Myofascial pain syndrome in headache

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The President's Physician

The Life and Legacy of Dr. Janet G. Travell

Dr. Janet G. Travell (1901-1997) was appointed as White House physician to two presidents, John F. Kennedy and Lyndon B. Johnson. She is also celebrated for her pioneering work in myofascial pain. The exhibit features vintage photographs, newspaper clippings and articles, scholarly papers, notes, and writings, as well as ephemera belonging to Dr. Travell. The exhibit includes her early life in New York city; her education at Wellesley College and later at Cornell University Medical College; early practice in medicine; experiments with ethyl chloride spray; the White House years; scholarship; her position in The George Washington University School of Medicine as Associate Clinical Professor of Medicine and other activities.

Dr. Travell was truly a remarkable woman. On the wall of her medical office hung a wooden plaque someone had given her with an inscription carved in it which read: "It's Better to Wear Out Than To Rust Out." She often said in lectures, "Life is like a bicycle. You don't fall off until you stop pedaling."

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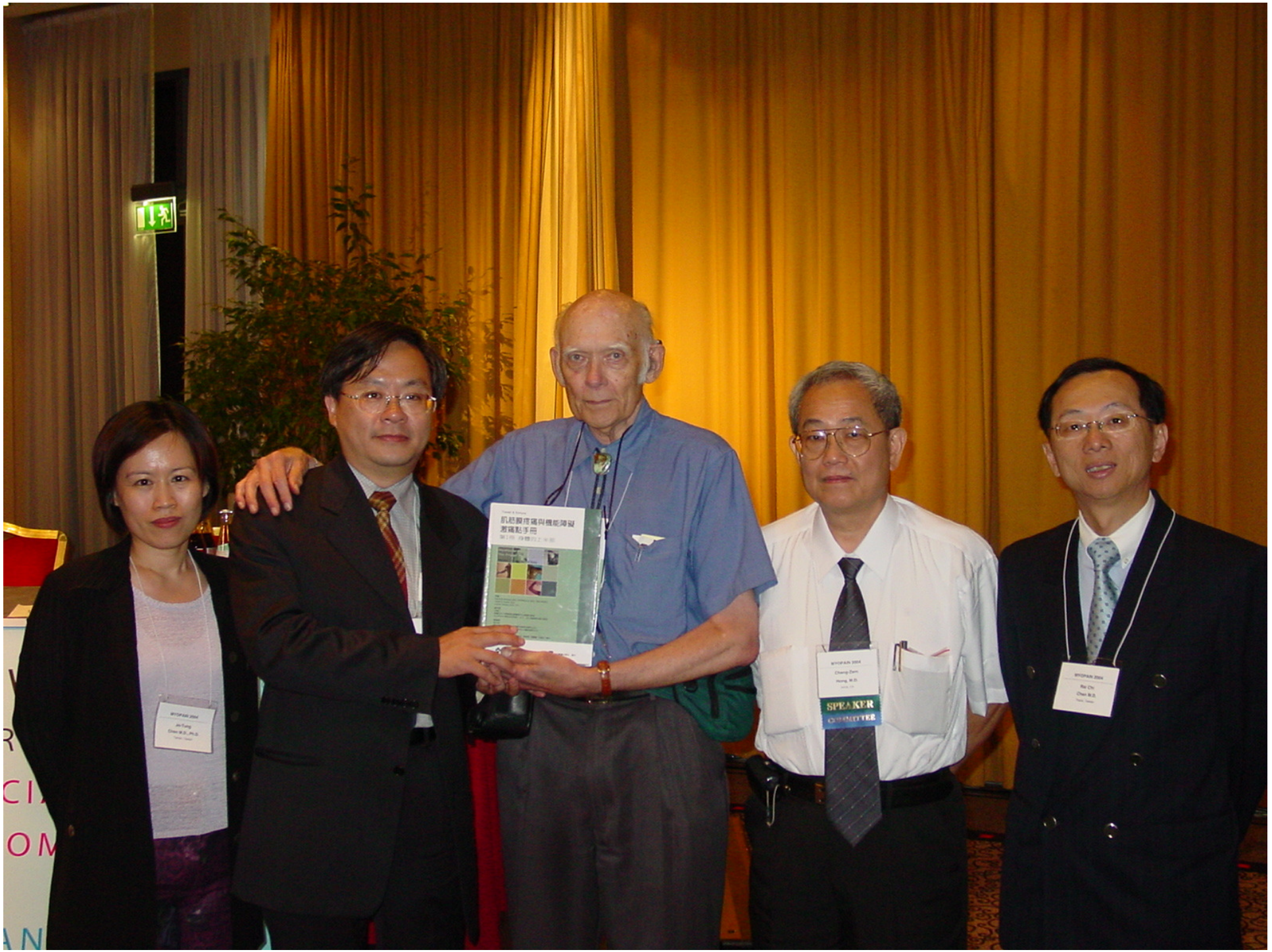
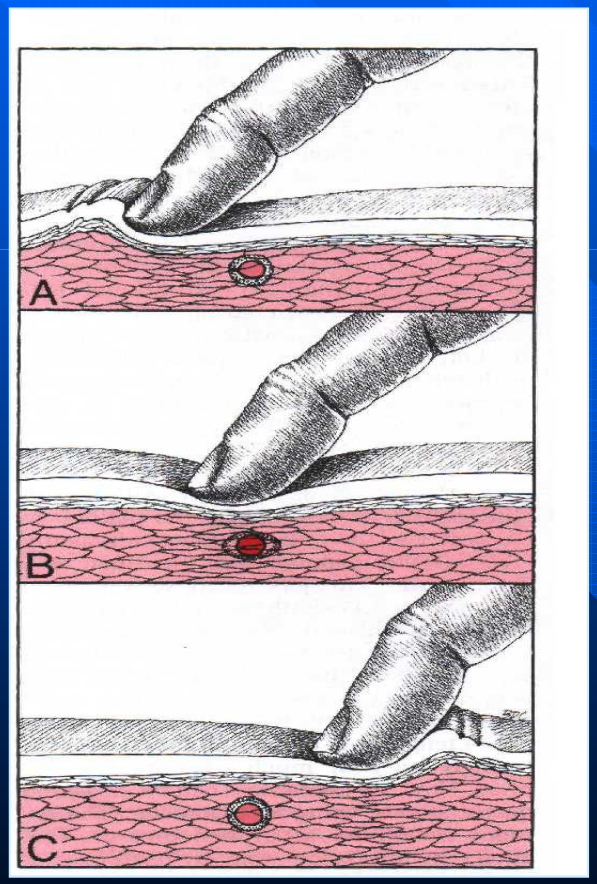

SPEAKER

肌膜疼痛症
(Myofascial Pain Syndrome)

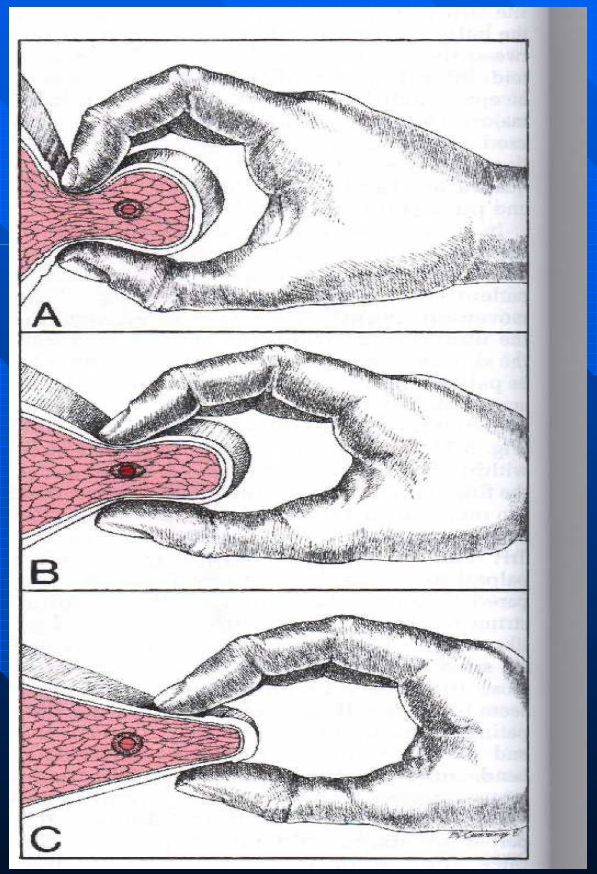
- 由肌膜激痛點(myofascial trigger point)引起之肌肉疼痛
- 通常是由於不適當或過度使用肌肉(如姿勢不良、運動過度)或是由其他疾病(如骨骼、韌帶、肌腱、神經等之病變)所造成

臨床特徵

- 觸診時，可找到緊繃帶(taut band)且在其上可找出激痛點。

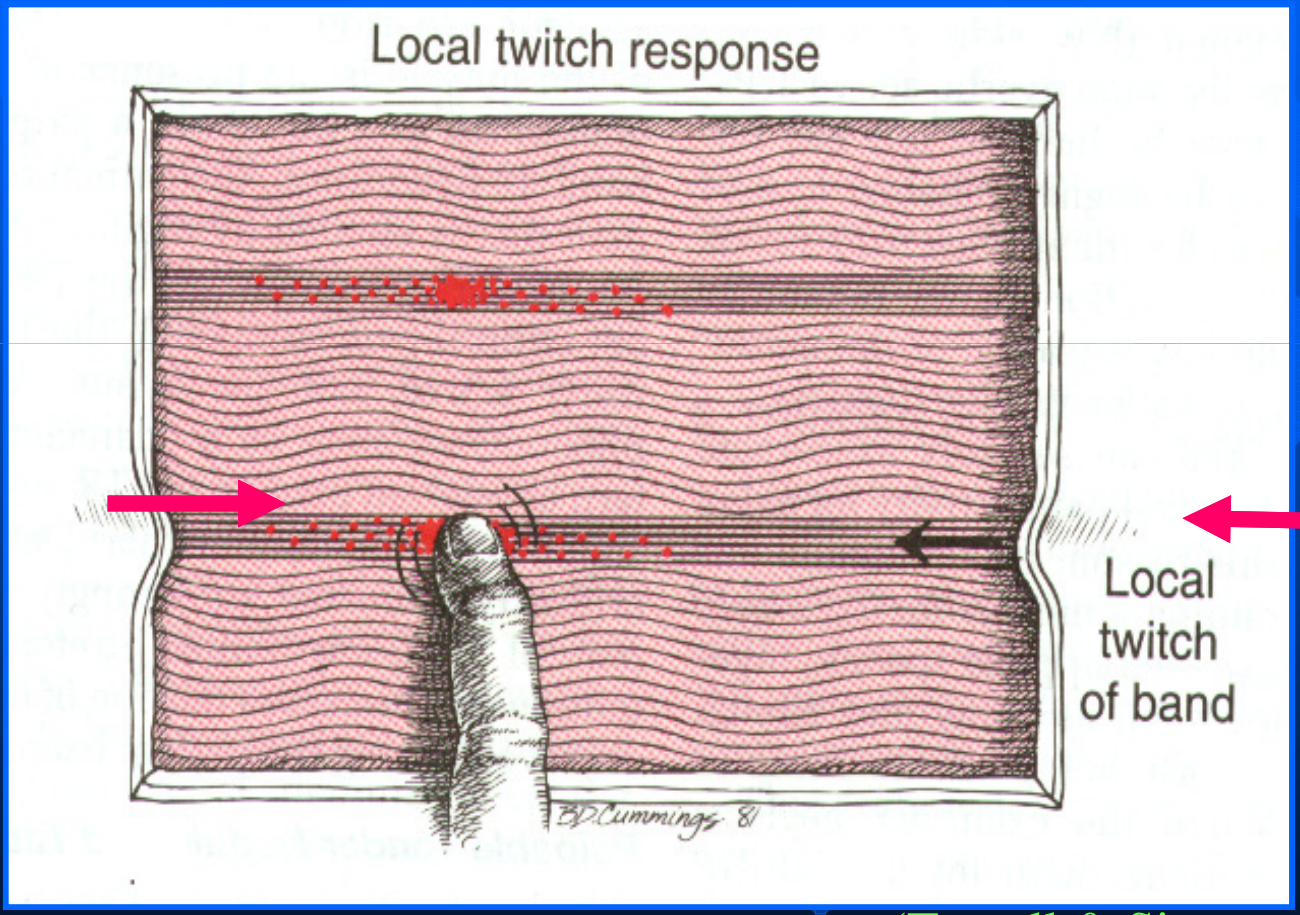


平滑式觸診



鉗捏式觸診

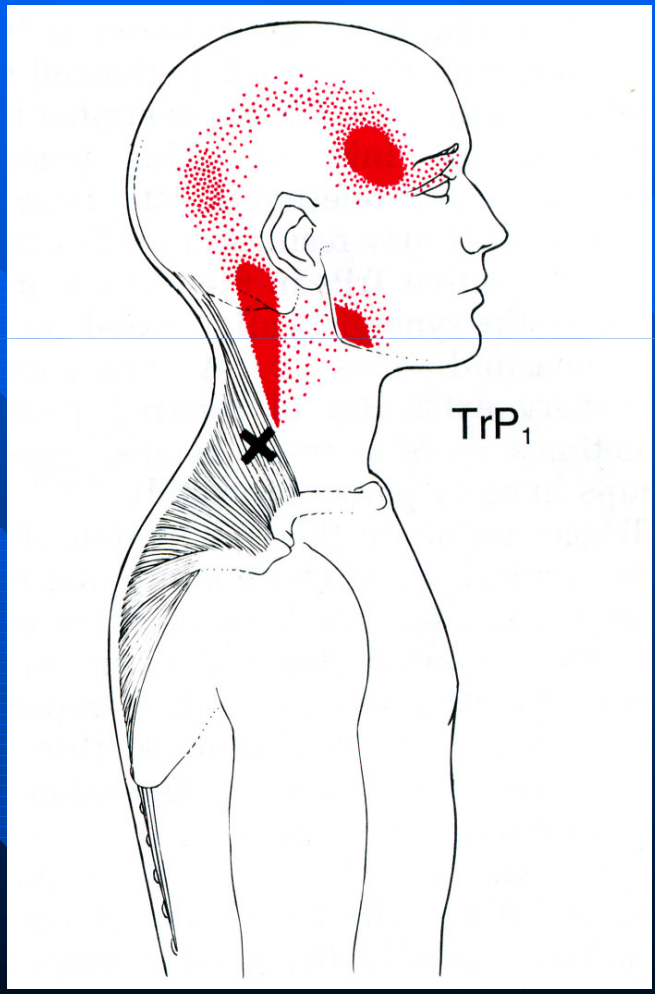
局部抽搐反應
Local Twitch Response



(Travell & Simons, 1983)

臨床特徵

- 壓激痛點時，可引起局部疼痛及引傳痛(referred pain)。引傳痛分佈因不同肌肉而有其固定形式。
- 含激痛點之肌肉活動度受限制且有無力現象。



臨床特徵

- 長期疼痛而偶發劇烈疼痛。若無適當治療會造成更多激痛點，此為衛星激痛點(satellite TrPs)或次發激痛點(secondary TrPs)。
- 伴有自主神經系統症狀(autonomic phenomena)，如：冷、熱、出汗、紅腫等現象。
- 潛伏性肌膜激痛點 (latent)

  活動性肌膜激痛點 (active)

Diagnostic Criteria of Myofascial Trigger Point (MTrP)

1.Minimal Criteria to identify an MTrP:

