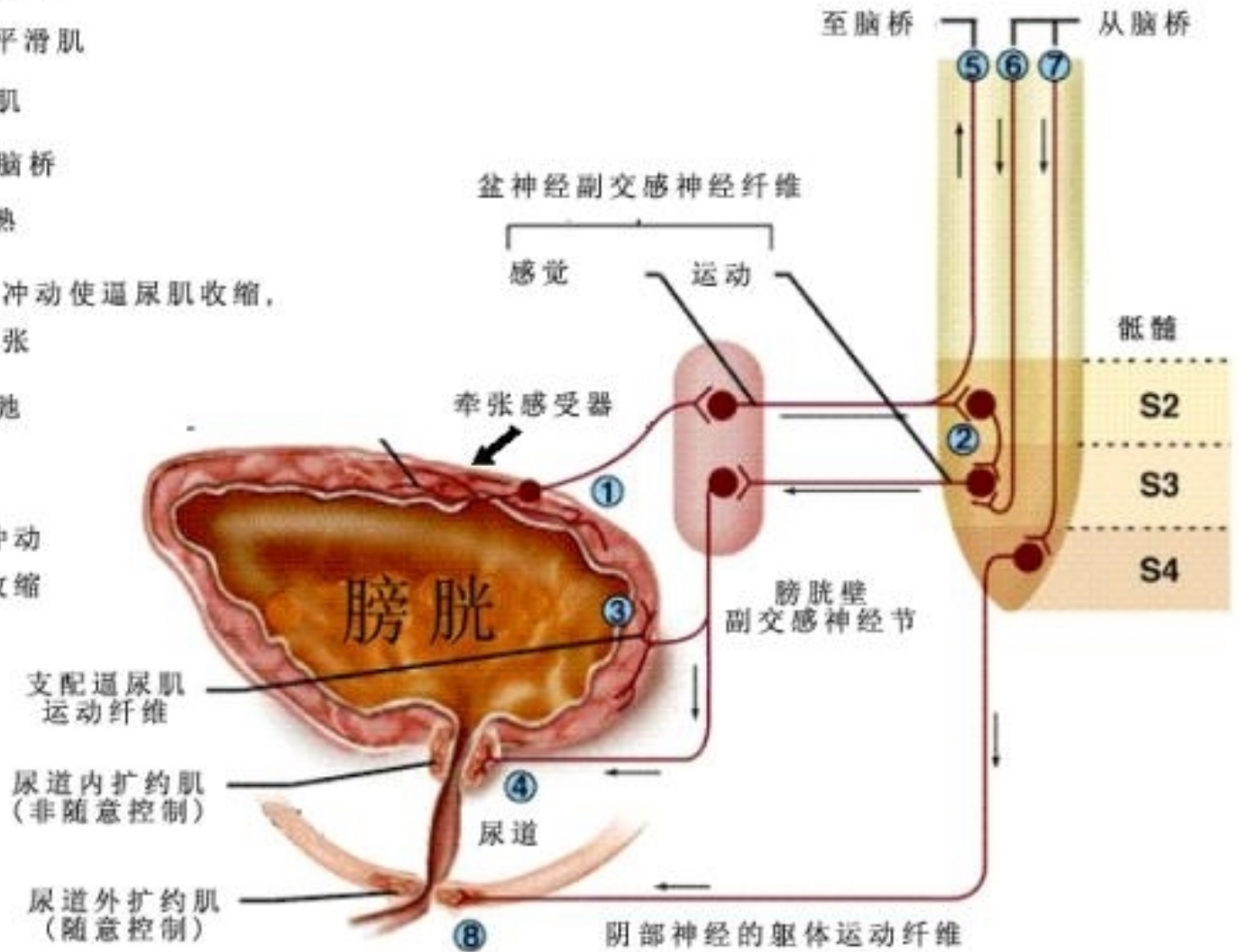
- 1) 牵张感受器产生神经冲动
- 2) 反射弧产生神经冲动
- 3) 刺激膀胱壁中的平滑肌
- 4) 松弛尿道内扩约肌
- 5) 牵张信息传递到脑桥
- 6) 如果排尿条件成熟

