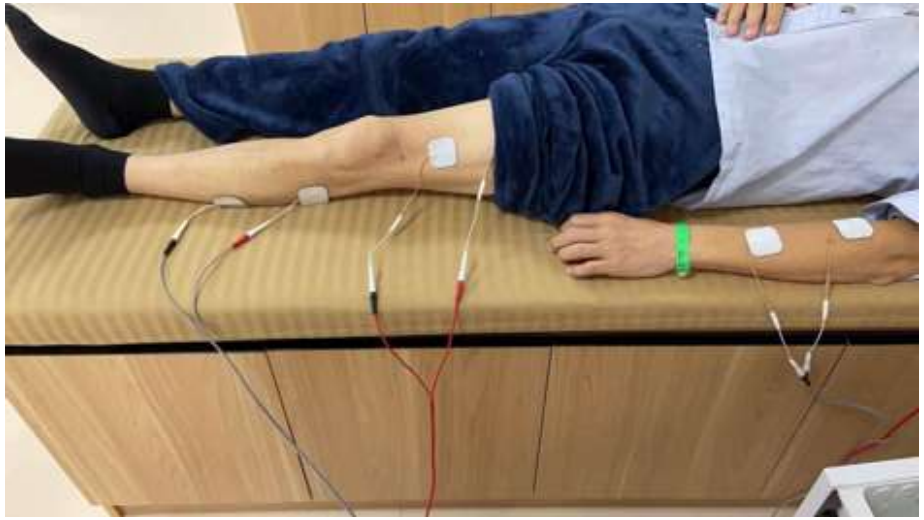
Why NMES?

Neuromuscular electrical stimulation and voluntary muscle contraction are two exercise modes widely used in rehabilitation to strengthen skeletal muscle.



神经肌肉电刺激和随意肌收缩是康复中广泛使用的两种增强骨骼肌的运动模式。

1

适应症

Indications and effects

Neuromuscular facilitation

Muscle re-education

Muscle training

Prevention/slowing of atrophy/hypotrophy

Retaining muscle strength during immobilization

Preventing postoperative muscle weakness

Reduction of spasticity

神经肌肉促进
肌肉再教育
肌肉训练
预防/减缓萎缩/机能减退
固定期间保持肌肉力量
预防术后肌无力
减少痉挛

Indications and effects – cont.

Maintaining or increasing range of motion

Circulation increase

Treatment of scoliosis

Incontinence treatment

维持或增加运动范围
流通量增加
脊柱侧凸的治疗
失禁治疗

TYPES OF SURFACE ELECTRODES

Metal electrode
- durable
- reusable
- inexpensive
- Inflexible

Carbonized Rubber
- relatively inexpensive
- fairly durable
- gel or water required

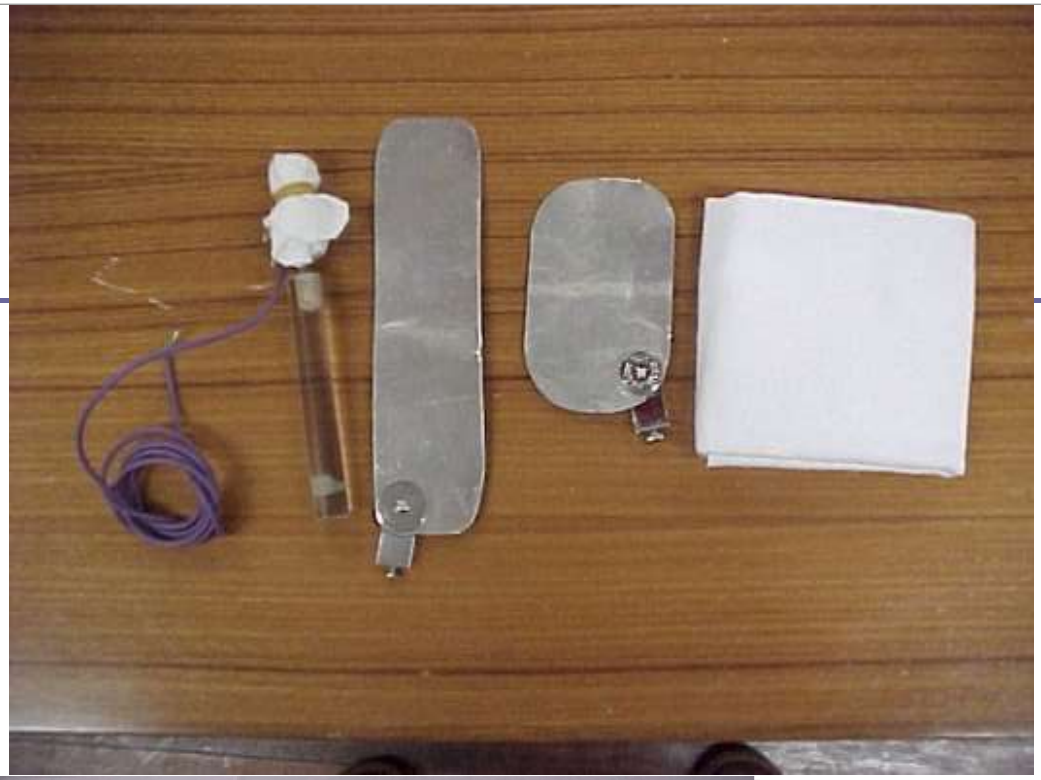
PROBE electrode
- Allow point stimulation
- location of motor point