1). Spot Tenderness

2). Pain Recognition

3). Taut Band

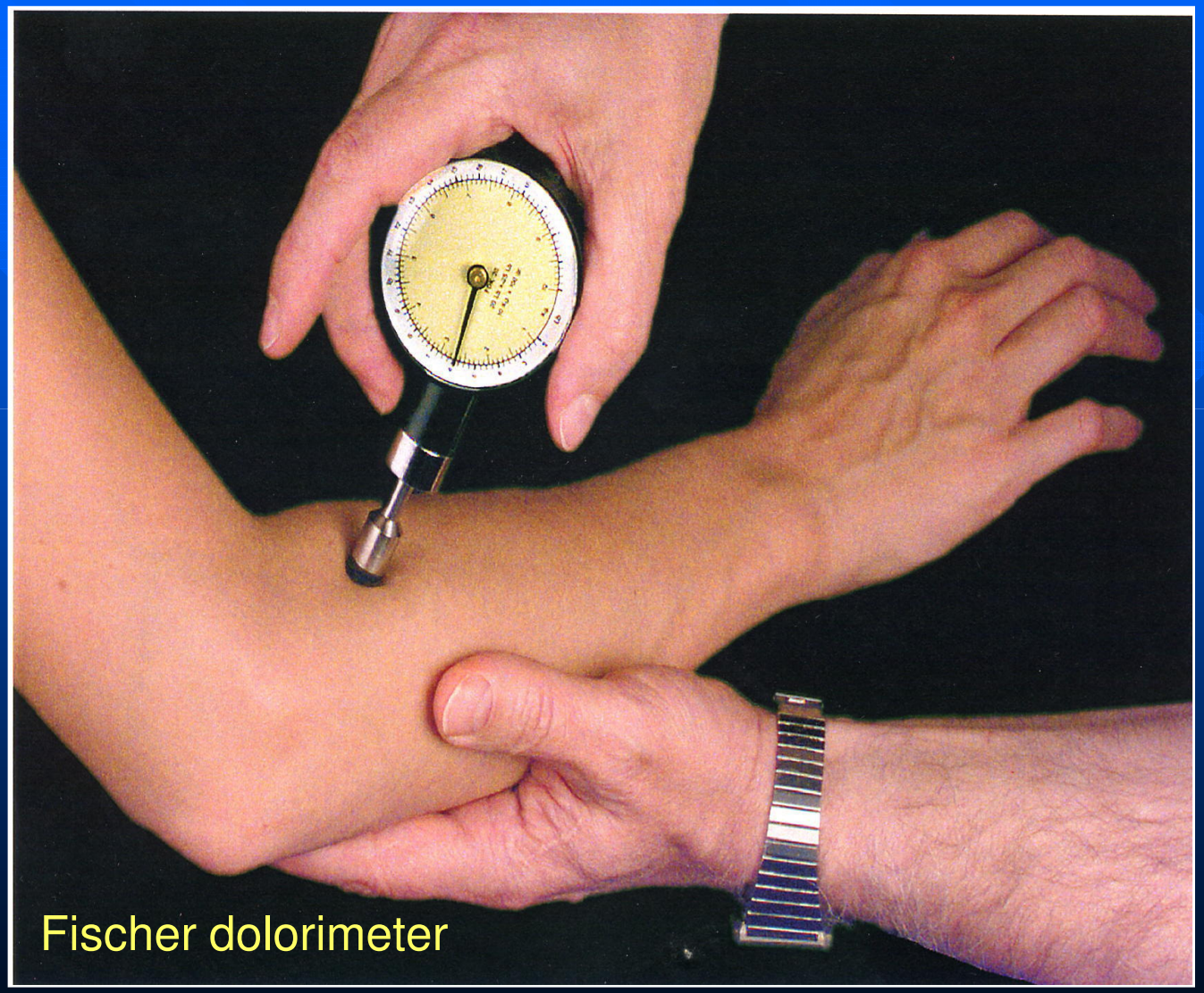
2. Confirmatory Signs of MTrP:

1). Referred pain

2). Local Twitch Response

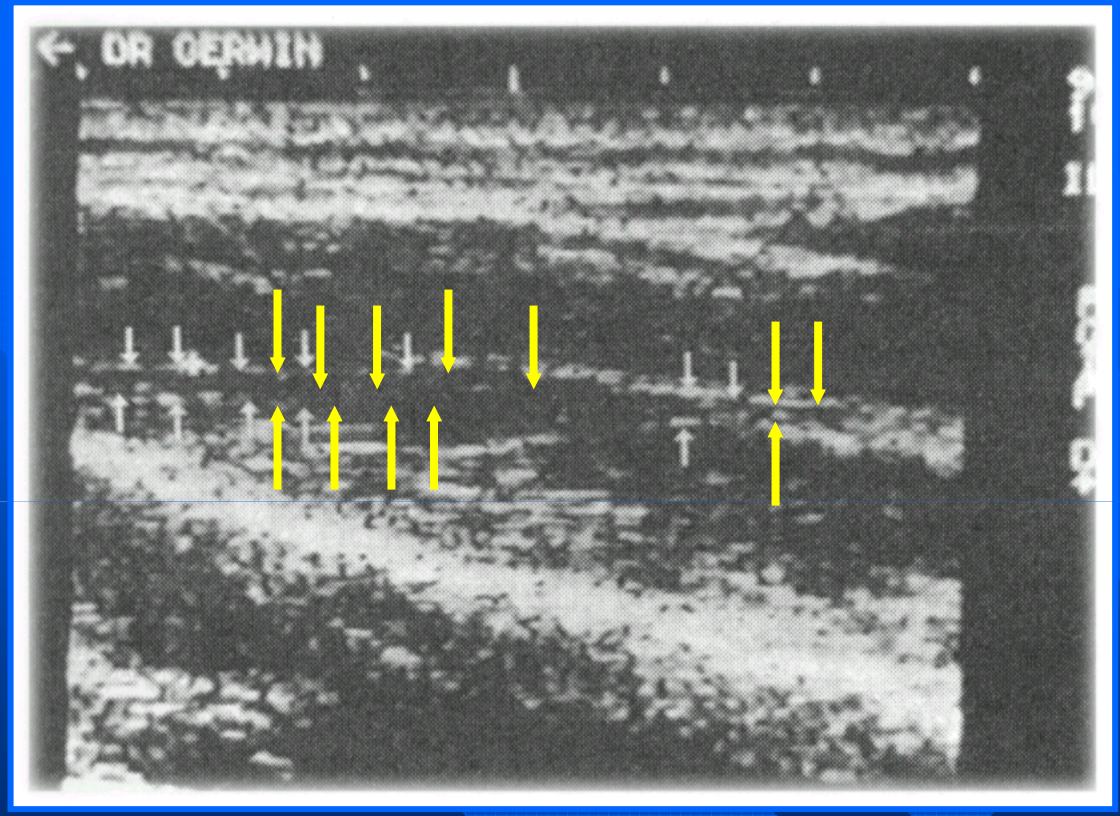
(Gerwin et al 1997)

Pressure Algometer



Fischer dolorimeter

高解析力超音波影像

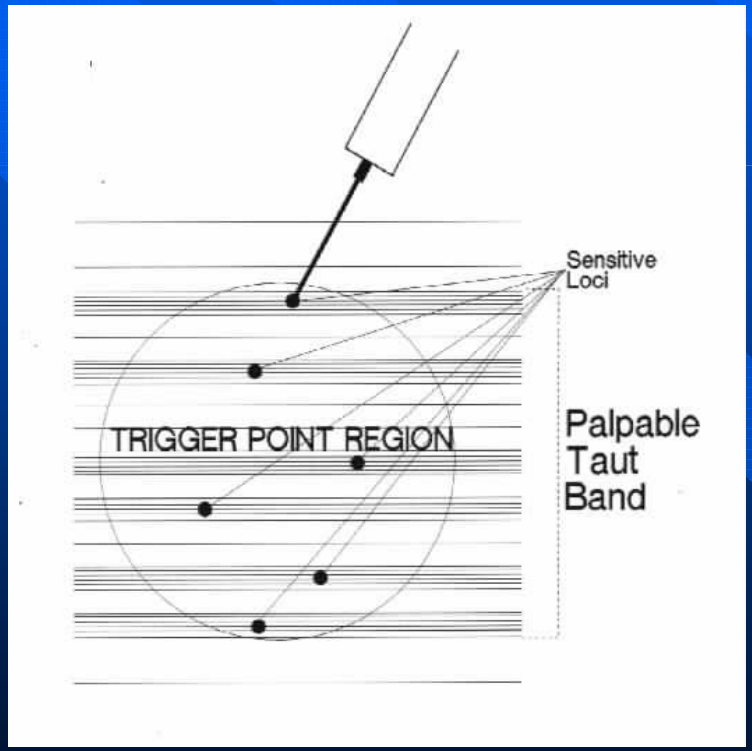


激痛點之緊繃肌帶(taut band)與
局部抽搐反應(local twitch response)

(Gerwin & Duranleau, 1997)

肌膜激痛點之特性

- 肌膜激痛點乃是由多個敏感小點所組成

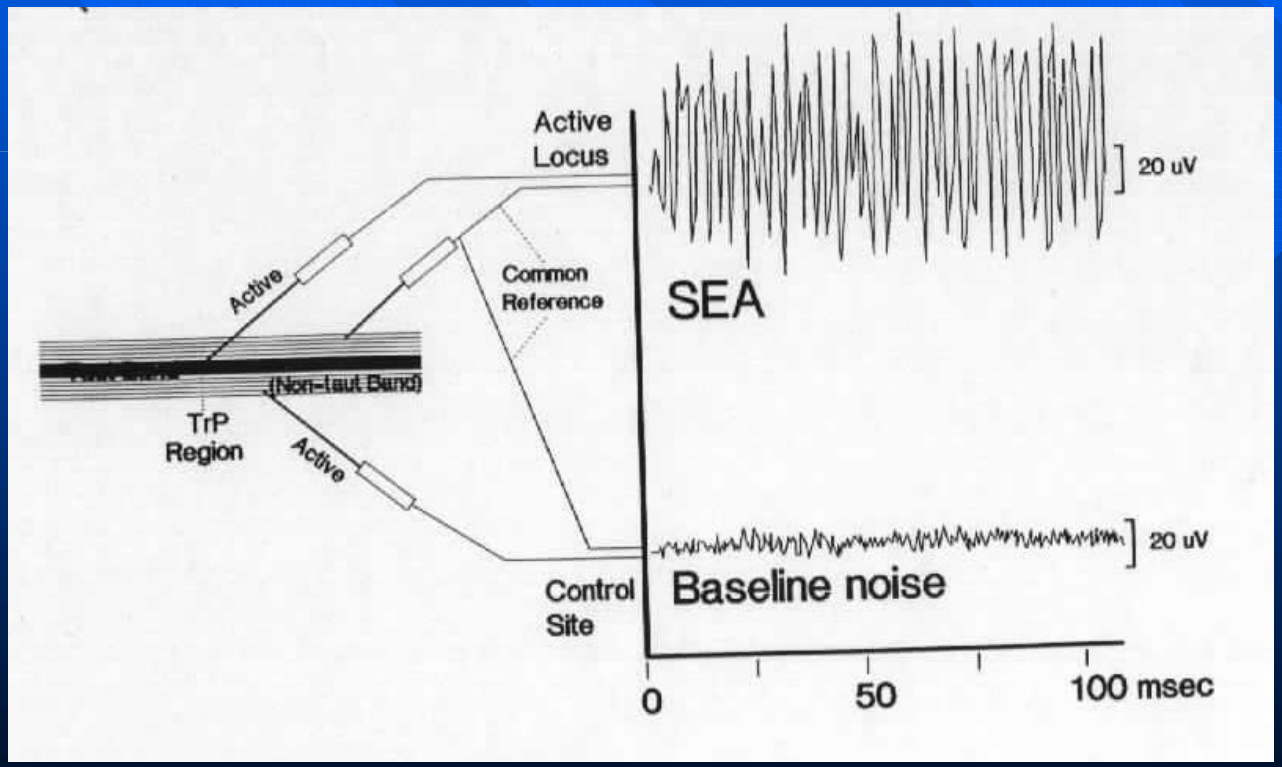


肌膜激痛點之肌電訊號量測

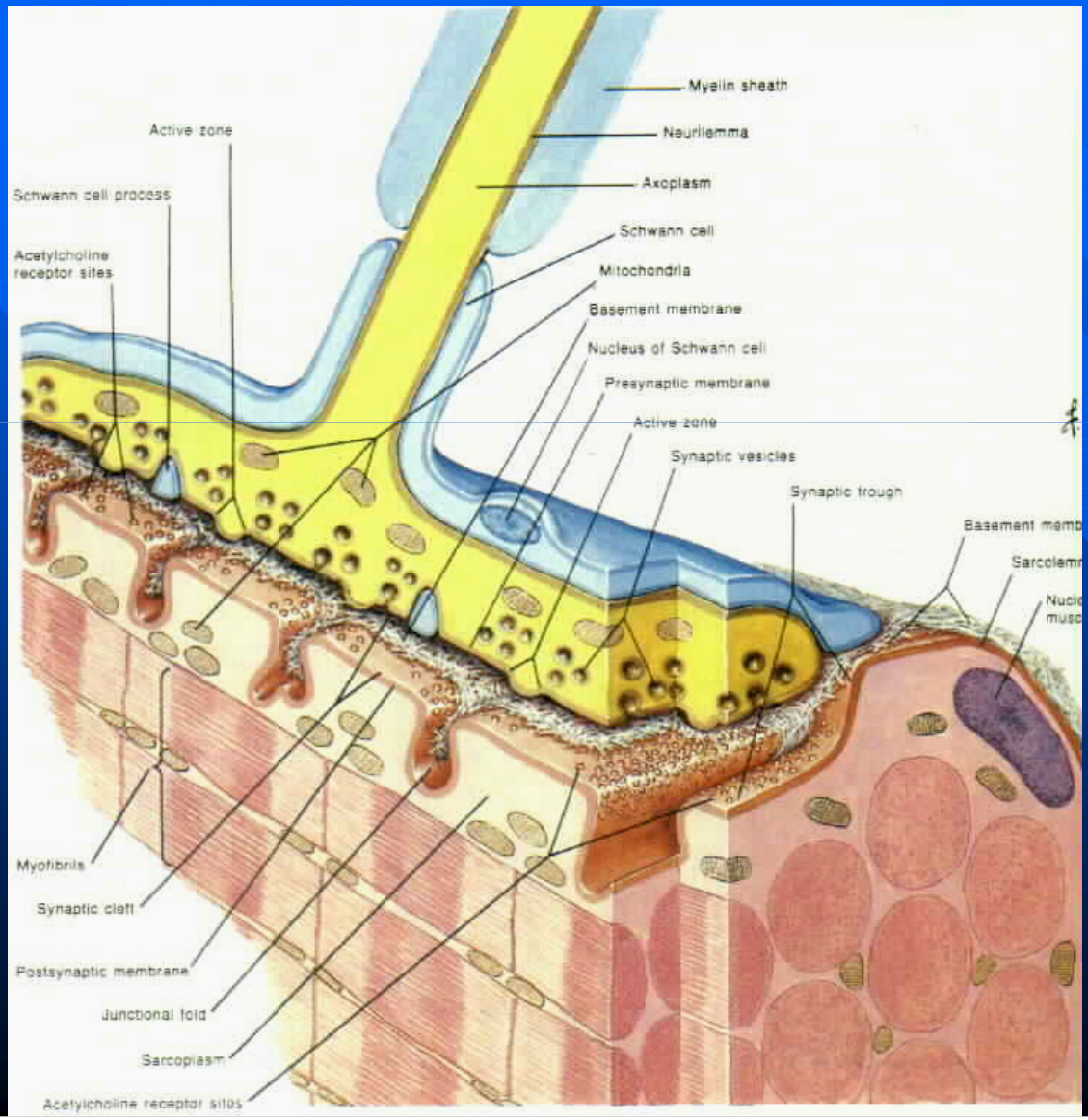
(Hubbard & Berkoff, 1993)

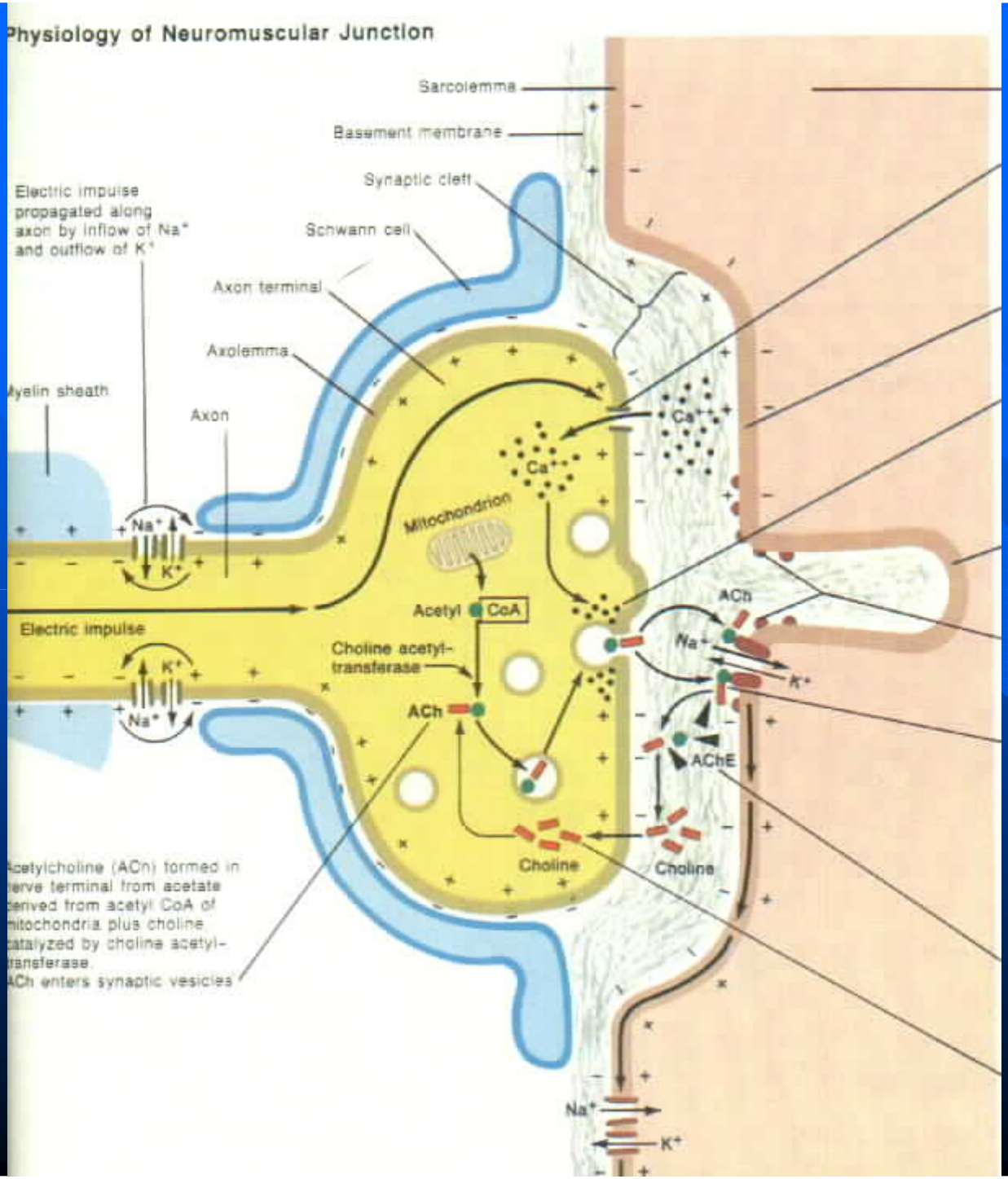
(Simons et al., 1995)

