

AK & Nerve Entrapment

**How to uncover hidden problems
in the upper extremity**

With

Clive Lindley-Jones B.Ed. (Hons) D.O.
Teaching Diplomate

The International Board of Applied Kinesiology



Thank you for asking me to return to
your lovely country after 40 years!

40 years ago!





General Overview



C. L-J Seminars

<http://www.helixhouse.co.uk>

Applied Kinesiology is
the assessment of the
motor response to a
sensory challenge

AK는 sensory challenge에 대한
motor response를 평가하는
것이다

Applied Kinesiology is...

- *A system* which evaluates our structural, chemical and mental aspects.
- It employs muscle testing with other standard methods of diagnosis.

다른 standard한 진단방법과 함께 muscle testing 을 사용한다.

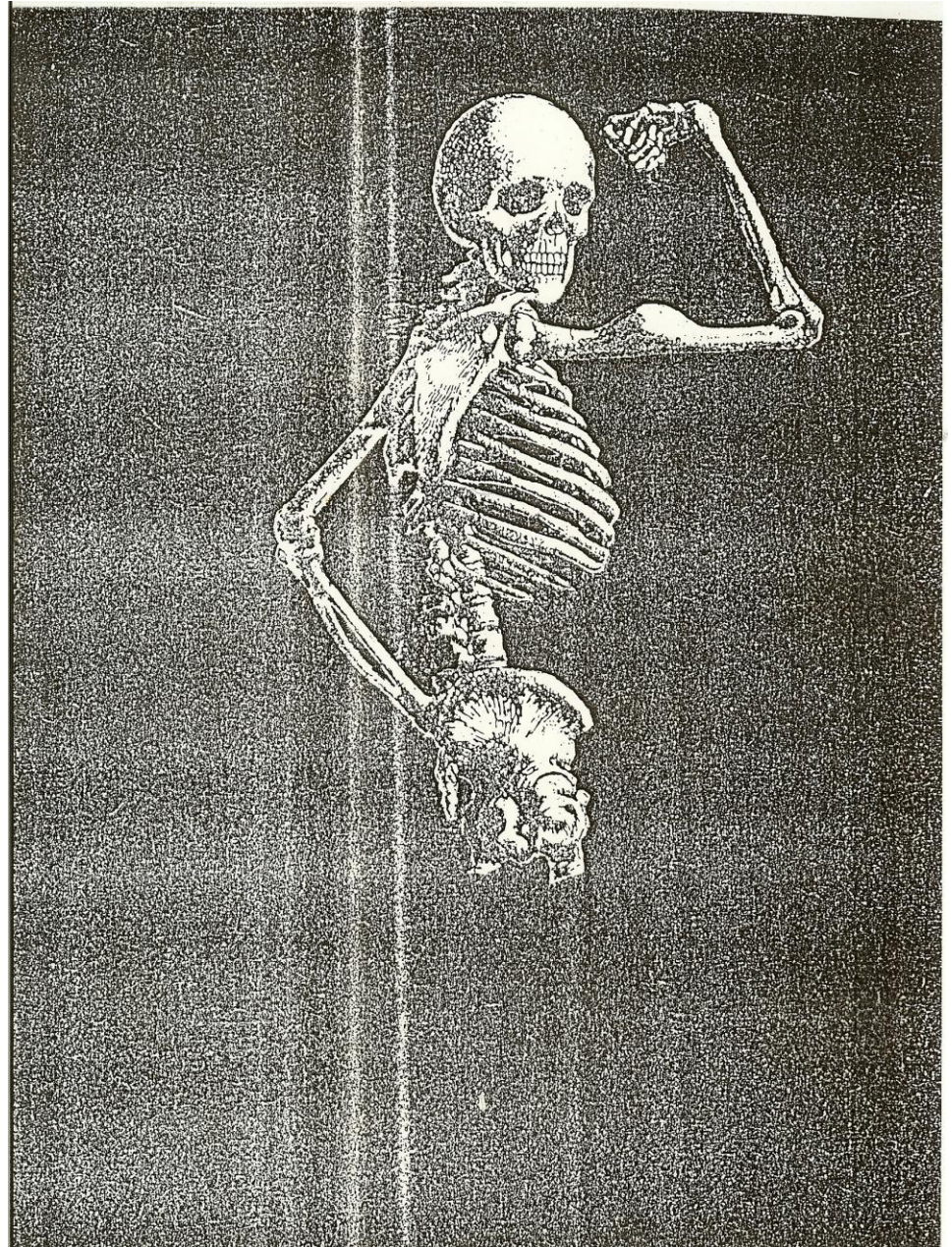
- Nutrition, manipulation, diet acupressure, exercise and education are used therapeutically to help restore balance and maintain well being throughout life.

In this advanced module we are going to **focus** on the structure.

이번 모듈에서는 structure에 초점을 맞추려 한다

But this does not exclude us remembering the other sides of the triangle of health and considering, at all times, whether they may be involved.

하지만 triangle of health 의 다른 부분들도 고려해야 한다.

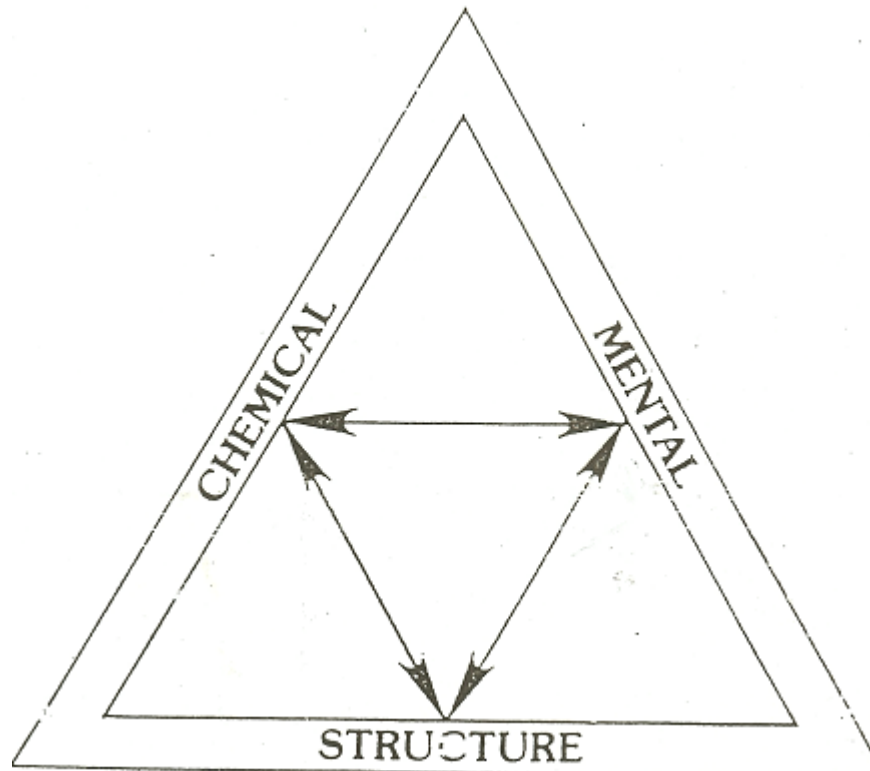


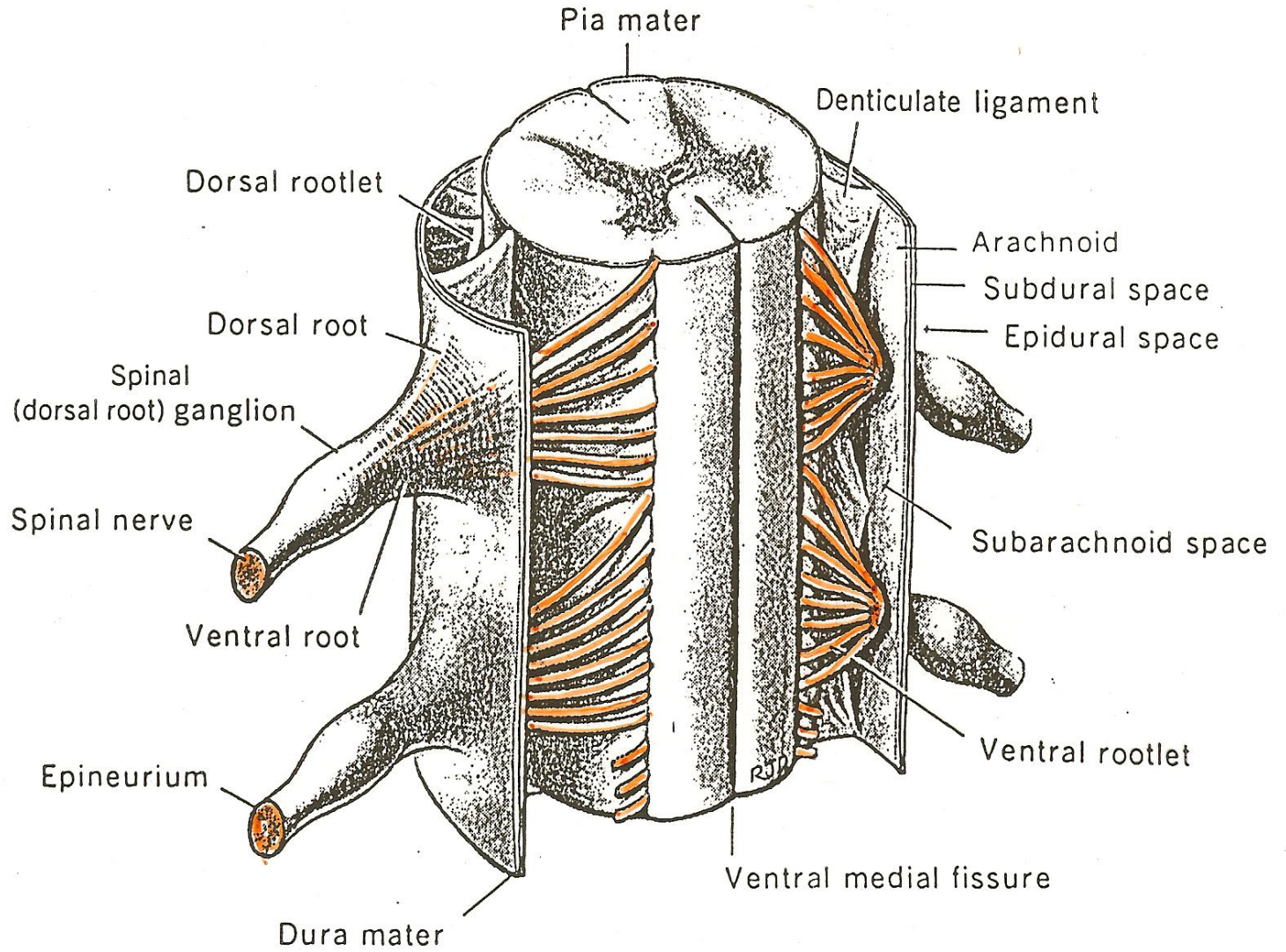
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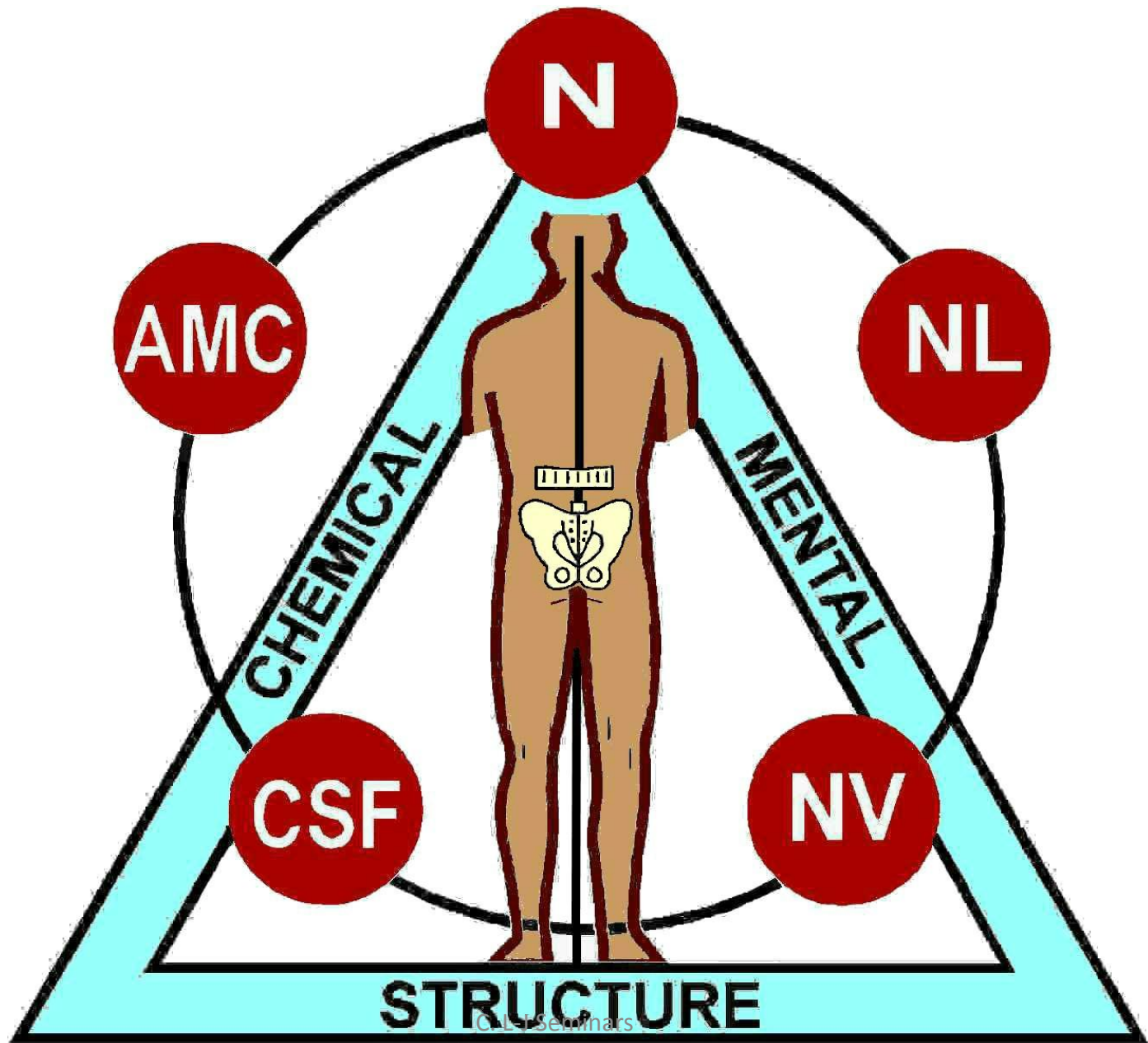
The body balance

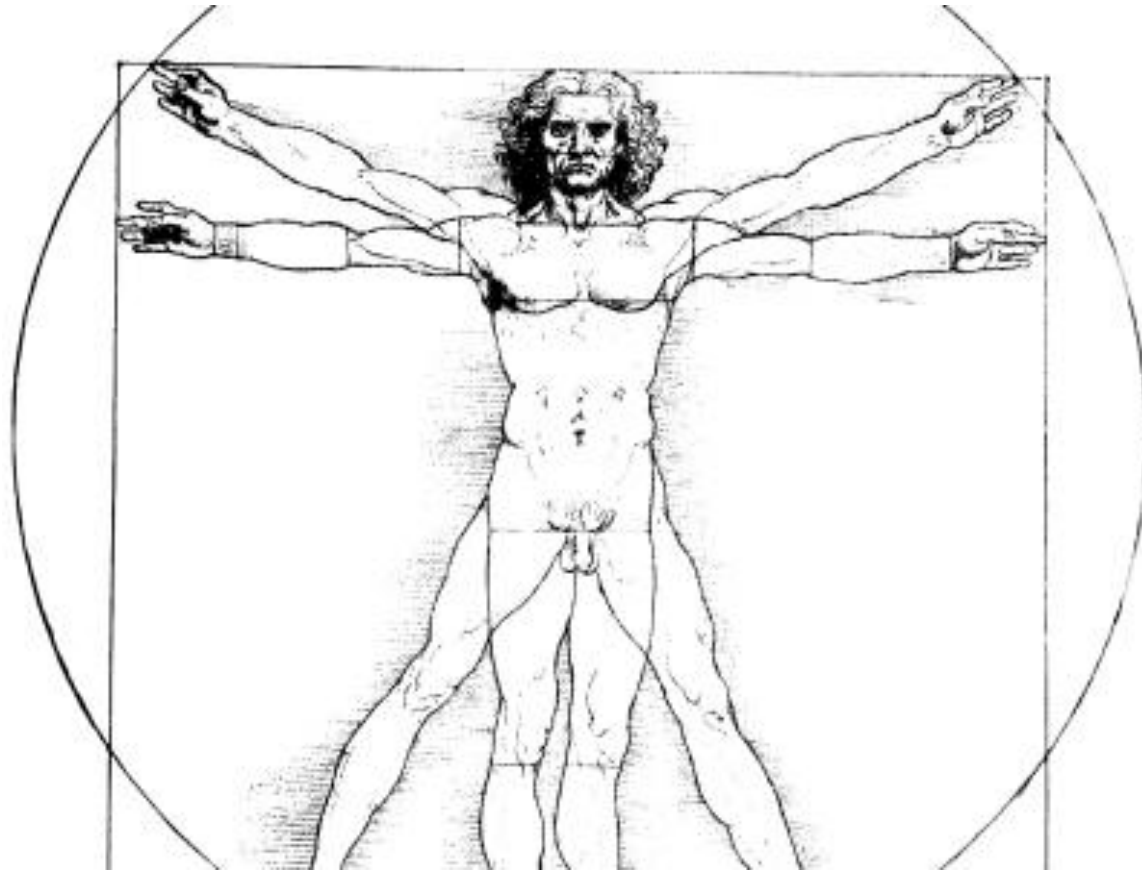
The AK Interpretation





Two segments of the spinal cord and its meningeal coverings.





Vitruvian Man

old style



The examination procedures of Applied
Kinesiology are really its essence

- *“The primary advantage of AK is its ready capability of finding a problem, determining what type of correction is of value, and finally, ascertaining if correction is obtained”.*

D. Walther

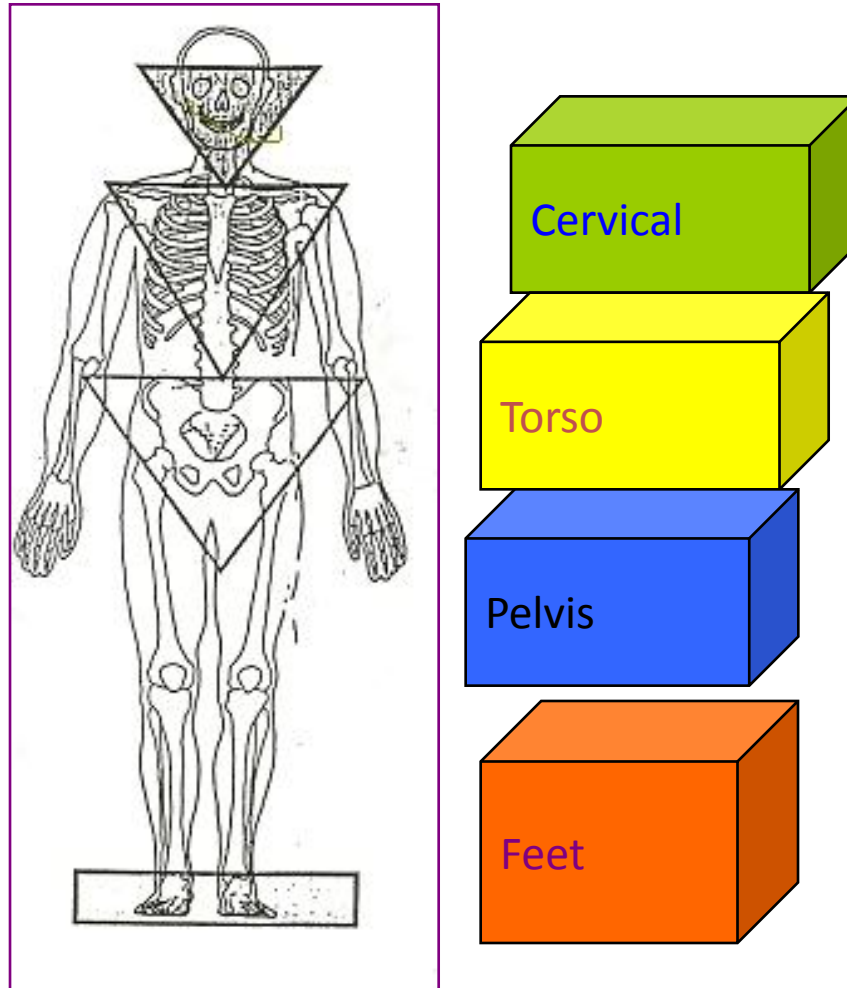
AK의 주된 장점은 즉시 문제를 찾을 수 있고 어떤 교정이 효과가 있는지, 그리고 교정이 잘 됐는지를 확인할 수 있다는 점이다.

Faulty Alignment

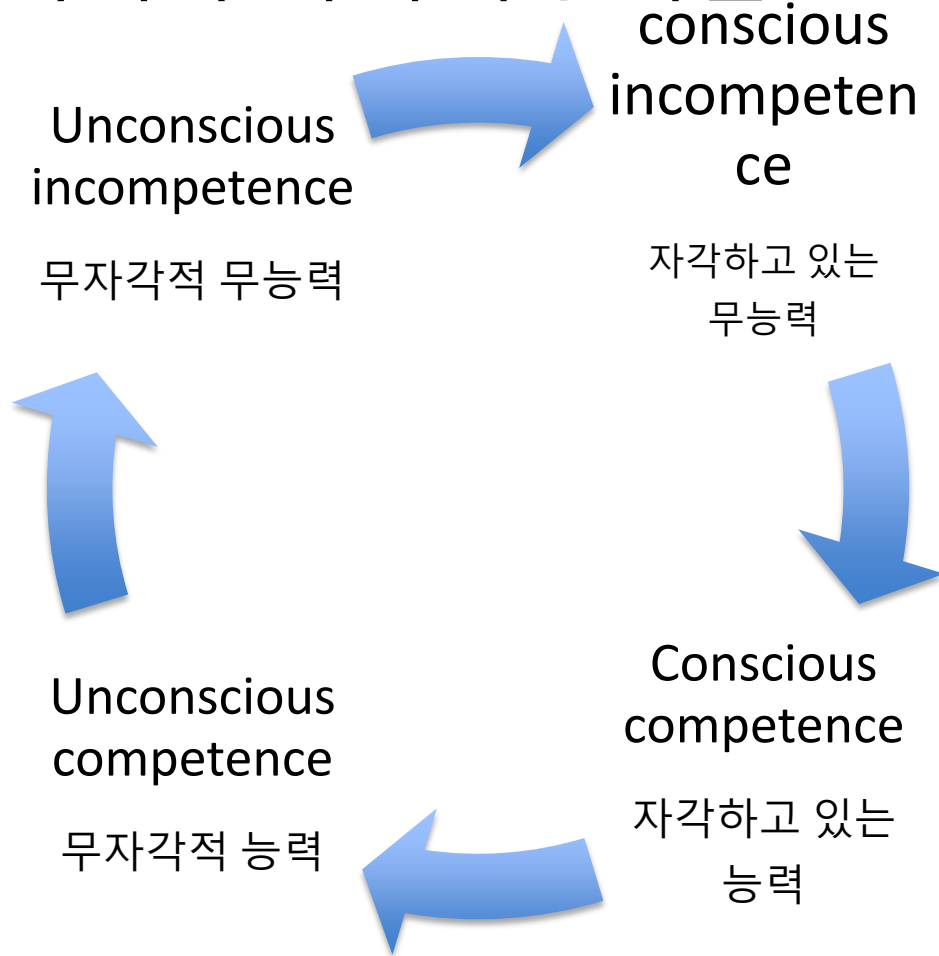
- Posterior View



The 'Big Four' Posture Components



The learners (sometimes) painful journey 배우는
사람들은 가끔 고통스런 배움의 여정을
통해서 무자각적능력을 길러야





Practice, practice, practice.



Components of Postural Alignment

Skeletal Structure	Soft Tissue Integrity	Neurological Control
Size and shape of bones	Ligamentous stability	Inborn reflexes
Alignment / function of joints	Balanced muscle support	Habit / psychology

Finding Hidden Problems

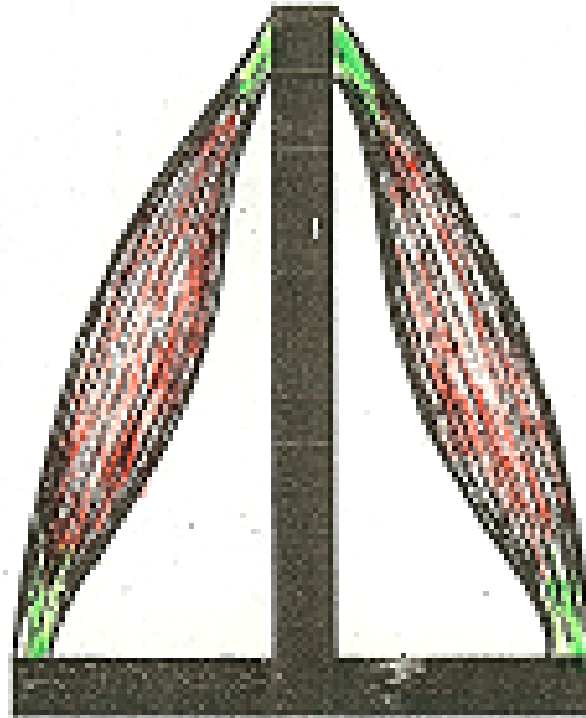


How does the artist allow the statue to escape from the stone?
예술가는 어떻게 돌에서 조각상을 탈출시킬까?



Muscular/structural function

- When muscular function is balanced
- Structure is balanced!
- 근육의 기능이 균형 잡히면, 구조도 균형 잡힌다.



Muscular/structural dysfunction

- If functional muscle weakness is primary
- The antagonist contracts from lack of opposition
- Generally this will lead to pain in the contracted muscle

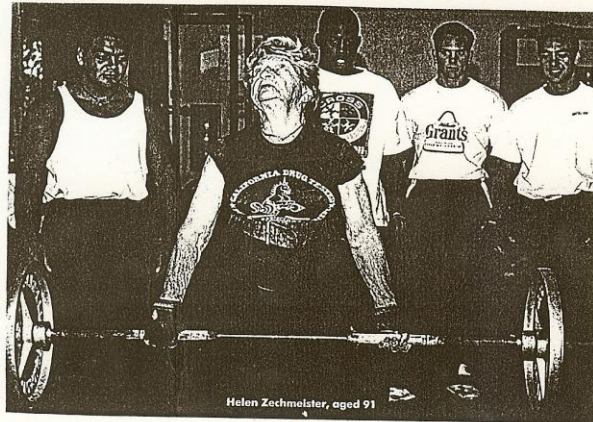
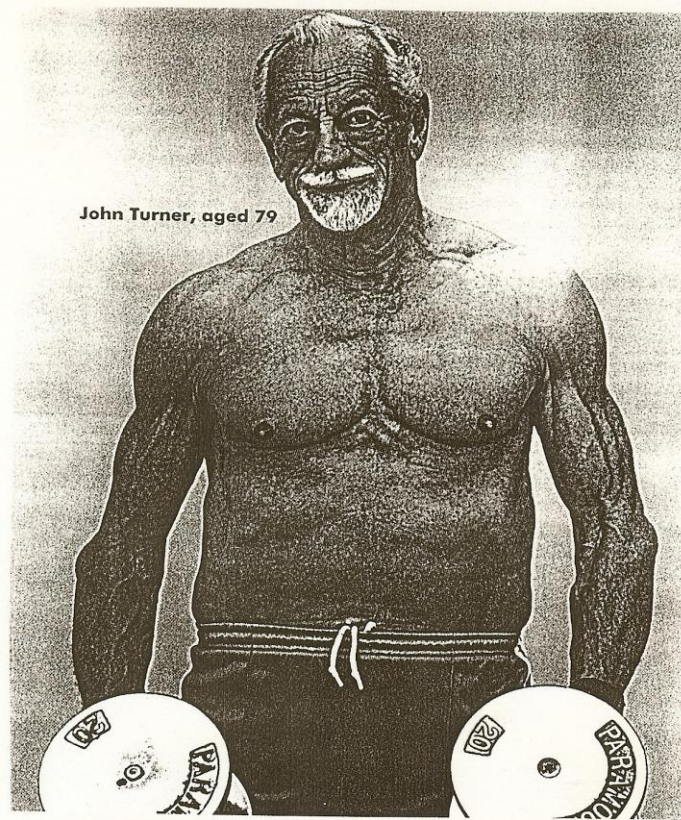
기능적 근육약화가 primary라면
길항근은 반대쪽의 약화로 인해 단축되며,
이는 단축된 근육에서 통증을 일으킨다



The Master: Paris, 1990.

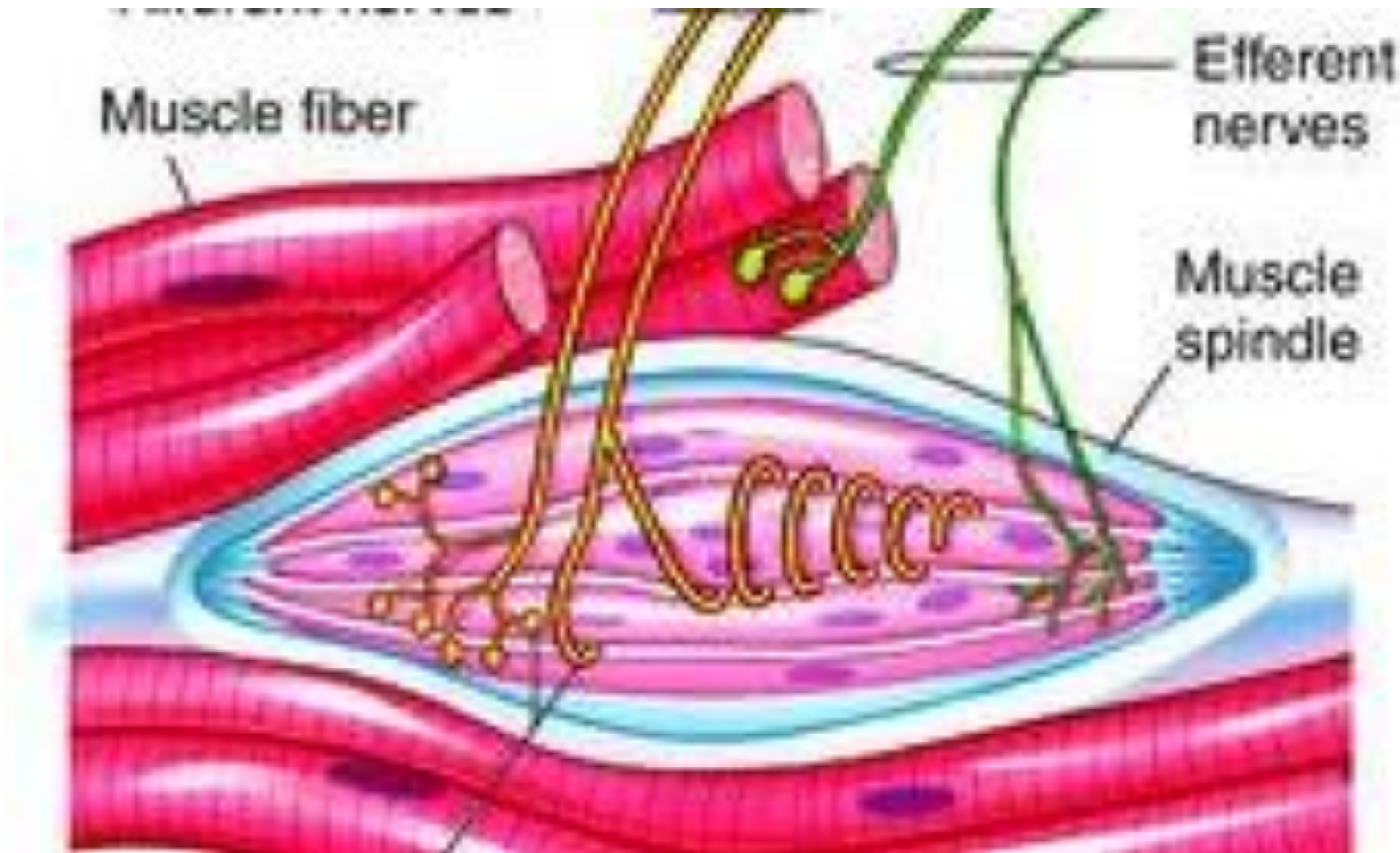


John Turner, aged 79



Helen Zachmelster, aged 91

Muscle Spindle



REACTIVE MUSCLES

- A Reactive Muscle is one that tests weak after another muscle has previously contracted.
- 반응성 근육은 그냥 검사하면 강한데, 다른 근육을 수축시키고 나서 검사를 하면 약해진다.

Goodheart postulates

- that the neuromuscular spindle is;
 - 'set too high'
 - thus as the primary muscle contracts;
- the 1a afferent impulses cause over abundant inhibition of an antagonistic muscle through the inhibited interneuron

반응성 근육에 대한 Dr. Goodheart의 가설은 신경근방추가 너무 높게 과긴장되어, 일차 근육이 수축함에 따라, 1a afferent impulses 는 inhibitor interneuron을 통해 길항근을 과도하게 억제시킨다.