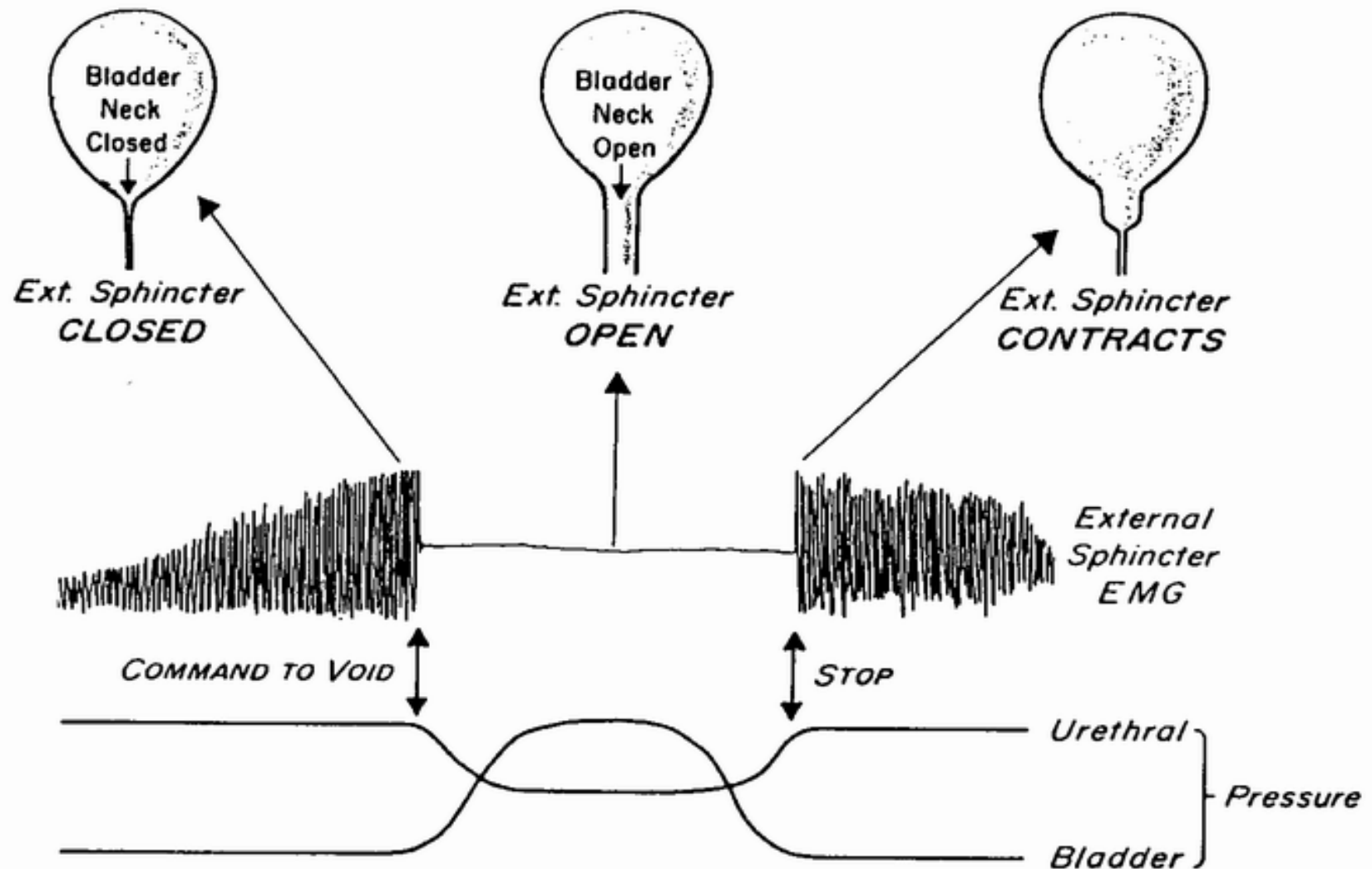
— 来自脑桥的神经冲动使逼尿肌收缩，  
尿道内扩约肌舒张

— 尿道外扩约肌松弛

- 7) 排尿时机不成熟

— 来自脑桥的神经冲动  
使尿道外扩约肌收缩





**Figure 9.** Physiology of micturition. As the bladder fills with urine, bladder pressure remains fairly constant and urethral pressure exceeds bladder pressure. Continence is preserved by the closed bladder neck. During voluntary micturition, the external urethral sphincter relaxes (decreased sphincter EMG activity), urethral pressure falls, the