- 自發性電位活動

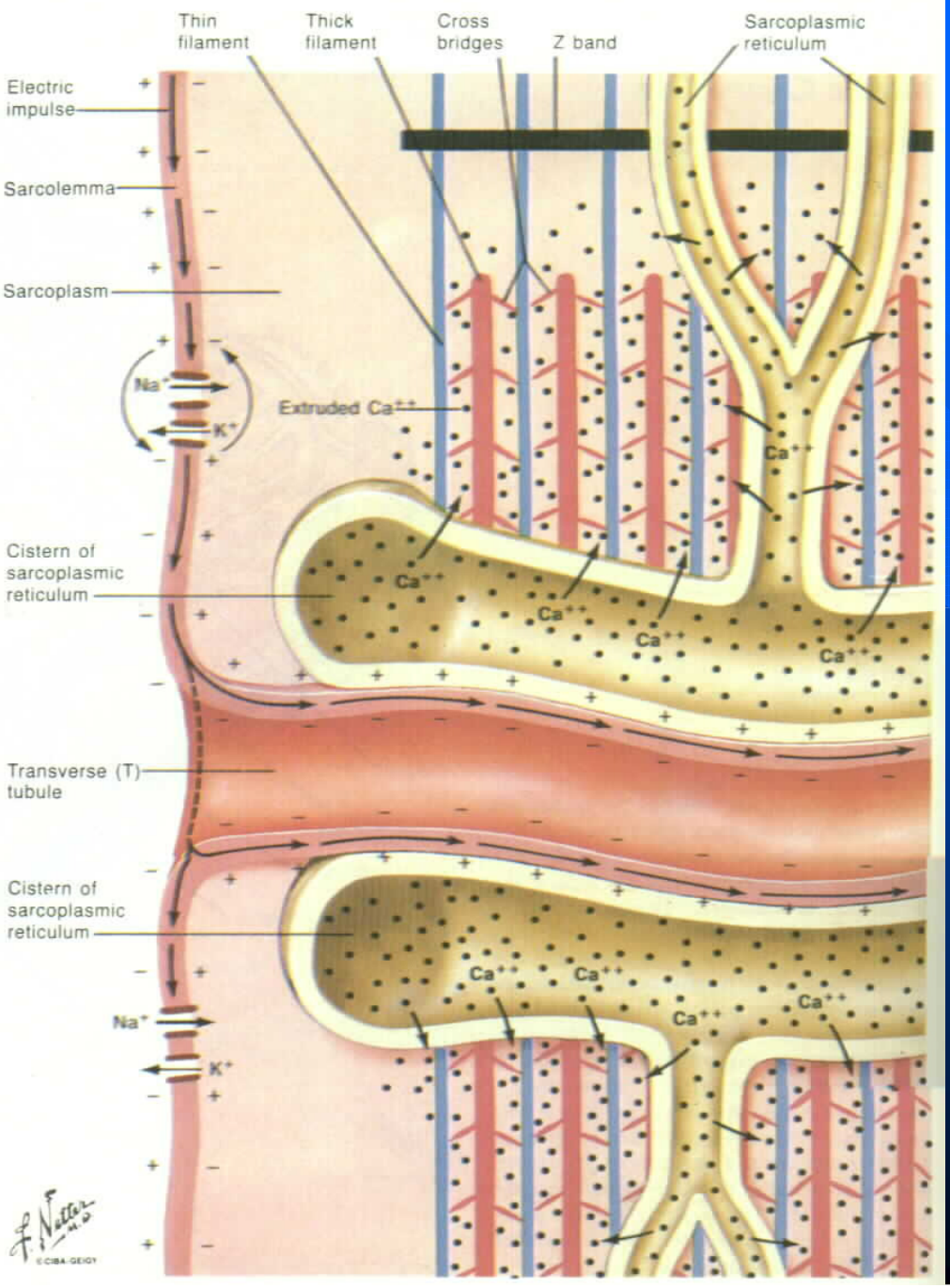


正常的神經肌肉交接處


Myelin sheath
Neurilemma
Axoplasm
Schwann cell
Mitochondria
Basement membrane
Nucleus of Schwann cell
Presynaptic membrane
Active zone
Synaptic vesicles
Synaptic trough
Basement memb
Sarcolemm
Nucl
musc
Active zone
Schwann cell process
Acetylcholine receptor sites
Myofibrils
Synaptic cleft
Postsynaptic membrane
Junctional fold
Sarcoplasm
Acetylcholine receptor sites

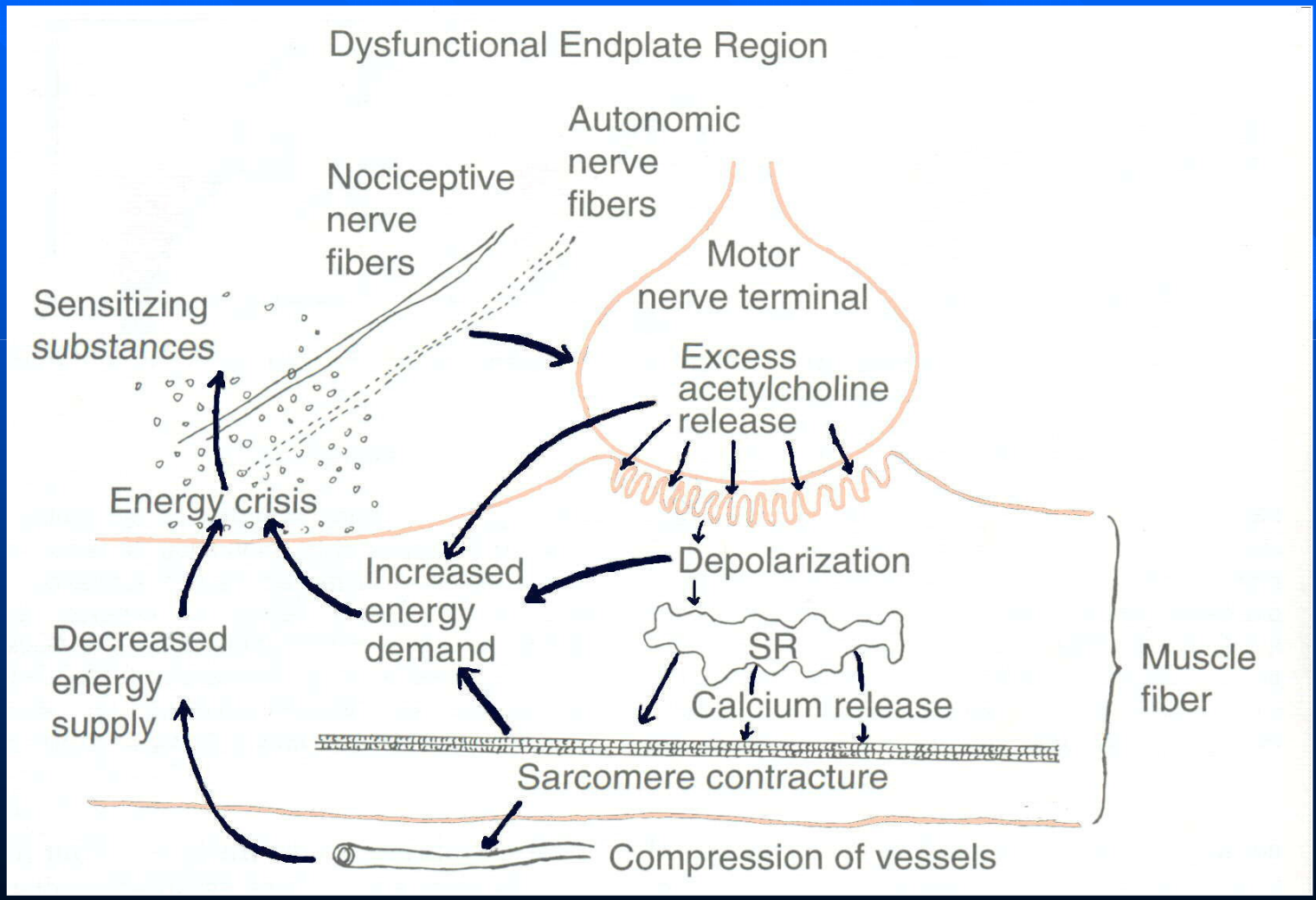

Physiology of Neuromuscular Junction
Sarcolemma
Basement membrane
Synaptic cleft
Schwann cell
Axon terminal
Axolemma
Myelin sheath
Axon
Electric impulse propagated along axon by inflow of Na+ and outflow of K+
Electric impulse
Mitochondrion
Acetyl CoA
Choline acetyl-transferase
ACh
AChE
Choline
Ca++
Na+
K+
Acetylcholine (ACh) formed in nerve terminal from acetate derived from acetyl CoA of mitochondria plus choline catalyzed by choline acetyl-transferase. ACh enters synaptic vesicles

Initiation of Muscle Contraction by Electric Impulse and Calcium Movement



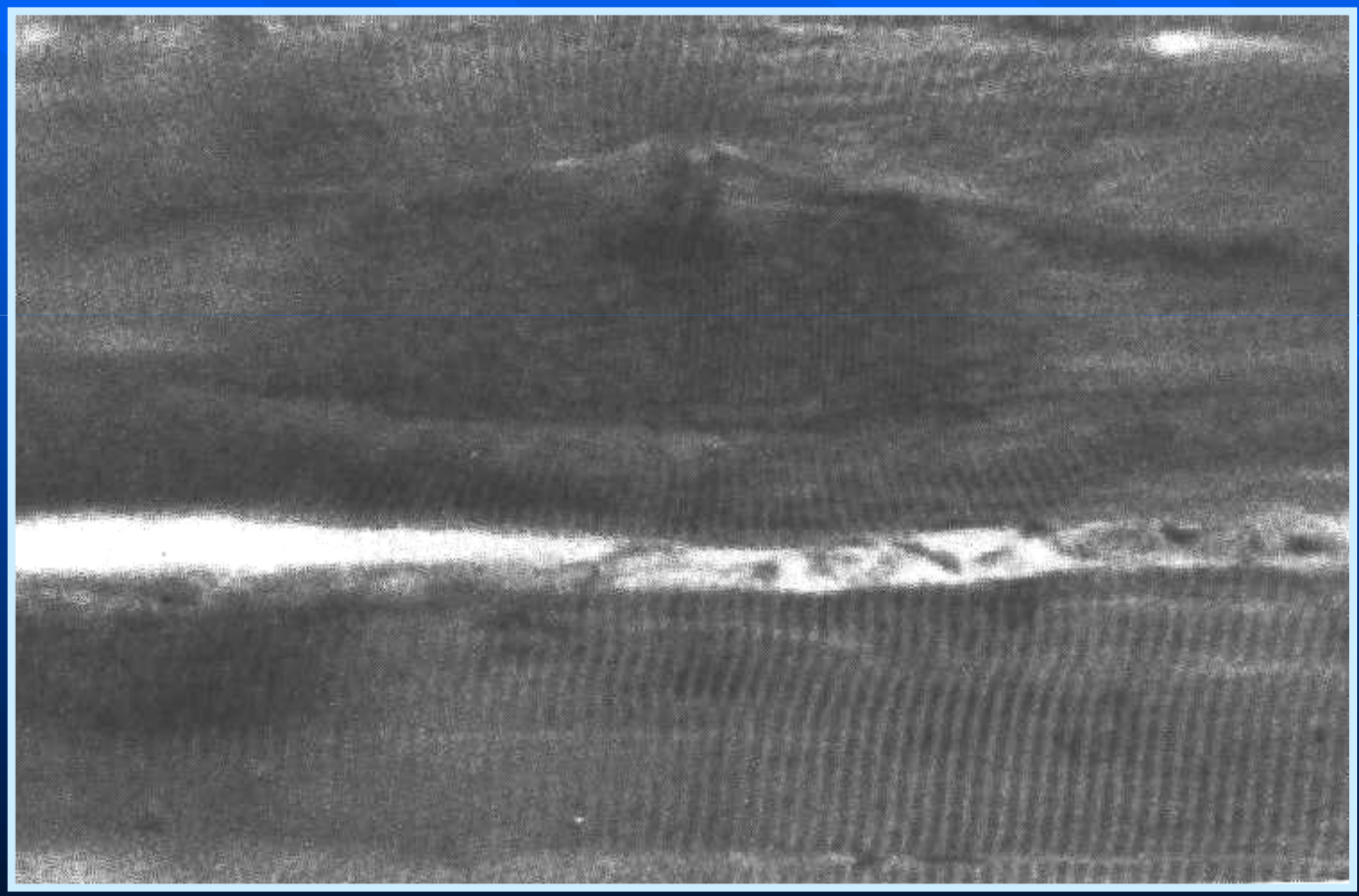
異常的神經肌肉交接處

Simons, 1999



電子顯微鏡下所看到的收縮小結節

Contraction Knot



(Simons & Stolov, 1976)

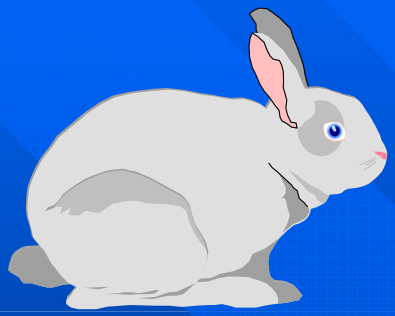
Biochemical milieu of the MTrP

Jay P. Shah, et al, 2005, 2008

- A microdialysis technique to sample the substances of interstitial fluid (~0.5μL) from MTrP.
- ↑ SP, norepinephrine, bradykinin, TNF-α, IL-1β, IL-6, IL-8, 5-HT, CGRP
- ↓ pH

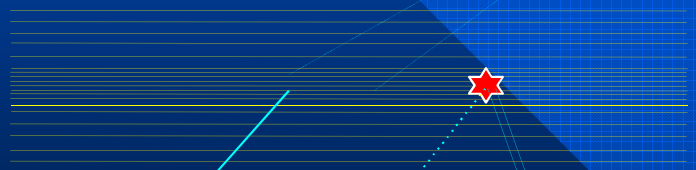
Animal Model for MTrP Study

(Hong & Torigoe: J Musculoske Pain 2(2):17-43, 1994)