- . E.g.
- knee pain, strong quads and hamstrings when tested separately but...
- when the hamstrings are tested, and then the quads immediately afterwards, *then* the quads become temporarily weak.
- These are, as you might expect, often, but not by any means exclusively, associated with athletic injury.
- 예를 들어서 무릎이 아픈 경우에 대퇴사두근과 슬근은 각각 검사했을 때는 강하지만, 슬근을 검사(수축)하고 바로 직후 대퇴사두근을 검사하면, 대퇴사두근이 일시적으로 약화된다.
- 이는 주로 운동 손상과 관련이 있다.

STRAIN COUNTER STRAIN

- **BODY'S MEMORY OF STRAINED STATE FROM A PRIOR MUSCLE INJURY OFTEN A REACTION TO A SYNERGIST MUSCLE SIMILAR TO TRIGGER POINTS OF Travell**
- 이전에 있었던 근육 손상으로부터의 긴장상태에 대한 몸의 기억은 종종 Travell의 트리거포인트와 비슷하게 협력근에 대한 반응에 의해서 생긴다.
 - Strain counter strain은 협력근의 수축에 의해서 생긴다는 말이다.

FASCIA

- **FACIAL SHORTENING IN RELATION TO MUSCLE CREATES A NEUROLOGICAL IMBALANCE IN CONTROL OF MUSCLE.**
- 근육과 비교하여 근막이 단축되면 근육 조절에 있어 신경학적인 불균형이 생긴다.
- 근막과 근육의 부조화로 인해서 생기는 문제는 fascial release를 해야 한다.

FASCIA

IF STRONG STRETCH MUSCLE AND RETEST MUSCLE

강한 근육을 스트레칭시키고 나서 다시 근육검사를 했을 때 약해지면, 근육과 근막의 disharmony가 생기고, fascial release 를 해야 하는 적응증이 된다.

FASCIA

- **TENDERNESS OF THE LENGTH OF THE BELLY OF THE MUSCLE MAY SUGGEST FASCIAL AGGLUTINATION**

근육의 belly를 누를 때 압통이 있거나 nodule 등이 만져지면 근막의 유착이 있다는 것을 의미한다.

FASCIA

- **IF NOW WEAK, TREAT FASCIA WITH HEAVY PRESSURE**

앞에서 말한 것처럼 스트레칭을 했을 때 근육이 약해지면 근육을 압력을 주면서 밀어서 fascial release로 치료한다.

1.

Use the history of the patient and the pain pattern to think what could be the hidden weakness?

환자의 기왕력과 통증 양상을 이용하여 무엇이 숨겨진 약함일지 생각한다

2.

Use your reactive muscle chart
to test brainstormed
hypothesis of what muscles
may be weak in a reactive
manner in the area of pain.

반응성 근육 차트를 이용하여 통증 부위에서 어떤 근육이 반응성으로
약할지에 대한 가설을 검사한다.

3.

Consult your muscle action chart to consider further.

muscle action chart를 참고

4.

Remember the reactive muscle is the one that goes weak *after* you have contracted the suspected reactive one.

반응성 근육은 의심되는 근육을 수축한 이후 약해지는 근육이다

I.e. patient has unexplained pain in the right shoulder. All muscle are strong in the clear, however if you test the left Upper Trap and then immediately test the right one it *then* becomes hypotonic.

예)오른쪽 어깨통증- 모든 근육이 처음에는 강하게 검사되나, 왼쪽 상부승모근을 수축하고 다시
오른쪽 근육을 검사하면 약해진다

In this case we would need to address your therapy to sedate the left upper Trapezius.

이 경우 왼쪽 상부승모근을 진정시키는 치료가 필요

5.

then consider the right upper
Traps synergists for
Strain Counter Strain,
dysfunction by repeated tests
And...

오른쪽 상부승모근 협력근의 Strain Counter Strain을 고려

6.

Then look for any weakening on stretch in any antagonists for a ***Fascial Flush*** reaction.

길항근이 스트레치됐을 때 약해지는 Fascial Flush 반응을 찾는다

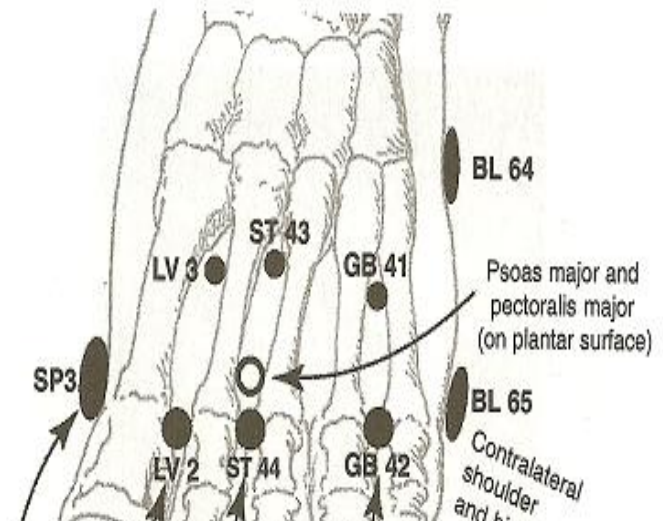
7.

Finally it would be a good idea
to check for any ***gait test***
dysfunction

*gait test dysfunction*을 검사

continuing dysfunction.'

1. Use the history of the patient and the pain pattern to think what could be the hidden weakness?
2. Use your reactive muscle chart to test brainstormed hypothesis of what muscles may be weak in a reactive manner in the area of pain."
3. Consult your muscle action chart to consider further.'
4. Remember the reactive muscle is the one that goes weak after you have contracted the suspected reactive one. I.e. patient has unexplained pain in the right shoulder. All muscle are strong in the clear, however if you test the left Upper Trap and then immediately test the right one it then becomes hypotonic. In this case we would need to address your therapy to sedate the left upper Trap"
5. and then consider the right upper Traps synergists for **Strain! Counter! Strain,** dysfunction by repeated tests and"
6. Then look for any weakening on stretch in any antagonists for a **Fascial! Flush** reaction.'
7. Finally it would be a good idea to check for any **gait!test!dysfunction!**



Applied Kinesiology & Nerve Entrapments of the Upper Extremity

Double crush syndrome

Double crush syndrome:

hypothesis of **Upton & McComas**, that neural function is impaired because single axons, having been compressed in one region, become especially susceptible to damage in another site. This depends on the idea of impaired axoplasmic flow and the interference to trophic substances flowing down the nerve.

신경이 한 부위에서 압박되면 다른 부위에서의 손상에 더욱 예민하게 된다. 이는 손상된 axoplasmic flow와 영양물질이 차단되기 때문이다.

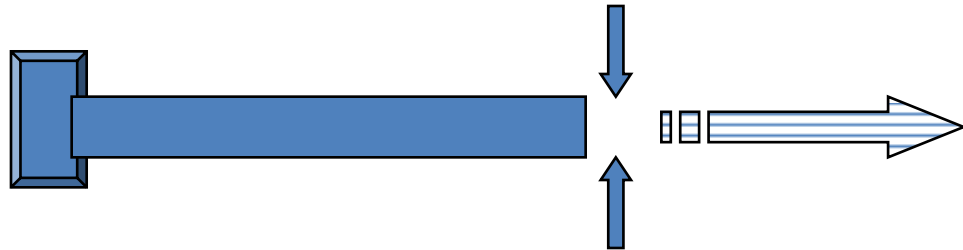
A) No compression



Axoplasmic Flow

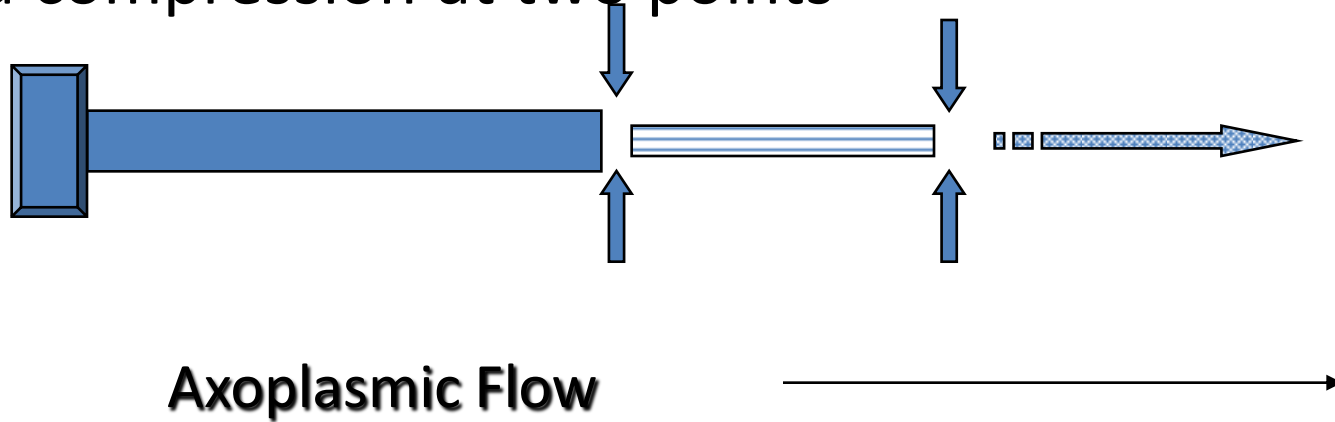


B) Mild compression

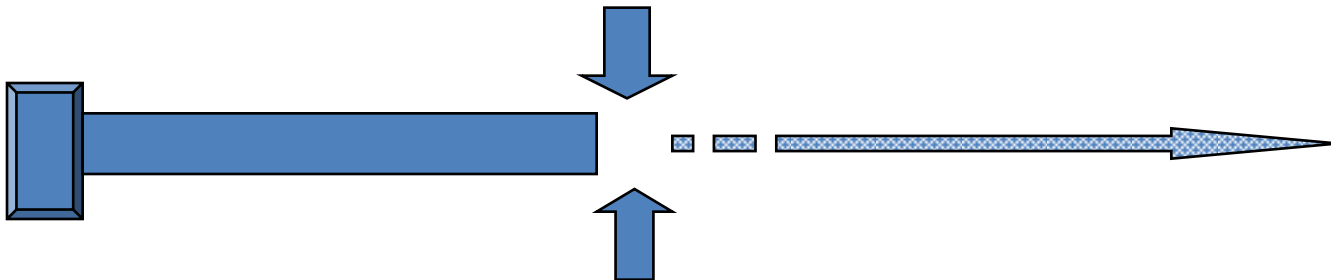


Double crush syndrome

C) Mild compression at two points



D) Severe compression at one site only



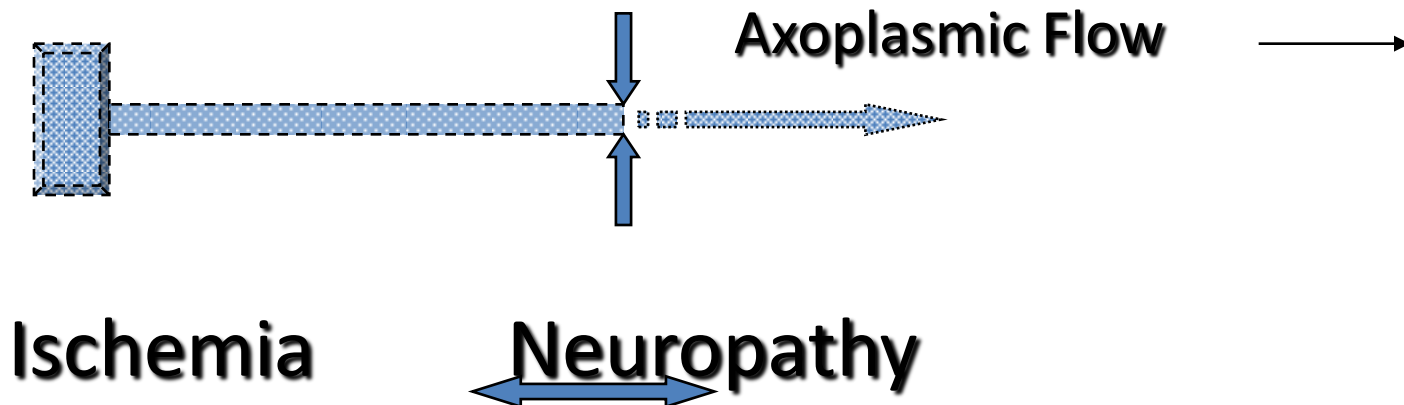
Double crush syndrome

E) Barely sufficient tropic material is produced by a sick neuron.

E.g. Diabetes

Plus compression at one site again causes denervation

병든 뉴런에 의해 겨우 영양물질이 생산될 때, 당뇨병이 있는 경우 한 부위에서 압박이 더해지면 탈신경이 된다.



Review of key areas to address in nerve entrapments

Patterns exist in many nerve entrapment problems; where a weak muscle, sometimes of a reactive type, fails to support the structure;

신경포착문제는 가끔 반응성 타입의 약한 근육이 structure를 지지하지 못할 때 발생하며 신경 포착을 일으키는 인대의 길이에 변화를 가져온다

causing changes; especially in the length of the ligaments which cause nerve entrapments

In each case we can direct treatment to...

1. The osseous structures

1. Bones and joints
2. Spinal innervation
3. Subluxation
4. Holographic subluxation at the spine and the periphery. Check for bone tenderness which can be a classic sign of a holographic or intraosseous subluxation

홀로그래픽 또는 골내 아탈구의 전통적인 표지가 될 수 있는 뼈 압통을 체크

2. The ligaments

1. Law of the ligaments
2. Ligament interlink
3. Related weak muscle causing ligament laxity or hypertonicity causing ligament shortening
관련된 약한 근육은 인대 약화를 일으키고, 과긴장된 근육은 인대 단축을 일으킨다
4. Nutrition – specifically manganese if multiple ligament problems in body and patient is suffering from ligament laxity. 망간은 인대 약화에 도움

3. The skin

1. Directional challenge, especially in scar tissue or trauma. (Injury recall etc.) 흉터 혹은 외상이 있었던 곳에 특정한 방향으로 유발검사를 하면 지표근육이 약해질 수 있다.
2. Proprioceptive imbalance from the skin can cause chronic weakness of the muscles that lie underneath. 피부로부터의 고유감각 불균형은 그 아래 있는 근육의 만성 약화를 야기

4. The muscles

1. Local proprioceptors, generally reactive muscle type, with local muscle injury 국소적인 근육손상으로 인해서 고유감각수용체 (대체로 반응성 근육)의 변화
2. Trigger point imbalances
3. Neurological causes of muscle weakness. start at spine and brain following through extremities to find the nerve entrapment.
신경포착을 찾기위해 뇌와 척추와에서 출발하여 사지로 따라간다
4. Involve patient in active rehabilitation.

Plaganoff discovered that if you exercise the muscle that has the same action as the ligament you tend to shorten the ligament.
Plaganoff는 인대와 같은 작용을 하는 근육을 운동한다면
헐거워진 인대를 단축시켜서 관절을 안정시키는 재활을 하게 되는 것이다.

3. Pectoralis Minor

To this have the patient;

1. Forcibly contract pec. minor and test muscles of the hand for weakness.

Sometimes the muscles is so short it is creating a weakness in a neutral position.

In these cases when you raise the arm above the head thereby stretching the pec. Minor the muscle will strengthen thereby telling you it is short.

4. Suprascapular nerve syndrome

This will create weakness in the infraspinatus muscle when the arm is in forced flexion rotating the scapular around the rib cage.

So stretching the Suprascapular nerve around the spine of the scapular.

Infraspinatus





Muscles that control the shoulder girdle

견갑대움직임을 조절하는 근육들

Flex. Ext. shoulder

-어깨의 굴곡과 신전







Flexion(굴곡)

0-90°

- Pectoralis Major(대흉근)
- Ant. Deltoid(앞 삼각근)
- Coracobrachialis(오혜완근)

90-180°

- Serratus anterior(전거근)
- Upper trapezius(상부 승모근)

Extension(신전)

- Teres major (대원근)
- Teres minor (소원근)
- Latissimus dorsi (광배근)
- Post. Deltoid(후삼각근)

Abduction(외전)

0-30°

- Supraspinatus(극상근)

30-90°

- Medial deltoid(중 삼각근)

90-180°

- Serratus anterior (전거근)
- Upper trapezius(상부 승모근)

Adduction(내전)

- PMC (대흉근- 쇠골부)
- PMS (대흉근- 흉골부)
- Latissimus dorsi(광배근)
- Lower trapezius (하부승모근)

Medial rotation(내측회전)

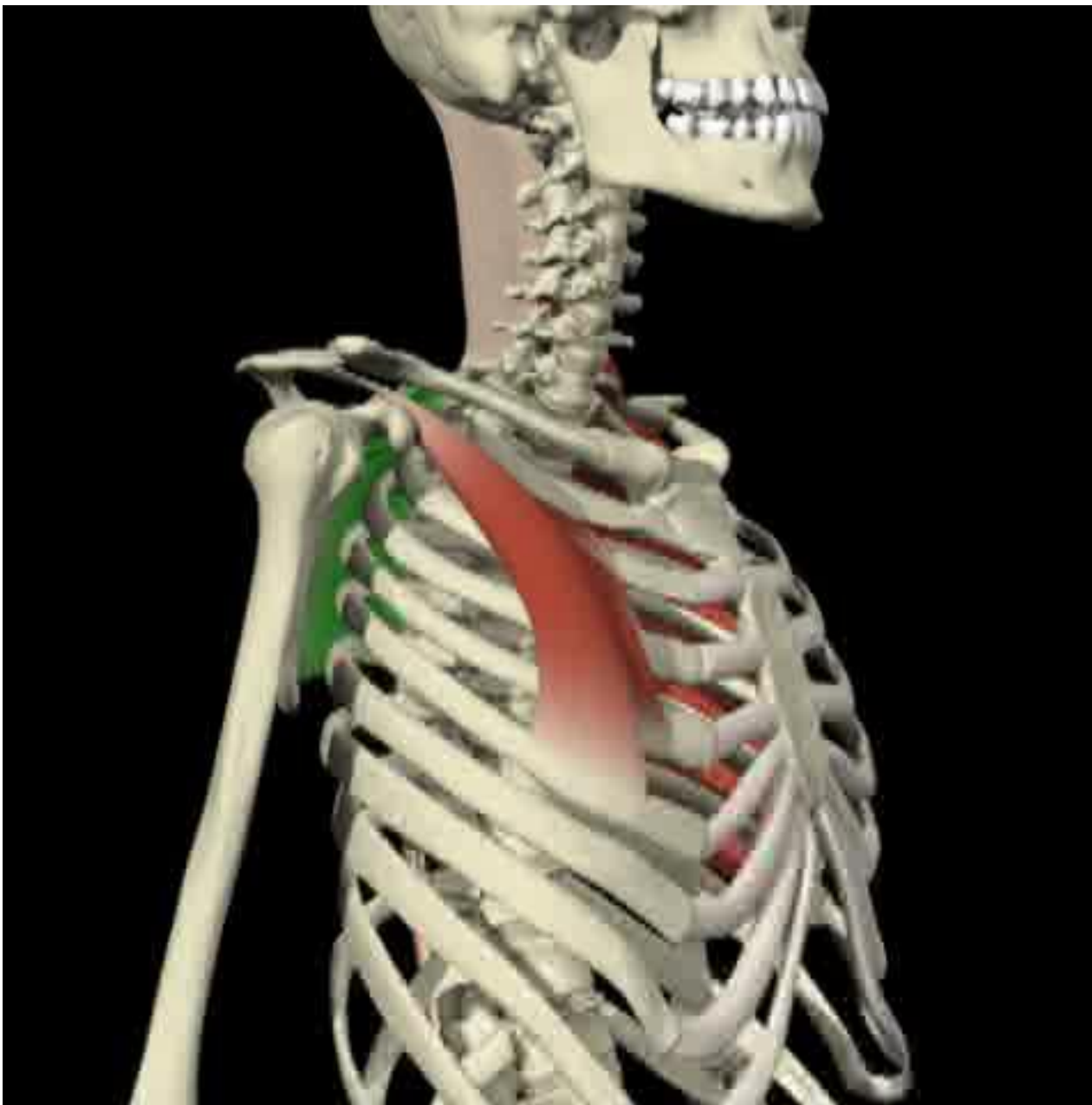
- Ant. deltoid (앞 삼각근)
- PMC (대흉근-쇄골부)
- Subscapularis (견갑하근)
- Teres major(대원근)
- Latissimus dorsi(광배근)

Lateral rotation(외측회전)

- Teres minor(소원근)
- Infraspinatus (극하근)

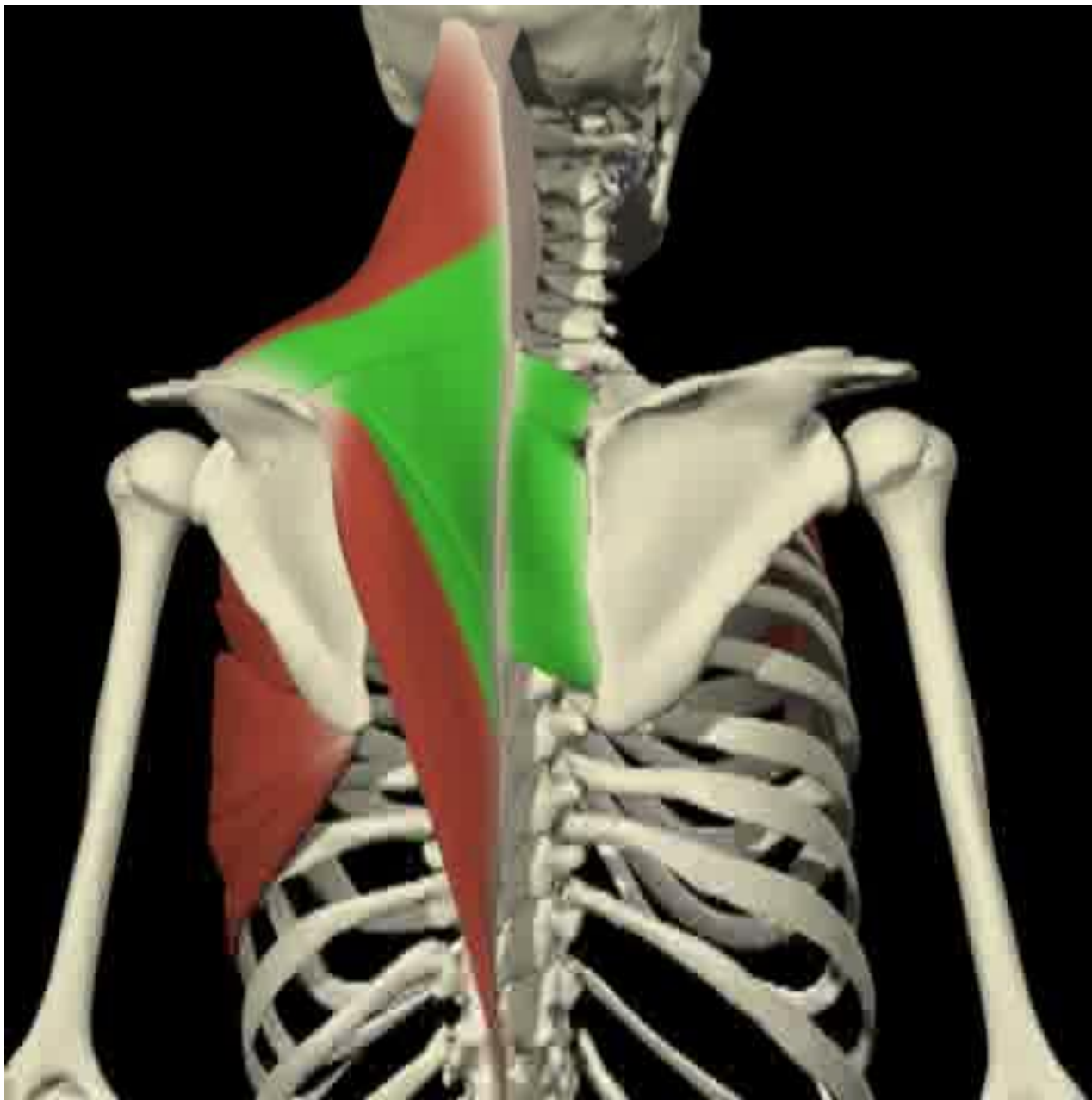
Protraction(내밌)

- Pectoralis minor(소흉근)
- Serratus anterior (전거근)



Retraction(뒤당김)

- Rhomboids(능형근)
- Middle trapezius (중부 승모근)



Elevation(올리기)

- Upper trapezius(상부승모근)
- Levator scapulae(견갑거근)

Depression(내리기)

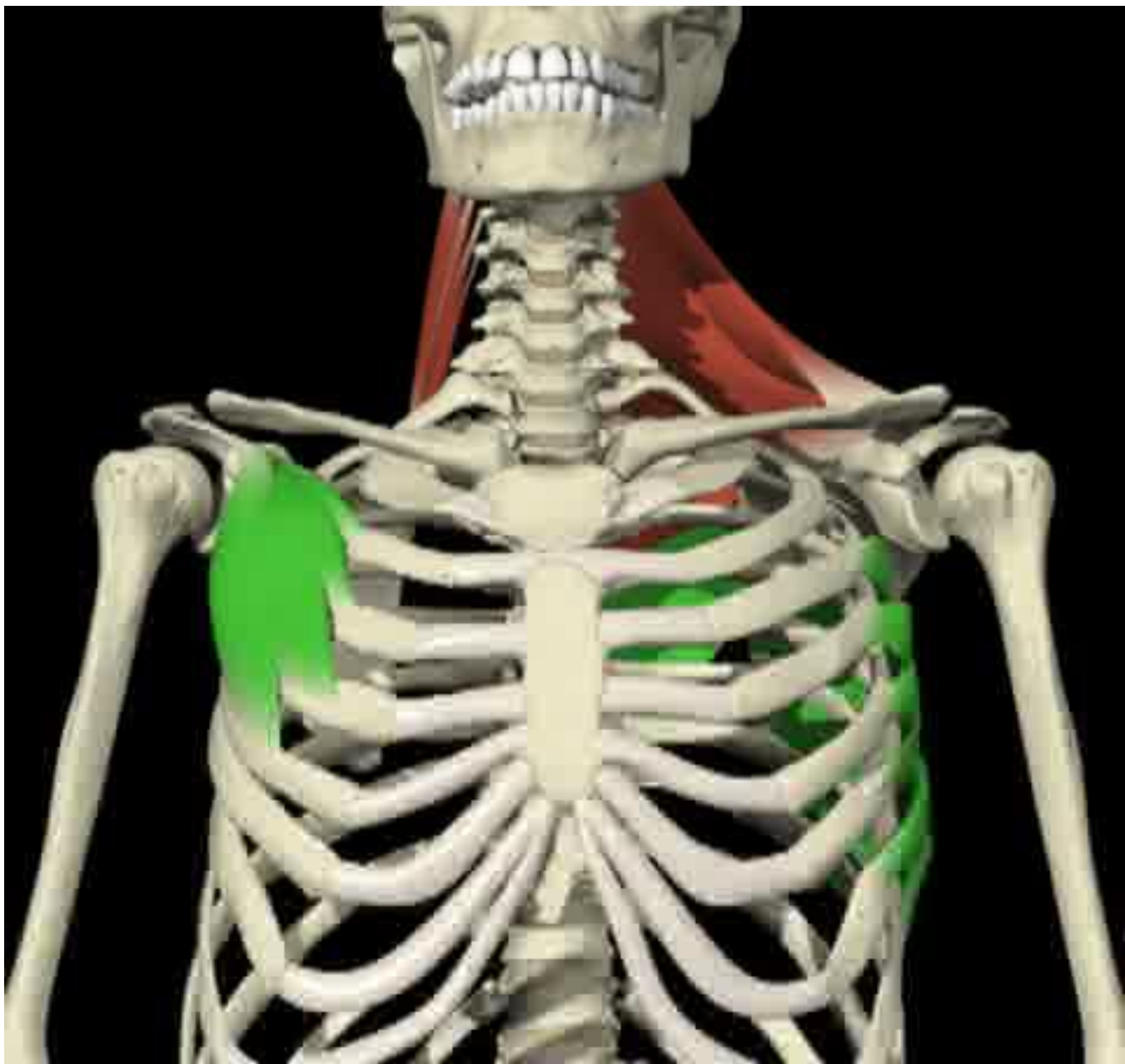
- Latissimus dorsi(광배근)
- Lower trapezius(하부 승모근)

N.B. All movements of the shoulder girdle are
steadied by subclavius

-견갑대의 모든 움직임은 쇄골하근육에 의해 안정화되고 있다

(often a need for magnesium)