金属电极
- 耐用
- 可重复使用
- 便宜
- 坚固

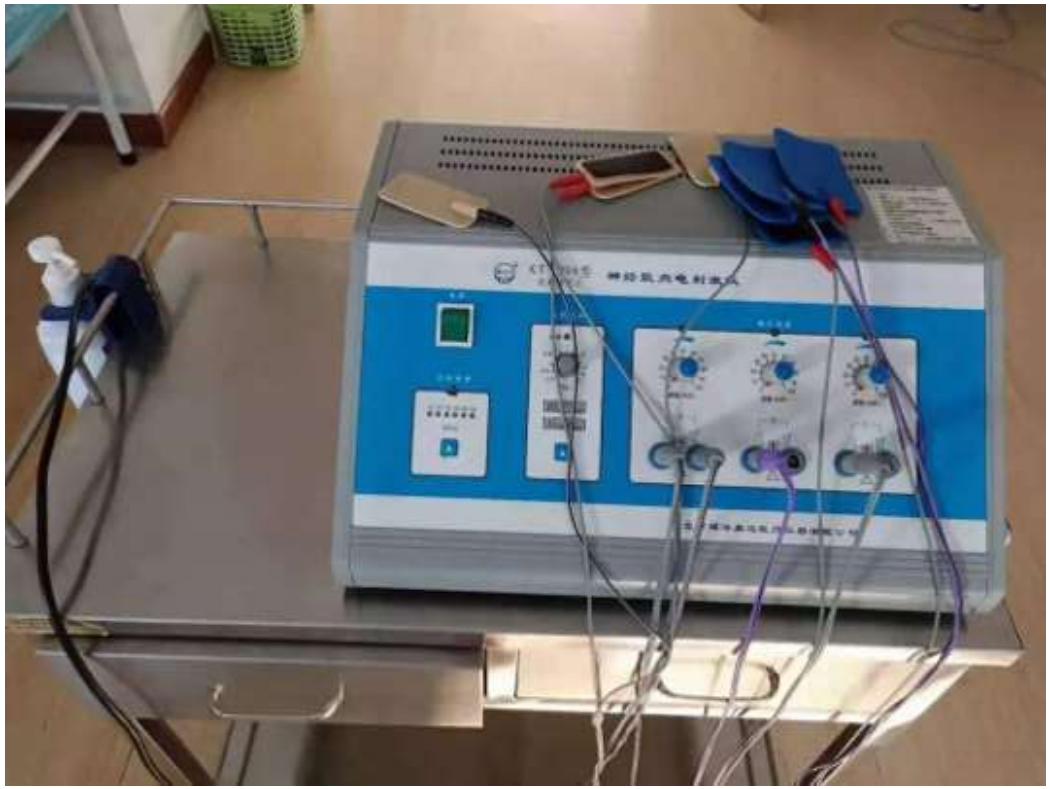
碳化橡胶
- 价格相对低廉
- 较为耐用
- 需要凝胶或水

探针电极
- 允许点刺激
- 可置于运动点上

4



The Machine



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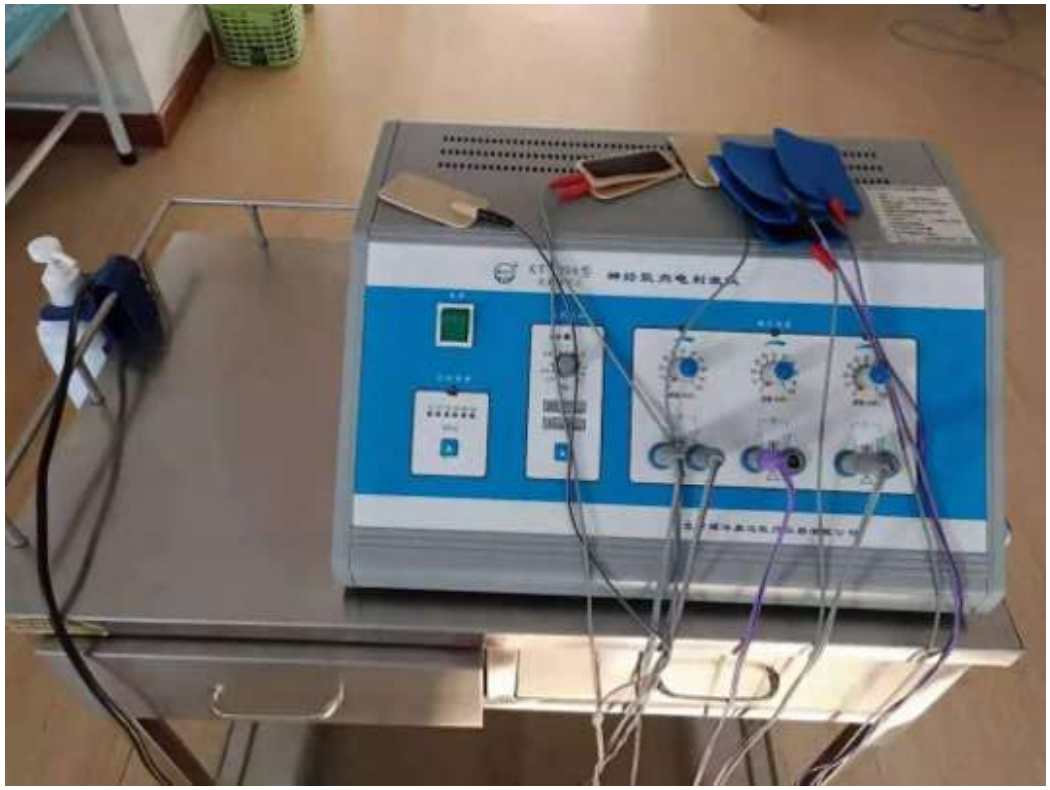
The Machine



There is big problem

- limited muscles it can stimulate

CLINICAL APPLICATION

Muscle strengthening in healthy subjects

正常人的肌肉强化

Treatment of disuse atrophy

废用性肌萎缩的治疗

Muscle re-education and facilitation

肌肉的再教育和易化

Increase range of motion

增加运动范围

Functional Electrical Stimulation (FES)

功能电刺激 (FES)

正常人肌肉强化

Yakov Kots (俄罗斯技术)

电流　　2500 Hz, modulated to 50 bursts

振幅　110-130% of 最大随意等长收缩

开/关周期　　10 s / 10s

Session　　3/52

结果　3-40% ↓ in strength, 3-4/52

DISUSE ATROPHY废用性萎缩

For which kind of disease?

Complete SCI

Incomplete SCI

SCI=spinal cord injury脊柱损伤

投票 最多可选1项 匿名投票

你认为，冠心病患者是否需要电刺激预防肌肉萎缩?

A 需要预防肌肉萎缩，但是不需要用电刺激

B 需要电刺激预防肌肉萎缩

C 不需要预防肌肉萎缩

提交

11