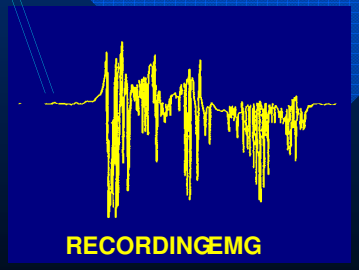
New-Zealand Albino rabbits

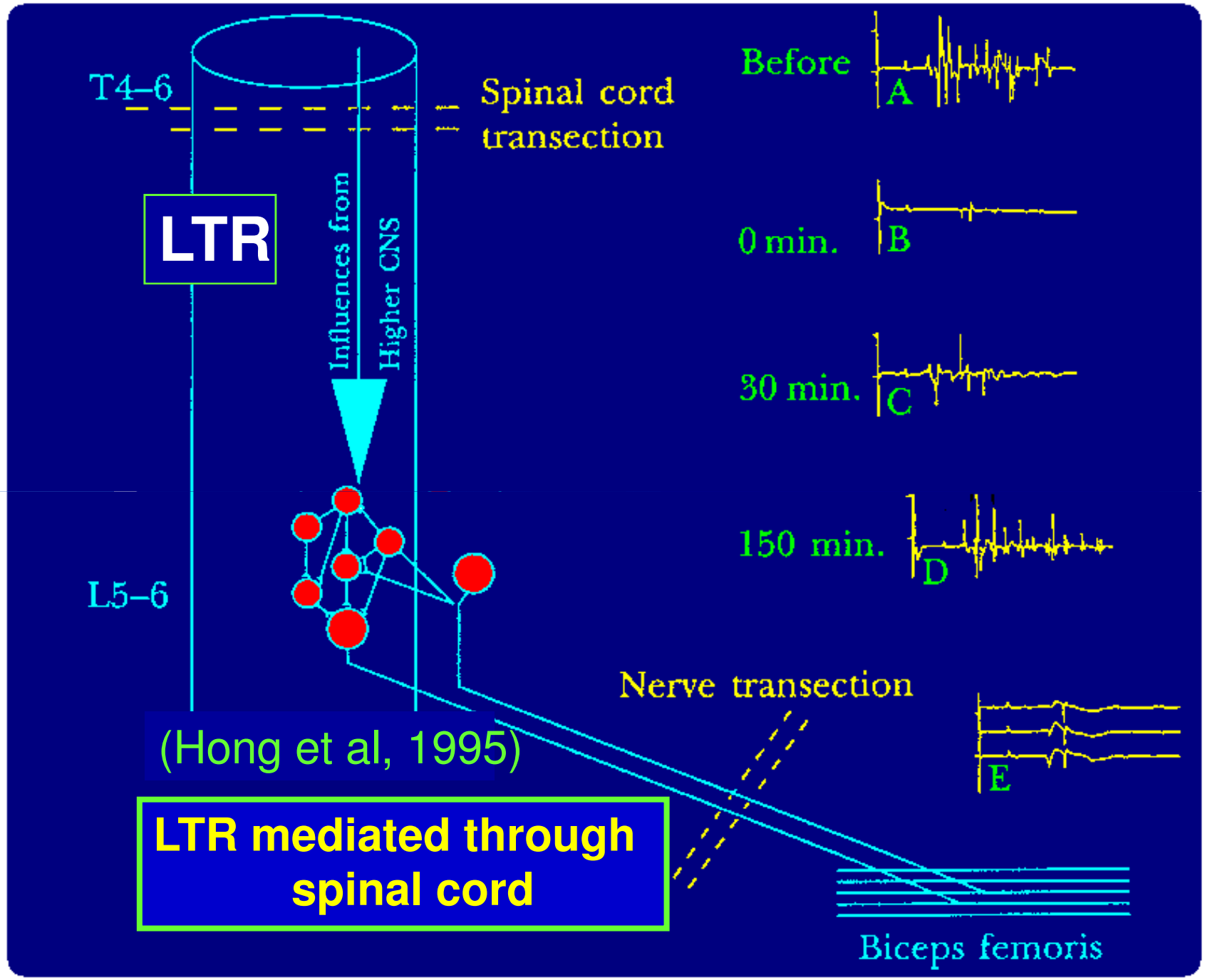
Biceps Femoris



Taut Band

MTrP



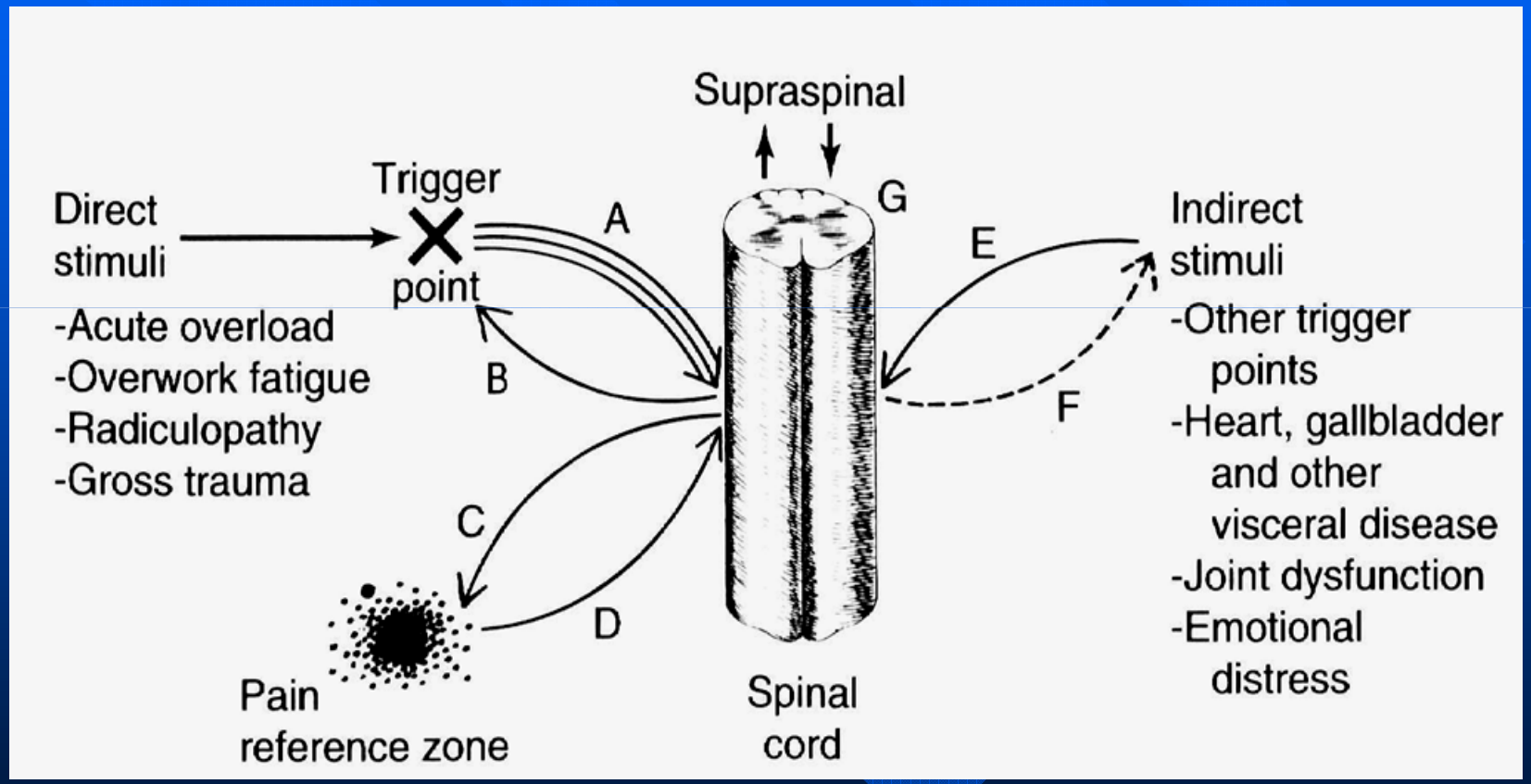

T4–6
Spinal cord transection
LTR
Influences from Higher CNS
L5–6
Before
A
0 min.
B
30 min.
C
150 min.
D
Nerve transection
E
Biceps femoris
(Hong et al, 1995)
LTR mediated through spinal cord

Spinal Cord Mechanism of Referred Pain (ReP)

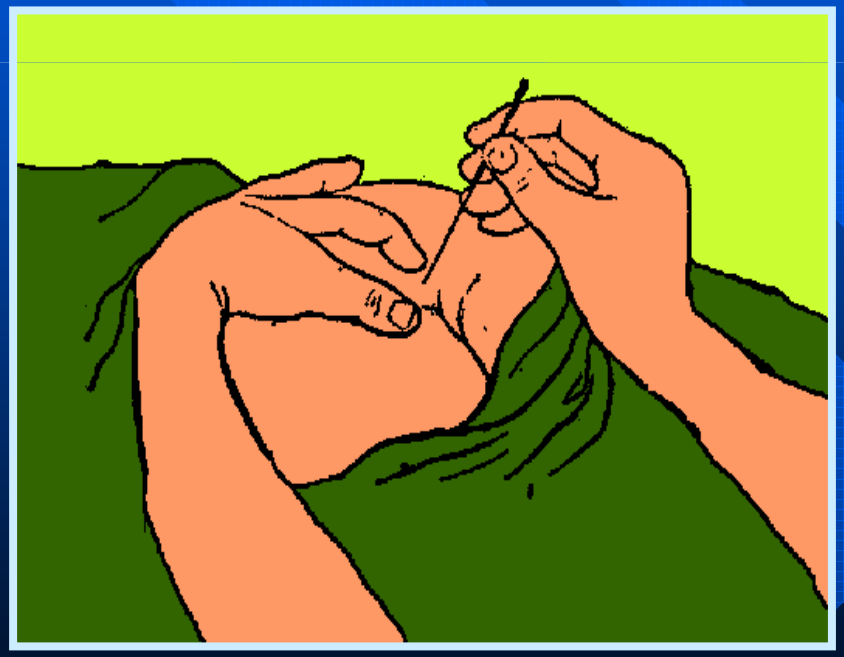
Clinical Aspects:

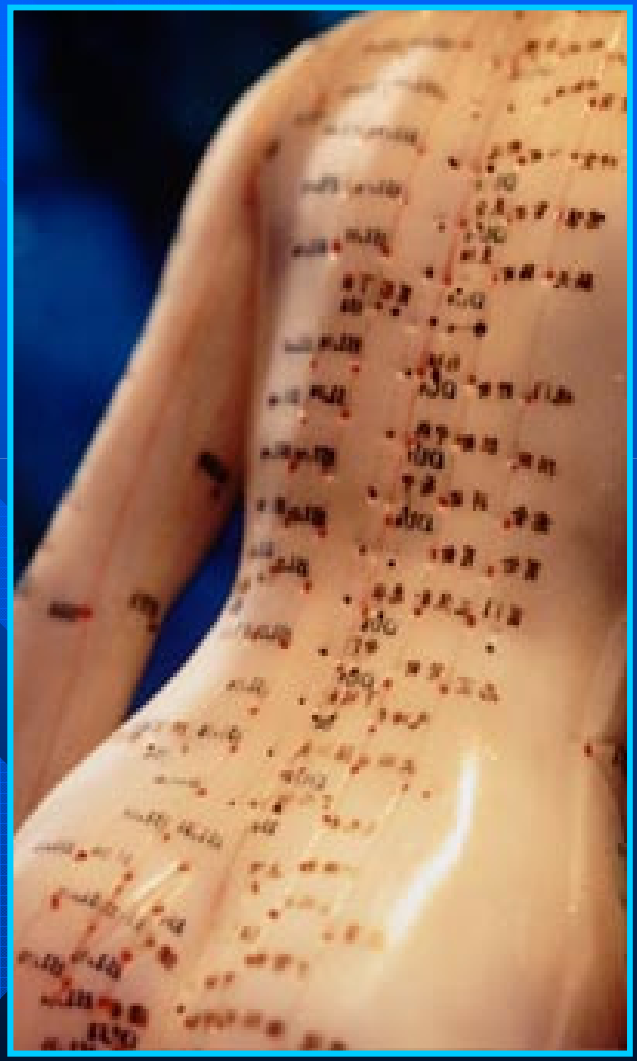
- The referred zone is different from the dermatome.
- Needling could elicit referred pain in 223 (87.7%) of 243 MTrPs, while palpation elicited referred pain in only 131 (53.9%) MTrPs. (Hong, 1997)
- Injection of a key MTrP can inactivate other satellite MTrPs.

CNS Interactions with MTrP



中國傳統的
針灸醫學





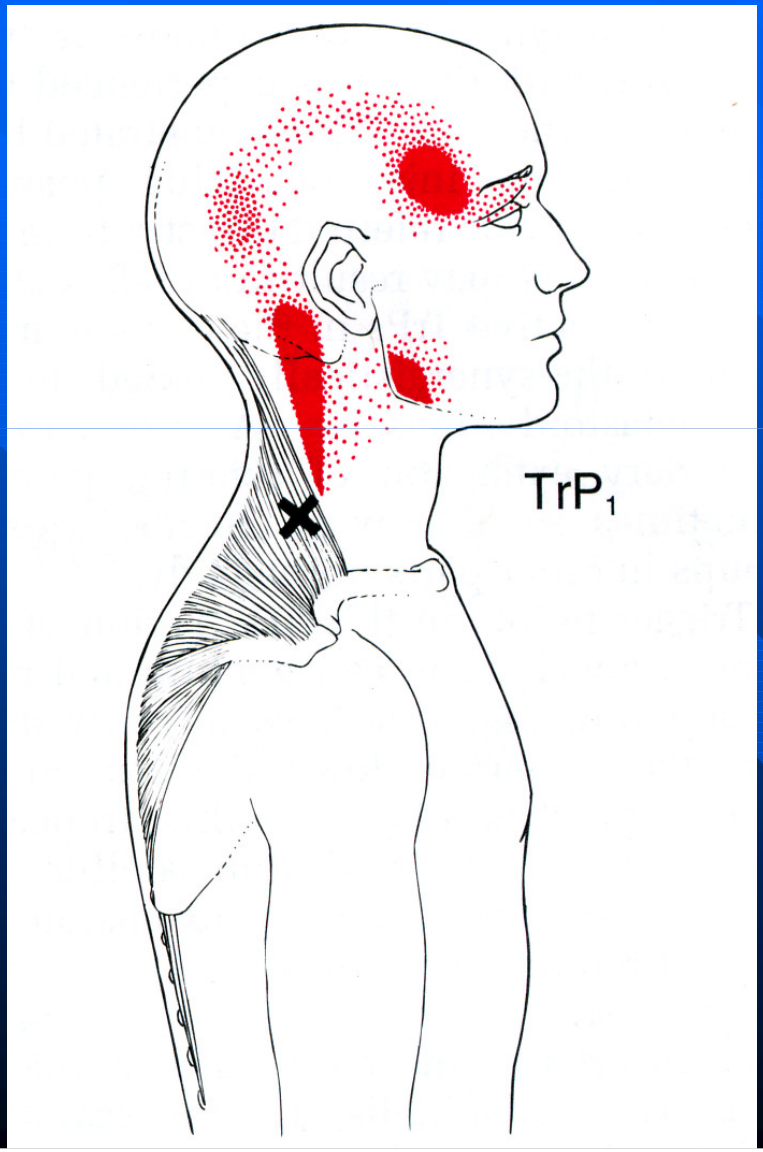
針刺得氣之中醫理論

- 我國最古之醫學經典—內經靈樞九鍼十二原中記載有：『刺之而氣不至，無問其數，刺之而氣至，乃去之，勿復鍼。鍼各有所宜，各不同形，各任其所為。刺之要，氣至而有效...』氣至之狀據標幽賦所形容為：『氣之至也如魚吞鉤餌之浮沈；氣之未至也，如處幽堂之深邃。』

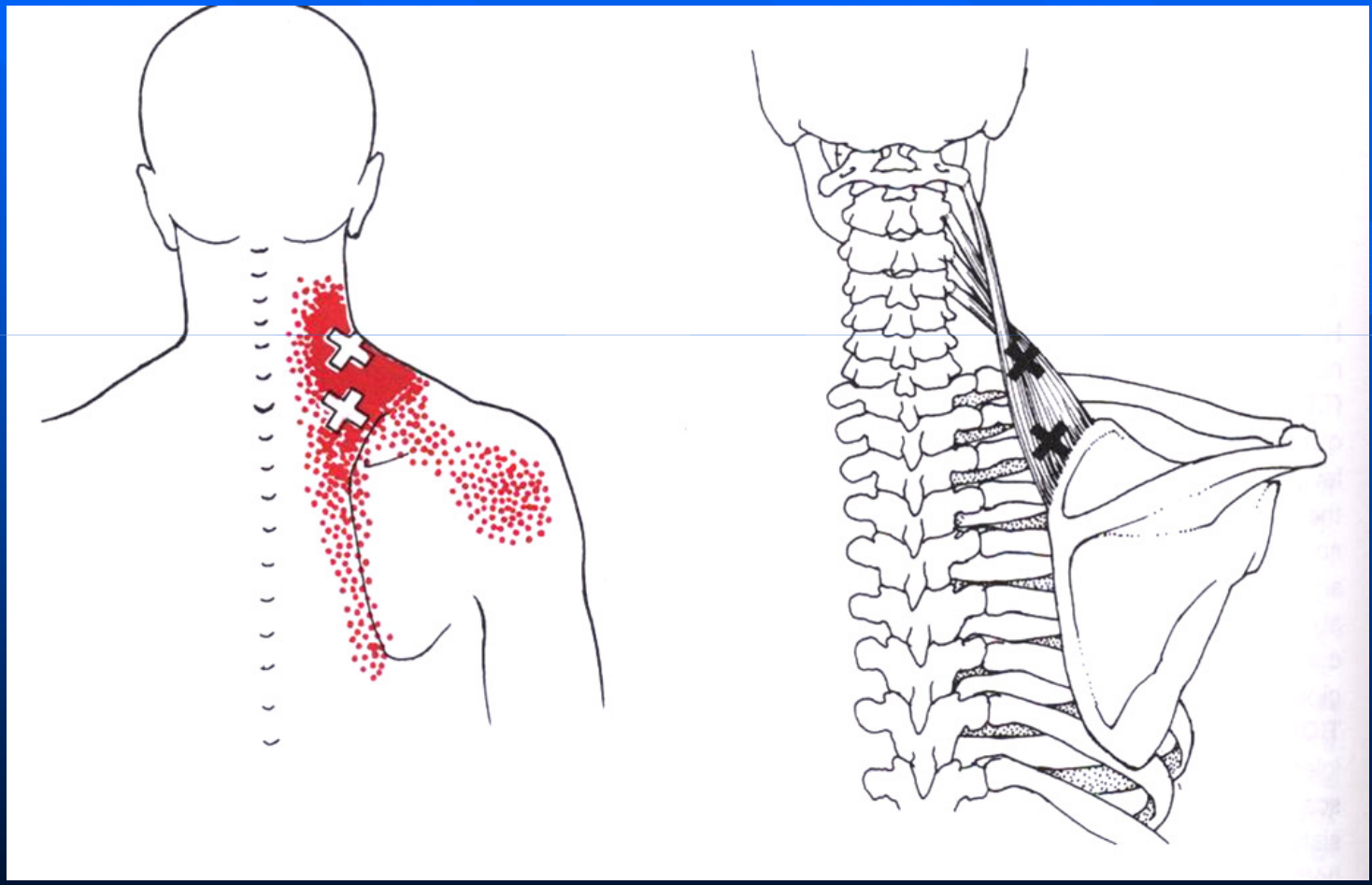
針刺得氣之中醫理論

- 如以局部麻醉藥(Procain, Novocain及Lidocain)浸潤穴位深部組織，則針刺得氣感應即行消失，針刺效應亦不復存在。
- 以Horseradish Peroxidase（HRP)之軸突逆行性運送特性來標記參與針刺得氣反應的神經組織，結果於脊髓神經節及脊髓前角發現HRP標記之神經元，
- 『針刺得氣』係一種節段性的反射。