-종종 Mg 이 필요

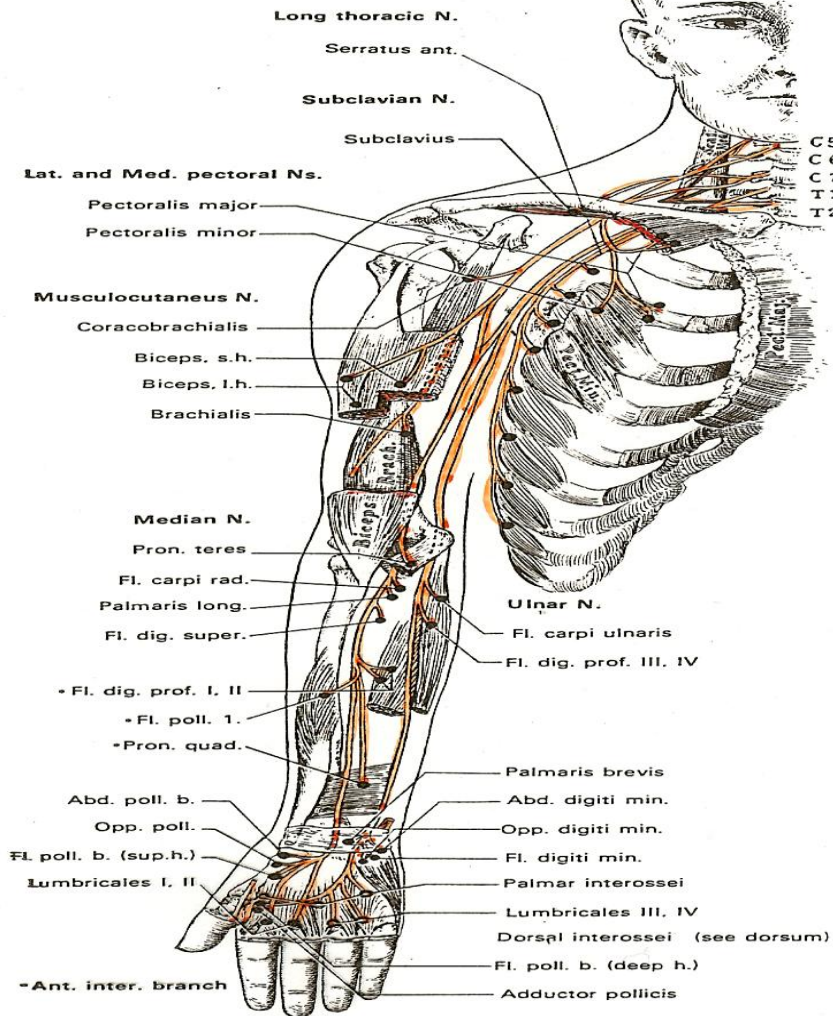


Nerve entrapments in the shoulder / neck area

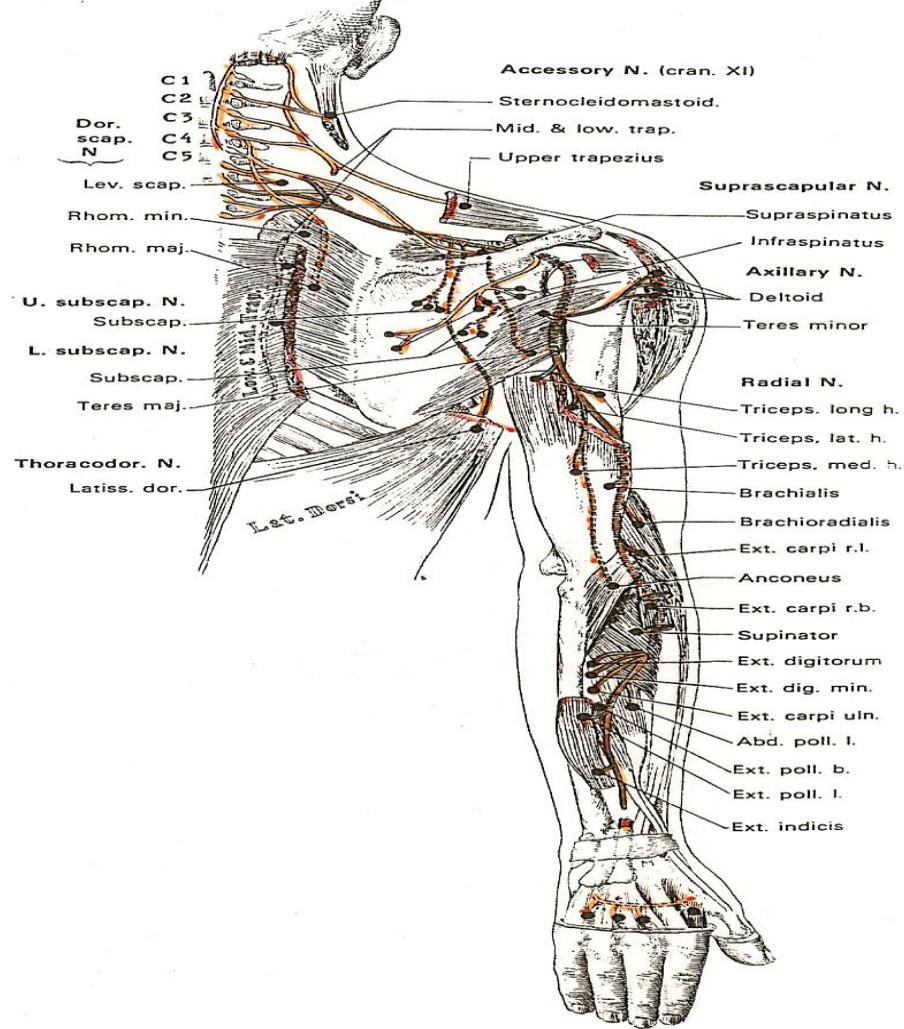
경추와 어깨부위에서의
신경죄임병증

Spinal Nerve and Motor Point Chart

ANTERIOR VIEW, RIGHT

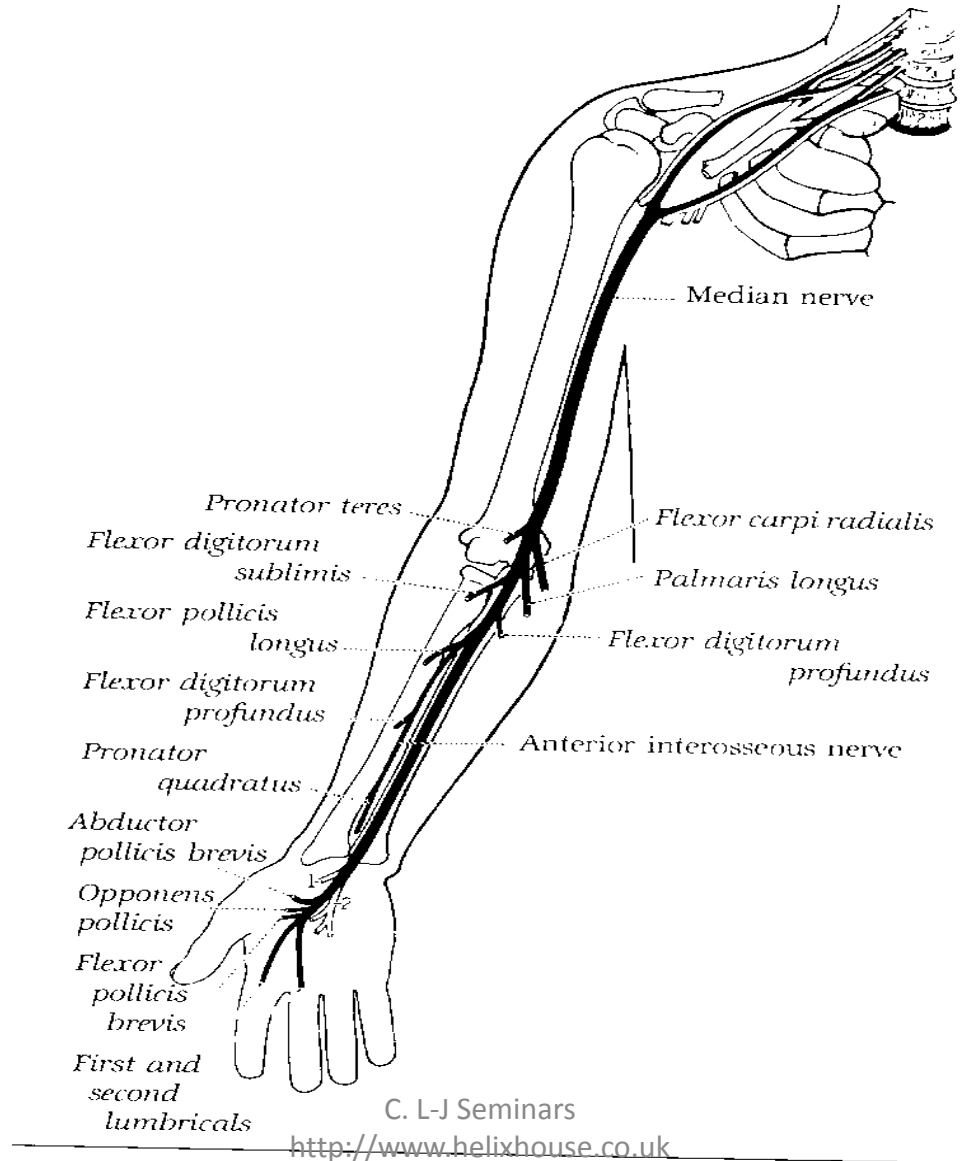


POSTERIOR VIEW, RIGHT



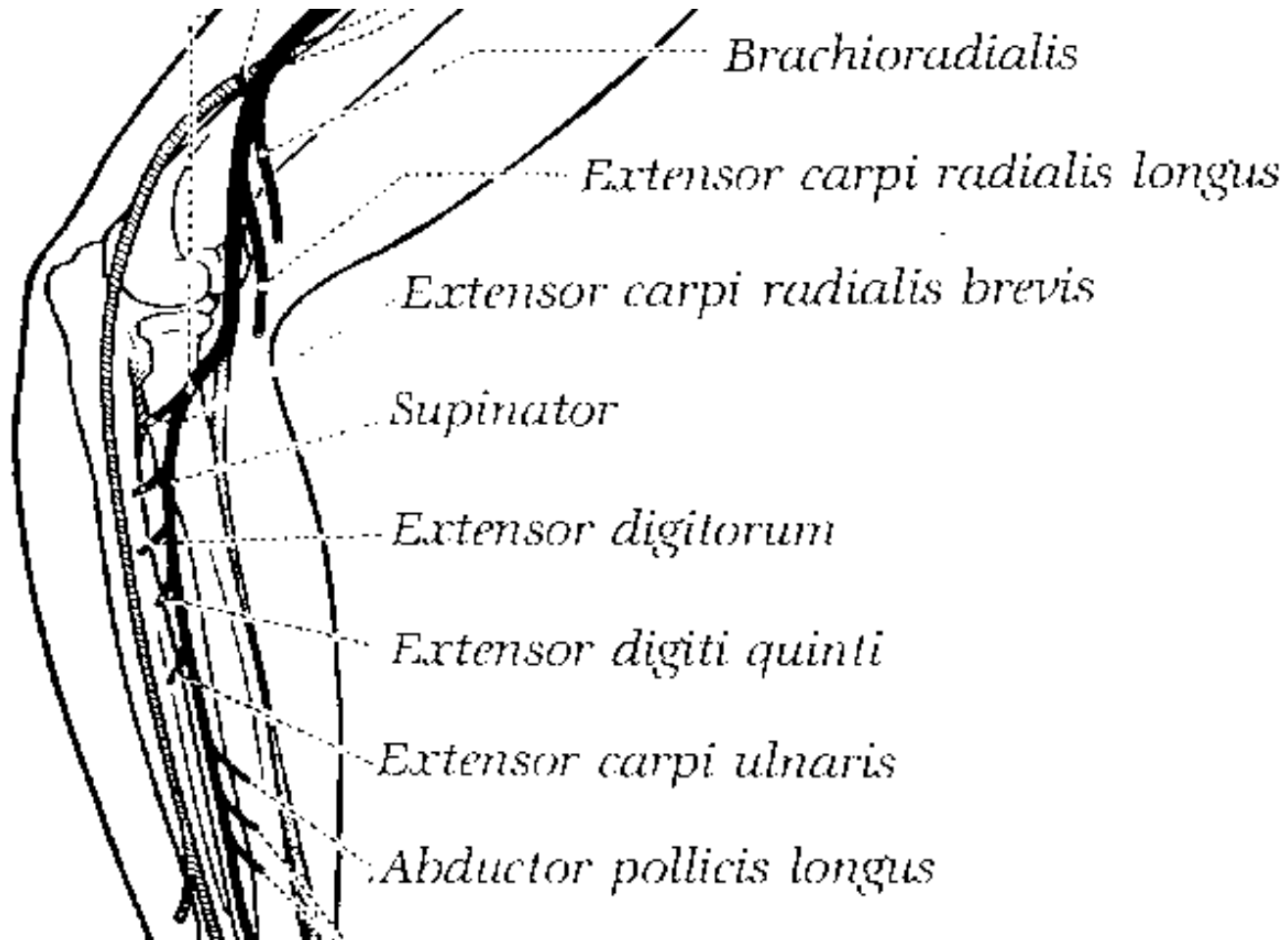
The Path of the Median Nerve

정중신경의 진행경로



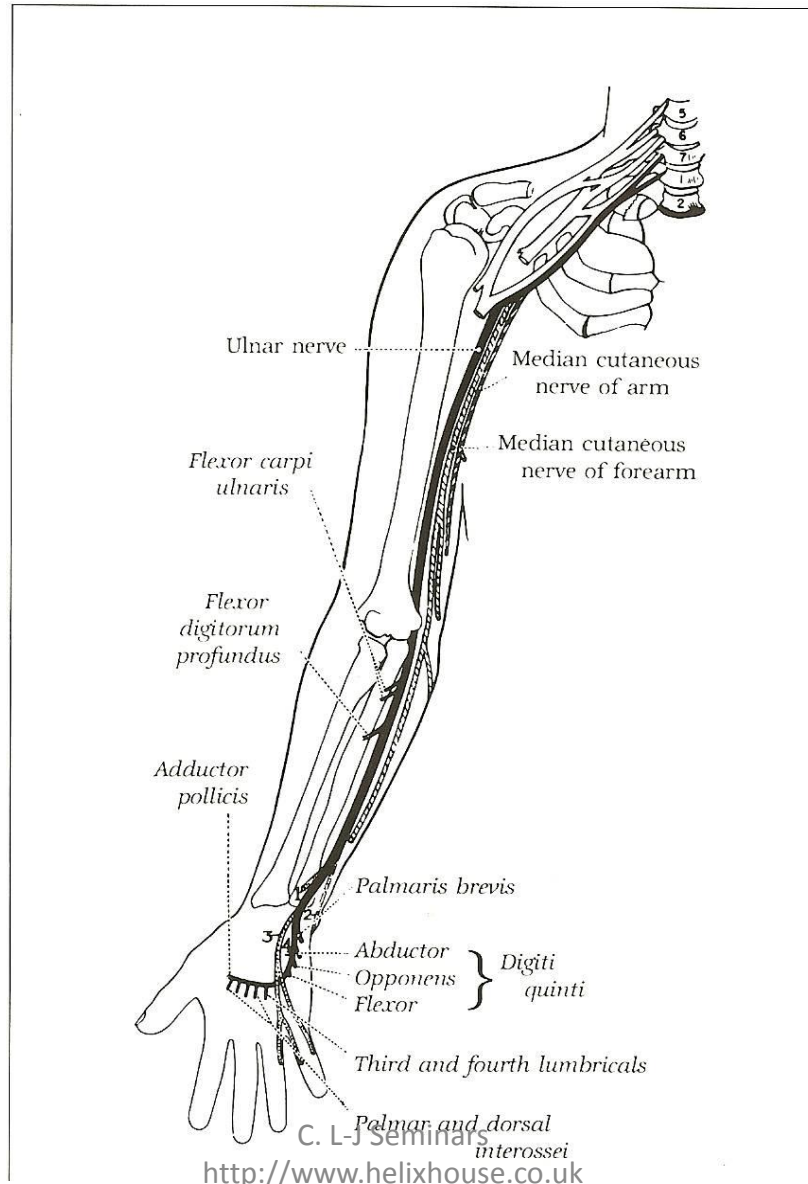
The pathway of the Radial Nerve

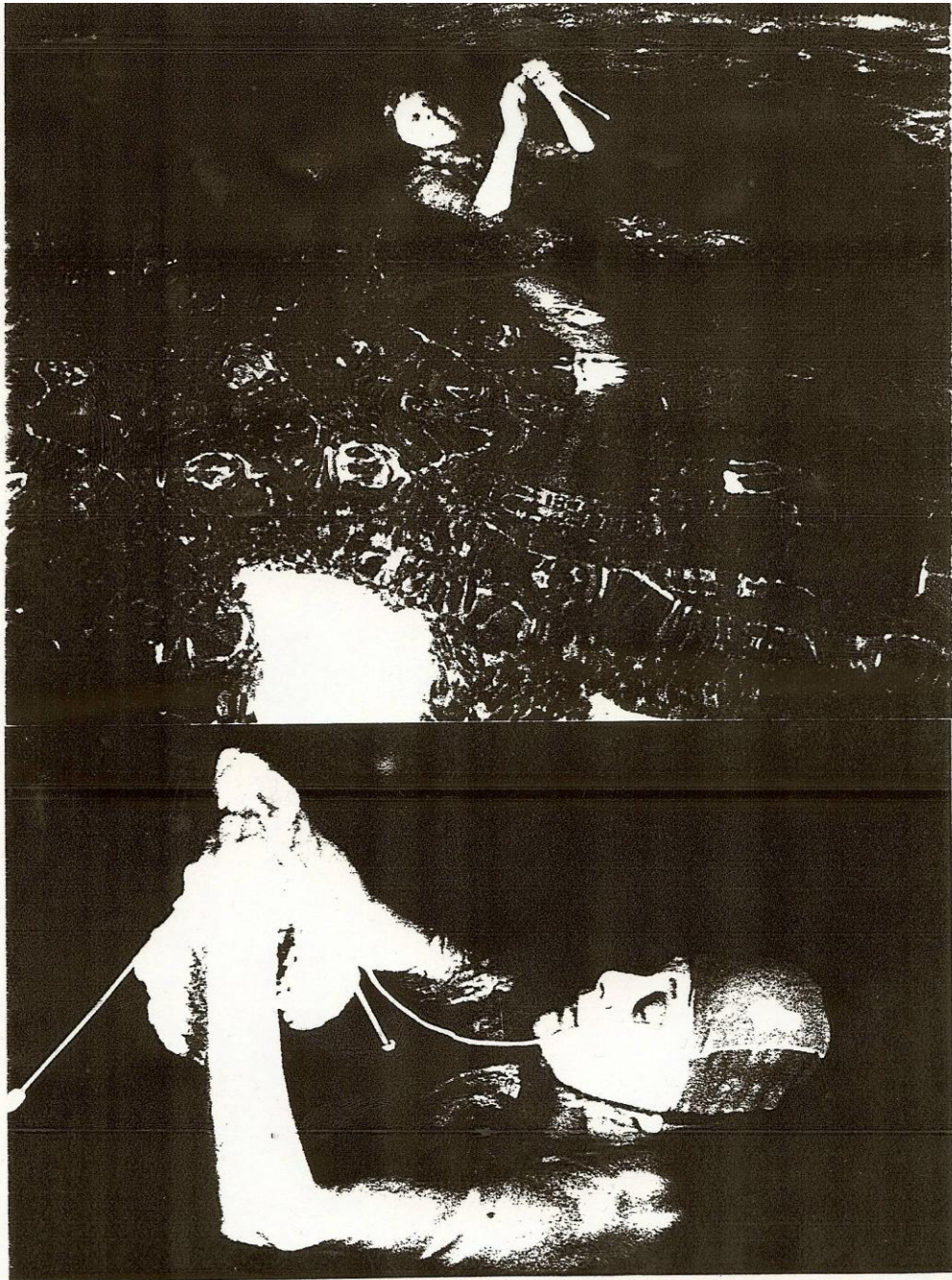
요골신경의 진행경로

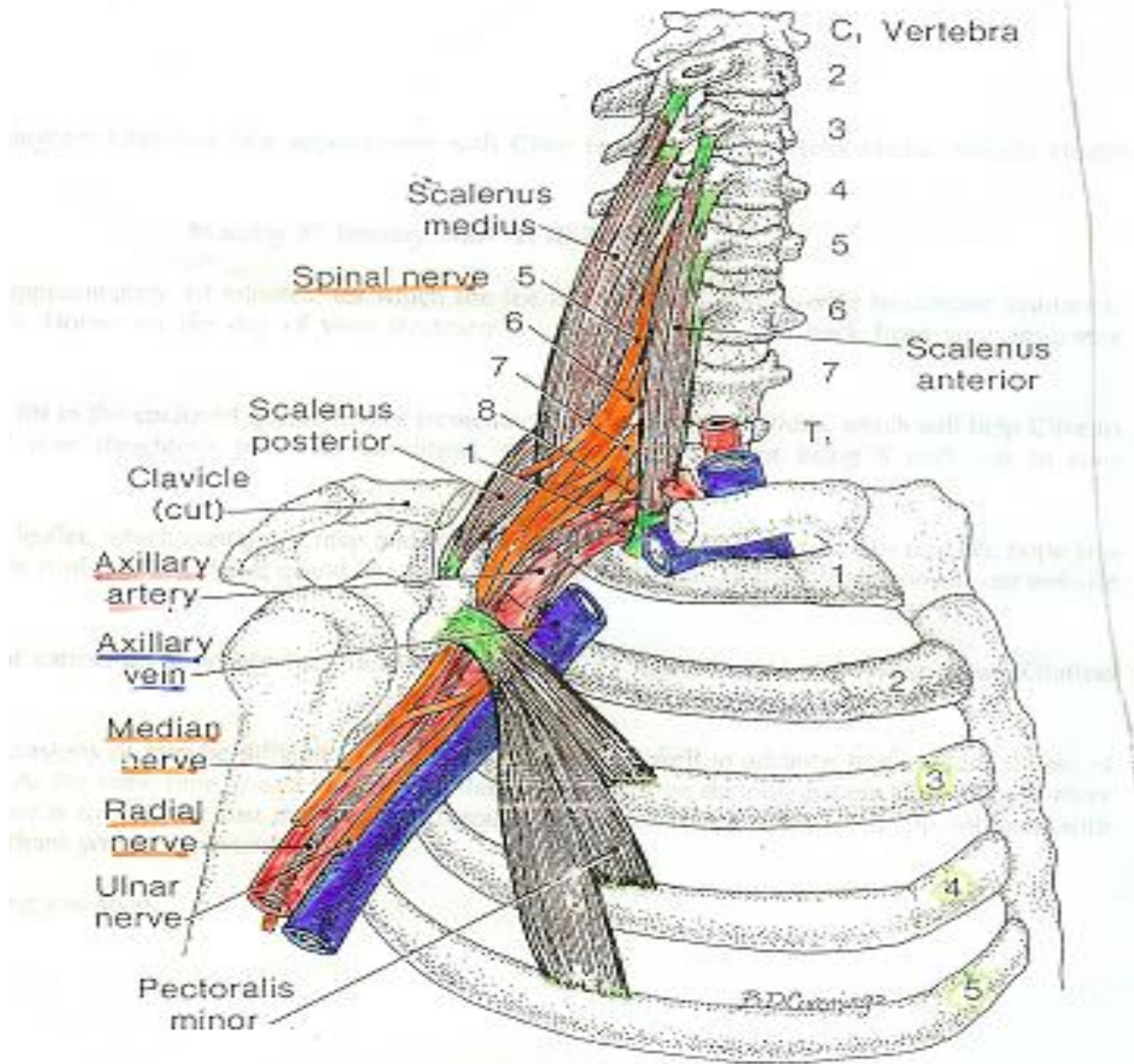


The pathway of the Ulna Nerve

척골신경의 진행경로







1. Anterior scalene

전사각근

To find this;

Place the patient so they are contracting
the anterior scalene

-이것을 보기 위해서 환자에게 전사각근을 수축시키게 한다

2. Costo clavicular syndrome

늑쇄골증후군

To find this have the patient reach back behind as if to;

늑쇄골증후군을 진단하기 위해 환자 손을 1.2.3 처럼 등뒤에 이르게한다

1. **Attach a bra.**
(브래지어에 닿게 한다)
2. **Reach into the backseat of a car**
(자동차 시트 등받이에 이르게 한다)
3. **Into their back pocket.**
(뒤주머니속으로)

3. Pectoralis Minor

소흉근

To this have the patient;

1. Forcibly contract pec. minor and test muscles of the hand for weakness.

- 소흉근을 수축 시킨후 손근육 테스트를 하여 근력약화를 확인한다.

Sometimes the muscles is so short it is creating a weakness in a neutral position.

- 때때로 중립자세에서도 손근육의 약화가 일어날 만큼 소흉근이 짧은 경우도 있다

In these cases when you raise the arm above the head thereby stretching the pec. Minor the muscle will strengthen thereby telling you it is short.

- 이런경우 팔을 머리위로 들어올려서 소흉근을 스트레칭 시키고 손근육 테스트를 하면 강해질 것이다. 이것은 곧 소흉근 길이가 짧다는 것을 의미한다.

4. Suprascapular nerve syndrome

견갑상신경 증후군

This will create weakness in the infraspinatus muscle when the arm is in forced flexion rotating the scapular around the rib cage.

- 견갑상신경 증후군시 흉곽을 따라 견갑골을 돌리면서 팔을 저항 굴곡시키고 나면, 극하근의 약화가 나타난다

So stretching the Suprascapular nerve around the spine of the scapular.

- 이것은 견갑극 주변의 견갑상신경을 스트레칭했기 때문에 극하근을 검사하면 약해진다는 것이다.

Infraspinatus(극하근)





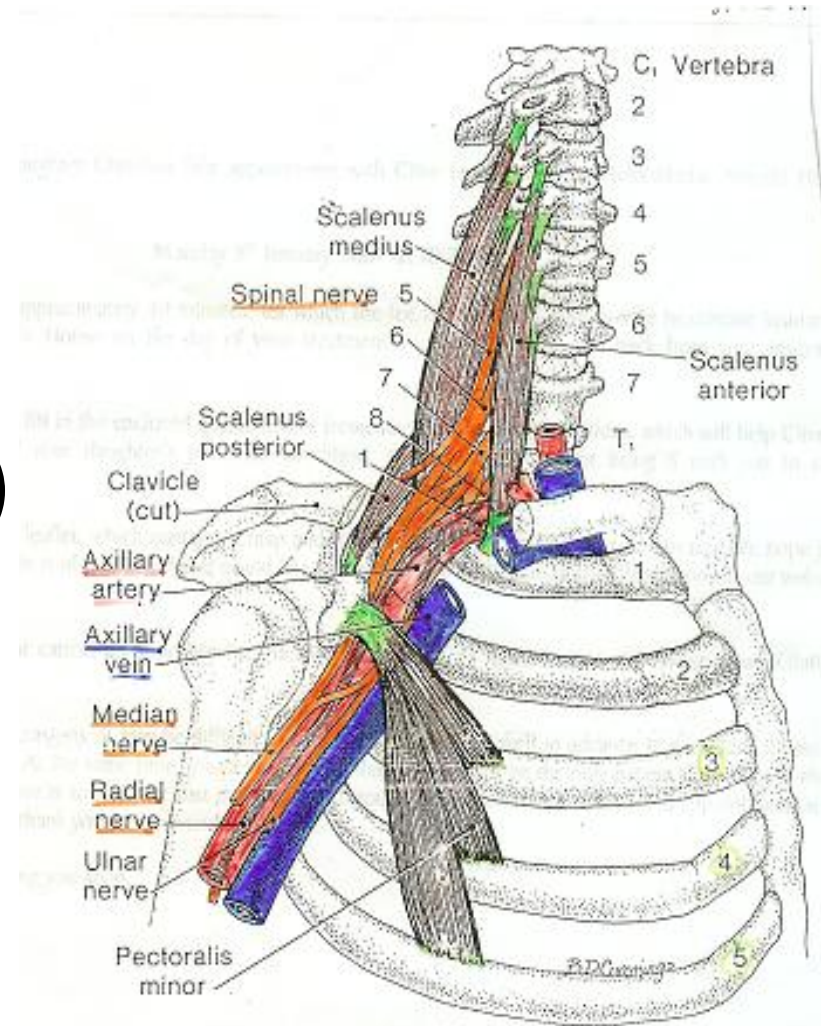
THORACIC OUTLET SYNDROME

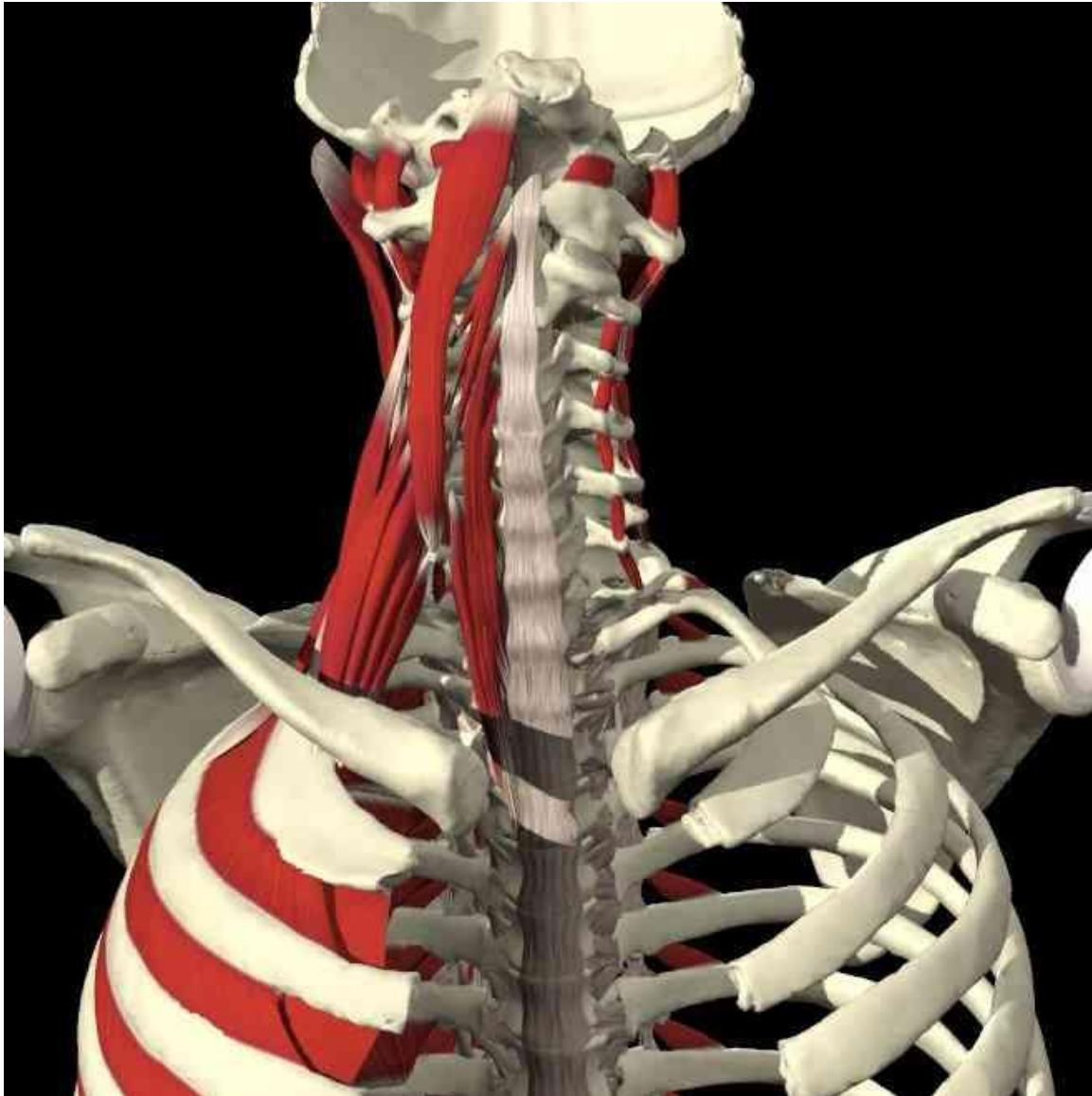
(흉곽출구 증후군)

Structures affected in thoracic outlet problems

(영향 받는 구조물들)

- Spinal Nerve (척수신경)
- Axillary artery(액와 동맥)
- Axillary vein (액와 정맥)
- Median nerve (정중 신경)
- Radial nerve (요골 신경)





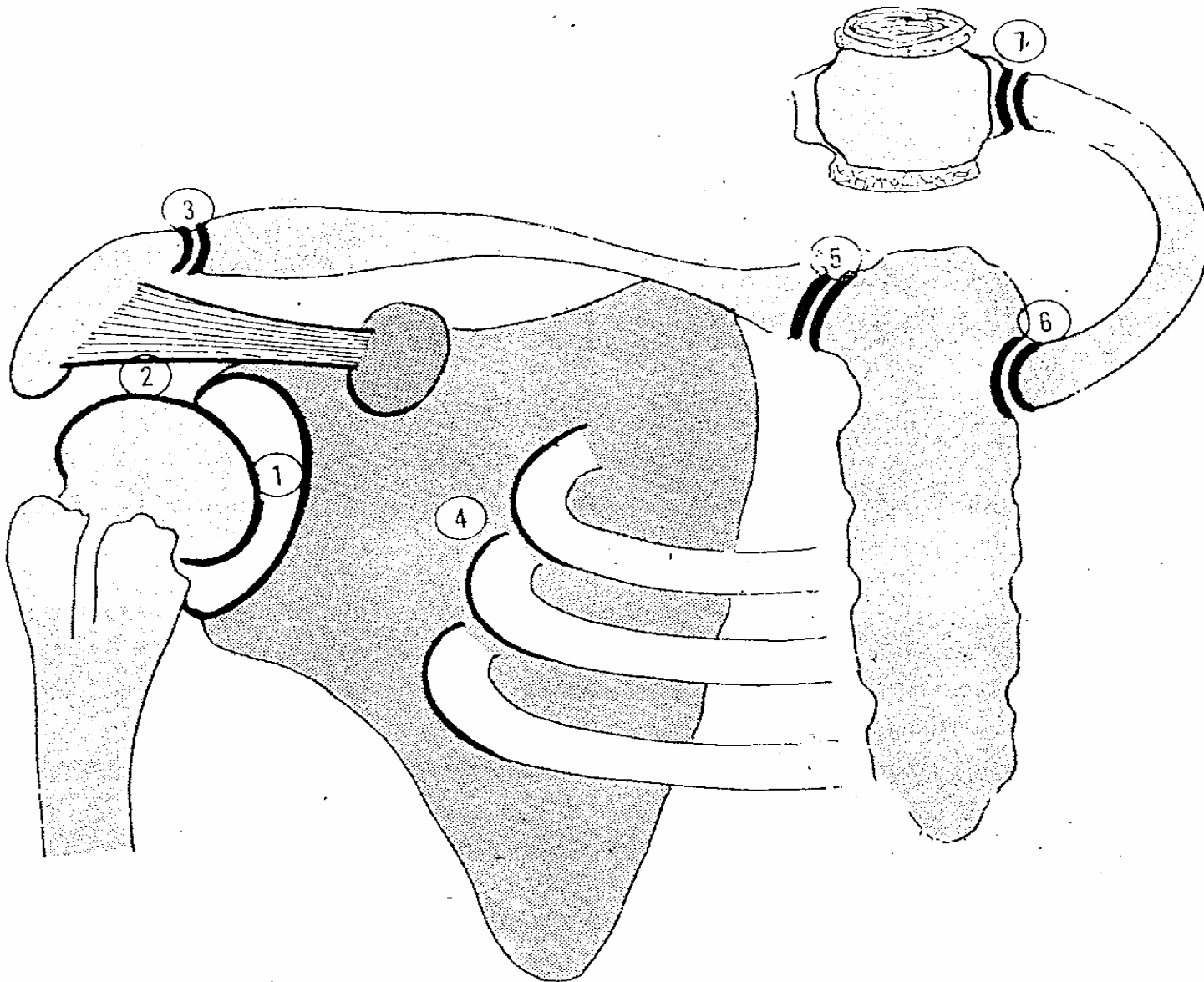
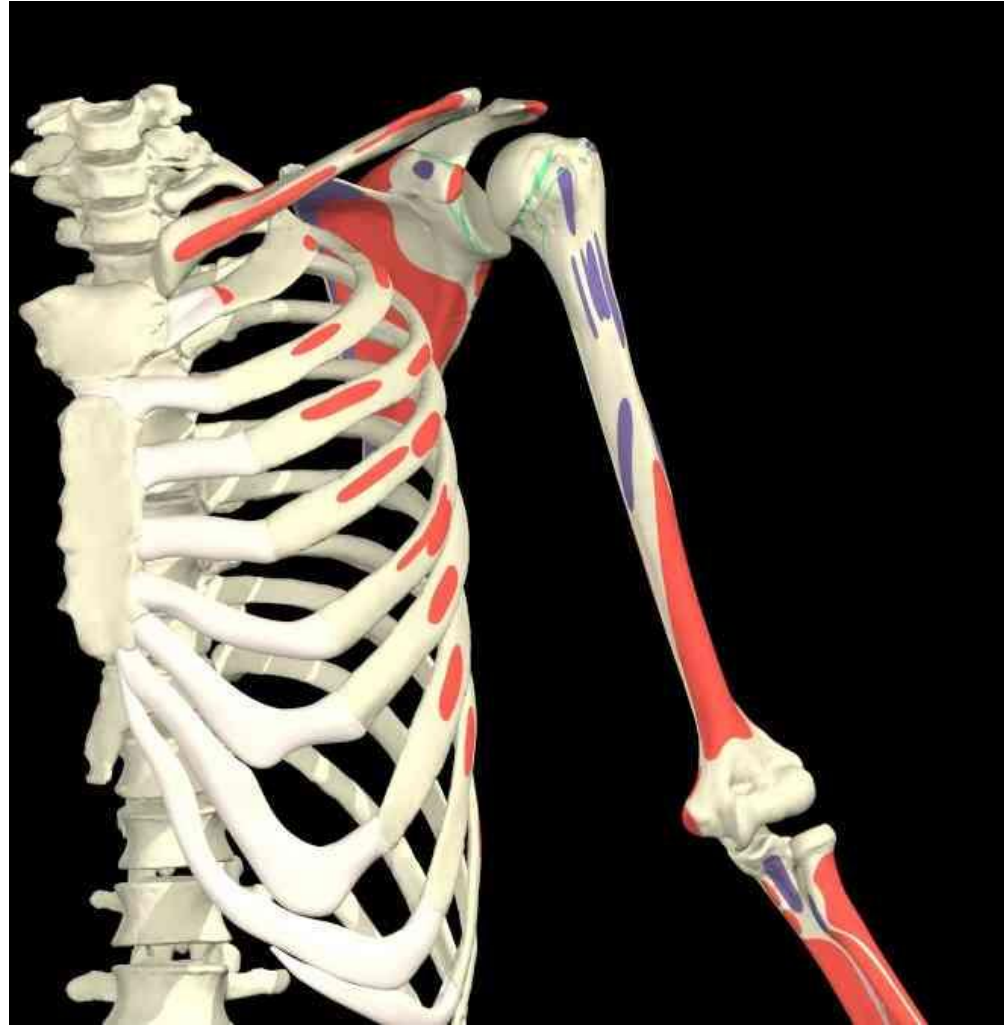


FIGURE 1. The joints of the shoulder girdle: (1) glenohumeral; (2) suprahumeral; (3) acromioclavicular; (4) scapulocestral; (5) sternoclavicular; (6) costosternal; (7) costovertebral.