detrusor contracts, and the bladder neck opens. Voluntary interruption of the stream occurs by contraction of the external sphincter. EMG = electromyogram. This is a gross measure of external sphincter activity. (From Blaivas JG: Management of bladder dysfunction in multiple sclerosis. *Neurology* 30(2):13, 1980; with permission.)

# 神经源性膀胱 ( Neurogenic bladder, NB )

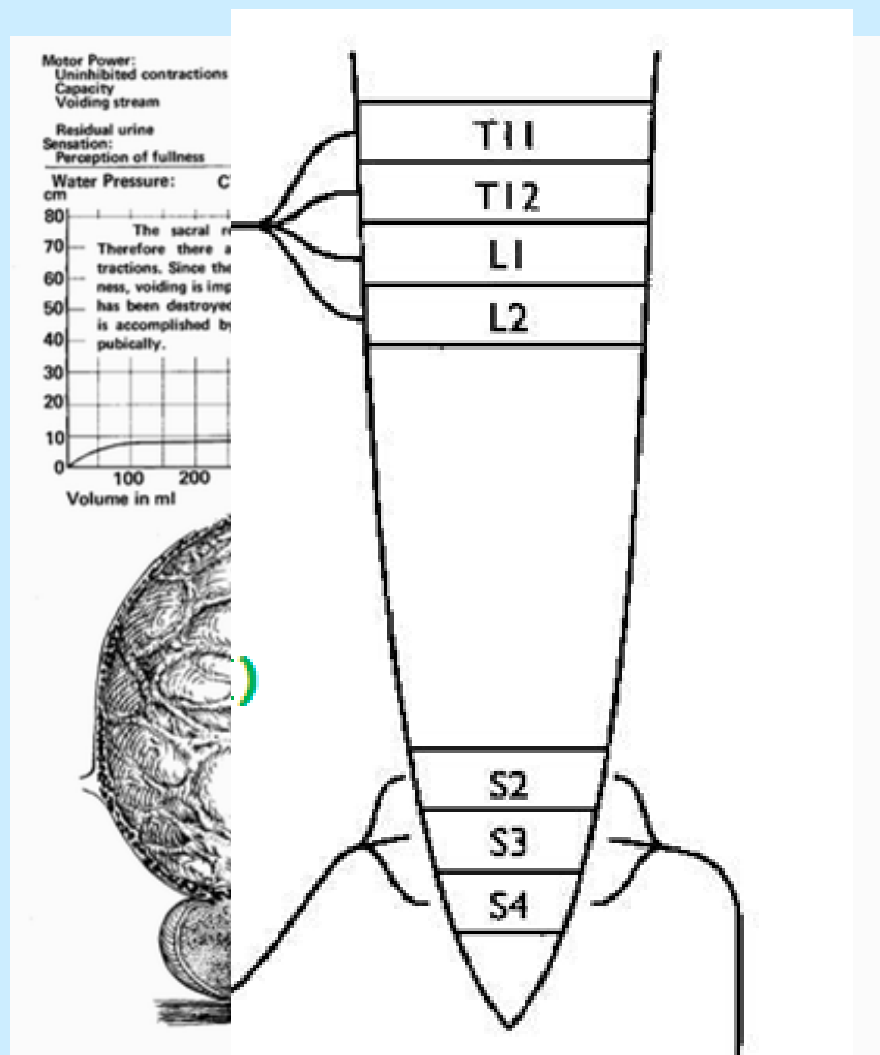
- 定义
- 一类由于神经系统病变导致膀胱和/或尿道功能障碍（即储尿和/或排尿功能障碍），进而产生一系列下尿路症状及并发症的疾病总称。