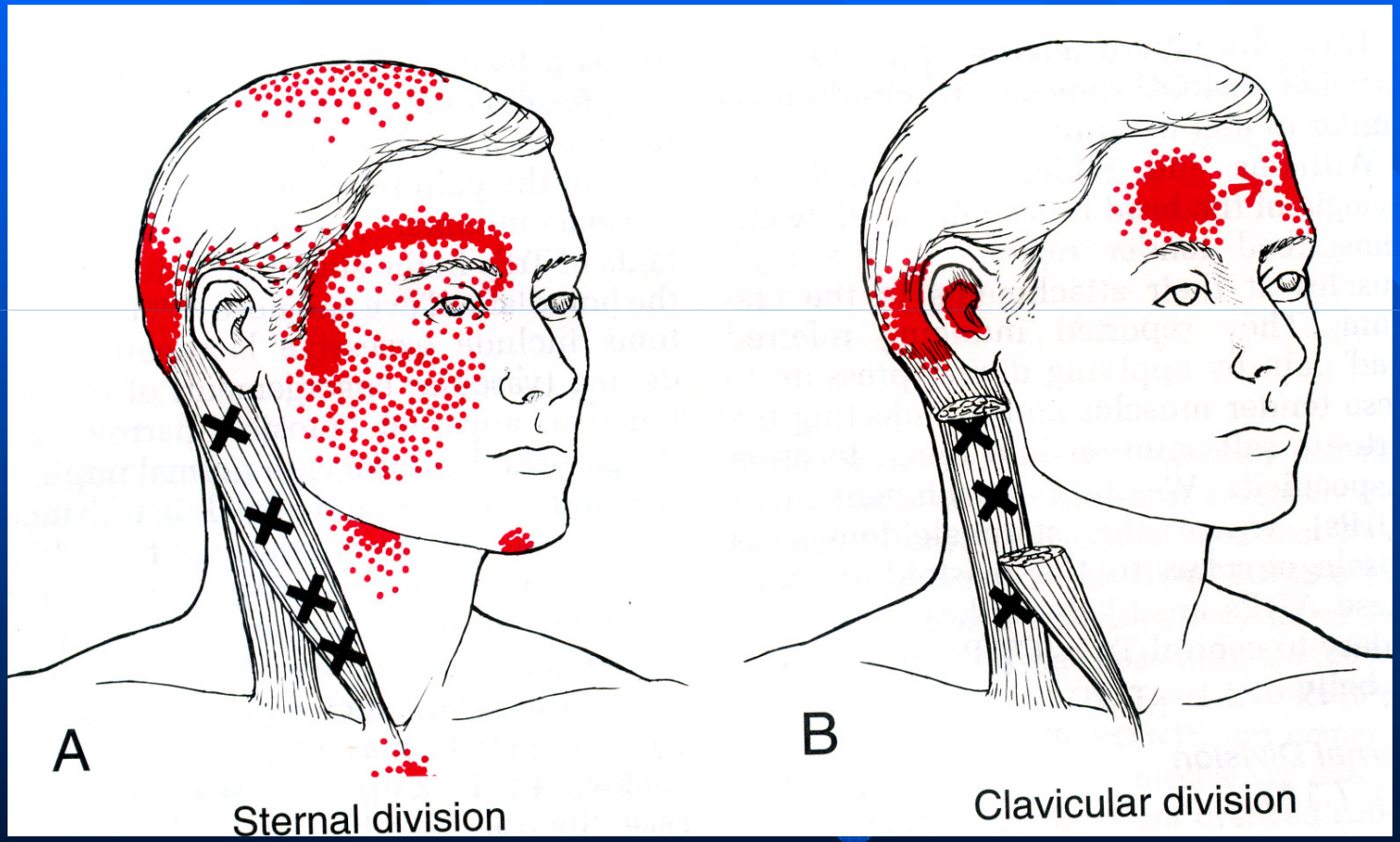
Upper Trapezius



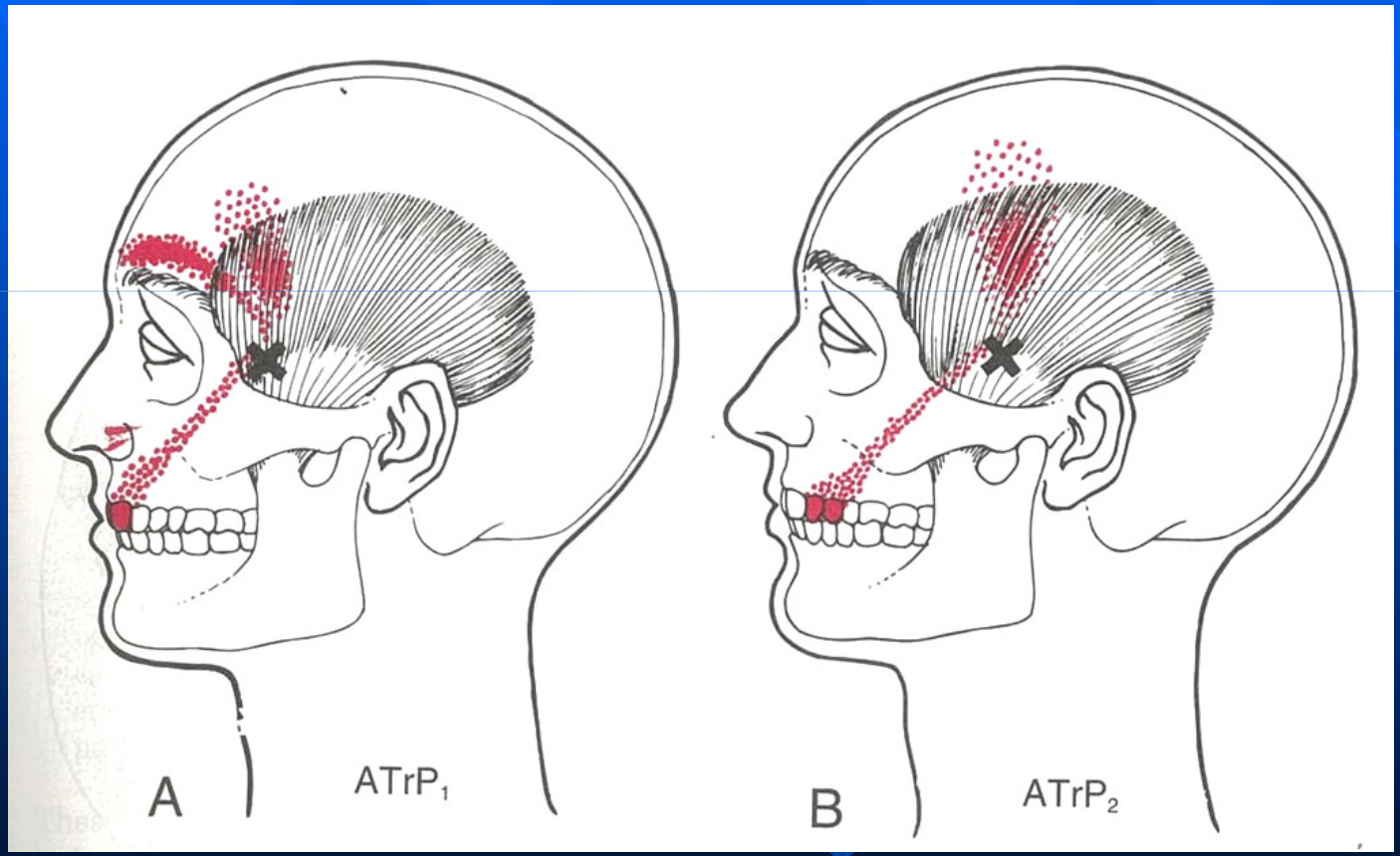
Levator Scapulae

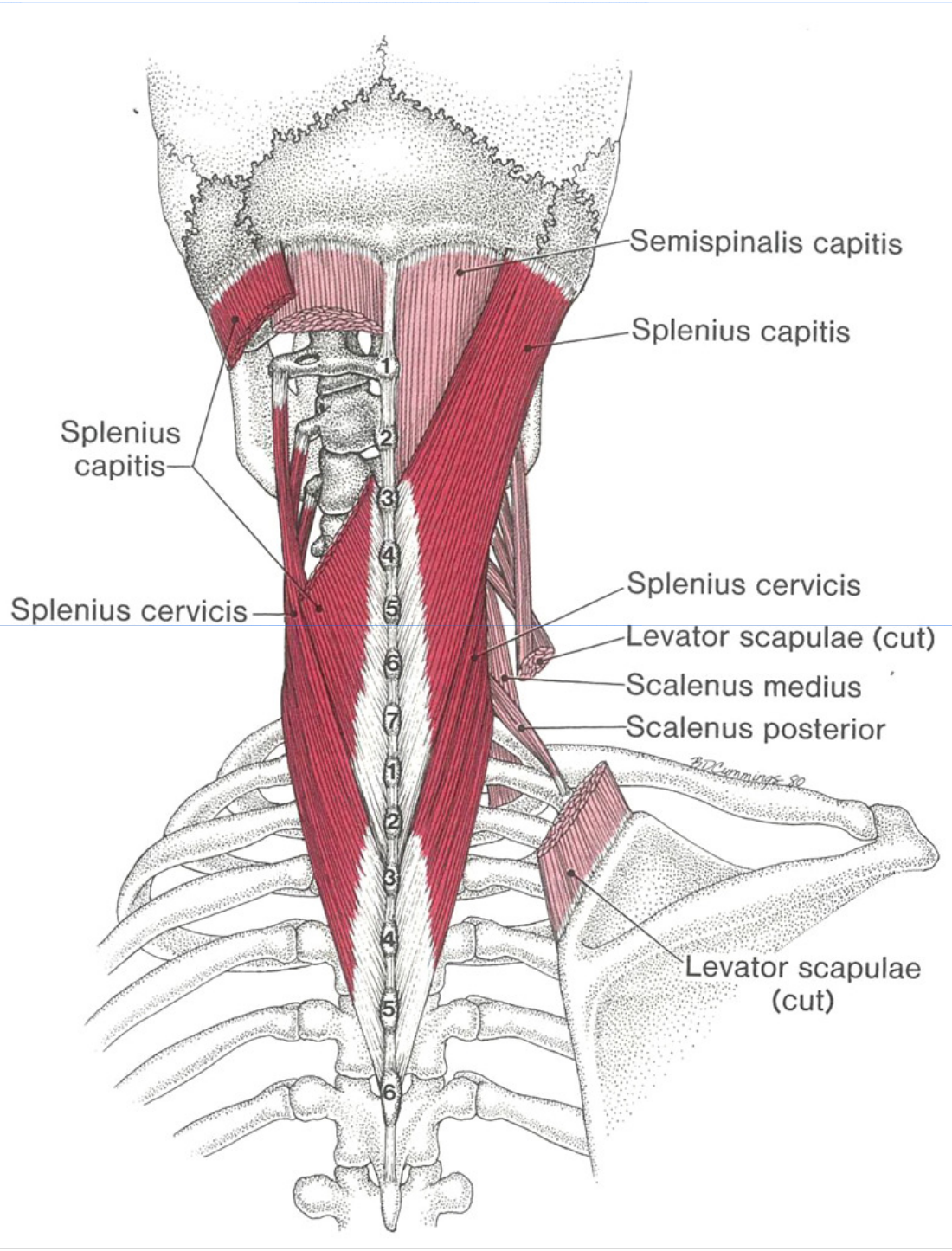


Sternocleidomastoid Muscle

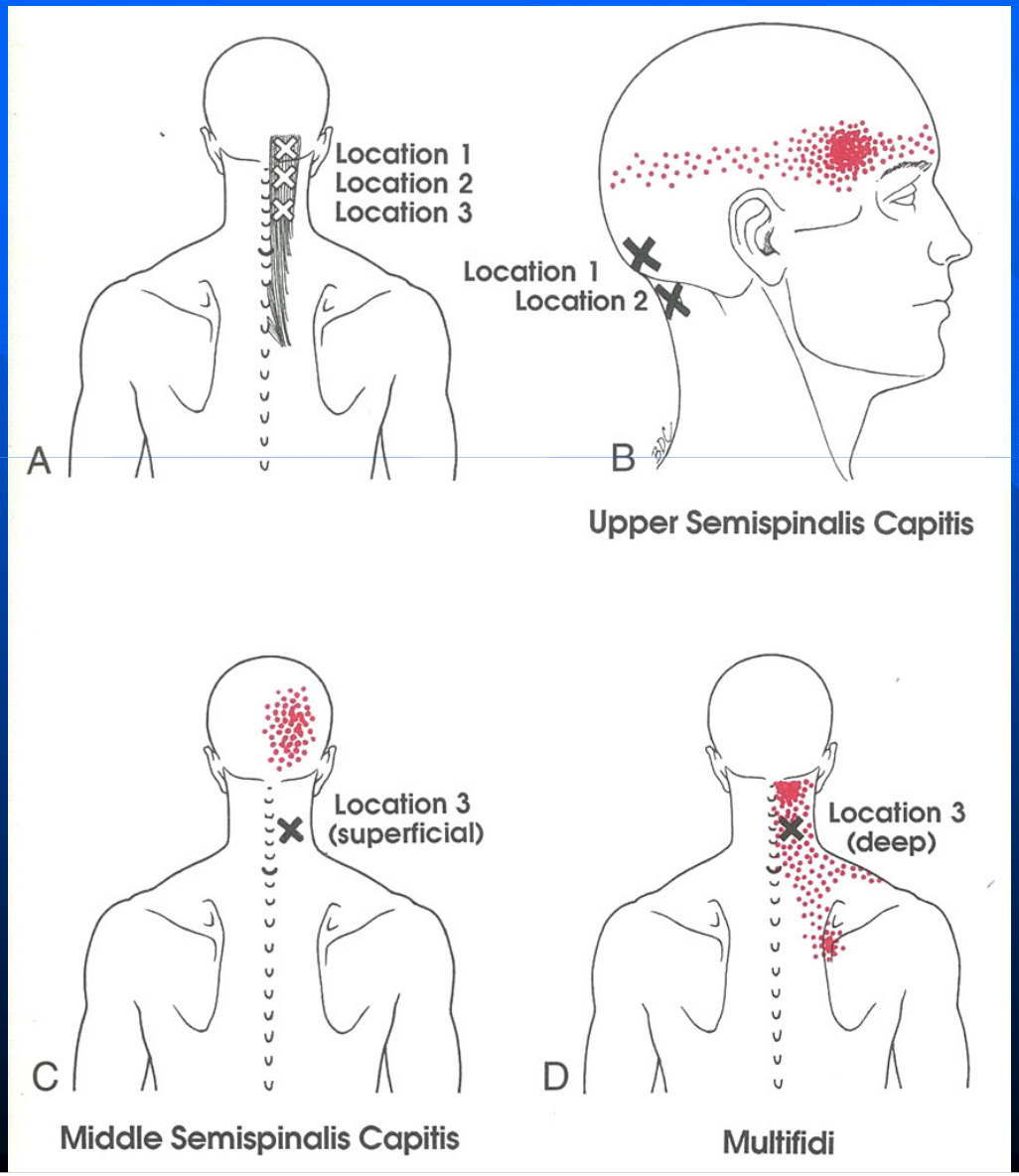


Temporalis

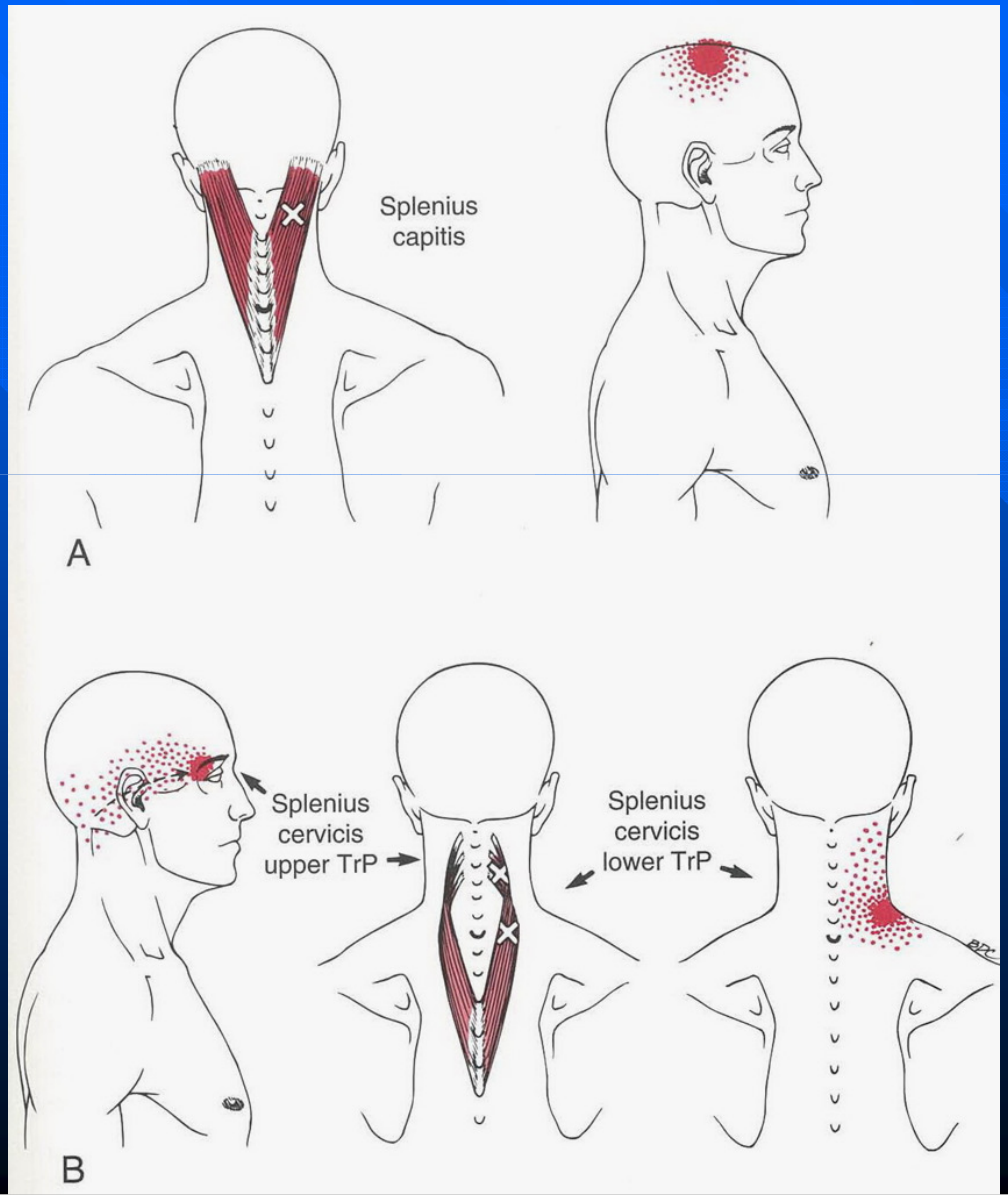


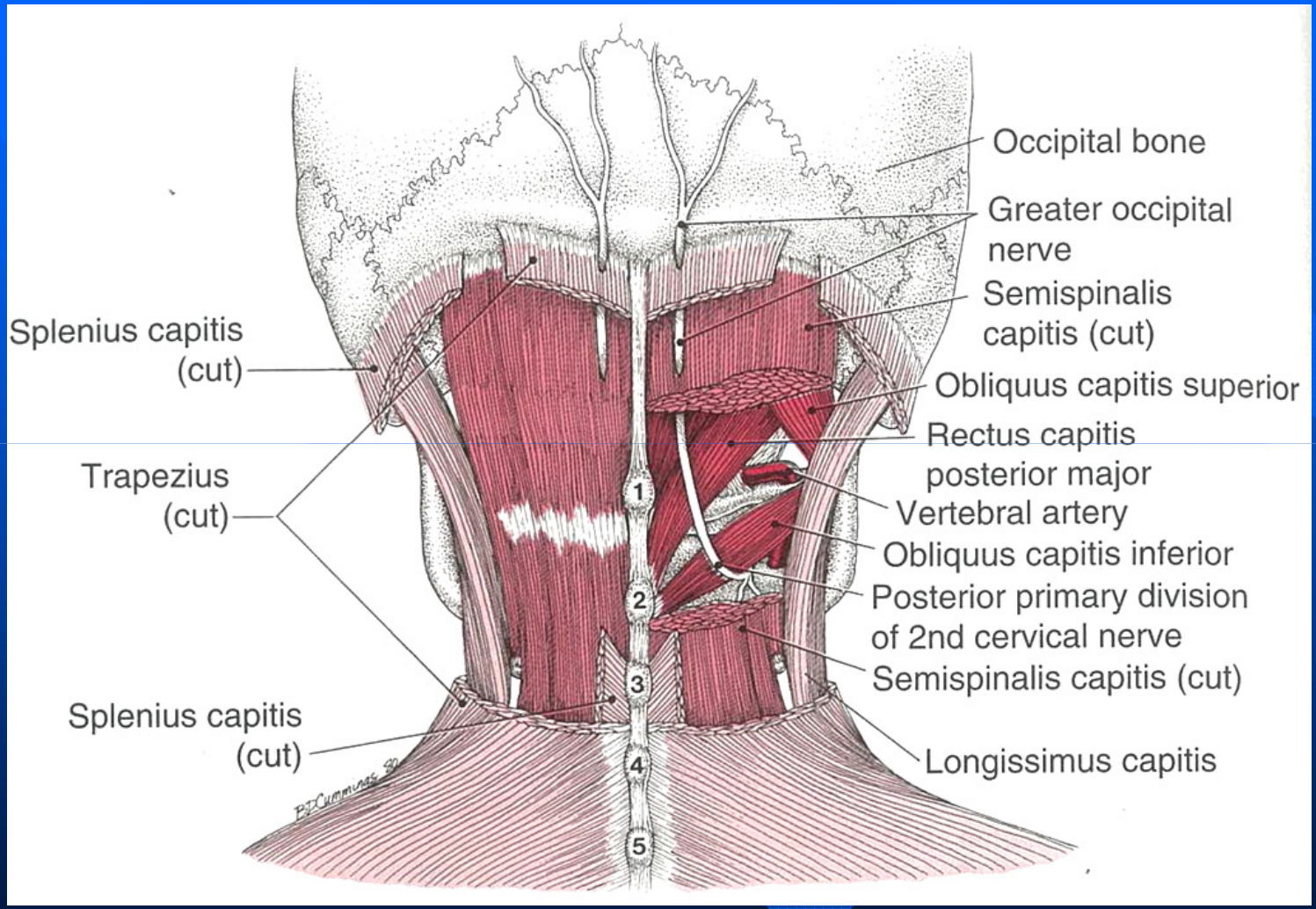

Semispinalis capitis
Splenius capitis
Splenius capitis
Splenius cervicis
Splenius cervicis
Levator scapulae (cut)
Scalenus medius
Scalenus posterior
Levator scapulae (cut)