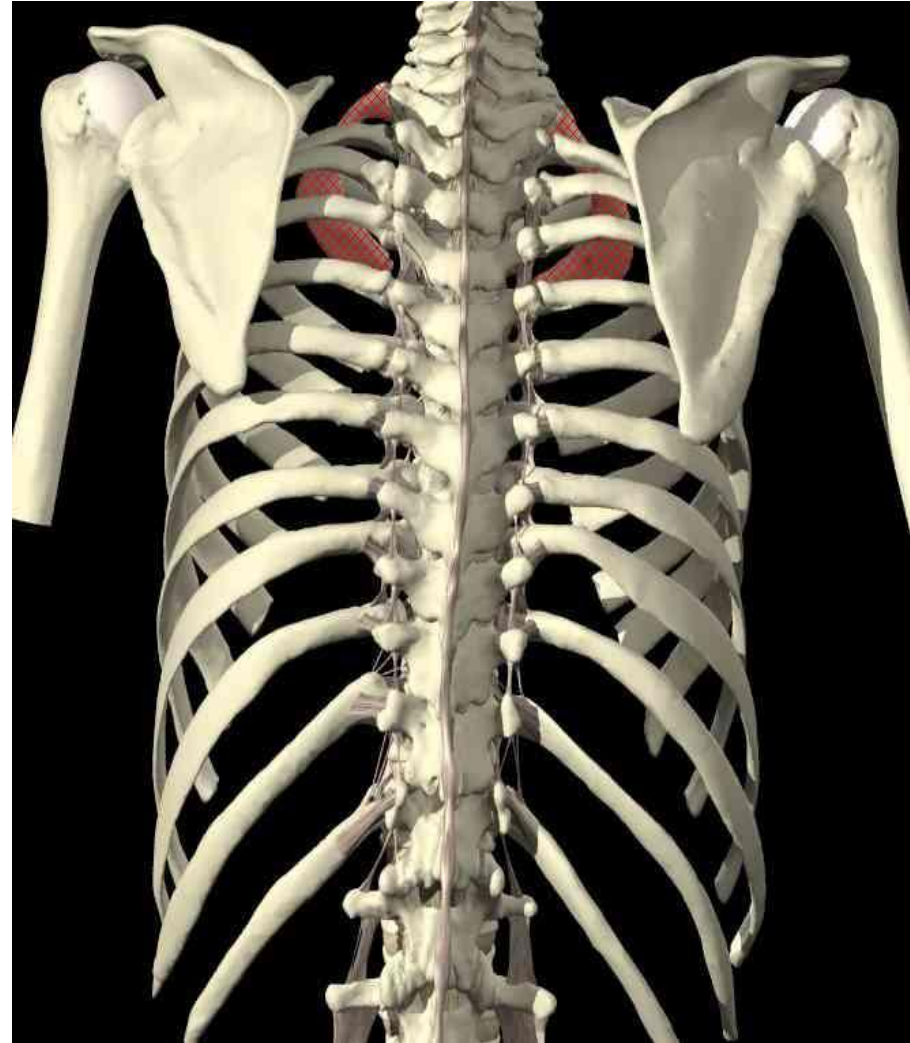
Joints of the Shoulder Girdle (견관절의 관절들)

- 1) Gleno-humeral (견관절)
- 2) Supra-humeral (상요골관절)
- 3) Acromio-clavicular
(견봉쇄골관절)
- 4) Sternoclavicular (흉쇄관절)



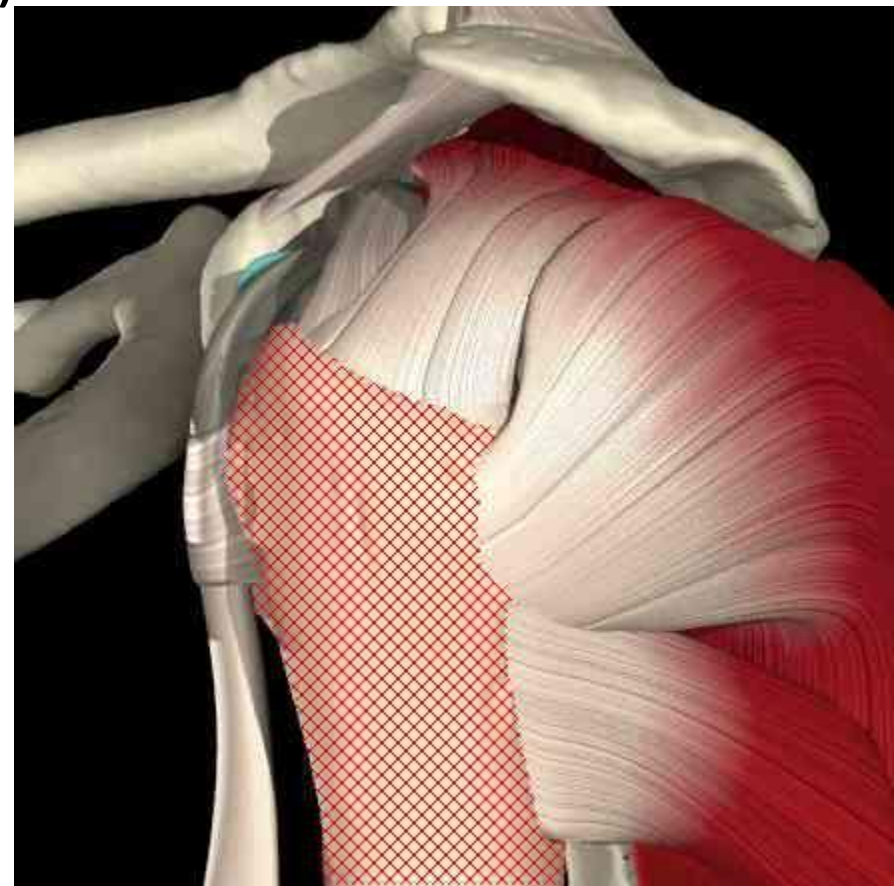
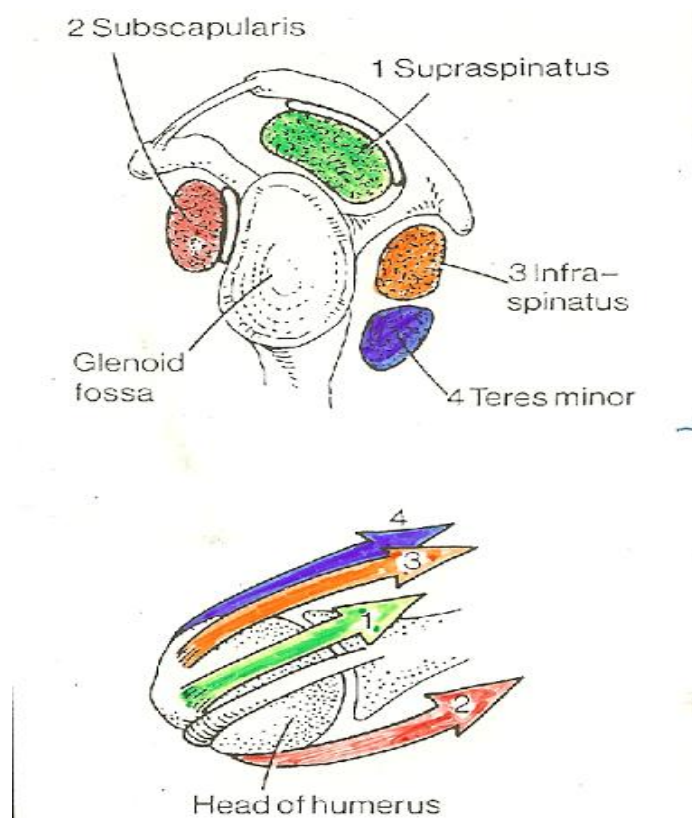
Shoulder Girdle Joints pt. II

- 4) *Scapulacostal*
(견갑늑골관절)
- 5) *Costosternal*
(늑흉골관절)
- 6) *Costovertebral*
(늑척추관절)



Gleno-Humeral Joint (견관절)

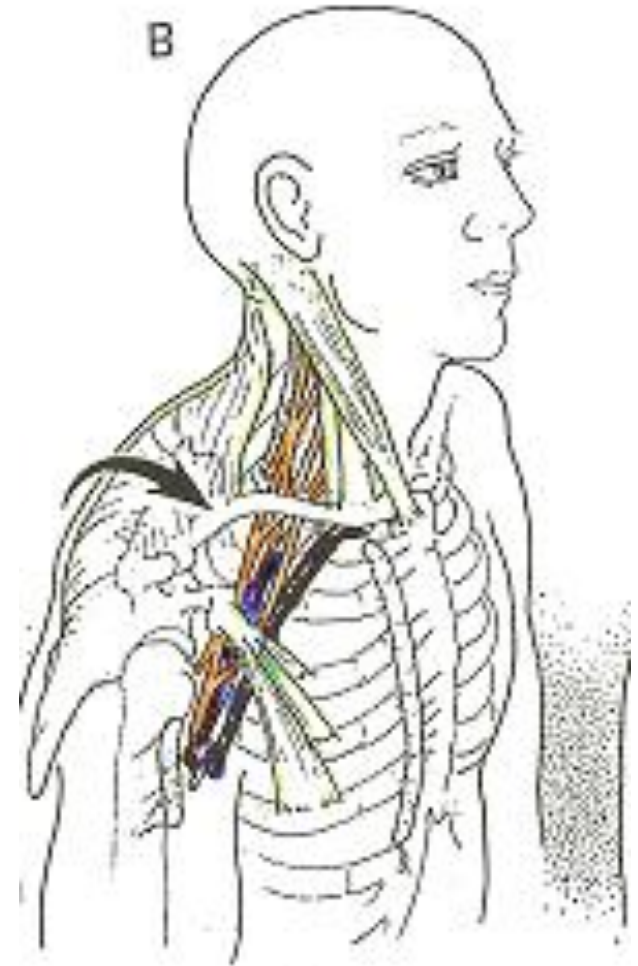
- Tendons/Actions of the Rotator Cuff Muscles
(회전근개의 인대 및 작용)



Shoulder protraction beginning (어깨의 전방 전위 초기)

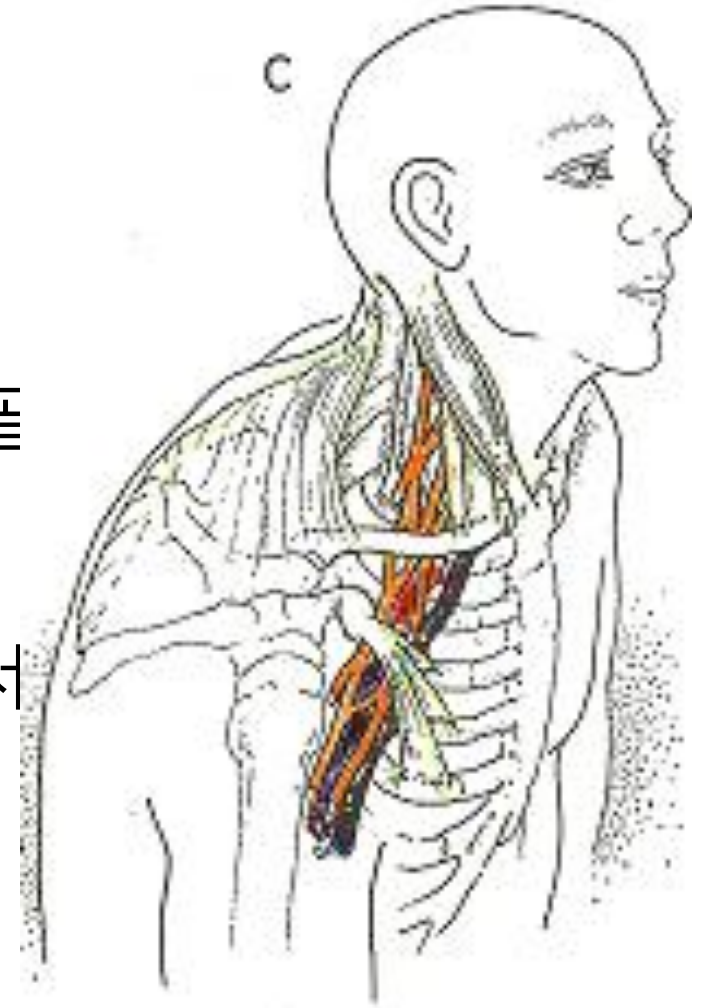
Sternocleidomastoid muscles shorten. (흉쇄유돌근의 단축)

- Head drawn anteriorly & inferiorly
(머리가 전 하방으로 이동)



Advanced deformity (진행된 변형)

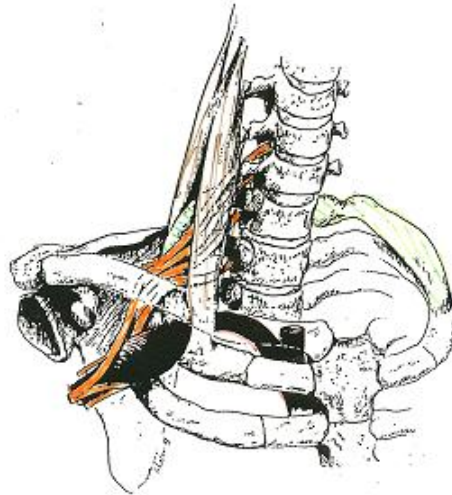
- Adaptive shortening of scalenes & pectoralis minor.
(소흉근과 사각근의 보상적 단축)
- Costo-clavicular space narrowed ribs 1-5 elevated. (1-5 늑골 거상으로 늑쇄골 공간 좁아짐)
- Neurovascular compression evident at all 3 sites (3부위 모두에서 혈관-신경 압박 소견이 분명해짐)



Thoracic Outlet Syndrome

Common Pathology

(흉곽출구 증후군의 주된 병변)

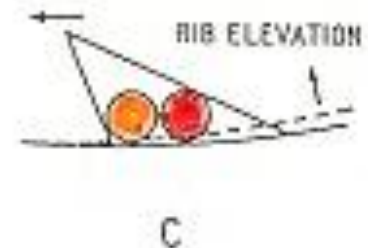
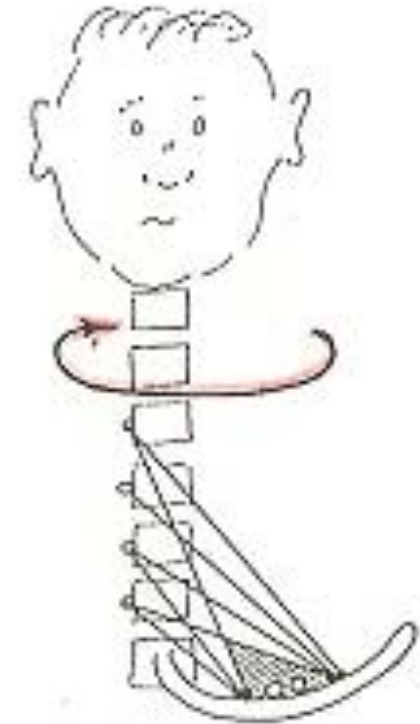


- Bilateral cervical ribs (7경추 횡돌기가 길어진 경우)
- Brachial plexus angulation over 1st Thoracic rib
(상완 신경총이 1늑골 위에서 꺾임)
- Brachial Plexus & subclavian artery compressed between clavicle & 1st rib.(쇄골과 1늑골사이에서 신경총과 동맥 압박)
- Artery forms post stenotic dilation (동맥의 압박 원위부 팽대)

Distortion from turning head towards symptomatic side

- **Compression of the; (압박)**
 - neurovascular bundle, (신경혈관 다발)
 - The brachial plexus, (완신경총)
 - the subclavian artery (쇄골하동맥)
 - occasionally the subclavian vein (때때로 쇄골하 정맥)

can be pictured from the test manoeuvre for the anterior scalenes syndrome
(전방사각근 증후군 검사법으로 확인 가능)



- While not a major nerve entrapment problem

주요 신경 압박은 아니지만

- The **Dorsal scapular nerve** has a particular role in the scalene syndrome 견갑배측신경은 사각근을 뚫고 나오기 때문에 사각근 증후군에서 잘 발생한다
- And can cause considerable difficulty and pain on the medial border of the scapula with diffuse pain down the lateral surface of the arm and forearm. 견갑골 내측부 통증과 팔의 외측에 통증을 유발함

DARK HORSES



ALL HALLOWS EVE ALBUM LAUNCH SHOW
WITH GREAT PAGANS, 31ST OCTOBER 2012

THE GREEN DOOR STORE

WWW.DARKHORSESMUSIC.COM

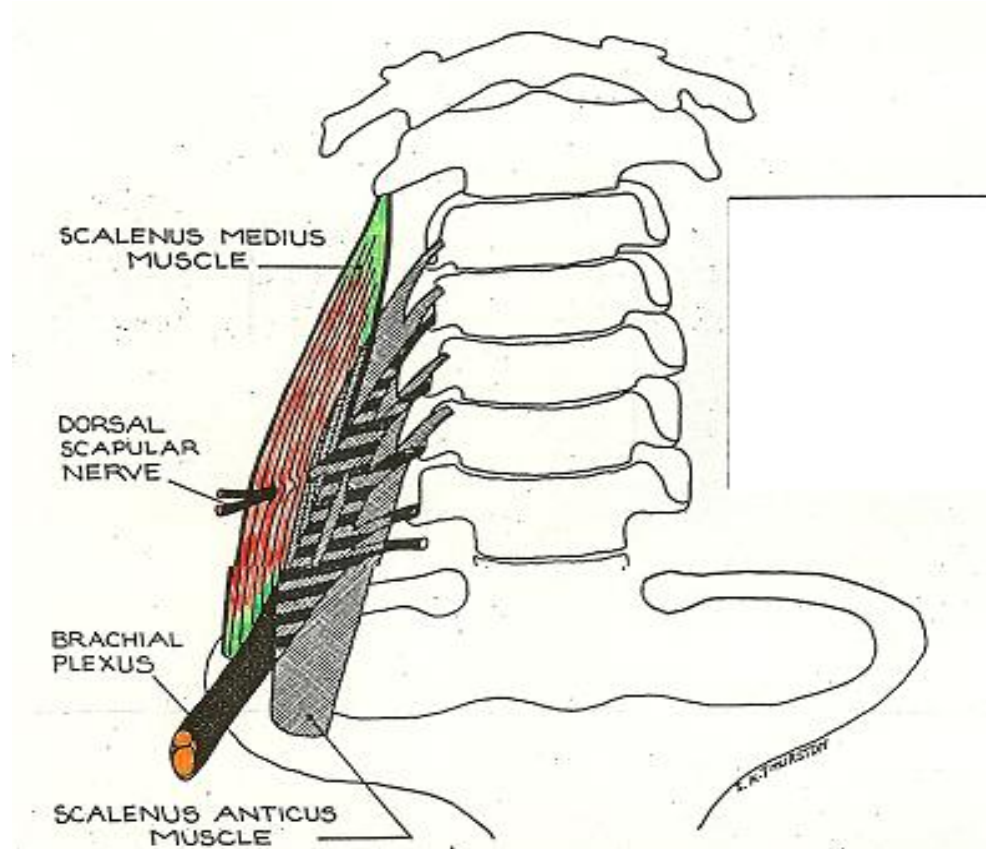
WWW.LOUTPROMOTIONS.CO.UK

THE LIGHTNING IS WITHIN YOU

TRAFALGAR ARCHES, LOWER GOODS YARD, BRIGHTON TRAIN STATION,
DOORS 7.30PM. OVER 18'S. TICKETS WWW.SEETICKETS.COM & RESIDENT 01273 606312

The Dorsal scapular nerve (견갑배측신경)

- The Dorsal scapular nerve is a motor nerve *without* skin sensory components. It supplies: (순수한 운동신경으로 다음 근육들을 지배)
- **Rhomboid major & minor** (대능형근과 소능형근)
- and a portion of the **levator scapula** (견갑거근의 일부)
- These muscles play a key role in assisting in maintaining the scapula against the chest wall and to participate in stabilizing and moving the scapula for arm motion. (이 근육들은 흉곽에서 견갑골을 지지하고 유지하는데, 팔을 움직일 때 견갑골을 안정시키고 움직이는데 매우 중요한 작용을 한다)



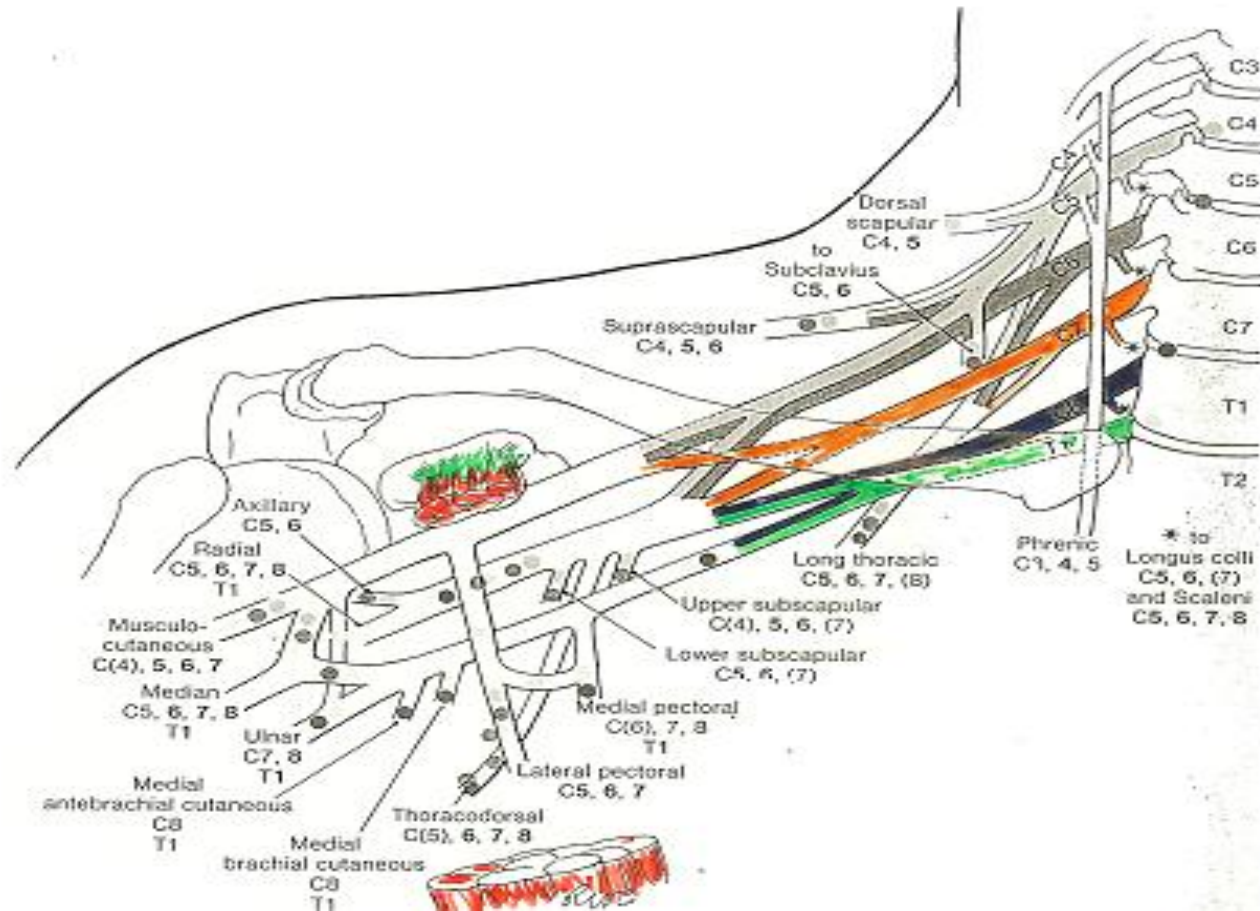
- Note, dorsal scapular nerve piercing scalene medius (견갑배측신경이 중사각근을 뚫고 지나감에 주의)

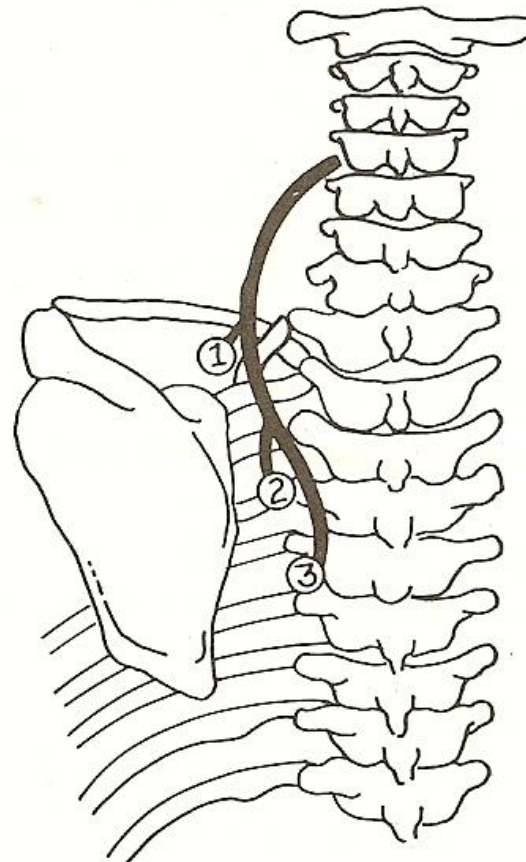
The long thoracic nerve (긴 흉부 신경)

- Innervates the **Serratus Anterior**
(전거근 지배)
- Roots derive from C5, C6 & C7.
(C5,6,7에서 기원함)
- The roots from C5 & 6 enter the Medial Scalene where they form a common trunk.
- This Trunk unites with the C7 root after it emerges from the lateral border of the medial scalene.

Brachial Plexus (상완신경총)

- *Main Nerves*





① LEVATOR SCAPULA

② RHOMBOID MINOR

③ RHOMBOID MAJOR

FIG. 60. Dorsal scapular nerve—motor distribution

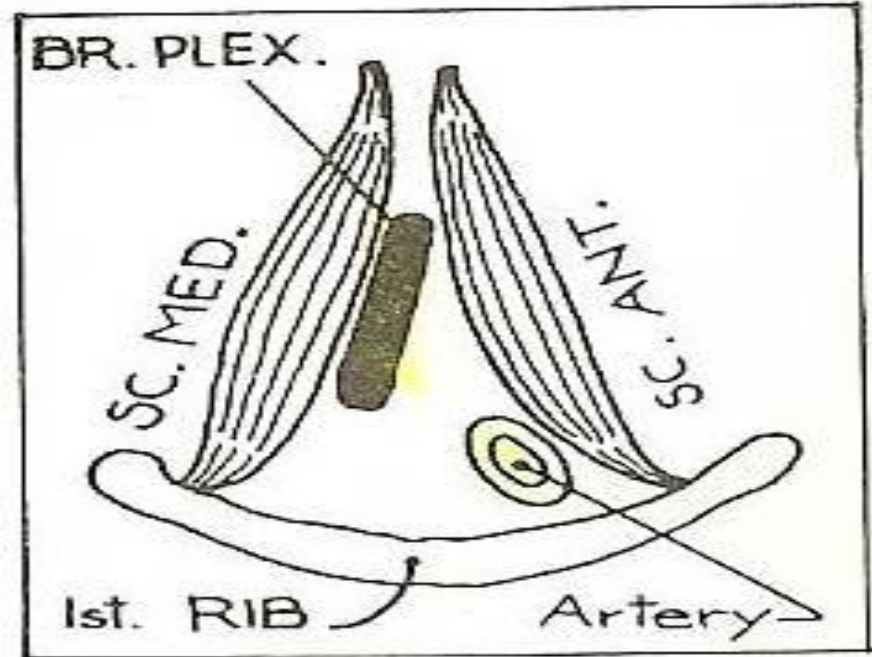
The Dorsal scapular nerve (견갑배측신경)

- The entrapment of this nerve can often be linked to other conditions such as the anterior cervical subluxation (Anterior Cervical disc).
(이 신경의 압박은 때때로 전방 경추 아탈구와 같은 다른 질환과 종종 연관됨)
- It arises predominantly from the 5th cervical nerve and may receive contributions from C4 & C6. (주로 제5번 경추 신경에서 기원하지만 4번 또는 6번 신경에서도 기원하는 수도 있음)

The Dorsal scapular nerve (견갑배측 신경)

Note the relationship of the brachial plexus to the medial scalene and the artery to the anterior scalene muscle.

(완신경총과 사각근, 동맥과의 관계에 주의할 것)



The Dorsal scapular nerve: Symptoms

1. (증상 1)

- Pain along medial border of the scapula, radiating into the lateral surface of the arm and forearm. (This can be due to the abnormal attachment to the first rib or compression from a fibrotic scalene minimus compressing the lower portion of the plexus causing ulna distribution of symptoms. (견갑골 내측부를 따라 통증 발생하며 팔과 상완부 외측을 따라 방사됨 이는 1늑골에 비정상적으로 붙거나 섬유화된 사각근에 의해 신경총의 척골분지부가 압박되어 발생)
- A typical generalised dull ache characteristic of a motor nerve. Look for aching and soreness in levator scapula and the rhomboids. (둔한 통증은 운동신경 병변의 특징. 견갑거근과 능형근의 통증과 쓰라림을 확인할 것)
- David Walther, on his *Systems DC* website, notes that while there may be no historical event the patient can recall as a cause of the pain, there may well be some trauma or occupational aetiology. (David walther는 특별한 과거력이 없더라도 환자는 통증의 원인-외상이나 직업적인 병인-을 기억해낼 수 있다고 그의 웹사이트에서 언급했다)

The Dorsal scapular nerve: Symptoms

2.(증상 2)

- The most common trauma is violent stretching to the scalene muscles such as in the hyperextension-hyper flexion of whiplash dynamics.

(가장 흔한 손상은 과신전-과굴곡 등의 편타 양상으로 인한 사각근에 과격한 신전이다)

- Occupations that require extended overhead work, such as painters and electricians can make workers susceptible to develop dorsal scapula nerve entrapment.

(화가나 전기 기술자처럼 지속적으로 경추를 신장시킨 자세를 오래 유지해야 하는 직업을 가진 사람들의 경우, 견갑배측신경 압박이 발생하기 쉽다.)

The Dorsal scapular nerve: Examination. (검사)

- In a chronic condition there may be atrophy of the rhomboid muscles and possibly of levator scapula.

(만성적인 경우, 능형근과 견갑거근의 위축이 있을 수 있다.)

- Possible slight subtle winging of the scapula

(경도의 익상견이 있을 수 있다)

- Look for head forward posture with some lateral flexion and rotation of the neck that relaxes the scalene muscles, taking pressure off the nerve.

(목을 약간 옆으로 숙이고 돌린 상태에서 Head forward posture 를 취하면 사각근이 이완되면서 신경총의 압박이 해소된다)

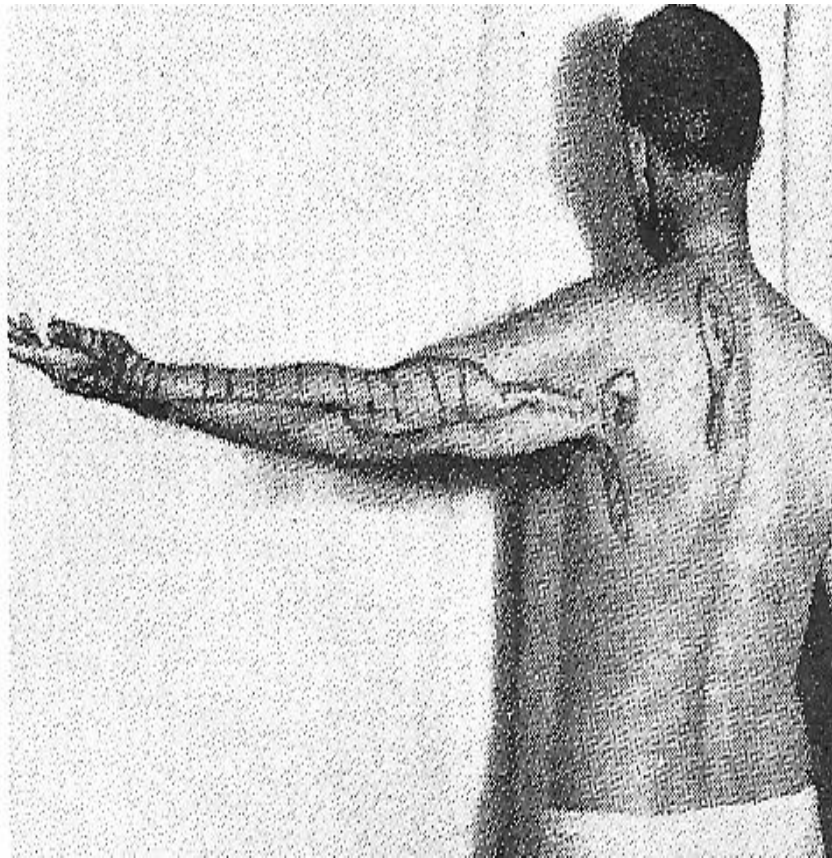
- Palpate the Rhomboids and levator Scapula, as well as the medial scalene muscles for any tenderness. Tenderness in the former may be increased by palpation a the later.