# 病因

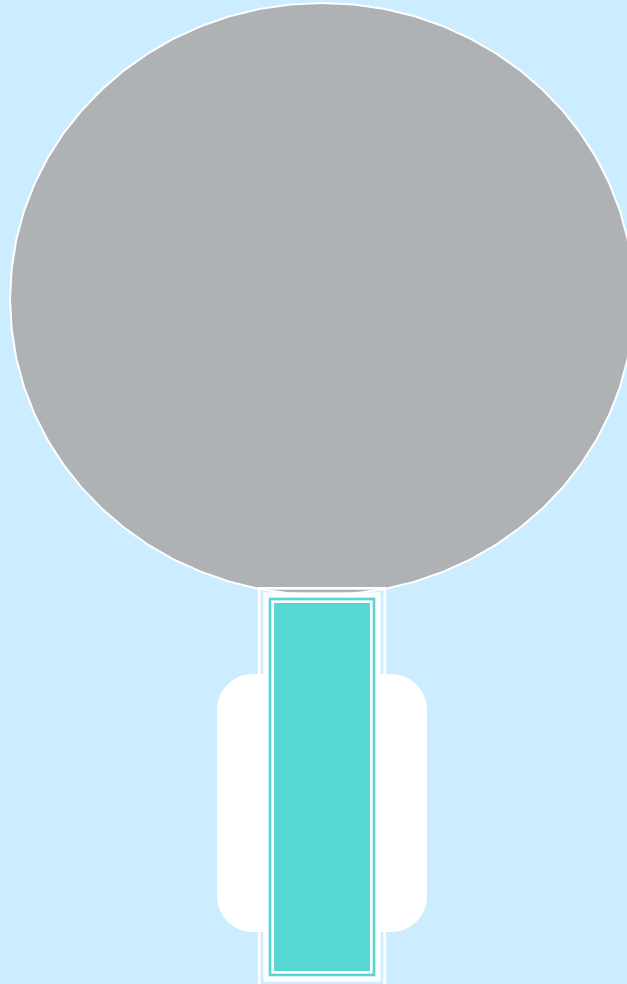
- 外周神经病变
- 糖尿病、盆腔手术、感染性疾病、椎间盘疾病
- 中枢神经系统病变
- 神经脱髓鞘病变（多发性硬化症）、老年性痴呆、基底节病变、脑血管病变、额叶脑肿瘤、脊髓损伤、