1
2
3
4
5
6
7
1
2
3
4
5
6

Semispinalis capitis

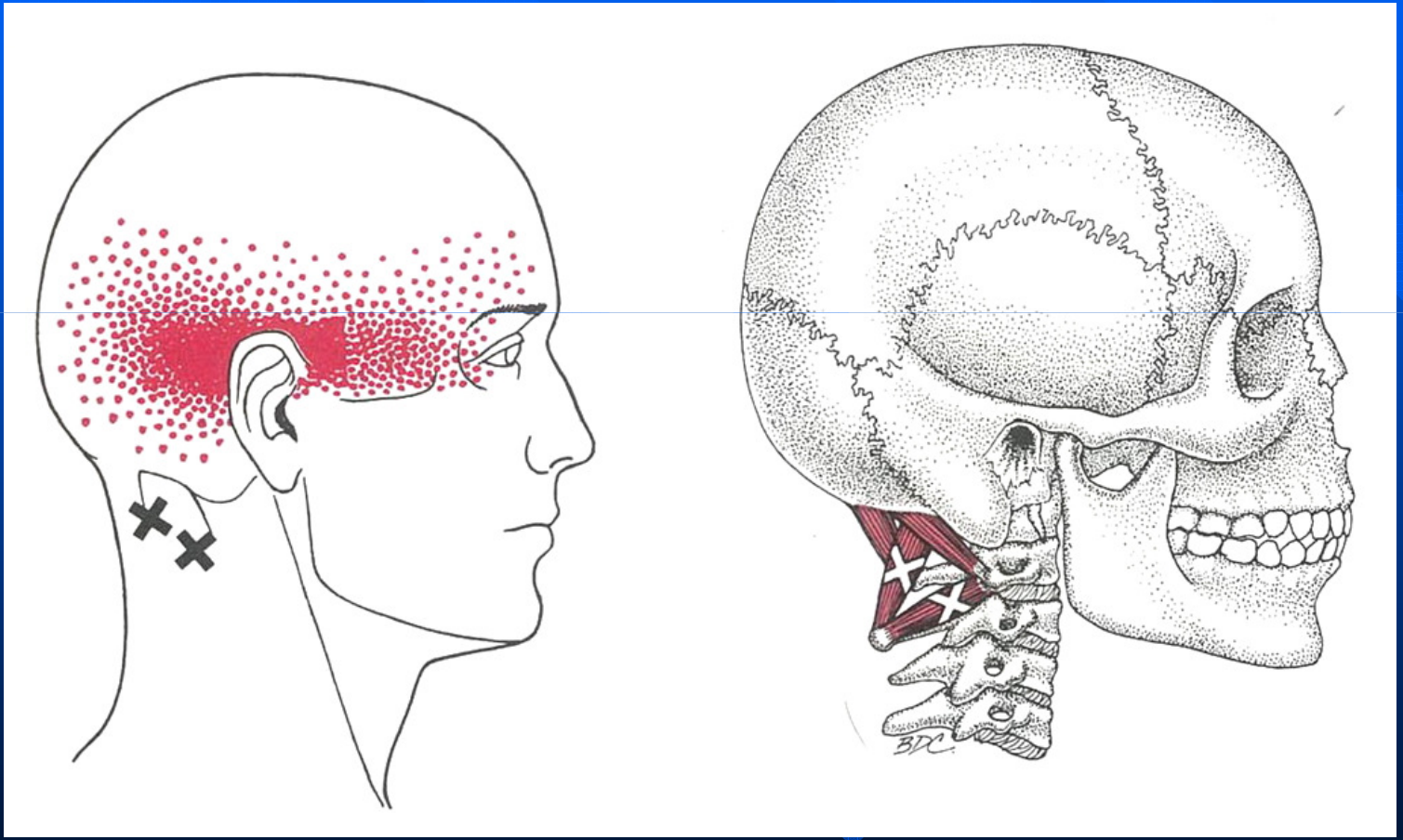


Splenius capitis & cervicis

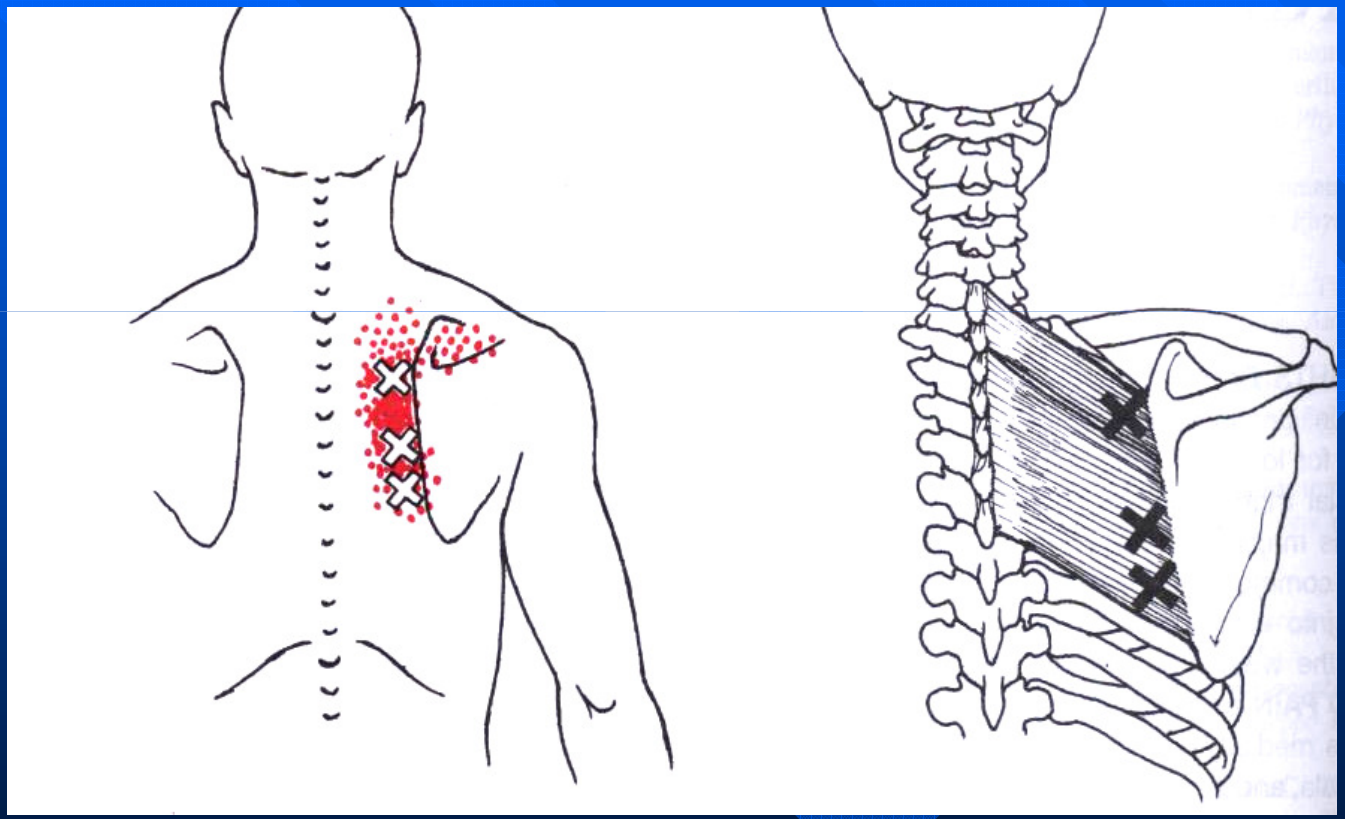



Occipital bone
Greater occipital nerve
Semispinalis capitis (cut)
Obliquus capitis superior
Rectus capitis posterior major
Vertebral artery
Obliquus capitis inferior
Posterior primary division of 2nd cervical nerve
Semispinalis capitis (cut)
Longissimus capitis
Splenius capitis (cut)
Trapezius (cut)
Splenius capitis (cut)
1
2
3
4
5