(능형근과 견갑거근, 내사각근의 압통이 있는지 촉진하여 확인한다)

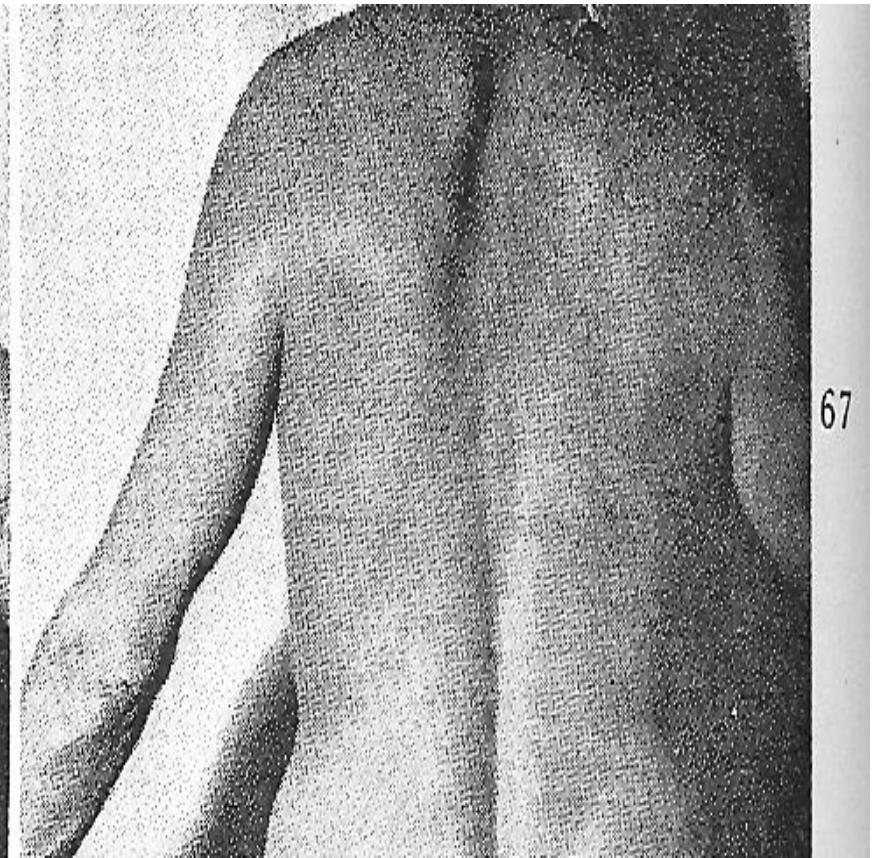
Entrapment neuropathy of dorsal scapular nerve

photos from *Peripheral Entrapment Neuropathies* by Kopell & Thompson

N.B. Wide distribution of referred pain and Scapular winging on affected side
넓은 연관통의 부위과 익상견 사진



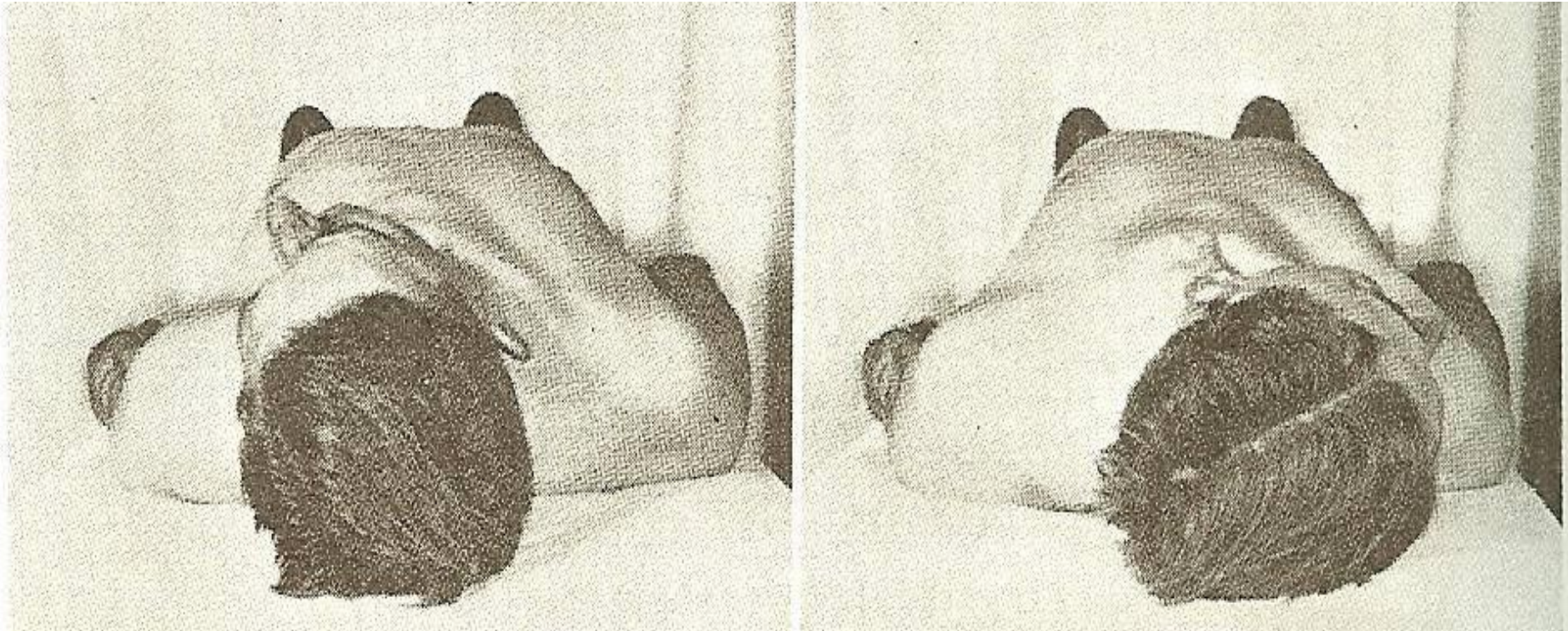
53



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The Dorsal scapular nerve

Head rotation limited by pain to affected side 문제 있는 쪽으로
머리 회전 제한



The Dorsal scapular nerve

Head side bending limited by pain to affected side

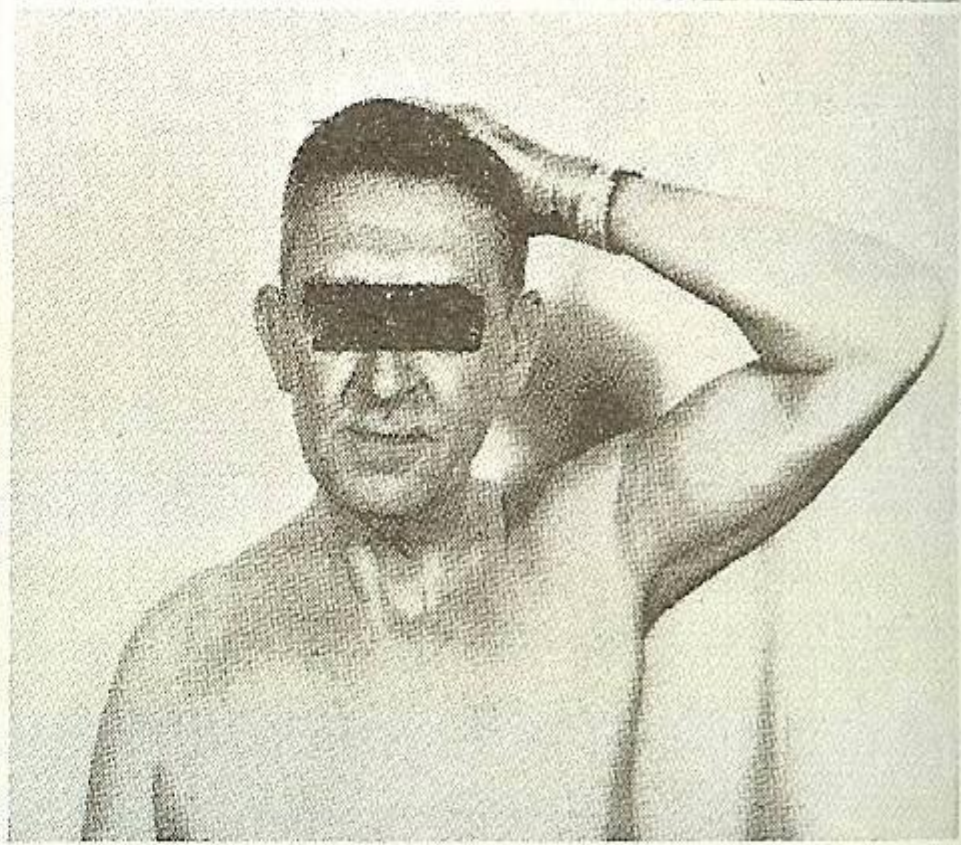
측면 굴곡도 제한



The Dorsal scapular nerve

(L) Thumb presses on point that aggravated peripheral pain rotation 누르면 통증 증가

(R) Position of hand on top of that relieved peripheral pain radiation 머리 위에 올리면 감소



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The Dorsal scapular nerve: Examination.(검사)

- Unilateral entrapment of the dorsal scapular nerve causes an imbalance between the bilateral rhomboid muscles and/or the bilateral levator scapular muscles.

(편측 견갑배측신경의 압박은 양측 능형근 및/또는 양측 견갑거근의 불균형을 유발할 수 있다.)

- Walther notes, that because of their spinal attachments such imbalance may cause subluxations in the cervical and/or the thoracic spine, or at least chronic strain in those areas.

(Walther는 이 근육들은 척추에 부착하므로 이 불균형은 경추 및/또는 흉추의 아탈구, 최소한 만성적 긴장을 유발함을 언급했다.)

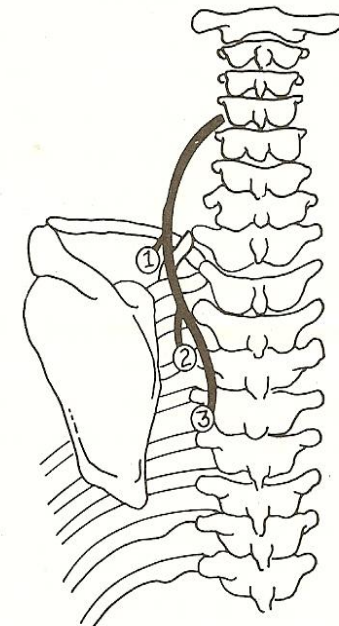
- Therefore in the absence of corrections to the muscle imbalances, corrections of the spinal lesions may not hold.

(따라서 이 근육들의 불균형을 해소하지 않으면 척추의 교정이 유지되지 못할 것이다.)

The Dorsal scapular nerve: Treatment (치료)

- An anterior cervical subluxation, and suprascapular nerve stretch is often found in combination with a Dorsal scapular nerve entrapment.
(경추 전방 아탈구와 견갑상 신경의 늘어짐은 종종 견갑배측신경 압박과 동반된다.)
- Look for and test scalene imbalances and find the cause of any over contraction. While this could be congenital, hypertrophy as compensatory over activity of the medial scalene is more common.
(사각근의 불균형이 있는지 찾아보고 과수축의 원인을 찾아라. 이는 선천적인 것일 수도 있으나 내측 사각근의 과잉으로 인한 보상작용으로 인한 경우가 더 흔하다)
- Your task is to find out why it has hypertrophied and reduce this!
(과긴장의 원인을 찾아서 이를 해소하는 것이 당신이 해야 할 일!)

- Remember- (기억할 것-)
- Can effect any part of the plexus, including radial and ulna. (요측과 척측을 포함하여 신경총의 어느 부위든 압박될 수 있다.)
- Think *Pain* - medial boarder of scapula, plus diffuse pain radiating down lateral surface arm & forearm. Possibly **aggravated** by rotating and side bending to side of pain & **relieved** by placing hand on back of head. (통증- 견갑골의 내측과 더불어, 팔과 상완의 외측으로 방사되는 미만성의 통증, 머리를 통증 부위 쪽으로 돌리면 악화, 손을 머리 뒤에 올리면 호전)
- Puffiness in the supraclavicular region. (쇄골위의 부위가 부어 있다.)
- Marked tenderness over lower 2/3rd of scalenes may be radiating pain on pressure.(사각근의 하부2/3의 저명한 압통이 있으며 압박시 방사통 발생할 수 있음)
- Hypertrophy of medial scalene...Why? (내측 사각근의 비후...왜?)



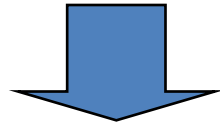
- ① LEVATOR SCAPULA
- ② RHOMBOID MINOR
- ③ RHOMBOID MAJOR

Fig. 60. Dorsal scapular nerve—motor distribution

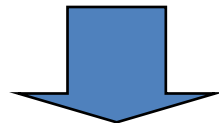
Brachial plexus -treatment 1

(상완신경총- 치료 1)

Provocative tests 유발검사, progressive therapy 점진적인 치료, localisation 접촉검사 and proximal-distal muscle tests of upper extremity 근육검사. Do these give any indication of location of entrapment? 이런 것들이 신경죄임의 위치를 결정하는 지표가 될까?

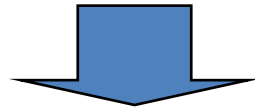


Correct all higher imbalances FIRST: cranial faults, TMJ, hyoid, pelvic categories, gait, meridians, and fixations (먼저 상부 불균형을 다 교정한다: 두개골기능이상, 턱관절, 설골, 골반 변형, 보행, 경락, 고정)

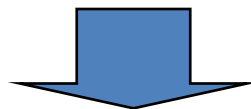


Brachial plexus – treatment 2

5 factors of I.V.F. of muscles of shoulder region with special regard to state of agonists, synergists and antagonists. Strain, counter-strain, fascia, reactive muscles, etc. (견부 근육의 추간공 5요소 특히 협력근, 길항근. 긴장-역긴장, 근막, 반응성 근육, 등등)



Re-examine scalenes which may only therapy localise when neck challenged in flexion look for trigger points and other local muscle dysfunction (사각근을 다시 검사할 것 경부 수축시에만 TL 양성일 수 있음 압통점 및 국소 근육 이상을 찾을 것)



Brachial plexus Treatment 3

RE-CHALLENGE OMOHYOID WITH T.L. AND SHOULDERS RAISED (견갑설골근을 TL 하고 어깨를 올린 상태에서 다시 검사한다)

RE-EVALUATE PECTORALIS MINOR AND ANTAGONIST FUNCTION MID AND LOWER TRAPEZIUS (소흉근 및 길항근인 중부, 하부 승모근을 다시 검사한다)

- CHECK FOR STERNO-CLAVICULAR FIXATION INVOLVING REACTIVE MUSCLE PATTERNS BETWEEN PEC.MINOR, SUBCLAVIUS, AND UPPER TRAP. ETC. (소흉근, 쇄골하근과 상부 승모근 간의 반응성 근육 양상 및 이와 관련된 흉골-쇄골 고정을 확인한다)

- EVALUATE FOR DOUBLE CRUSH IN ELBOW
AND WRIST
(팔꿈치와 손목의 이중 압착을 검사한다)

Anterior Scalene Syndrome (전사각근 증후군)

Medial Neck Flexors I (내측 경부 굴곡근 I)

SCALENE ANTERIOR (전사각근)

Origin:

- *Ant. tubercles TPs C2-C6*

Insertion:

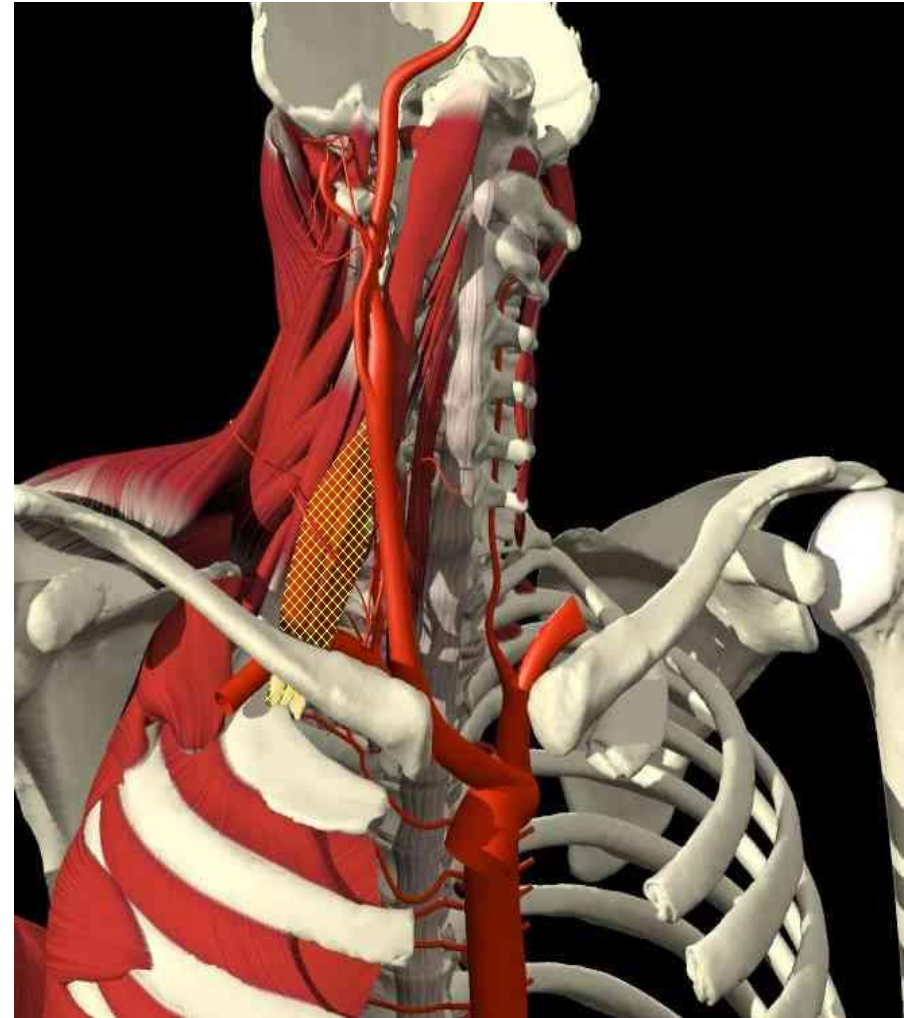
- *Scalene tubercle upper surface of the 1st rib.*

Action:

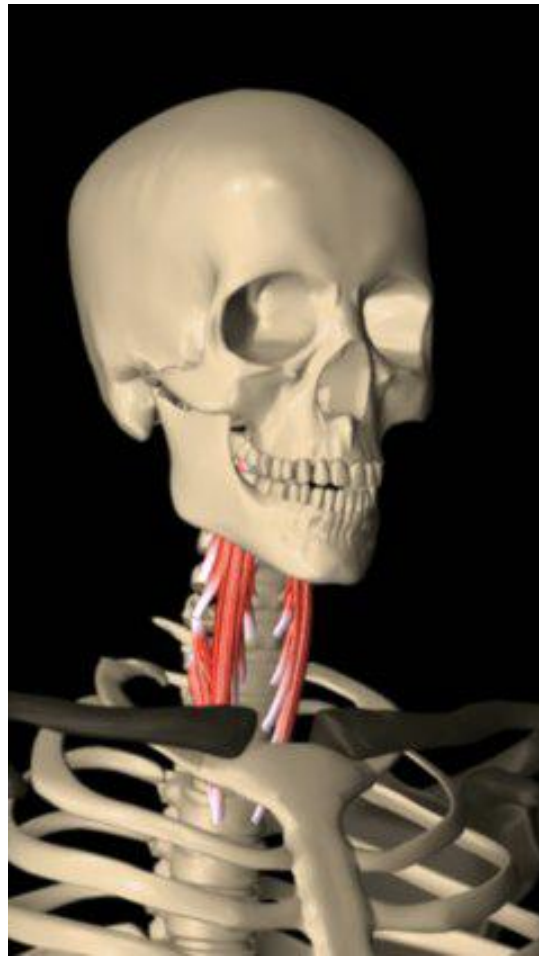
- *Flex & rotate C spine;*
- *Raises 1st rib.*

Nerve Supply:

Ant. branches C5,6,7 & 8



Neck Flexors



Medial Neck Flexors II

SCALENUS MEDIUS

Origin:

- *Post. tubercles TPs C2-C7*

Insertion:

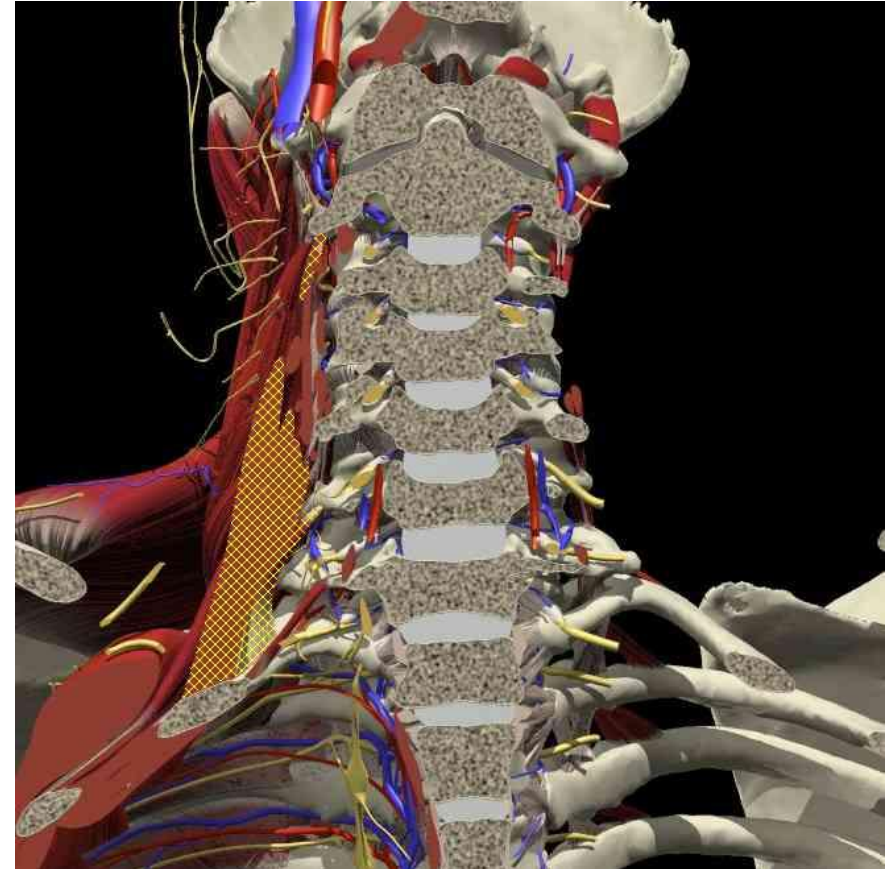
- *Upper surface 1st rib behind subclavian groove*

Action:

- *Flex & rotates C spine;*
- *raises 1st rib*

Nerve Supply:

- *Post. branches ant. rami C3,4*
- *Lat. muscular branches C3,4*



Medial Neck Flexors II

SCALENUS POSTERIOR

Origin:

- *Post. tubercles TPs C4, C5 & C6*

Insertion:

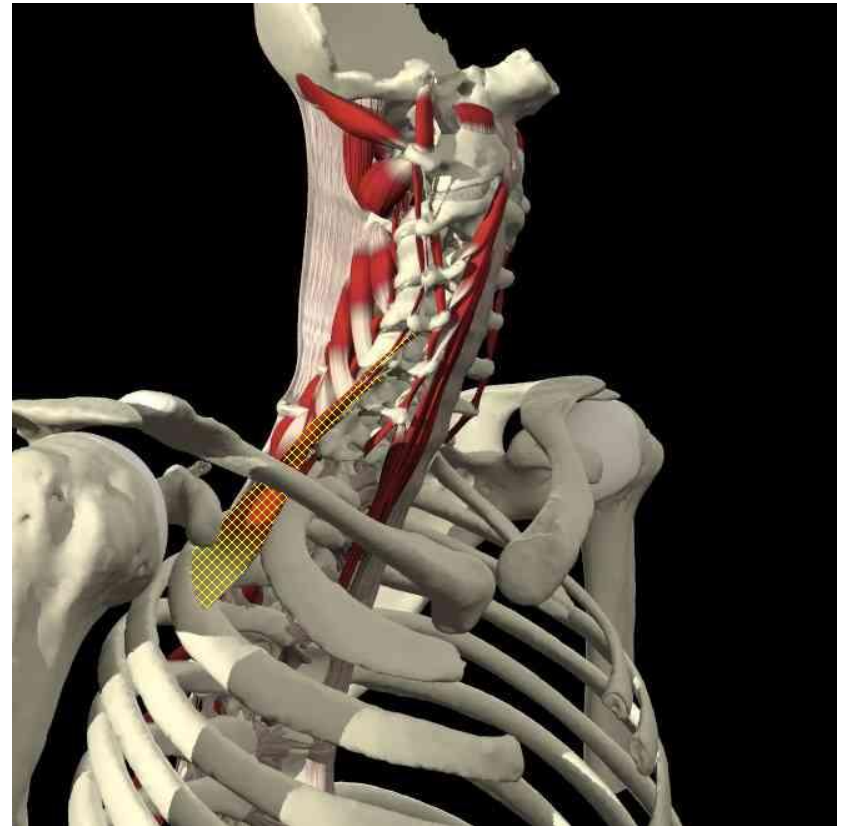
- *Surface of 2nd rib post to attachment Serratus anterior*

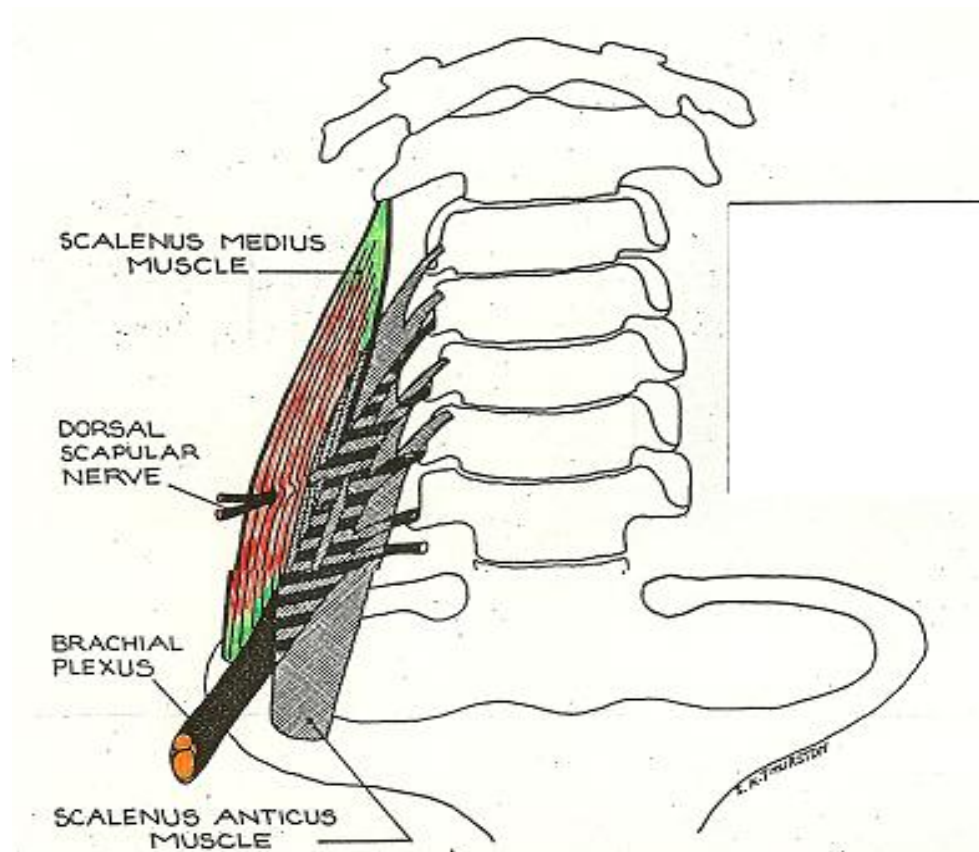
Action:

- *Flex & rotate the C spine;*
- *Raises 2nd rib*

Nerve Supply:

- *Posterior branches C5-C8*
- *Lat muscular branch of C3 & C4*





- Note dorsal scapular nerve, that supplies;
 1. Levator Scapula
 2. Rhomboid minor
 3. Rhomboid major
piercing scalene medius

Anterior Scalene Treatment 1

(치료 1)

- TEST FOR WEAKNESS OF ARM MUSCLES WITH SCALENES CONTRACTED (THIS CONDITION IS NOT NORMALLY FOUND WHEN THE SCALENES ARE WEAK BUT WHEN THEY ARE OVER CONTRACTED SECOUNDARILY TO A WEAK NECK EXTENSOR OR UPPER TRAP) 사각근 수축 상태에서 팔 근육의 위약을 평가(사각근이 약할 경우에는 드물지만 상부 승모근이나 경부 신근의 약화로 인해 과긴장되어 있을 경우 나타난다))

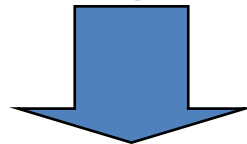
Anterior Scalene Treatment 2

- D.D FROM A HIDDEN CERVICAL SUBLUX, OR DISC, WHICH SHOULD DISPLAY ONE NERVE ROOT WEAKNESS ONLY, WHEREAS WITH TRICEPS HAND EXTENSORS ETC, ALL WEAK SUGGESTS SCALENE INVOLVEMENT (잠복성 경추 추간판탈출증 및 경추 추간판탈출증과의 감별이 필요함 추간판 탈출증은 특정 신경근에 관련된 근육의 약화만 나타나지만 사각근 증후군은 삼두근, 수부신장근 등 모든 근육의 약화가 나타남)



Anterior Scalene Treatment 2

- OBSERVE FOR POSTURAL IMBALANCE. FORWARD HEAD, HYPER. PLANTER FASCIAL MUSCLES. TEST IN WEIGHT BEARING AND WITHOUT. RULE OUT TMJ. RULE OUT TMJ WITH TONGUE DEPRESSOR BETWEEN TEETH (자세 불균형을 확인할 것. FORWARD HEAD, HYPER. PLANTER FASCIAL MUSCLES. 체중 부하 및 부하 없는 상태에서 평가. 어금니사이에 설압자를 물고 턱관절 평가 및 감별)
- PALPATE FOR TRIGGER POINTS. FASCIAL FLUSH (유발점 촉진 및 근막 이완술)



Anterior Scalene Treatment 3

TEST FOR WEAKNESS OF NECK EXTENSORS & UPPER TRAP.