# 脊髓S<sub>2-4</sub>损伤

- 下尿路的神经控制丧失
- 逼尿肌松弛
- 尿道外括约肌松弛
- 膀胱颈机制存在
- 大膀胱
- 尿失禁

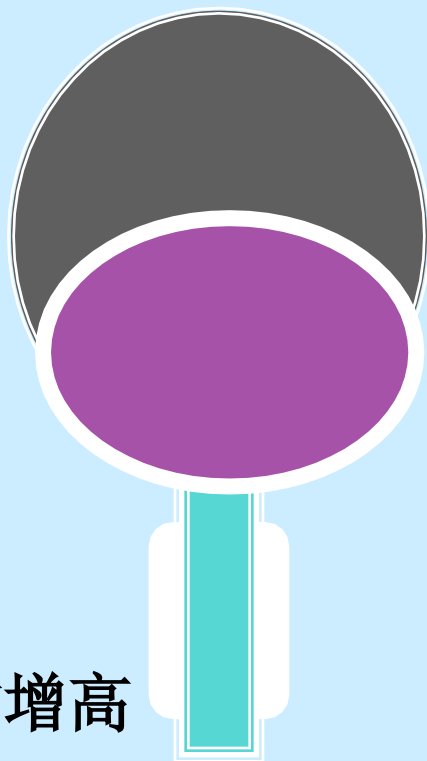


# 逼尿肌-括约肌：储水球囊和水龙头的关系



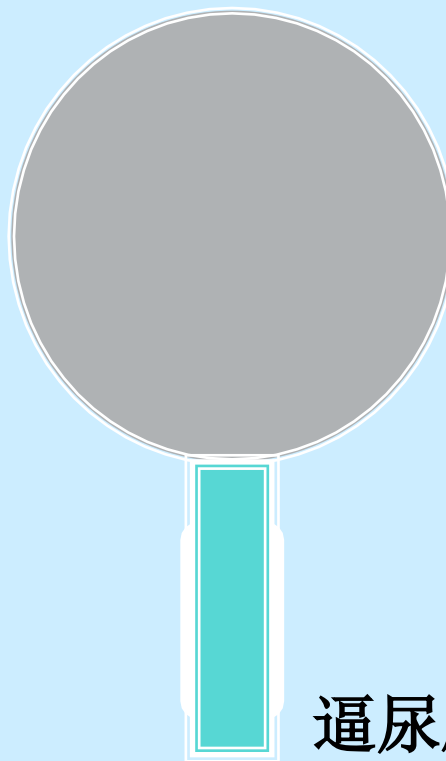
# 尿失禁

副交感兴奋



逼尿肌张力异常增高  
括约肌张力正常

骶丛损伤

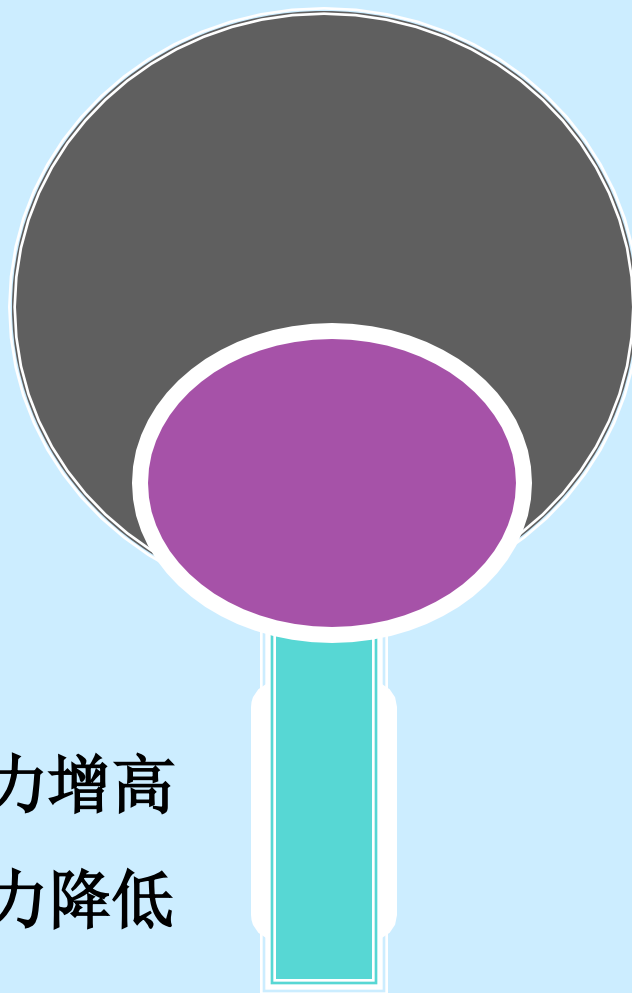


逼尿肌张力正常  
括约肌张力降低

# 尿失禁

骶丛损伤+  
副交感兴奋