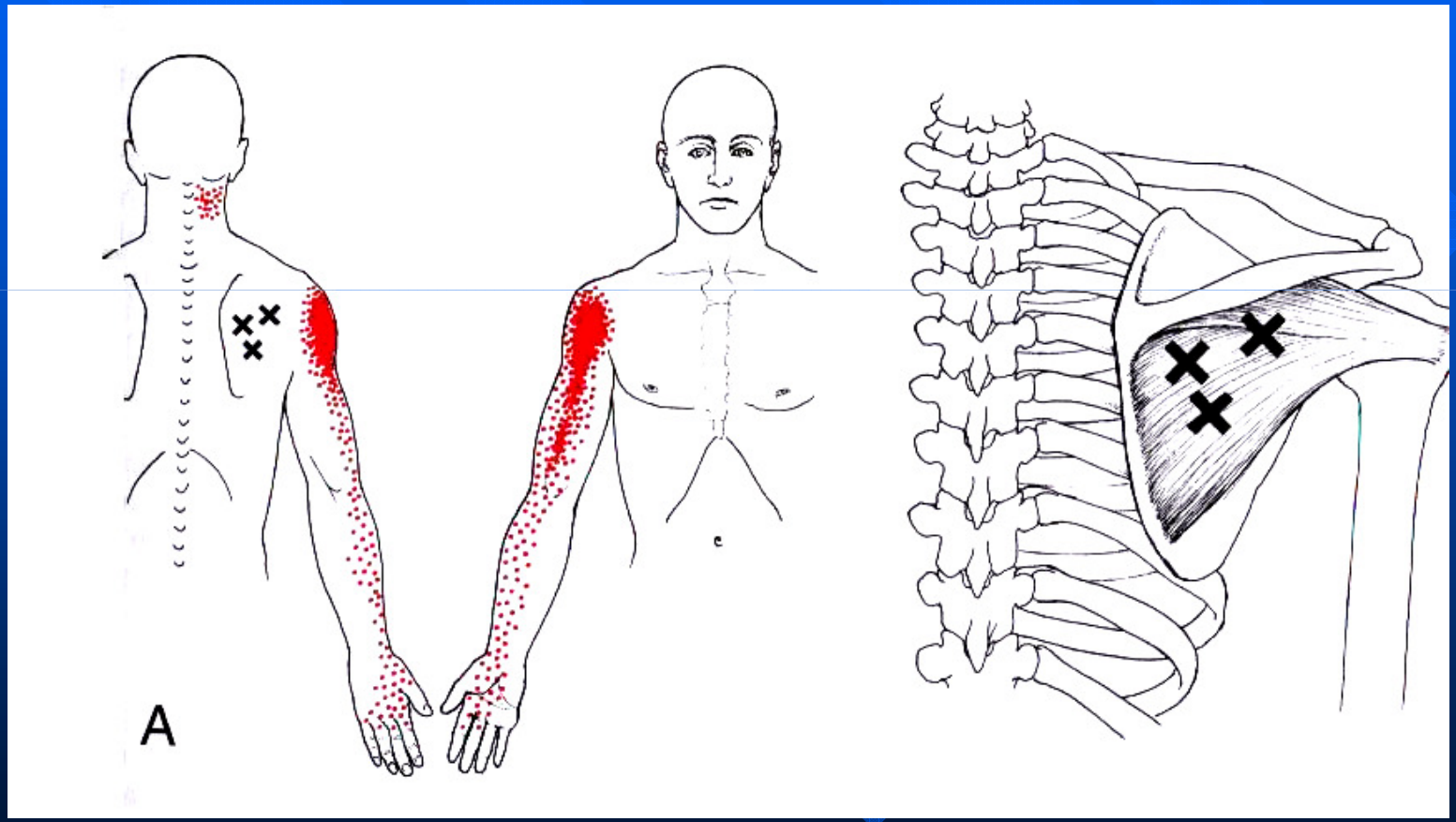
Suboccipital muscle



Rhomboid Major & Minor



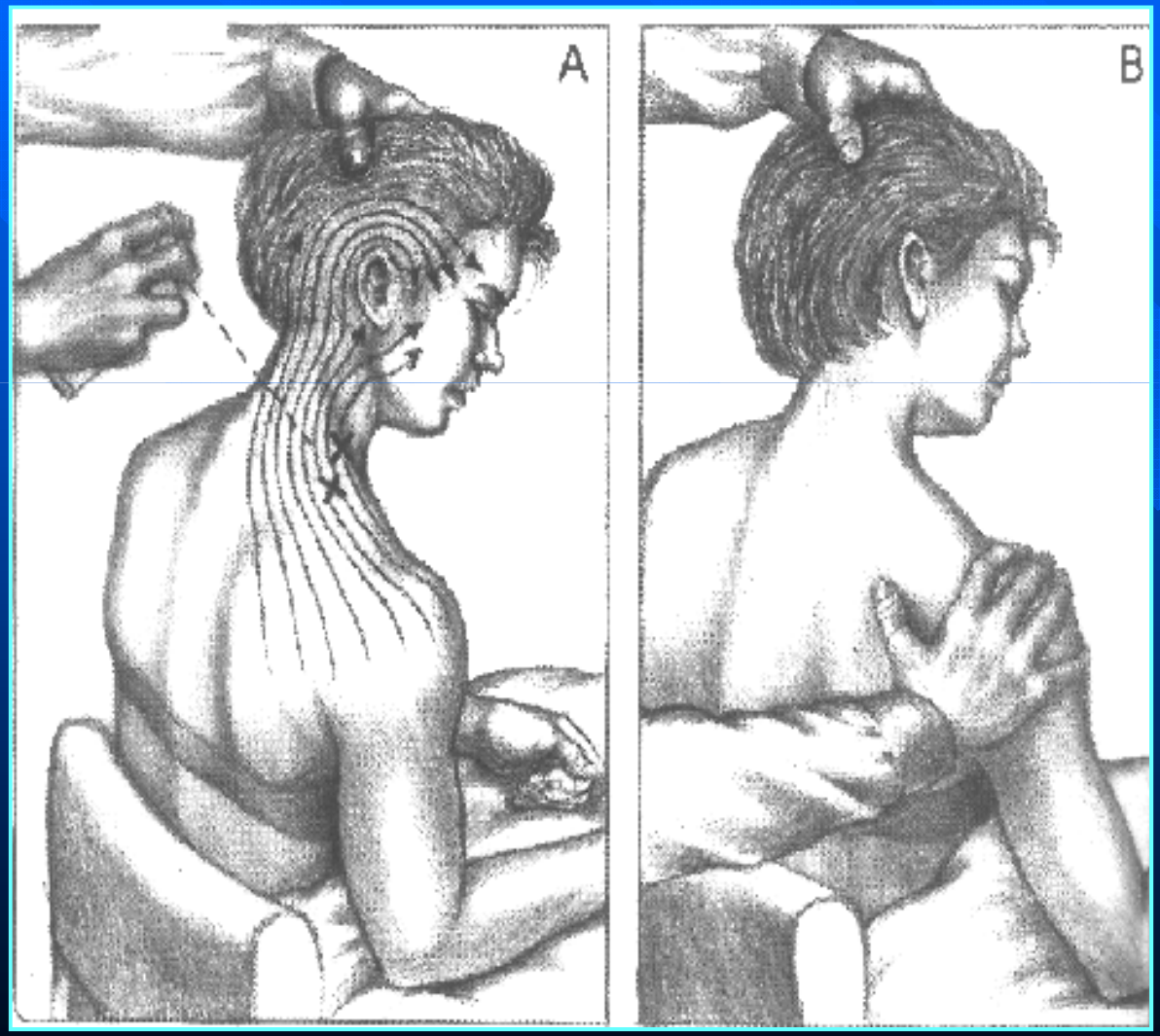
Infraspinatus



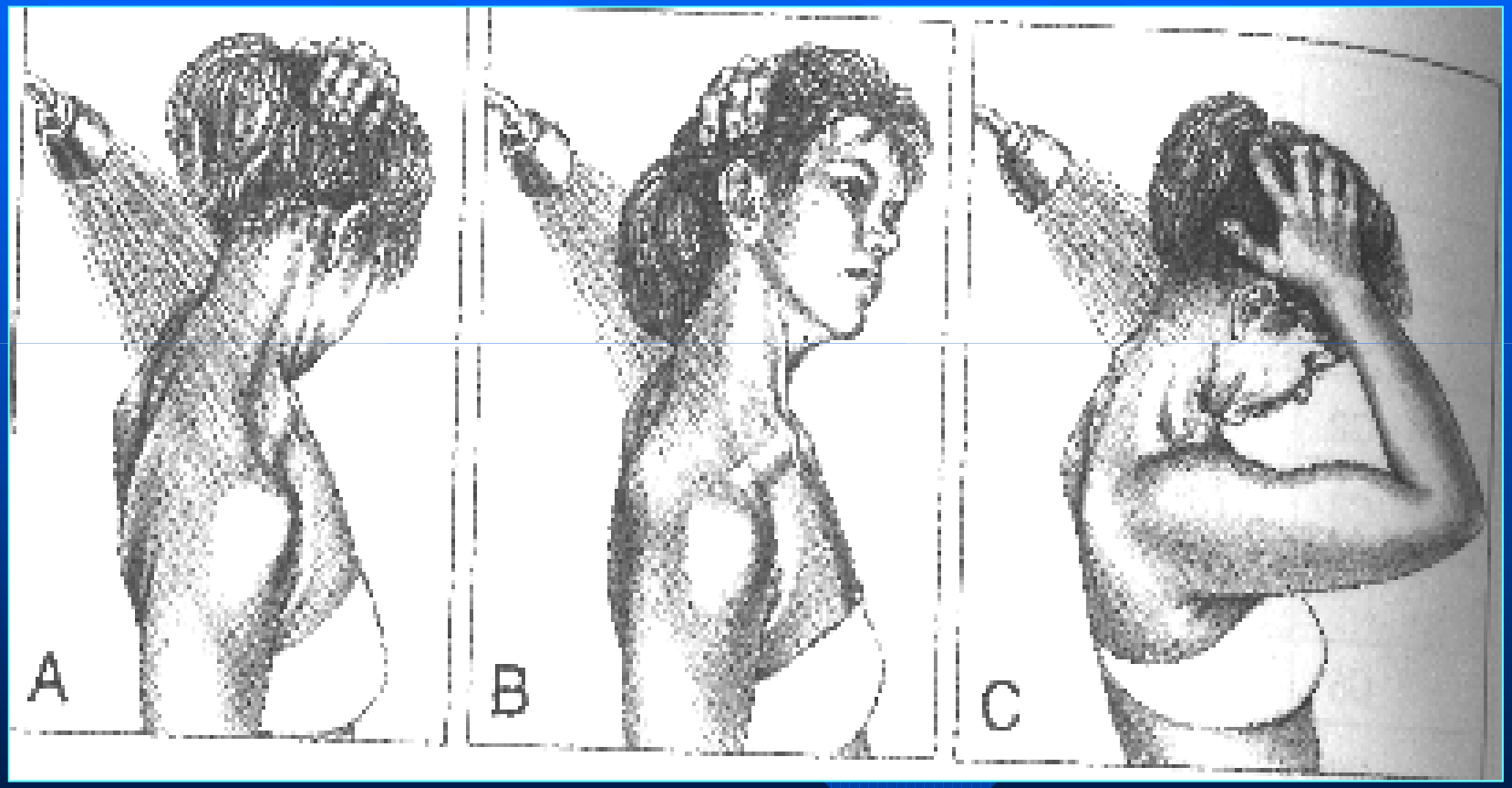
肌膜激痛點之治療方法

- **熱療**
  包括熱敷墊，短波，及超音波等
- **電療法**
  經由電刺激來促進肌肉放鬆
- **拉筋運動**
  應緩慢溫和的來促進肌肉放鬆

上斜方肌肌膜激痛點的冷噴與牽拉放鬆

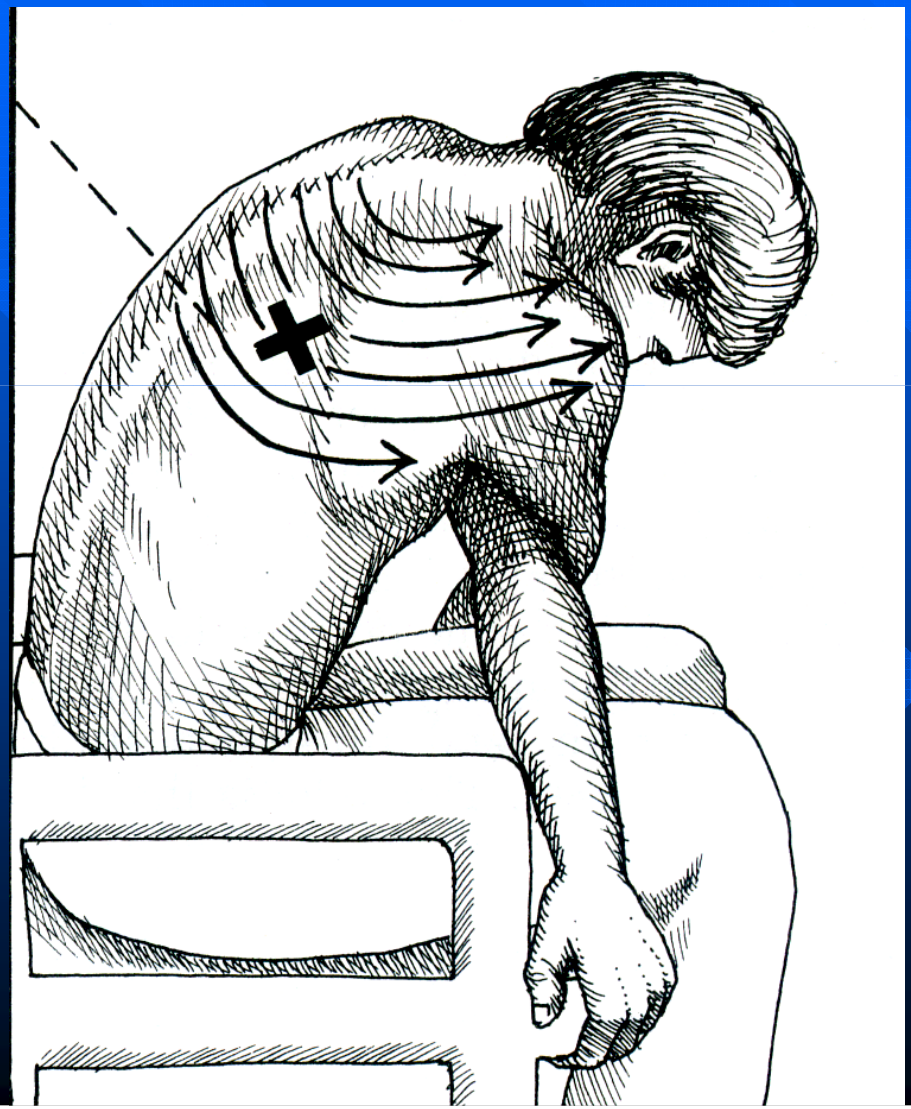


自我牽拉運動 (Self-Stretch Exercise)



提肩胛肌　　上斜方肌　　後頸肌

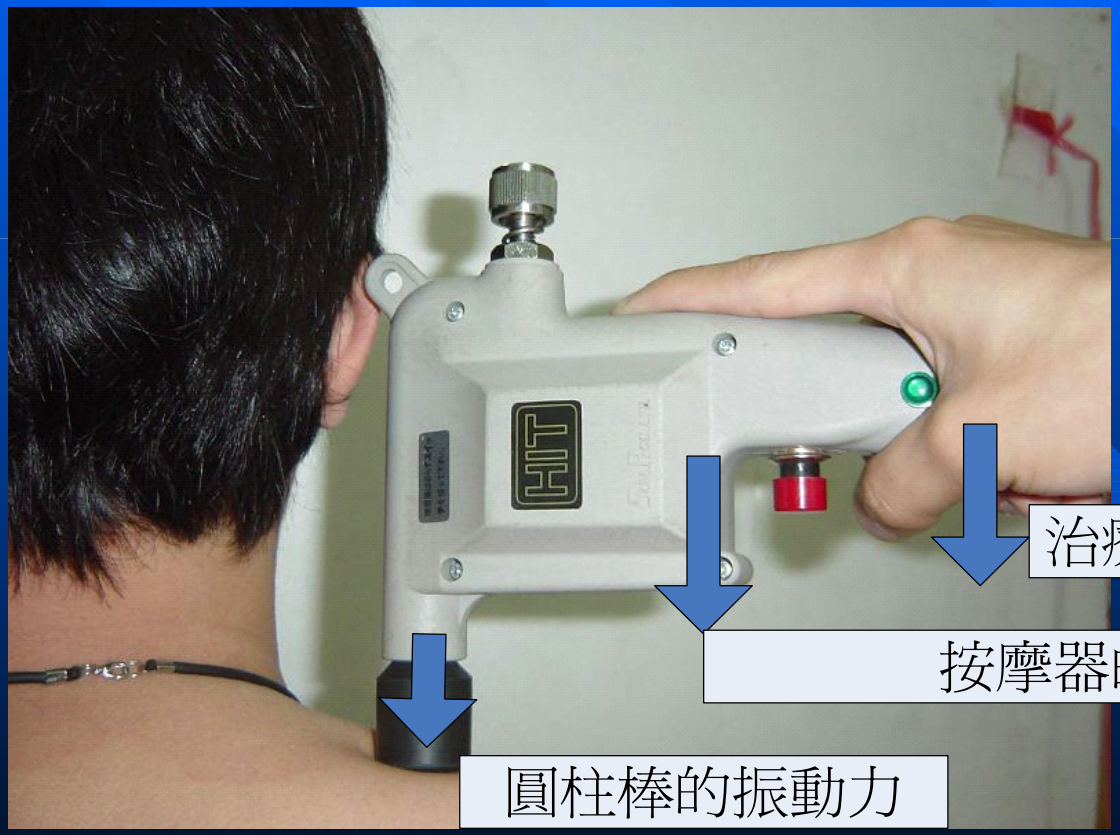
菱形肌牽拉運動



肌膜激痛點之治療方法

- **機械性刺激療法**
  - 機械性刺激可以誘發激痛點局部抽搐反應。
  - 按摩、指壓、拔罐、刮痧、針灸等可能均是經由提供不同程度的機械性刺激來緩解症狀。
  - 震波治療
  - 振動刺激治療