FIND AND FIX THE CAUSE

(경부 신장근 및 상부 승모근이 약한지 검사하고 원인을 교정할 것)

CHECK FOR AND FIX 1ST & 2ND. RIB

PROBLEMS DUE ACTIONS OF OVER

CONTRACTED SCALENES (제1,2 늑골의 문제를 확인하고 교정할 것, 늑골의 문제는 사각근의 과긴장으로 생긴 것)

Costo-clavicular Syndrome

(늑쇄 증후군)

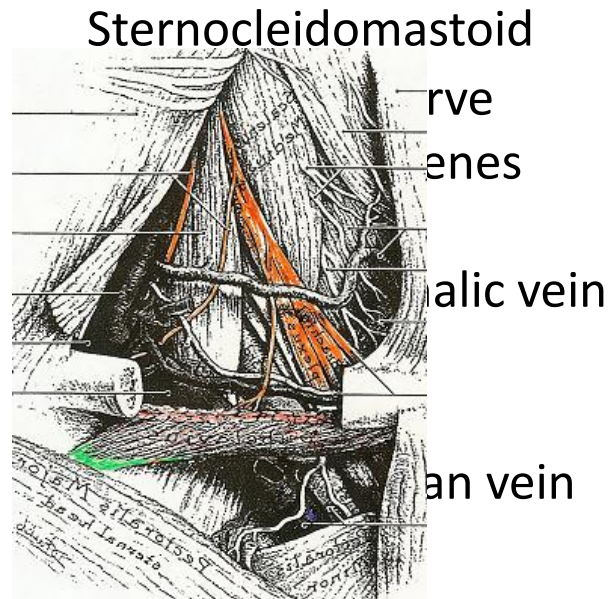
2. Costo-cavicular Syndrome

To find this have the patient;

1. Attach a bra. 브래지어의 끈을 잇는 자세
2. Reach into the backseat of a car 옆의 시트 뒤로 손을 뻗치는 자세(후진할 때)
3. Into their back pocket. 뒷 주머니에 손을 넣는 자세

Posterior triangle of the neck

Trapezius
Levator scapulae
Branches of the C5
Posterior scalenes
Branches of C6
Serratus anterior
Deltoid
Axillary artery and vein



Subclavius (쇄골하근)

Origin:

- *inferior surface clavicle*

Insertion:

- *1st rib & costal cartilage ant. to
ostoclavicular lig*

Action:

- *Pulls tip of shoulder ant. &
inferior*

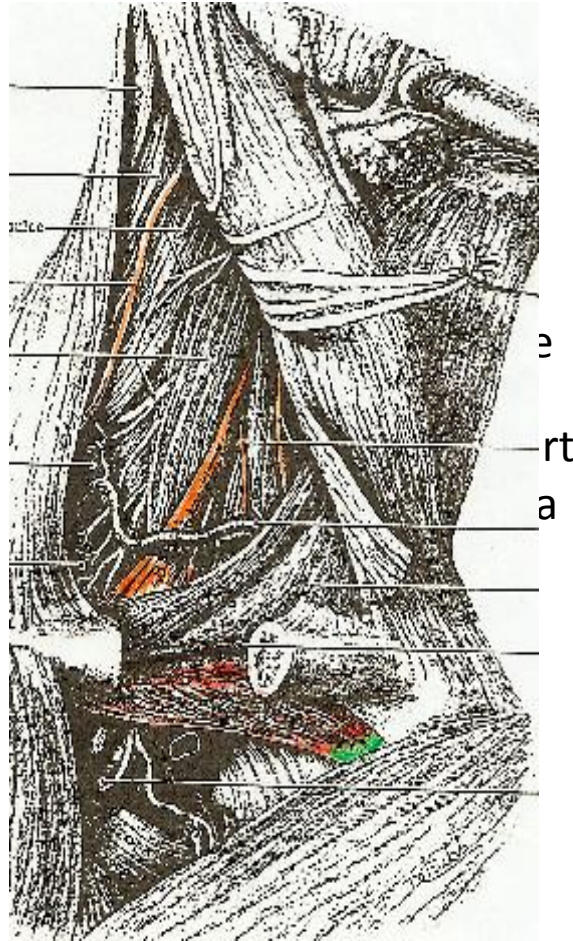
Nerve Supply:

- *Subclavian branch of Brachial
plexus C5 & 6*



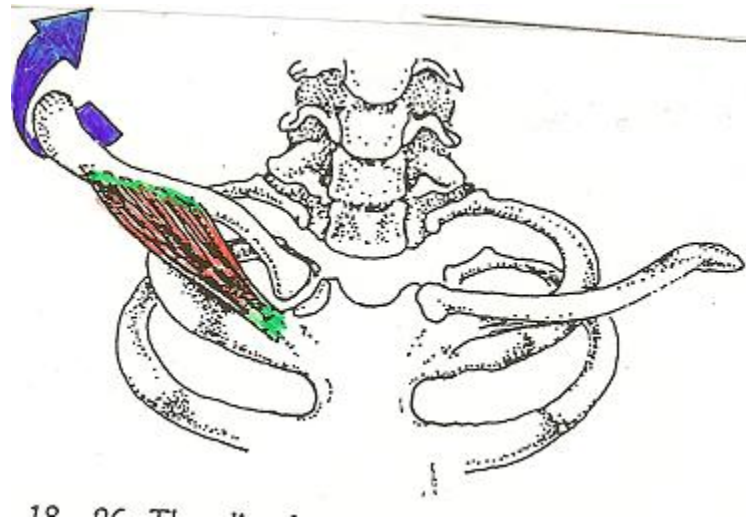
Posterior triangle of the neck II

Splenius capitus
Levator scapulae
N to levator scapulae
Median scalene
N. To rhomboids
Acc phrenic nerve
Posterior scalene
Serratus anterior
C5 & 6



Anatomy of subclavius (해부학)

- The distal end of the right clavicle is elevated (우측 쇄골의 원위부가 들림)
- There is a slight disarticulation from the sternum to reveal the insertion of the subclavius muscle (쇄골하근의 종지부를 보이기 위해 쇄골을 들어 올림)



N.B. The rotation of the clavicle in this diagram is opposite to normal to show the insertion of subclavius (쇄골하근의 종지부를 보여주기 위해 쇄골을 정상적인 회전 방향과 반대로 돌림)

Costo Clavicular Syndrome- Treatment 1

(치료 1)

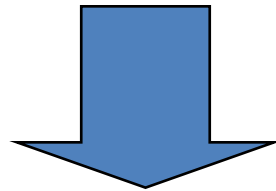
SYMPTOMS OCCUR WHEN THE ARM IS PLACED IN A POSITION THAT APPLIES TORSION TO THE CLAVICLE.
(팔을 쇄골이 틀어지는 방향으로 두었을 때 증상이 발생함.)

THERE IS INSTABILITY OF THE CLAVICLE DUE TO FAILURE OF FUNCTION OF ONE OF THE FOUR CLAVICULAR STABILISING MUSCLES, USUALLY SUBCLAVIUS, LEADING TO BRACHIAL PLEXUS ENTRAPMENT. (쇄골을 안정시키는 4근육 중 하나의 장애 (주로 쇄골 하근) 로 인해 쇄골이 불안정해지면서 상완신경총의 압박을 유발하여 발생함.)

Costo Clavicular Syndrome- Treatment 2

TEST PUT B.I.D BEST WITH ARM RAISED OR SHOULDER EXTENDED. THE EASIEST MUSCLES TO USE HERE WILL BE THE WRIST EXTENSORS.

검사 팔을 올리거나 어깨를 뒤로 신전시키는 Body Into Dystorsion 몸을 빼돌어지게 한 다음
이 때 가장 검사하기 쉬운 근육은 손목 신장근이다.



Costo Clavicular Syndrome- Treatment 3

TEST FOR WEAKNESS OR S.C.S. OF THE SUBCLAVIUS. (쇄골하근이 약한지 혹은 근육을 수축시킨 다음 약한 과긴장-역긴장이 있는지 검사.)

AS YOU PALPATE FOR TENDERNESS PRESS THE SHOULDER FORWARD AS IF TO BRING THE SCAPULAR ACROSS TO THE OPPOSITE HIP. (어깨를 전방으로 눌러서 견갑골이 반대쪽 고관절쪽으로 힘을 가했을 때 압통이 있나 확인)

THE Sub clavicular TENDERNESS SHOULD REDUCE. HOLD FOR APPROX. TWO MINUTES.(이 때 쇄골하 압통이 감소해야 하며 2분간 근접시킨다)

Costo Clavicular Syndrome- Treatment 4

IF THERE IS AN INVOLVED SUBCLAVIUS CHECK REST OF ROTATOR CUFF. PARTICULARLY CHECK ALTERATIONS IN OTHER THREE CLAVICLE STABILISERS. (쇄골하근에 대한 검사 후 나머지 회전근개 근육들과 특히 나머지 3개의 쇄골 안정 근육을 검사할 것)

1. P.M.C (대흉근 쇄골지)
2. DELTOID. (삼각근)
3. S.C.M. (흉쇄유돌근)

CHECK FOR *TENDERNESS* IN CLAVICLE – HOLOGRAPHIC SUBLUXATION (쇄골의 압통을 확인- 골내 아탈구)

THYROHYOID

Origin: Oblique line on the lamina of the thyroid cartilage.

Insertion: Lower border of the greater cornu and adjacent part of the body of the hyoid.

Description: A small, quadrilateral muscle which could be considered as a continuation of the sternothyroid. It lies deep and somewhat lateral to the sternothyroid. Like the sternothyroid muscle, it is stretched when the hyoid is challenged superiorly. Its possible involvement is indicated when phonation

Hyoid Muscles and Function

and swallowing are added to another examination procedure, which is then found positive after previously being negative.

Action: Draws the hyoid inferiorly or, if it is the fixed origin, draws the thyroid cartilage superiorly.

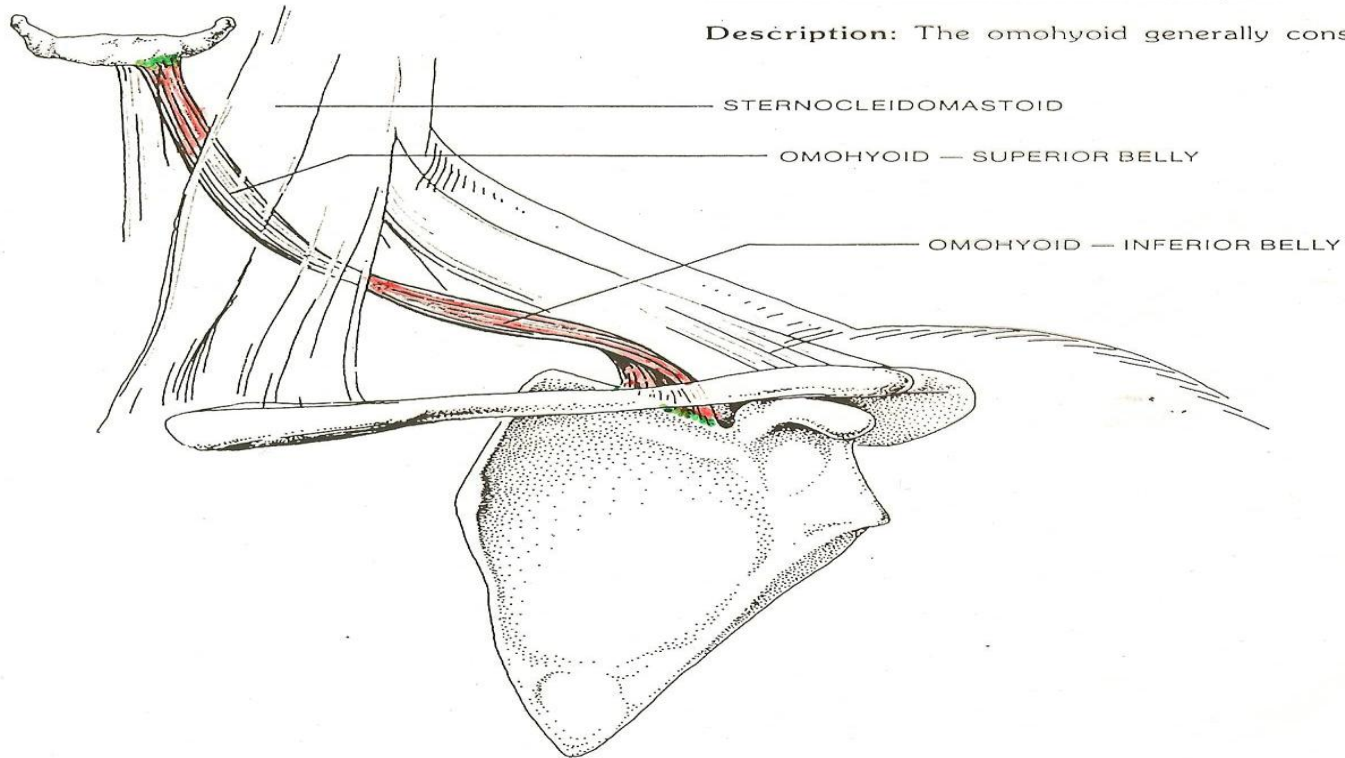
Nerve Supply: Branch of the ansa cervicalis with branches from C1 and possibly C2.

OMOHYOID

Origin: From the upper border of the scapula near the scapular notch.

Insertion: Inferior border of the body of the hyoid, lateral to the insertion of the sternohyoid.

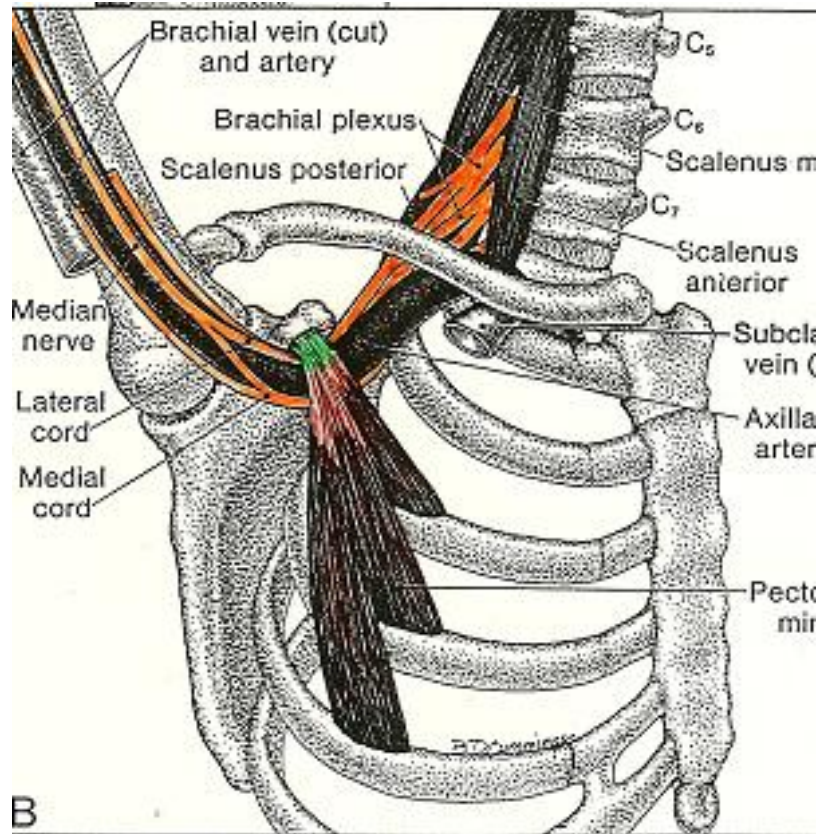
Description: The omohyoid generally consists of



13—10. Omohyoid muscle.

PECTORALIS MINOR SYNDROME

소흉근 증후군

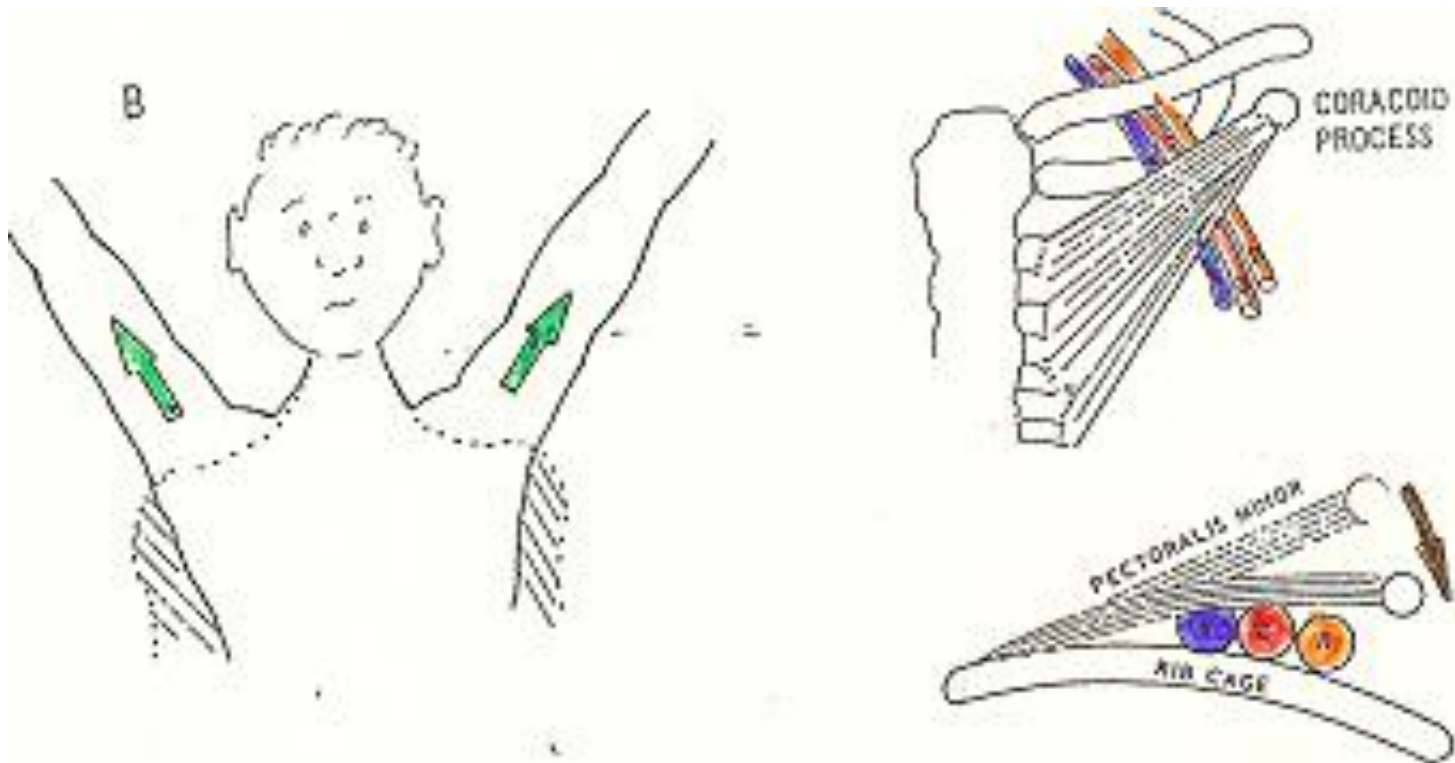


- As they hook underneath the attachment of pectoralis minor at the coracoid process
 신경근 다발과 혈관들이 오헤돌기(coracoid process) 부위에서 소흉근 부착부 아래에 걸려 올라간다
- By the compression by the clavicle directly against the first rib as the scapular is retracted.
 견갑골이 후견(retract) 될 때 쇄골이 1번 늑골에 대해 바로 압박을 가하게 된다.

소흉근 증후군 (Pectoralis Minor syndrome)

The neurovascular bundle may be compressed by elevating the arms in a position of abduction and move them behind the head

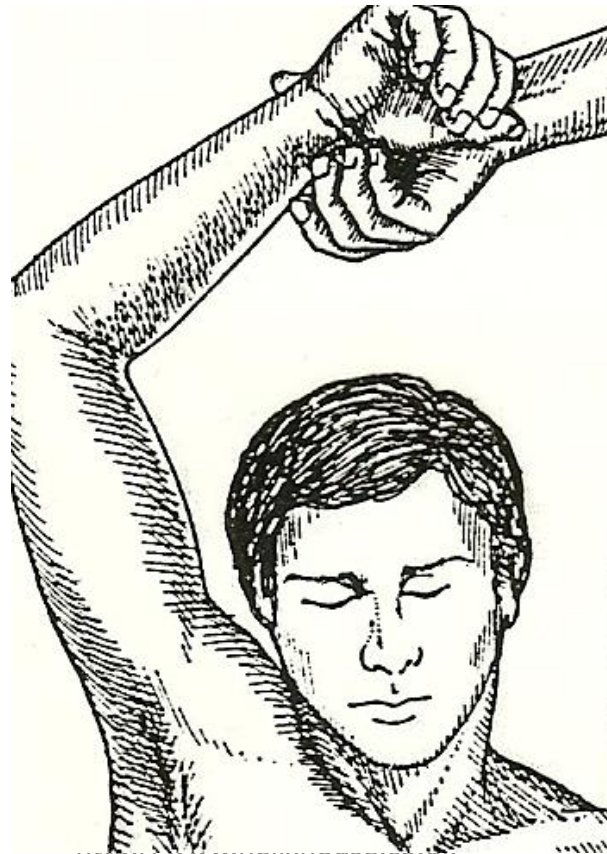
상지를 외전 상태에서 거상(elevation)하고 머리 뒤에 위치하는 자세를 취하면 신경근 다발(neurovascular bundle)이 압박을 받을 수 있다.



A +ve Wright hyper abduction test

- Entrapment of the lower brachial plexus & axillary artery by pectoralis minor

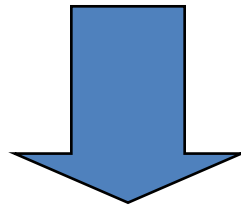
소흉근에 의한 하부 상완신경총 (lower brachial plexus) 과 액와 동맥(axillary artery)의 눌림 (entrapment)



Pectoralis Minor Syndrome - Treatment 1

- 1) COMMONLY A SHORTENING OF THE PEC. MINOR WILL CAUSE A NEUROVASCULAR BUNDLE ENTRAPMENT. IN REALITY RETROGRADE LYMPHATIC SYNDROMES ARE SHORTENING OF PEC. MINOR

대개 소흉근(Pec.minor)의 단축은 신경 혈관 다발의 눌림(entrapment)을 야기한다. 실제로 역행성 림프 증후군(RETROGRADE LYMPHATIC SYNDROMES)은 소흉근의 단축으로 일어난다.



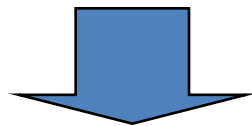
Pectoralis Minor Treatment 2

2) PALPATE FOR TENDERNESS IN BELLY OF MUSCLE THAT MAY REDUCE WHEN SHOULDER IS DROPPED AND PULLED BACK.

소흉근 근복의 압통(tenderness)을 촉진한다. 어깨를 늘어뜨리고 뒤로 잡아당기는 자세(drop and pull back)에서 이 압통이 감소한다.

3) SHOW PATIENT THE LINE OF THE MUSCLE FROM THE SCAPULAR TO THE THIRD, FOURTH AND FIFTH RIBS.

환자에게 견갑골로부터 3,4,5번 늑골로 주행하는 소흉근을 확인시켜준다.



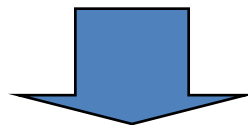
Pectoralis minor syndrome - Treatment 3

자가 치료 (HOME TREATMENT)

5) DEMONSTRATE TO THEM HOW THEY CAN FEEL MUSCLE IF THEY HOLD THEIR HAND BEHIND HEAD. GET THEM TO ICE AND HOT SPRAY MUSCLE IN SHOWER. 환자에게 손을 머리 뒤로 올리는 자세에서 근육을 만져보게 하고, 환자로 하여금 샤워할 때 이 부위에 냉각 또는 온열 스프레이를 사용하도록 지도한다.

6) TEST FOR MUSCLE WEAKNESS IN B.I.D

변위를 향하는 자세(Body into distorsion, BID)에서 근육을 검사한다.



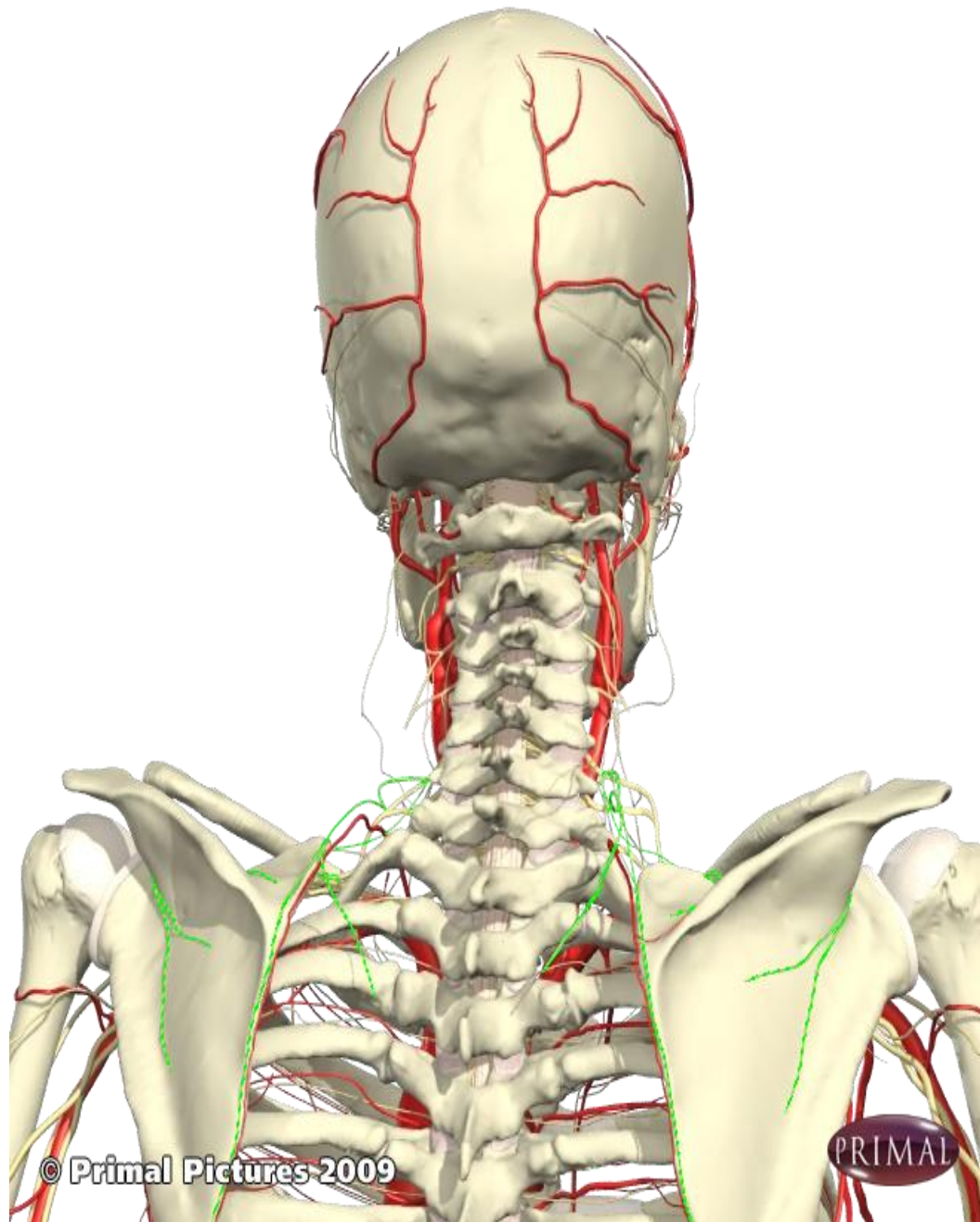
Pectoralis minor syndrome -Treatment 4

7) IF THE MUSCLE IS SHORT YOU MUST FIND THE HIDDEN WEAKNESS. CHECK **RHOMBOIDS, LATISSMUS DORSI, INFRASPINATUS, POSTERIOR DELTOID** PARTICULARLY.

ALSO CHECK FOR BILATERAL LOWER TRAP. WEAKNESS

만일 소흉근이 단축되어 있다면 관련된 숨겨진 약화(hidden weakness)를 찾아내야한다. 능형근(Rhomboid), 광배근(Latissimus dorsi), 극하근(infraspinatus), 후방 삼각근(posterior deltoid)이 약해져있지 않은지 검사해보아야 한다. 양측 하부 승모근(bilateral lower trapezius)의 약화도 확인해보라.

견갑상신경 증후군 (Suprascapular nerve Syndrome)



© Primal Pictures 2009

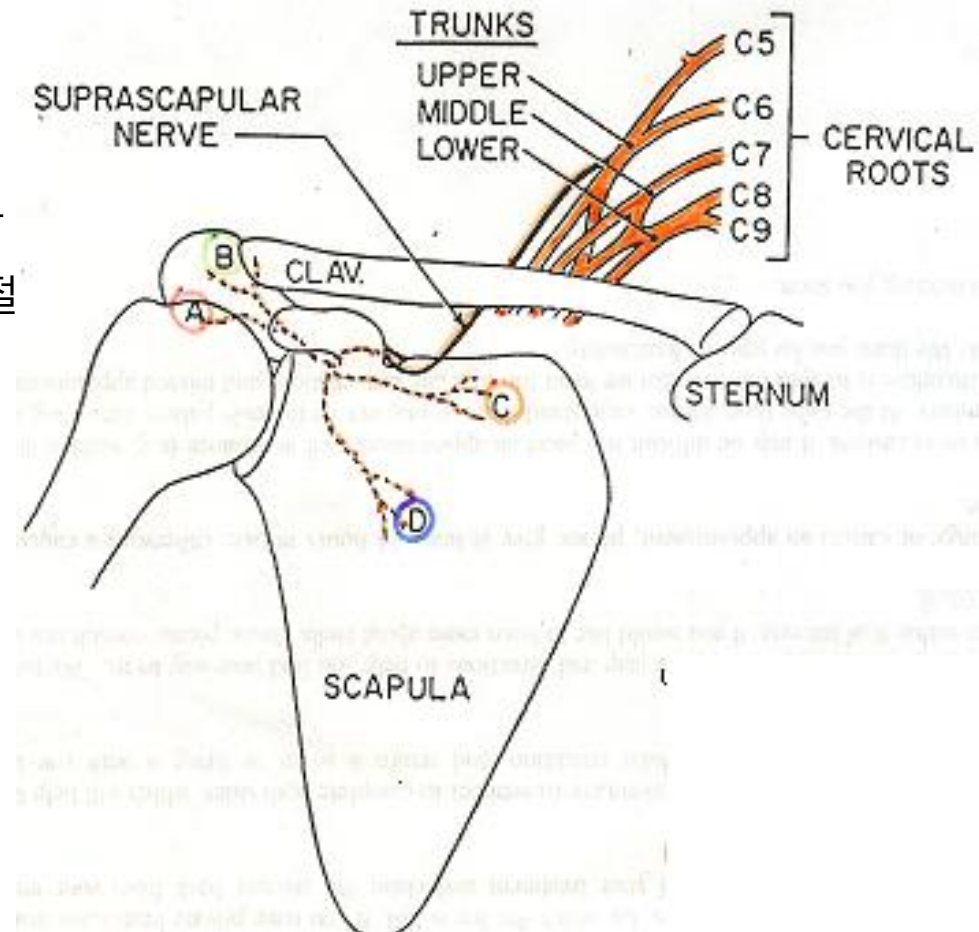
PRIMAL

Nerve supply to the shoulder complex

Branches of suprascapular nerve
견갑상신경

- A) to shoulder joint capsule 견관절낭
- B) to acromioclavicular joint 견쇄관절
- C) to supraspinatus muscle 극상근
- D) to infraspinatus muscle 극하근

으로 분지 한다



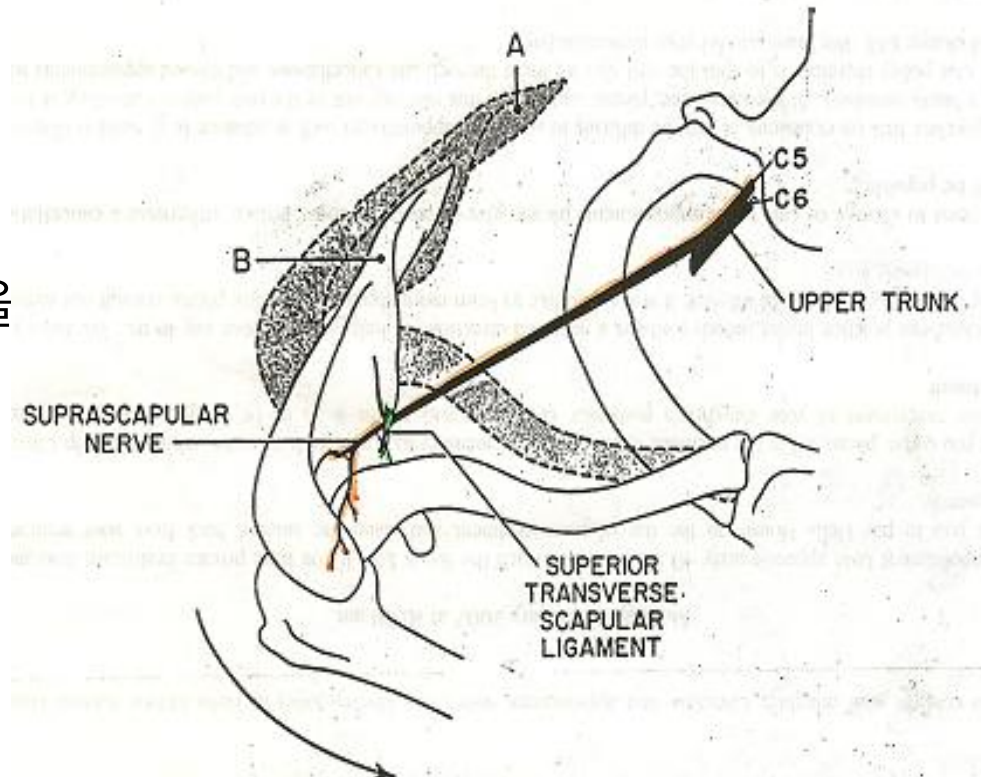
Scapular motion in relation to suprascapular nerve 견갑상 신경(suprascapular nerve)과 연관된 견갑골의 움직임

Position of scapular when;
A. the arm is in the anatomical position.