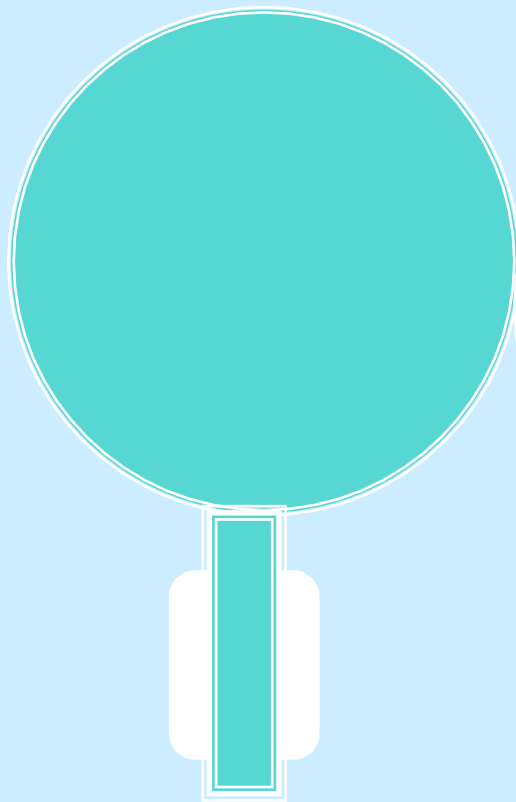
逼尿肌张力增高  
括约肌张力降低



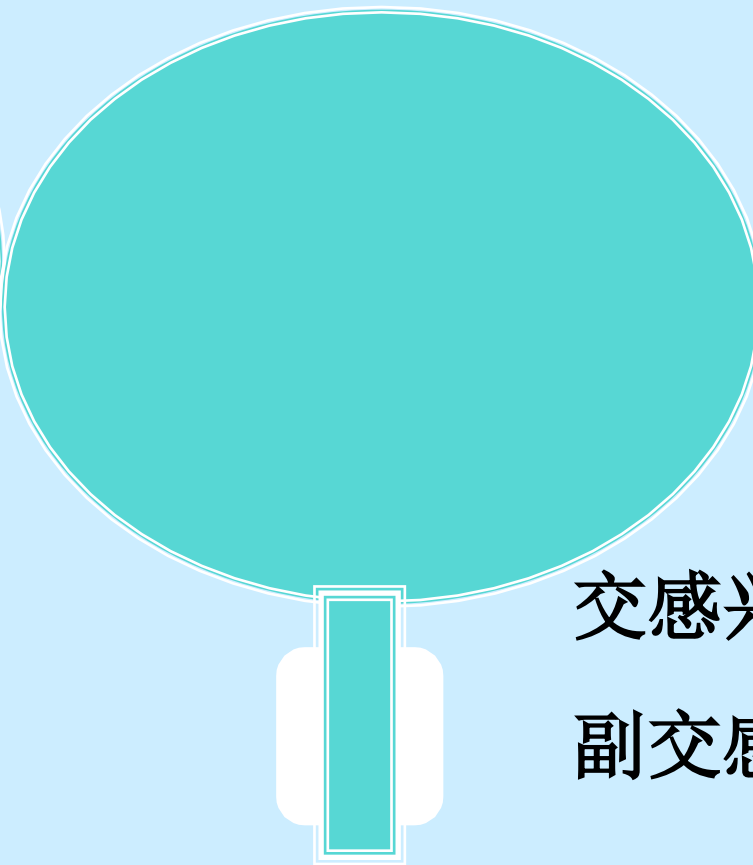


# 尿潴留

交感兴奋



逼尿肌张力正常  
括约肌张力增高



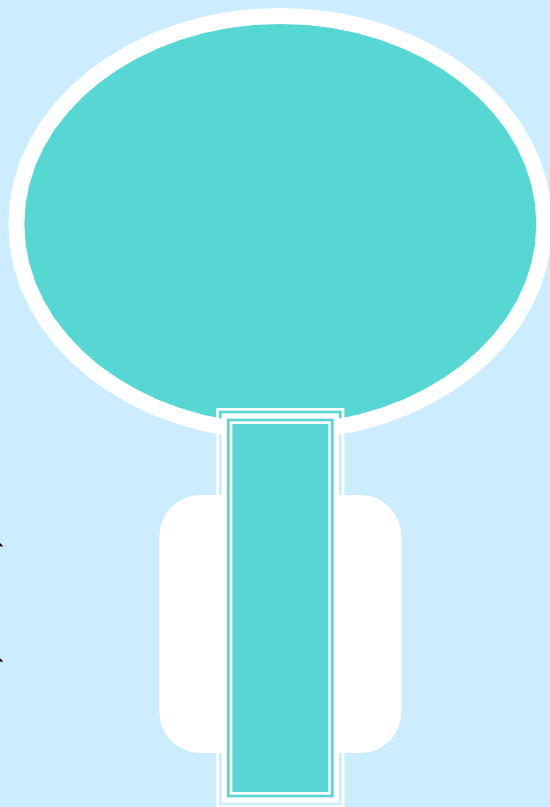
交感兴奋+  
副交感抑制

逼尿肌张力降低  
括约肌张力增高

# 潴留+失禁

交感和副交  
感均兴奋

逼尿肌张力增高  
括约肌张力增高  
肾脏返流严重



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