振動刺激治療



Hong's Technique for Myofascial Trigger Point Injection

Fast-in, Fast-out

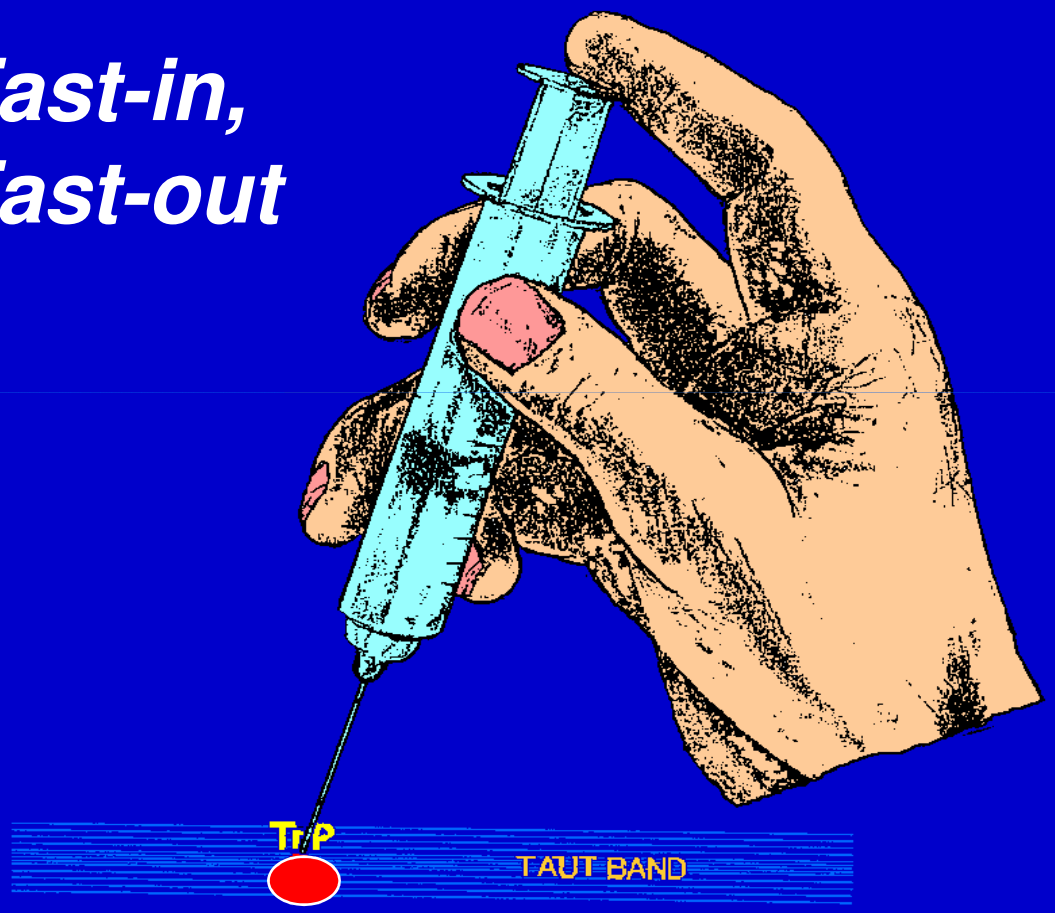
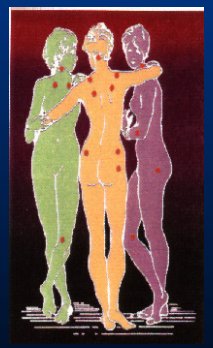
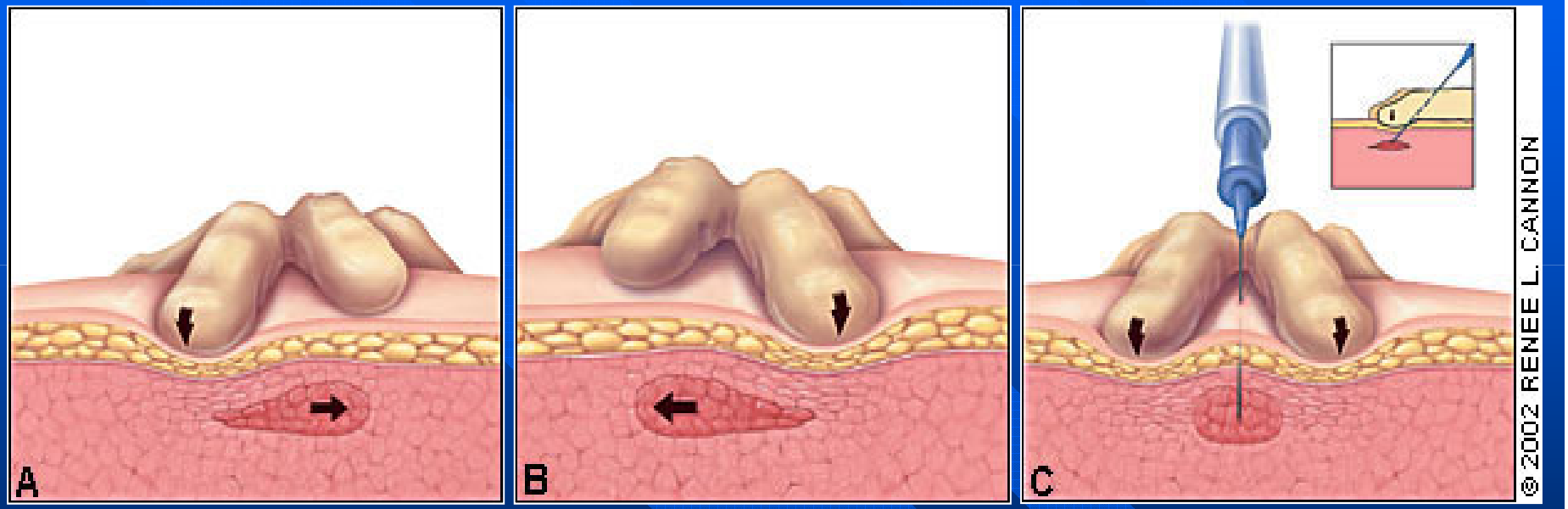


FIGURE Recommended way to hold syringe for trigger point injection.



(洪章仁 教授, 1994)

Myofascial Trigger Point Injection



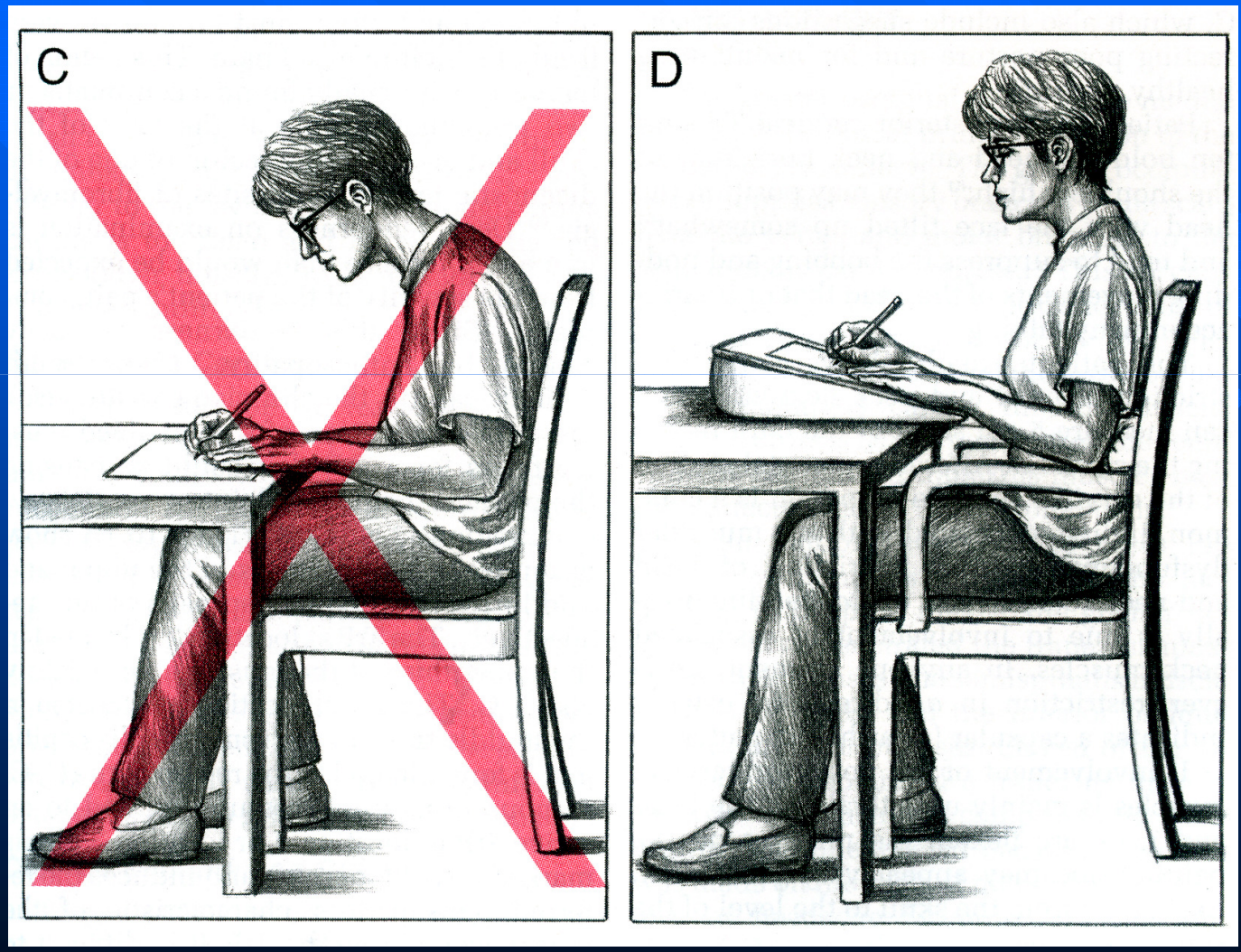
肌膜激痛點之治療方法

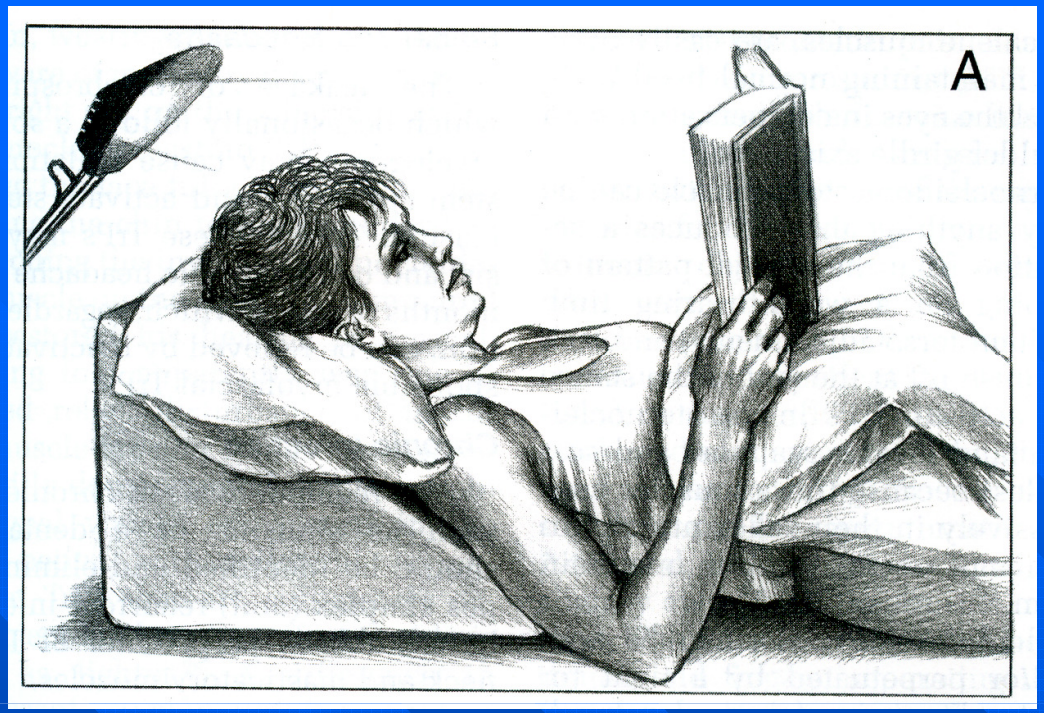
- **治療潛在病因**

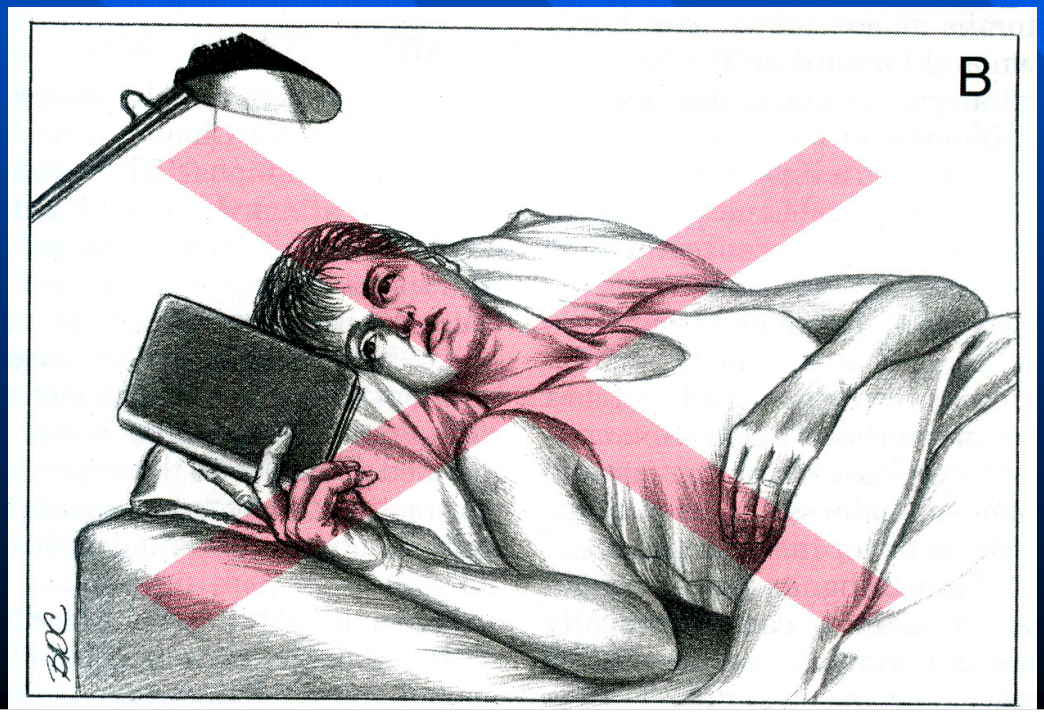
  找出誘發肌膜激痛點之病因而治療之。如果症狀在短時間內再發，表示其誘發之病因尚未被完全解決或控制。

- **Home programs**

  身心放鬆，良好睡眠，維持正確姿勢，自我拉筋運動， 熱敷， 指壓按摩等


C
D


A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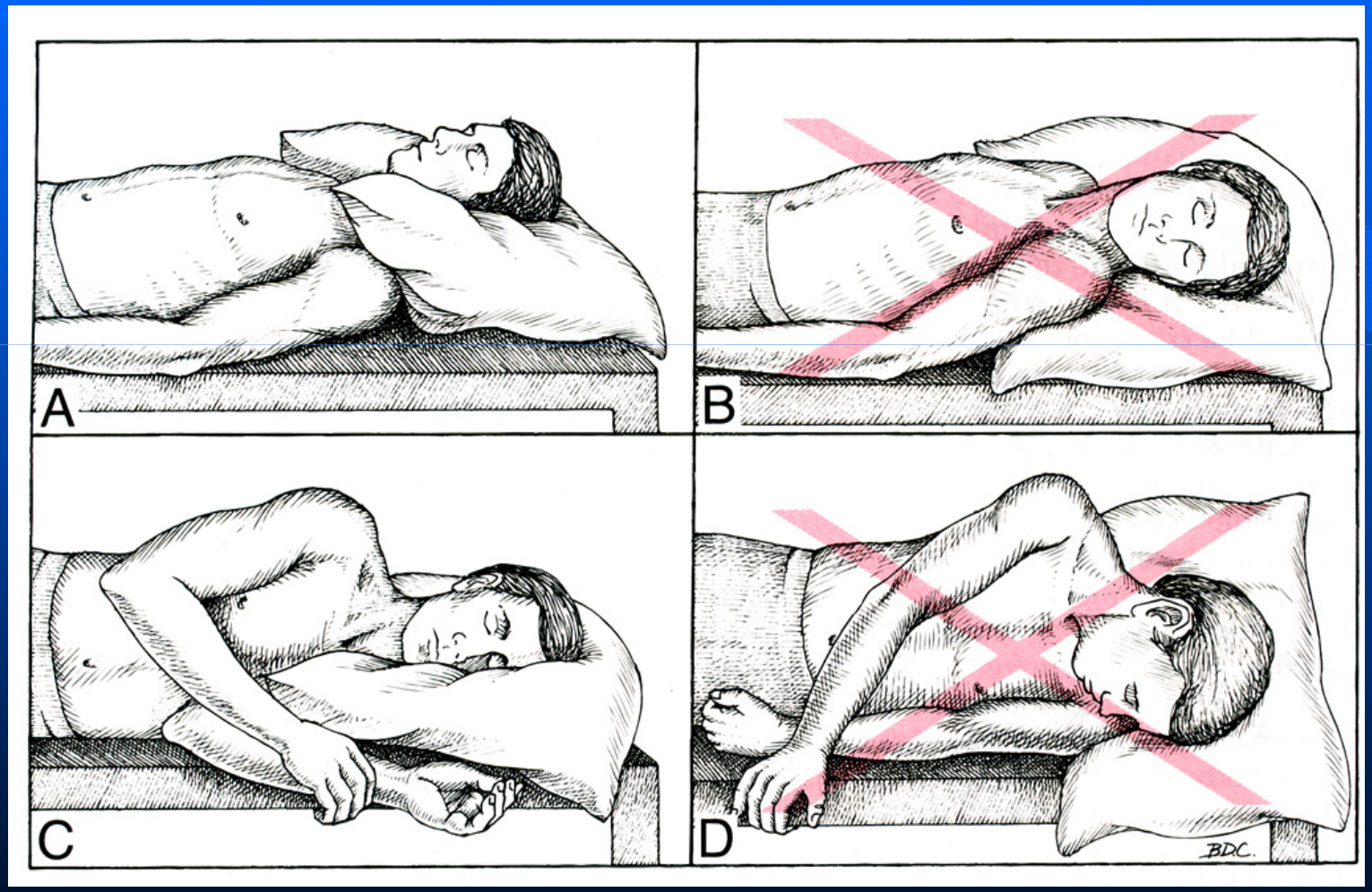
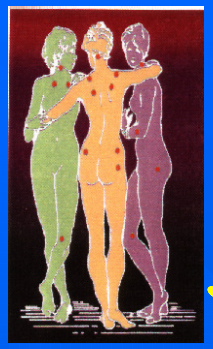
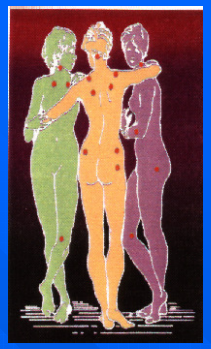

A
B
C
D
BDC.



謝謝指教



Thanks for Your Attention !