상지의 해부학적 위치에서의

B. the arm is adducted across the body.

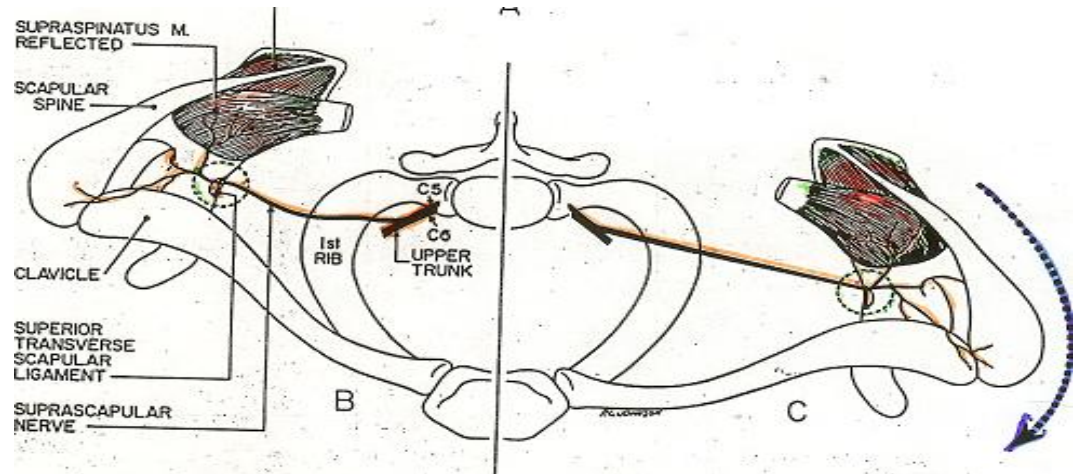
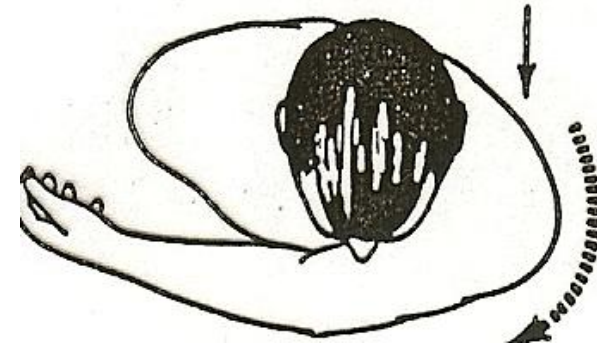
상지가 체간을 가로질러 내전되었을
때의
견갑골의 위치



Coronal view of alteration of course of Suprascapular nerve by scapular motion

관상면에서의 견갑골 움직임에 따른 견갑상 신경 경로의 변화에 대한 관찰

- A. Direction of motion 움직임의 방향
- B. Normal anatomical position 정상적인 해부학적 위치
- C. Nerve tension produced by arm posture in A
A 자세에서의 팔의 위치에 따른 신경의 긴장



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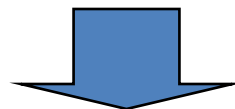
Subscapular nerve syndrome - Treatment 1

- 1) THIS IS BASICALLY AN UNSTABLE SCAPULAR. IT IS COMMONLY OVERLOOKED BECAUSE THE INFRASPINATUS MAY ONLY SHOW ITS WEAKNESS WHEN THE ARM IS IN FLEXION SO STRETCHING THE NERVE AS IT CURVES AROUND THE SPINE OF THE SCAPULAR.

이 경우 기본적으로 견갑골이 불안정하다. 이 사실은 종종 간과되는데 이는 상지를 굴곡하여 견갑극 주위를 돌아가는 이 신경을 스트레칭 할 때만 극하근이 약해지기 때문이다.

- 2) AS LONG AS MAJOR SCAPULAR STABILISERS ARE STRONG THERE WILL NOT BE TOO MUCH STRESS ON THE NERVE

견갑골을 안정화 시키는 주요 근육이 충분히 강하면 견갑골의 움직임에도 불구하고 이 신경에 그다지 큰 스트레스를 가하지 않을 것이다.



Subscapular nerve syndrome - Treatment 2

3) *OBSERVE* FOR SCAPULAR INSTABILITY AND EXCESS MOTION AROUND THE RIB CAGE.

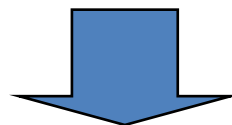
견갑골 불안정성과 늑곽 주변에서의 과도한 움직임을 관찰한다.

4) *LISTEN* TO PATIENT THEY MAY COMPLAIN OF PAIN OR WEAKNESS IN THE ARM IN DIFFICULT POSITIONS.

환자가 특정 자세에서 통증이나 근육의 약화를 호소하지 않는지 문진한다.

5) *TEST* THE INFRASPINATUS WITH THE ARM IN FLEXION AND THE SCAPULAR PULLED Laterally ACROSS THE RIB CAGE.

팔을 굴곡하고 견갑골을 늑곽의 측방으로 견인한 상태에서 극하근이 약해지지 않는지 검사한다.



Subscapular nerve syndrome - Treatment 3

6) *TEST* STABILISING SCAPULAR MUSCLES ESPECIALLY THE RHOMBOIDS AND SERRATUS ANTERIOR.

견갑골 안정화 근육 특히, 능형근(Rhomboid)과 전거근(serratus anterior)을 검사한다

7) *TREAT* CAUSES OF WEAKNESS PARTICULARLY CHECKING FOR ORIGIN AND INSERTION AND S.C.S

약화의 원인을 치료한다. 주로 기시-종지(origin-insertion)의 문제나 긴장-역긴장(strain-counter strain,SCS) 문제를 살펴본다.

Nerve entrapments in the shoulder / neck area

어깨/목 주변에서의 신경 눌림

1. Anterior scalene syndrome 전사각근 증후군
2. Costo-cavicular syndrome 늑쇄 증후군
3. Pectoralis Minor syndrome 소흉근 증후군
4. Suprascapular nerve syndrome 견갑상 신경 증후군
5. Doral scapula nerve syndrome 견갑배 신경 증후군

1. Anterior scalene 전사각 증후군

To find this;

Place the patient so they are contracting
the anterior scalene

환자가 전사각근을 수축하는 자세를 취하게 한다

2. Costo clavicular syndrome

To find this have the patient reach back behind themselves as if to; 이런 죄임을 찾기 위해서는 팔을 몸 뒤로 하는 자세를 취해야 한다.

1. Attach a bra. 브래지어의 끈을 잇는 자세
2. Reach into the backseat of a car 옆의 시트 뒤로 손을 뻗치는 자세(후진할 때)
3. Into their back pocket. 뒷 주머니에 손을 넣는 자세

3. Pectoralis Minor

To find this have the patient;

1. Forcibly contract pec minor and test muscles of the hand for weakness. Sometimes the muscles is so short it is creating a weakness in a neutral position. In these cases when you raise the arm above the head thereby stretching the pec. Minor the muscle will strengthen the muscle will strengthen thereby telling you it is short.

소흉근을 강하게 수축시킨 후에 손 근육이 약해지는지 관찰한다. 때로는 소흉근이 너무 짧아져 있어 중립위(neutral position)에서도 약하게 평가되는 경우가 있다. 이러한 경우 팔을 머리 위로 올려 소흉근을 신장시키면 손 근육은 다시 강해질 것이고 이로써 소흉근이 짧아져 있음을 알 수 있다.

4. Suprascapular nerve syndrome

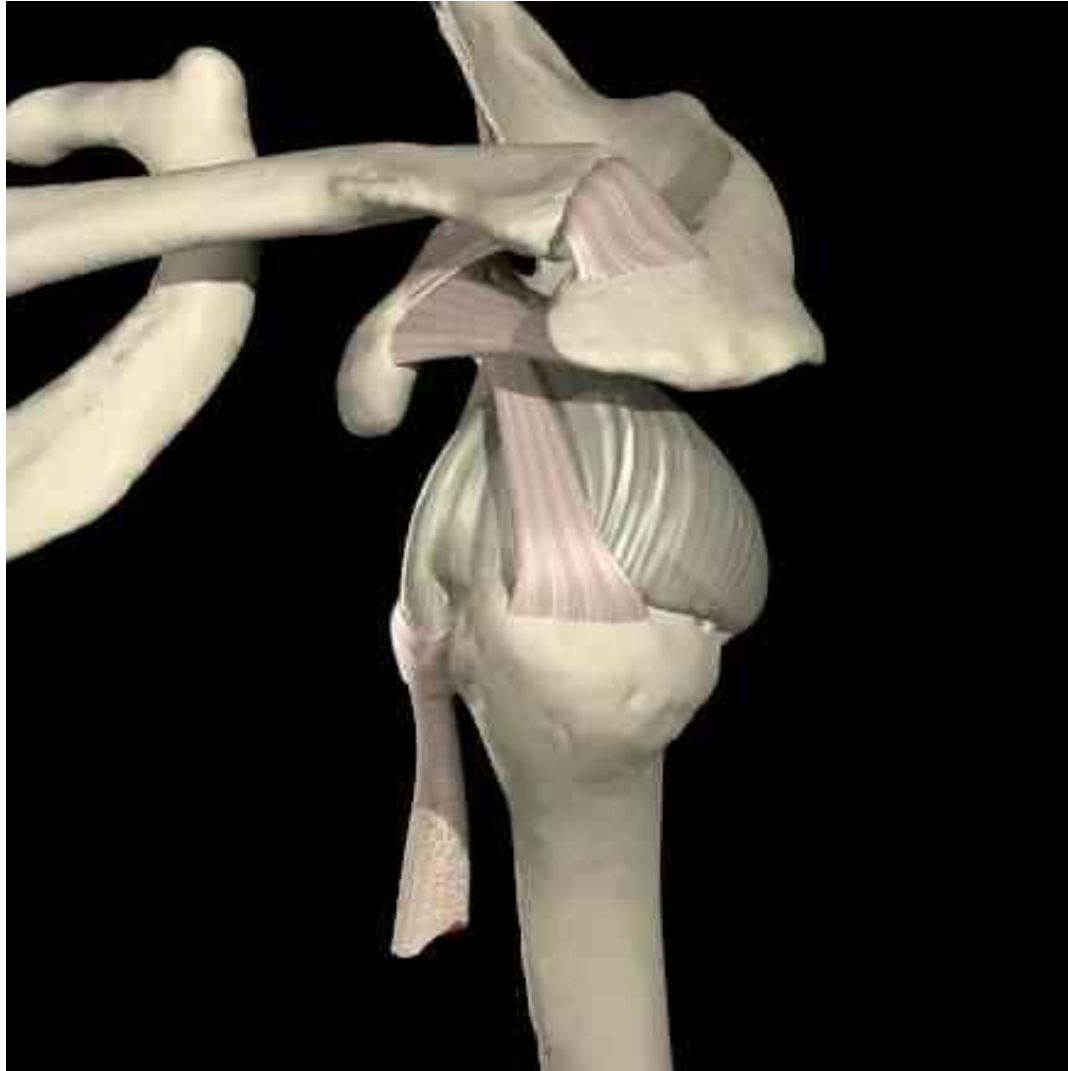
This will create weakness in the infraspinatus muscle when the arm is in forced flexion rotating the scapular around the rib cage.

이 경우 상지를 강하게 굴곡시켜 견갑골을 늑곽의 외측으로 회전시켜 견갑극 주변에서 견갑상 신경을 신장시키면 극하근(infraspinatus)이 약해진다.

So stretching the Suprascapular nerve around the spine of the scapular. 견갑극 주변을 돌아가는 견갑상 신경을 신장시켜야한다

Acromio-Clavicular joint separation 견쇄 관절의 분리

Acromio Clavicular Joint



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Cause 원인

- COMMONLY RESULTS FROM FALLS ONTO THE HAND AND ROAD TRAFFIC ACCIDENTS.

보행중 교통사고나 넘어지면서 손으로 땅을 짚으면서 일어난다.

- FORCES PUSH THE ACROMION PROCESS AWAY FROM THE SCAPULAR SEPARATING THE JOINT AND SLIGHTLY STRETCHING THE LIGAMENT

견봉돌기(acromion process)를 견갑골로부터 분리되게 하여 인대를 살짝 신장시키는 방향으로 힘을 가한다.



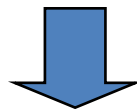
Diagnosis

- **OBSERVE FOR RELATIVE WEAKNESS ON SHOULDER MUSCLES, PARTICULARLY A WEAKNESS IN DELTOID, ESPECIALLY MID. AND POSTERIOR DELTOID.**

어깨 근육의 상대적인 약화를 진단한다. 특히, 삼각근 그 중에서도 중부, 후부 섬유위약의 위약을 평가한다.

- **THIS MAY LEAD TO A REACTIVE PATTERN BETWEEN THE ANT. AND POST. DELTOID**

삼각근의 약화에는 전방, 후방 삼각근 사이의 reactive pattern이 관여되어 있을 수도 있다.



Deltoid

Origin:

- *Ant lat 1/3rd clavicle*
- *Lat border acromion*
- *Lower lip spine scapular*
- *Infraspinatus fascia*

Insertion:

- *Deltoid tuberosity*

Action:

- *Abduction of arm*

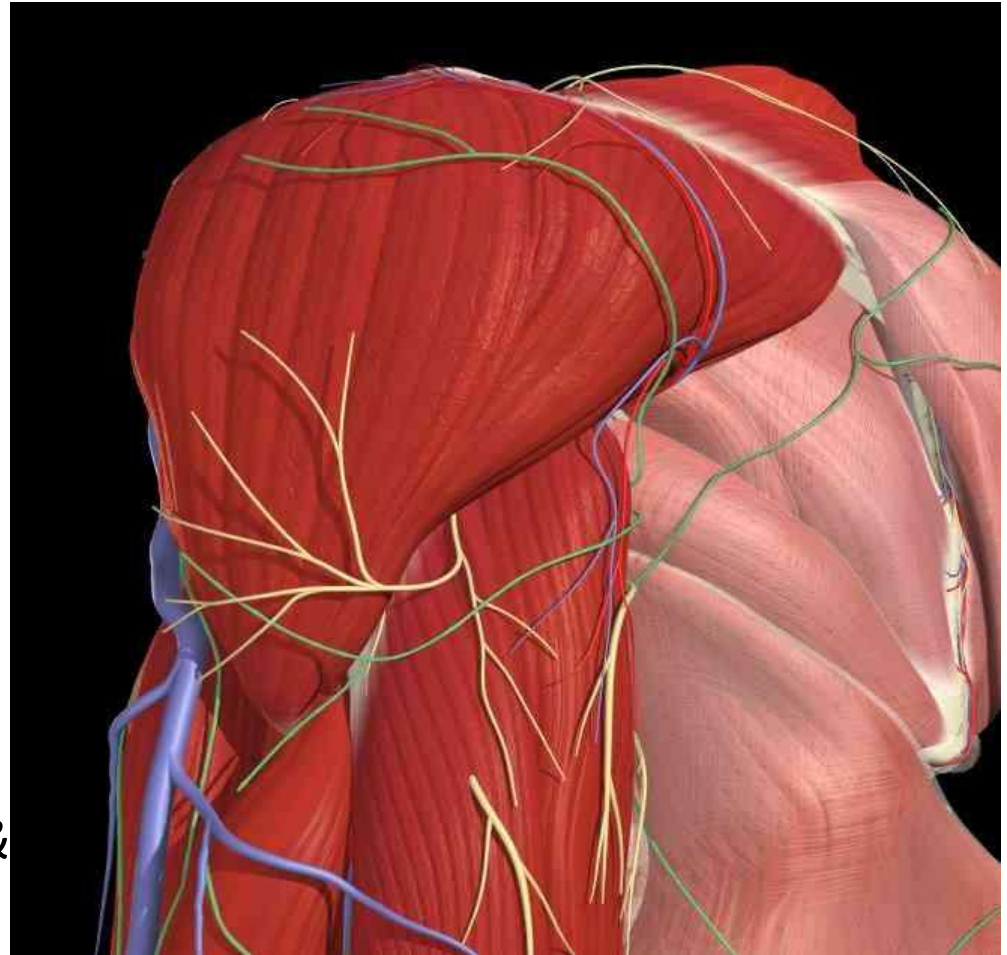
Ant pt:

- *Flexion arm*

Post pt:

- *Extension arm*

Nerve Supply: *Axillary nerve C5 &*



Diagnosis

WITH *WEAK* DELTOID LOOK FOR HYPERTONICITY IN THE UPPER TRAP.

삼각근이 약할 경우 상부승모근이 과긴장(hypertonicity) 되어 있는지 살펴본다.

THIS WILL PULL ON THE OCCIPUT AND C7 WHERE IT IS ATTACHED AND CAN BE A HIDDEN CONTRIBUTOR TO LONGSTANDING POST R.T.A. NECK PAIN

상부승모근의 과긴장은 이 근육이 부착되어있는 후두골과 C7을 잡아당겨 지속적인 post. Retroauricular neck pain의 숨겨진 요인(hidden contributor)이 될 수 있다.

TEST FOR TRIGGER POINT PAIN REDUCTION IN UPPER TRAP. IN COMPRESSION OF THE A.C. JOINT TOGETHER.

견새관절(AC joint)을 압착시켜 상부 승모근의 trigger point의 압통이 감소하는지 테스트해 본다.

OBSERVE FOR INCREASED RANGE OF SIDEBENDING AND ROTATION OF THE CERVICALS ALSO ON A.C. JOINT COMPRESSION

견새관절(AC joint)를 압착시켜 경추의 측굴과 회전 가동 범위가 증가하는지 관찰한다.

Treatment 1

1. LIGAMENT 인대

CHALLENGE IT TOGETHER AND OBSERVE FOR MUSCLE CHANGE. TREAT ACCORDINGLY T.L. FOR LIGAMENT INTERLINK

유발검사를 하여 근육의 변화가 있는지 관찰한다. 인대교차연결(Ligament interlink)에 대한 TL을 해보고 이에 준해 치료한다.

2. BONE 뼈

CHALLENGE JOINT & ADJUST. TAPE WHERE NEEDED. TEST FOR MANGANESE CORRECT SPINE. C5?

관절에 유발검사를 시행하고 교정한다. 필요한 곳에 테이핑을 시행한다. 망간(manganese)을 테스트 하고, 척추(C5?)를 교정한다.

Treatment 2

3. MUSCLE

FIX ALL WEAKNESS SYNERGIST SCS.? ANTAG. F.F.?

협력근의 모든 문제와 길항근의 모든 문제를 치료한다. (협력근은 S.C.S,
길항근은 F.F.)

GAIT ?CHECK 보행(gait) 관계 체크



4. SKIN

T.L. SKIN

& LOOK FOR DIRECTION & PHASE OF RESP. THAT NEGATES IT

피부에 TL 하고 그 결과를 negation하는 방향과 호흡 주기를 찾는다.

Your lecturer 's first steps into Zen Buddhism!



Slipped Bicipital Tendon

미끄러진 이두근건

Biceps anatomy

Origin: 2 heads

Long head

- Superior rim glenoid fossa
into bicipital groove in a fibrous sheath
between tendons of subscapularis &
supraspinatus

Short head

- Coracoid process

Insertion:

- Via bicipital aponeurosis onto Ulna

Action:

- Supinates
- Flexes supinated arm

Nerve Supply:

- Musculocutaneous nerve C5 & 6



Biceps





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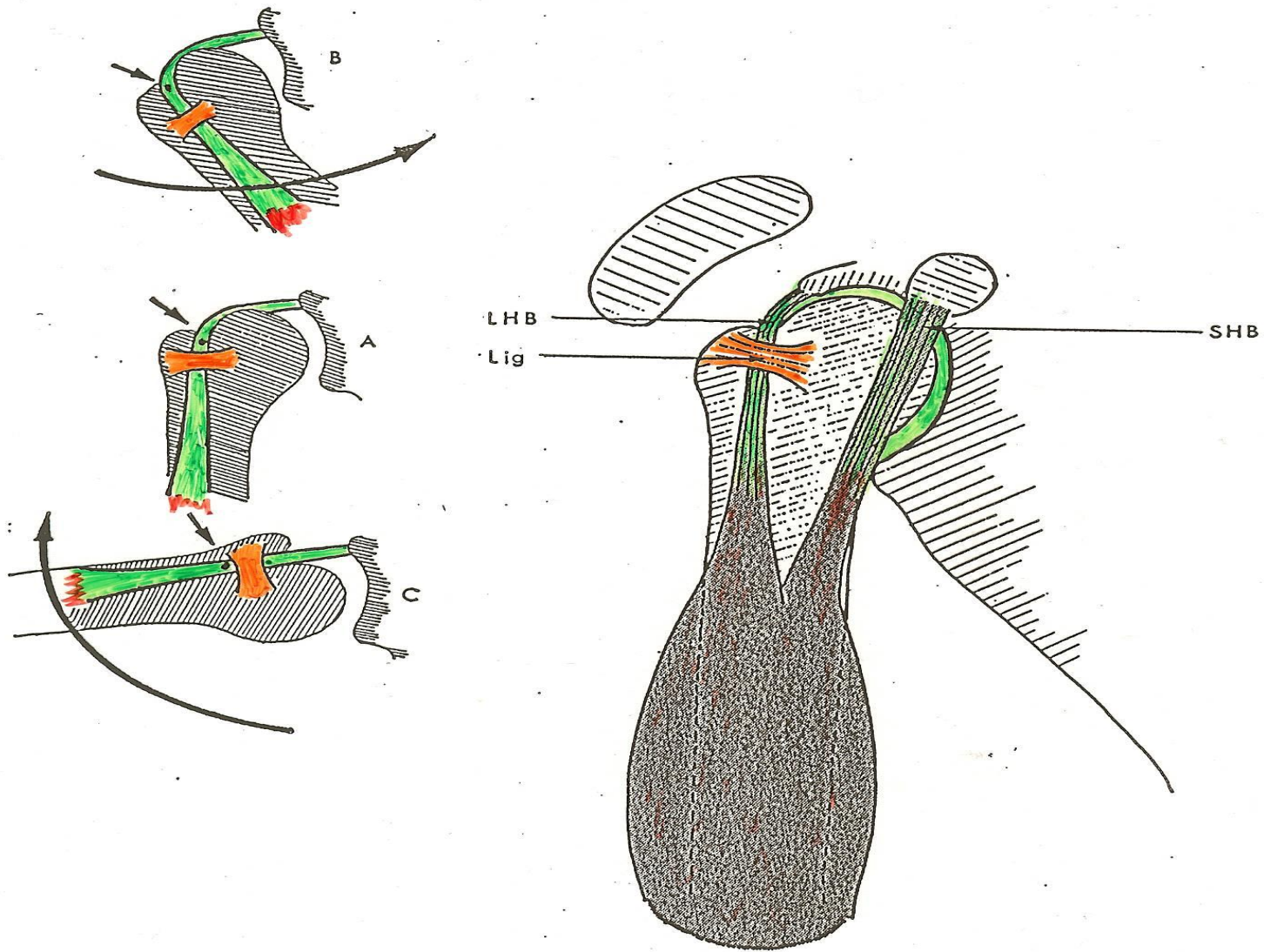
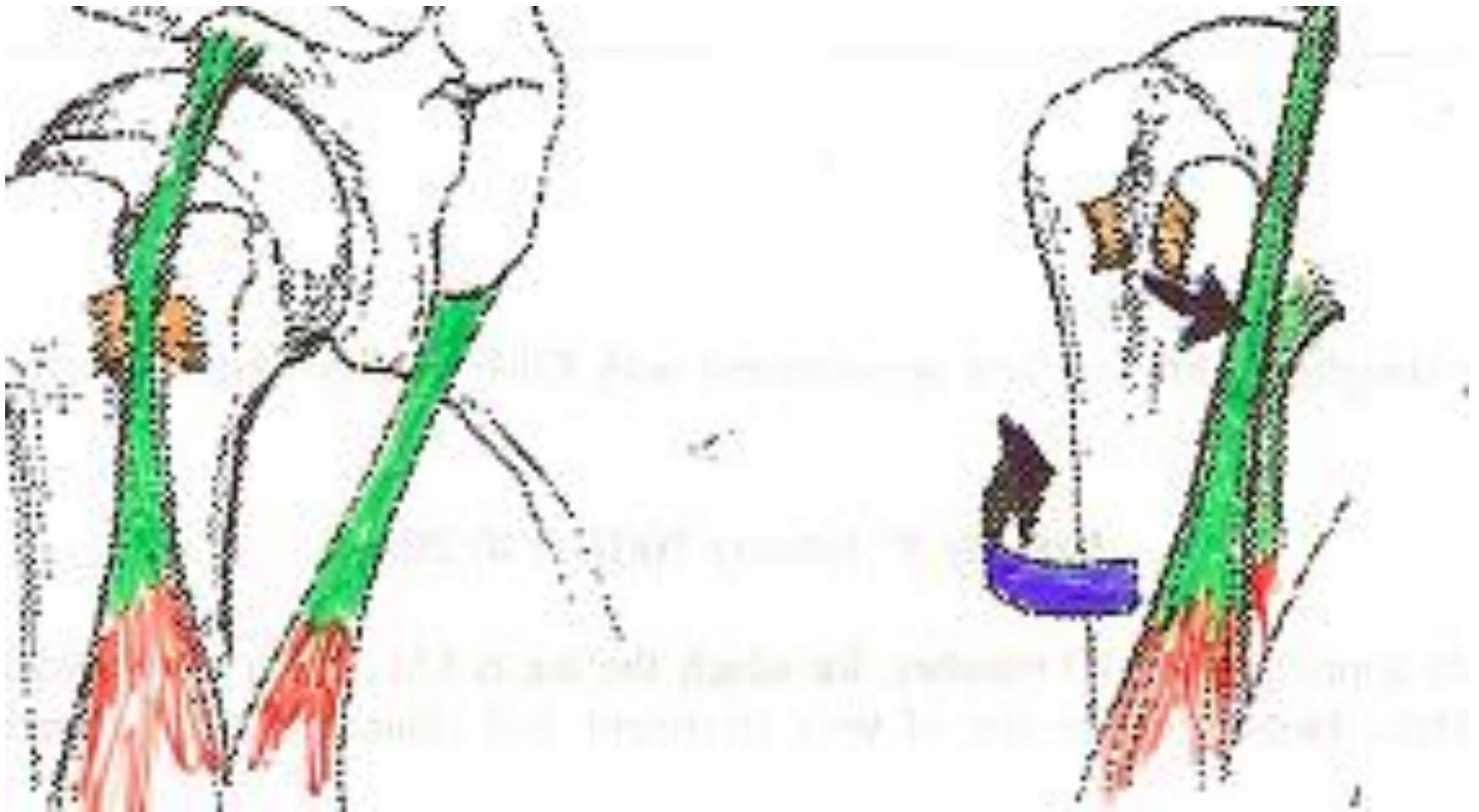
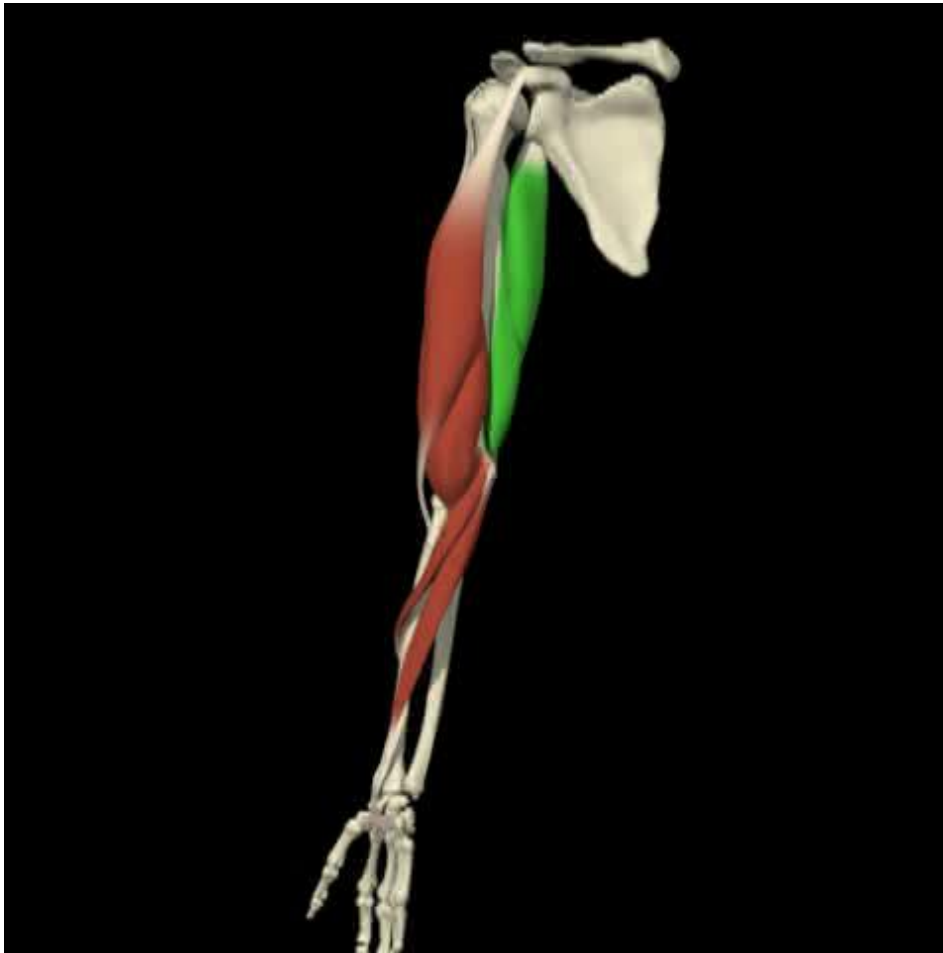


FIGURE 35. Biceps mechanism. The biceps brachii originates from two tendons: the short medial head, from the coracoid process; and the long head, from the superior rim of the glenoid fossa. The long head passes down into the bicipital groove in a fibrous sheath between the tendons of the subscapularis and the supraspinatus tendon. The small drawings at left depict the movement of the humerus upon the biceps tendon. *A.* The dependent hanging arm. *B.* Arm adducted, internally rotated, and extended, causing the ligament (*dot*) to move away from the transverse humeral ligament. *C* depicts the downward movement of the ligament (*dot*) below the transverse humeral ligament when the arm is abducted, externally rotated, and flexed forward.

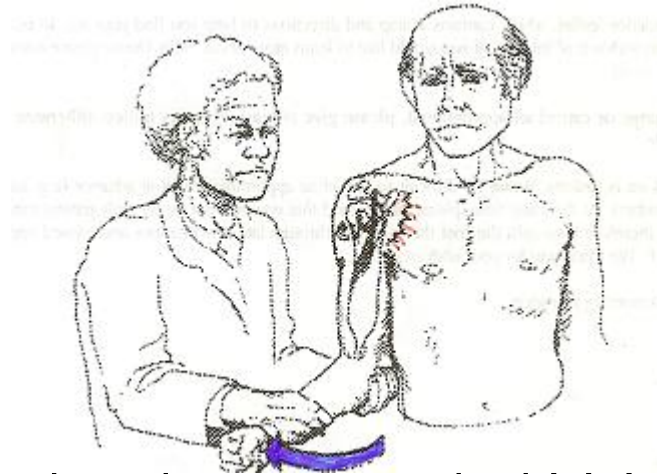
SLIPPED BICEPITAL TENDON



Flex. Ext. of forearm



Yergerson's test

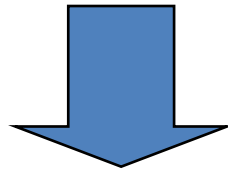


- When there is pain and tenderness over the bicipital groove.
상완 이두근구(bicipital groove) 상에 통증과 압통이 있을 때
- With elbow flexion and supination against resistance
마주하는 힘에 저항하여 주관절을 굴곡, 외회전(註 수정) 시킨다.

Slipped bicipital tendon - Treatment 1

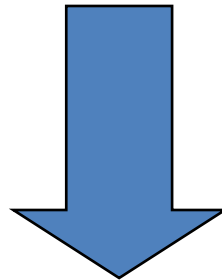
- PALPATE BICIPITAL GROOVE WITH ARM IN 90° FLEXION 30° EXTERNAL ROTATION. CHECK FOR CHANGES IN CONTOUR AT GROOVE & TENDERNESS IN SLIPPAGE, OR BICEPS BULGE IN RUPTURE

상완을 90° 굴곡, 30° 외회전 시킨 상태에서 상완이두근구(bicipital groove)를 촉진한다. 구(groove) 형태의 변화, 미끄러짐에 따른 압통 또는 파열(rupture)에 의한 이두근의 도드라짐이 있지 않은지 평가한다.



Slipped bicipital tendon - Treatment 2

- **YERGERSON'S TEST (PATIENT SUPINATES AGAINST RESISTANCE)** (저항에 대하여 환자가 상완을 외회전 함)
- **INDICATES** 검사 적응증;
 1. **TENDINITIS** 건염
 2. **SLIPPAGE** 미끄러짐

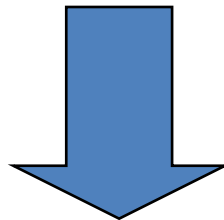


Slipped bicipital tendon - Treatment 3

TEST BICEPS, FREQUENTLY WEAK IN SLIPPAGE. POSITIVE INDICATION OF SLIPPAGE = PREVIOUSLY WEAK MUSCLE TEST STRONG WITH STATIC CHALLENGE ON THE TENDON TOWARDS THE GROOVE. + POSITIVE T. L. OVER GROOVE.

이두근 검사, 미끄러짐(slippage)이 있을 시 약하게 평가됨.

미끄러짐의 양성 지표=이전에 약하게 검사되었던 이두근이 이두근건을 groove 방향으로 정적 유발(static challenge)을 했을 때 강해진다. + groove에 대한 TL 시 양성반응



Slipped bicipital tendon - Treatment 4

- TENDON COMMONLY SLIPPED MEDIALY, MANIPULATE TENDON INTO GROOVE

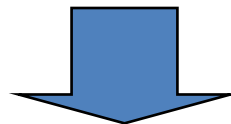
건은 보통 내측으로 미끄러지기 때문에 건에 대해 groove 방향으로 수기를 가한다.

1. ELBOW FLEXED 90° PRESSURE CONTINUOUSLY ONTO TENDON TOWARDS REDUCTION

주관절을 90° 굴곡시키고 건에 대해 통증이 감소하는 방향으로 지속적으로 압력을 가한다.