投票 最多可选1项 匿名投票

你认为，不完全性脊髓损伤患者是否需要电刺激预防肌肉萎缩?

A 需要预防肌肉萎缩，但是不需要用电刺激

B 需要电刺激预防肌肉萎缩

C 不需要预防肌肉萎缩

提交

12

投票 最多可选1项 匿名投票

你认为，完全性脊髓损伤患者是否需要电刺激预防肌肉萎缩?

A 需要预防肌肉萎缩，但是不需要用电刺激

B 需要电刺激预防肌肉萎缩

C 不需要预防肌肉萎缩

提交

13

MUSCLE RE-EDUCATION AND FACILITATION

Re-establish voluntary control of body positions and movement following injuries that affected either both the afferent, efferent neural pathway or the central control centres in the motor and premotor cortex

重新建立对身体姿势的自愿控制受伤后的运动影响了双方传入、传出神经通路或运动和前运动皮层的中央控制中心

投票 最多可选1项 匿名投票

外周骨骼肌的电刺激能否促进中枢神经损伤康复

A 能

B 不能，只能作用于外周

提交

15

CONTRAINDICATIONS

Patient with cardiac pacemaker or other implants (e.g. neural implants)带有心脏起搏器或其他植入物的患者 (例如神经埋植剂)

Area of pregnant uterus孕妇的腹部位

Treatment of open wounds or skin lesions皮肤缺损或开放性伤口

Acute inflammatory conditions急性炎症

Inability to communicate沟通不能

Benign / malignant tumours, T.B., osteomyelitis良性/恶性肿瘤, 肺结核， 骨髓炎

电刺激肌肉的应用拓展

17

电刺激在临床康复中的前沿与拓展

18