2. ARM SLOWLY EXTENDED. 팔을 천천히 신전시킨다.

3. AT MAX. EXT. ABDUCT AND INTERNALLY ROTATE ARM HOLDING PRESSURE ON TENDON. 견관절의 최대 신전, 외전, 내회전 상태에서 건에 압력을 가한다.



Cervical Disc Syndrome

Vertebral artery evaluation

Walther advises routine evaluation particularly for;(반드시 검사가 필요한 경우)

1. Post partum women (산욕기 여성)
2. Women in their 30's on the pill (피임약을 복용중인 30대 여성)
3. Smokers (흡연자)
4. following cervical trauma (경추 손상 환자)

Modified Adson's test

- Pt supine head rotates to 1 side with extension for 30-60 secs(환자는 바로 누운 자세에서 30~60초동안 목을 한쪽 반향으로 회전, 신전시킨다.)
- Observe for;
 1. Dizziness (어지러움)
 2. Visual disturbances (시력 이상)
 3. Nystagmus (눈 떨림)
 4. Syncope (실신)
- If found treat as contraindications' for cervical manipulations (위 증상이 발견되면 경추 수기치료를 해서는 안된다)
- Especially in the occipital atlantal area. (특히 후두- 1경추 부분의 치료시에는 더욱 조심해야한다.)

Cervical disc herniation

- 95% at C5/6
- Rest C6/7 + C4/5
 - Disc prolapse usually unilateral(추간판 탈출증은 보통 일측성으로 나타난다.)
 - Where annulus fibrosis weakest & PLL thinnest(디스크 섬유륜이 약하거나 후방 종인대가 얇은 경우에 발생한다.)
 - Midline rupture rare but can cause immediate paraplegia(정중앙으로의 추간판 파열은 더물지만, 사지마비가 즉각 생길 수가 있다)

Diagnosis

Two types of challenge;(2종류의 유발 검사)

1. Pressure on vertex of head caudally (정수리를 다리방향으로 누른다.)
 - Test strong wrist extensors if they weaken = +ve test (손목 펴근의 근력이 약해지는지 확인한다.)
 2. Locally press TP in Ant. Sup. direction (경추 횡돌기를 앞, 위 방향으로 누른다.)
 - When sup. vertebrae above disc lesion is challenged the indicator muscle will weaken.(탈출증 위의 경추를 유발검사할 때에 지표근이 약해진다.)
- N.B. Hidden cervical disc will not T.L. except under caudal compression. (잠복 경추 디스크는 접촉검사를 하지 않고 정수리를 다리방향으로 누르는 검사에는 지표근이 약해짐.)

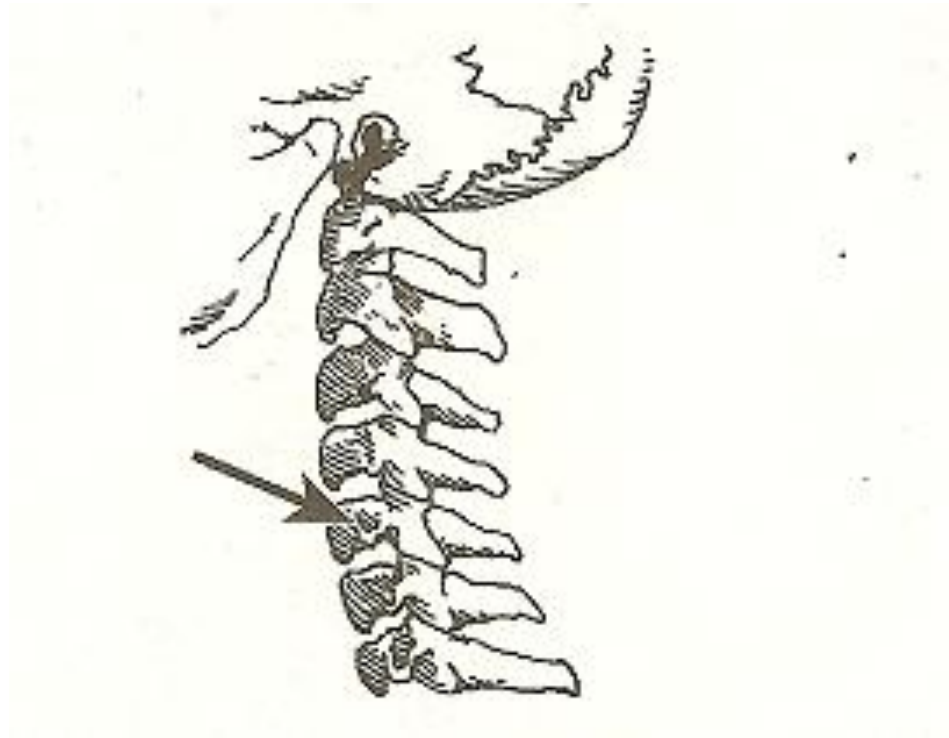
+ve challenge to disc in the direction it has
moved to compromise the disc
hidden cervical disc의 유발검사 방향



Adjustment direction on TP's

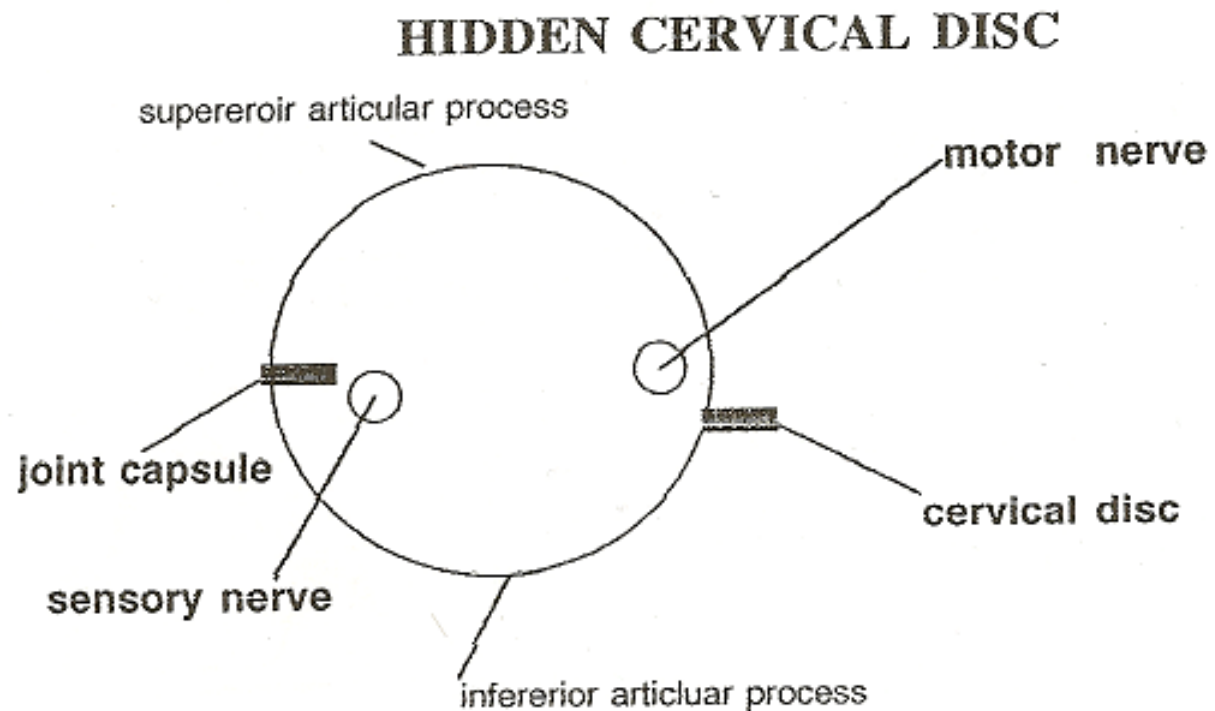
post. caudally to slide vertebrae down along facet line

hidden cervical disc의 치료방향, 뒤로 아래로 관절면을 따라
따라



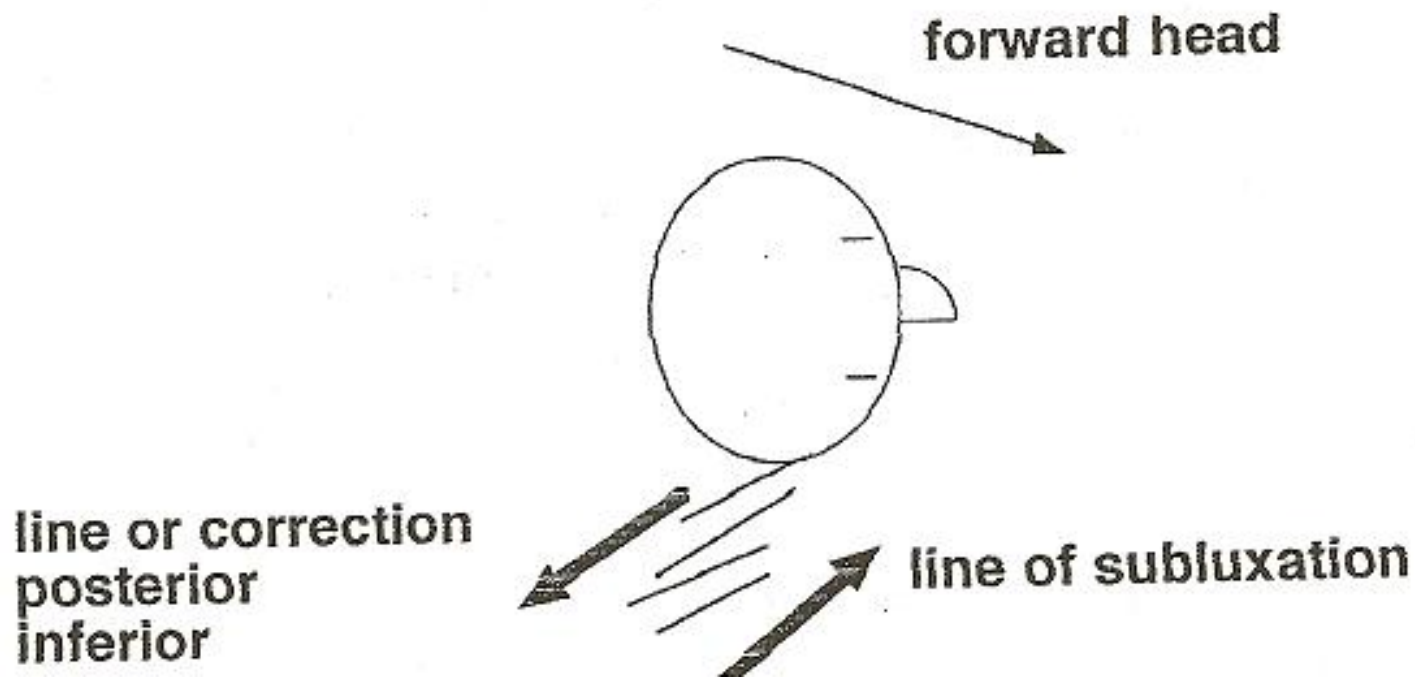
Hidden cervical disc

- Cervical I.V.F.



Hidden cervical disc

Hidden Cervical disc



“Hidden cervical disc” better know now as
‘Anterior Cervical disc’ hidden cervical
disc를 이제는 ant cervical disc로

- Goodheart postulated that some cervical spine pain and radicular problems result from laxity of the annulus fibrosis, causing an intervertebral disc bulge. Hence the term “Hidden cervical disc”(Dr. Goodheart은 디스크 섬유륜의 이완으로 인한 추간판 팽윤은 경추의 통증과 방사통을 일으킨다고 가정했다.)

'Anterior Cervical disc'

- Challenge for weakness in wrist extensors
 - In B.I.D.
 - Head flexed or caudal head relation to their spinal level of innervation.

B.I.D로 유발검사를 해서 손목폄근이 약해지는지 혹은 머리를 숙이거나 머리를 문제 있는 쪽으로 돌리고 숙여서 손목폄근이 약해지는지 검사.

- Adjust @ that level – post inf. direction to take facet down.

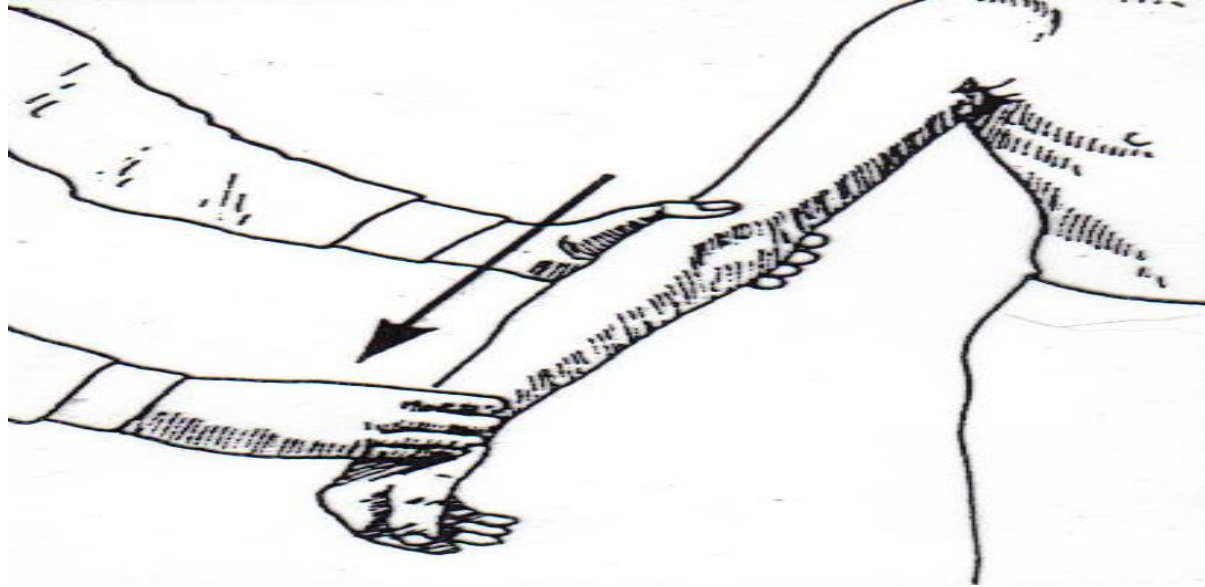
교정은 facet joint가 아래쪽 뒤쪽 방향으로 향하도록 교정한다.

Cervical Rib – 1



- Unilateral signs of ischemia i.e. coldness, discolouration, trophic changes(한쪽손에만 나타나는 허혈성증상, 차고, 퍼렇게, 빨강게, 영양성변화-trophic change)
- Bilateral changes are more suggestive of Raynaud's disease (양측성으로 허혈성 증상이 나타나면 Raynaud's ds.를 시사한다.)

Cervical rib – 2



- Palpate the radial pulse whilst applying traction to the arm(팔을 아래로 당기면서 요골동맥 pulse를 느낀다.)
- Obliteration of pulse not diagnostic but when there is no change on other side = suggestive(당긴팔쪽의 맥동의 변화가 있고 반대쪽 팔에선 변화가 없다면 cervical rib을 시사한다.)

Cervical rib – 3

- Ask the patient to turn their head towards the affected side(아픈 팔쪽으로 고개를 돌리게 한다.)
- Take a deep breath & hold it.(숨을 깊게 들이마시고 참게 한다.)
- If the radial pulse is obliterated (from scalene anterior obstruction)(만약 요골동맥의 맥동에 변화가 있다면 – ant. Scalen sx.을 의심한다,.)
- This is suggestive of thoracic outlet syndrome(위 test는 흉곽출구증후군을 시사한다.)



Cervical rib - 4

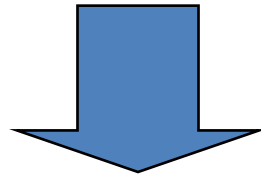
- Auscultate over the
- subclavian artery(쇄골하동맥을 청진한다.)
- A murmur is suggestive
- of a mechanical obstruction(murmur-심잡음은 동맥이 눌렸음을 시사한다.)
- Repeat on the other side(반대쪽도 같은 방법으로 검사한다.)



Cervical rib - Treatment 1

Nerve Root Muscles

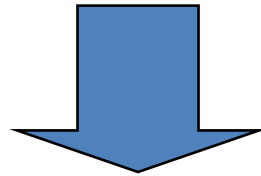
- Deltoid C6
- Triceps C7
- Finger adductors C8



Cervical rib - Treatment 2

THERAPY LOCALISATION 접촉검사

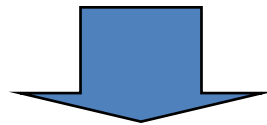
- To the Spinous Process above and below the disc (추간판 탈출증 위, 아래 극돌기가 접촉점이 된다.)



Cervical rib - Treatment 3

CHALLENGE

- Find optimal position of the neck to produce maximum strengthening of affected muscle i.e. extension, rotation. (약화된 지표근이 최대한 강해지는 목의 최적화된 자세를 찾는다.)



Cervical rib - Treatment 4

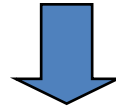
TREATMENT

- Adjust in vector that produced maximum strengthening, firmly and to that side only.
(지표근이 최대로 강해졌던 방향으로 교정한다.)
- Prescribe S.O.D. or Manganese (Disczyme) for nutritional support.

STERNOCLAVICULAR FIXATIONS 흥쇄골관절 고정

Treatment 1

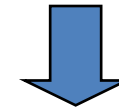
Test subclavius muscle bilaterally 양쪽 쇄골하근 검사



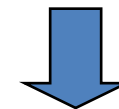
Screen for neurological disorganisation



Weak unilateral subclavius 한쪽만 약함



Weak bilateral subclavius 양쪽 약함



Sternoclavicular fixations - treatment 2

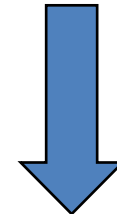


Evaluate and treat for reactive muscle pattern in upper trapezius, pectoralis minor, and supraspinatus, etc. (연관된 reactive muscle pattern 근육들을 검사 치료한다.)

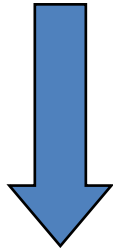


Check for sterno clavicular fixation with T.L. + movement of joint.

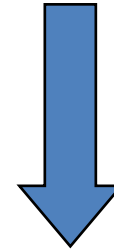
움직임+접촉검사로 SC 관절고정 검사, Ensure it is not K27 or a N.L. reflex you are T.L.ing. Observe for associated T.L. to occiput



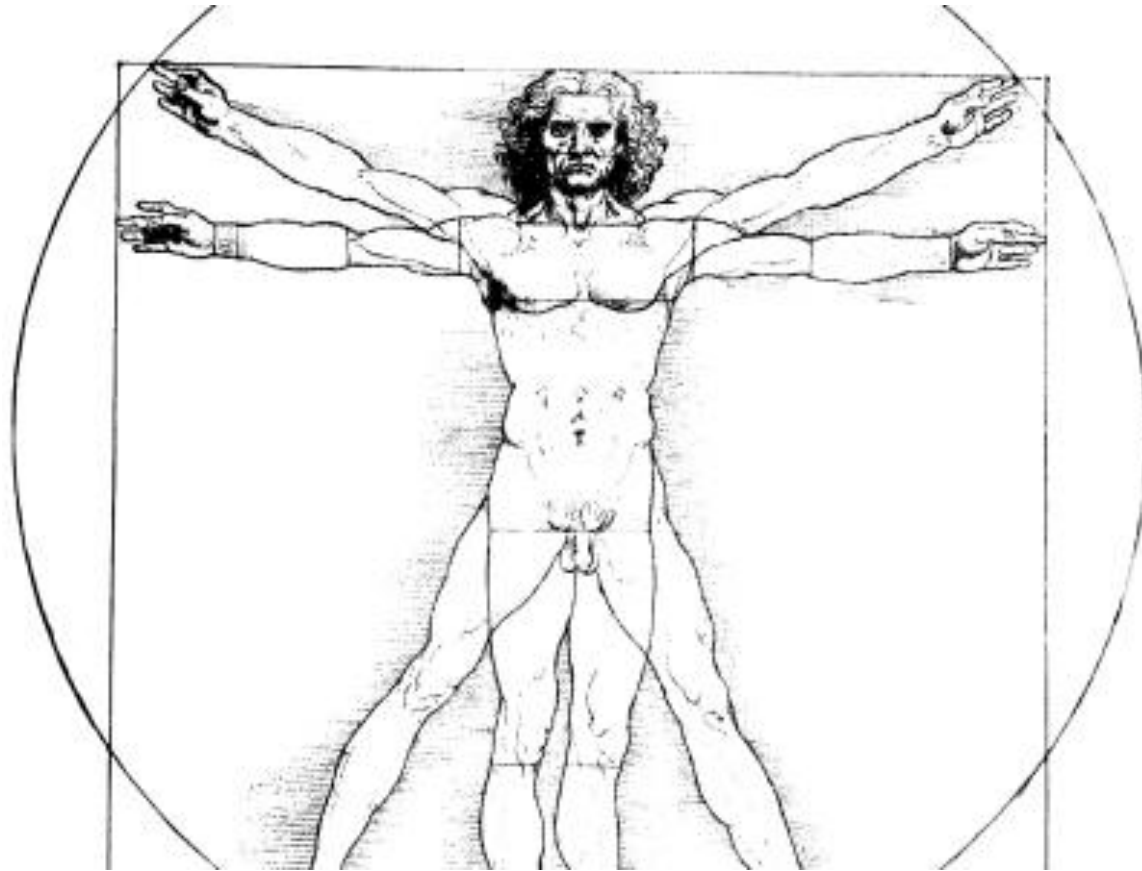
Sternoclavicular fixations - treatment 3



Evaluate and treat “limbic fixation” of C/D & 1st rib & possible Lovett Brother at 1st lumbar & 12th rib area (limbic fixation을 검사 치료한다.)



Challenge and treat fixation by moving in direction of challenge in phase of respiration that negates challenge. (호흡주기상 지표근이 강해지는 호흡에 fixation 치료를 시행한다.)
If fixation remains, subclavius may need direct spindle treatment (fixation이 남아 있다면 subclavius내 spindle 을 치료한다.)



Vitruvian Man

old style

Reactive muscles relating to the hips and jaw(엉덩이와 턱사이의 반응성 근육)

- Karl Ferreri DC. Found an interesting association at times between;
- Masseter(교근) → gluteus medius(중둔근)
- Medial Pterygoid (내측 익돌근) → Psoas(요근)
- Lateral Pterygoid(외측 익돌근) → adductors(모음근)

Nerve Entrapments of the Pelvis

(골반의 신경죄임병증)

- L5 Entrapment(요추5번신경 죄임)-shortening of the Ileo-lumbar ligament.(장요인대의 단축)
- Femoral Nerve Entrapment(대퇴신경 죄임)
- Obturator Nerve Entrapment(폐쇄신경 죄임)
- Piriformis Syndrome(궁둥구멍근 증후군)
- Lateral femoral Cutaneous Nerve Entrapment(외측 대퇴 근피신경죄임)

Nerve Entrapments of the Pelvis

(골반의 신경죄임병증)

- L5 Entrapment (요추5번신경죄임) -shortening of the Ileo-lumbar ligament.(장요인대의 단축)
- *Key may be the patient who gets symptoms on Rotation and bending*(굴곡과 회전시 증상이 나타남)

Nerve Entrapments of the Pelvis

- Femoral Nerve Entrapment(대퇴신경 죄임)
- Key:
 - Femoral Nerve Entrapment(대퇴신경죄임)
 - Key:
 - Weak Quads and strong Iliacus(in B.I.D . of extension of torso supine(척추 몸체를 신전시키는 자세이상 유발검사를 하면 허벅지 네갈레근이 약해지고 장골근은 강해진다.
 - Trauma to area(손상), pregnancy/obesity(임신/비만),
 - Lengthen ligament(늘어난 인대)

Nerve Entrapments of the Pelvis

- Obturator Nerve Entrapment(폐쇄신경죄임)
- Key:
- Loss of muscle tone in lower abdominal wall (하복부벽의 근긴장 소실/비만, 임신)(obesity, pregnancy?)
- Reactive test for abdominal wall (복벽근육의 반응성 검사)
- Fascia treatment(근막치료), strengthen abdominal wall(복벽근육강화)

Nerve Entrapments of the Pelvis

- Piriformis Syndrome(궁둥구멍근 증후군)

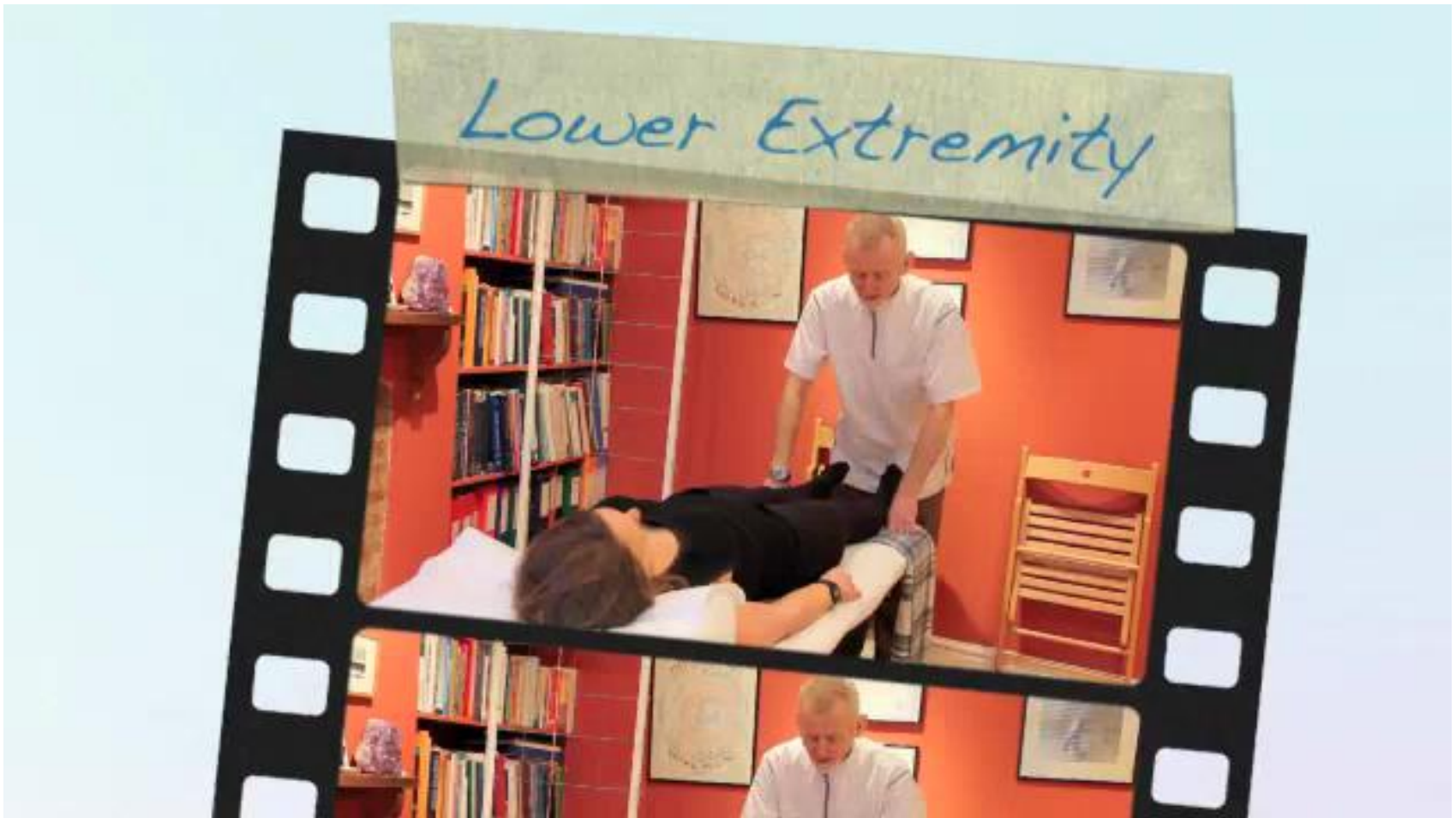
Key:

- Weak Glut. Max. (약한 대둔근)
- Swelling S.I. ligaments(엉치엉덩인대 부종)
- Nerve involvement of nerve of the Greater Sciatic foramen (큰궁둥구멍을 지나는 신경):
- Superior Gluteal nerve(윗볼기 신경)-Glut. Med.(중둔근) & TFL(대퇴근막장근)
- Inferior Gluteal Nerve(아랫볼기 신경)-Gluteus Max. (대둔근)
- The Sciatic nerve(좌골신경)- hamstrings-Down the leg.(넓다리 뒷근육-하지)
- The pudendal nerve(음부신경) –urogenital area(비뇨 생식기)
- Symptoms worsen on sitting or standing still in one position i.e. weight bearing(앉거나 서는 체중부하되는 자세에서 증상 악화)



Muscles that move the hip girdle.

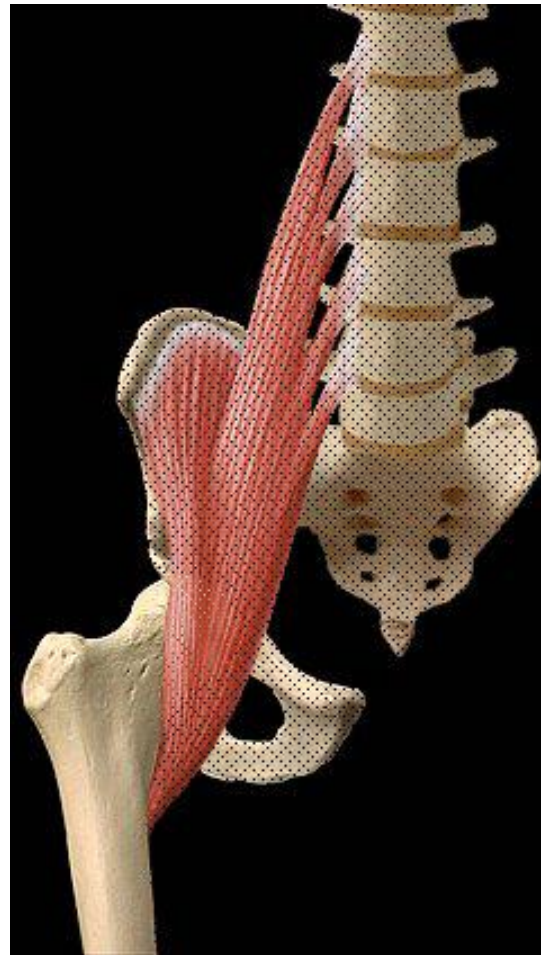
See notes for link to videos



Flexion (굴곡)

- Ilio-psoas (장요근)
- Rectus femoris (대퇴직근)

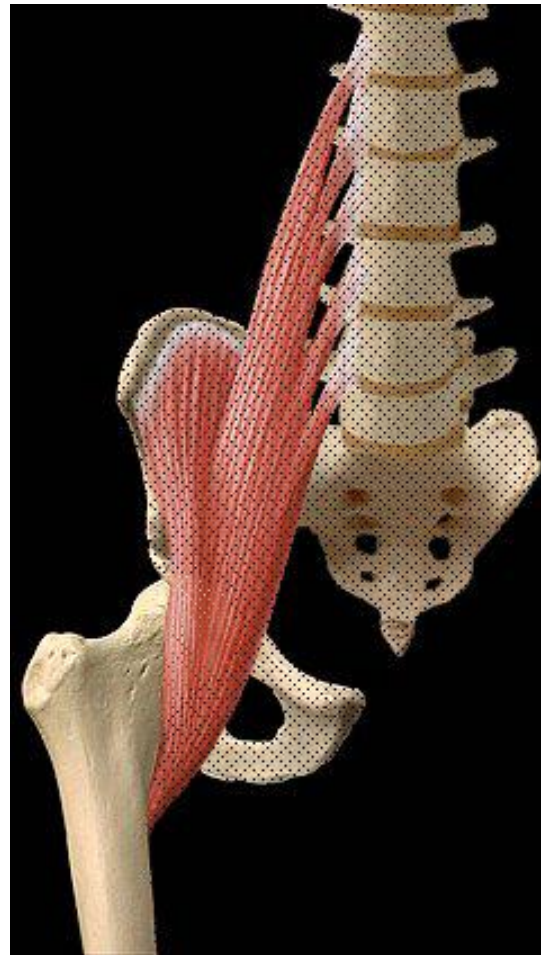
Insertion(종지) of Ilio-Psoas

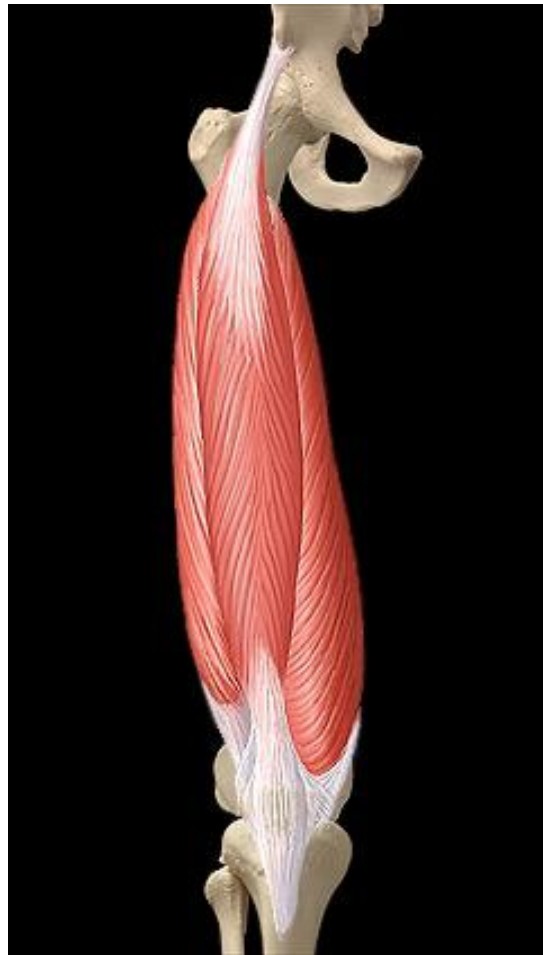


Iliopsoas



Insertion of Iliopsoas

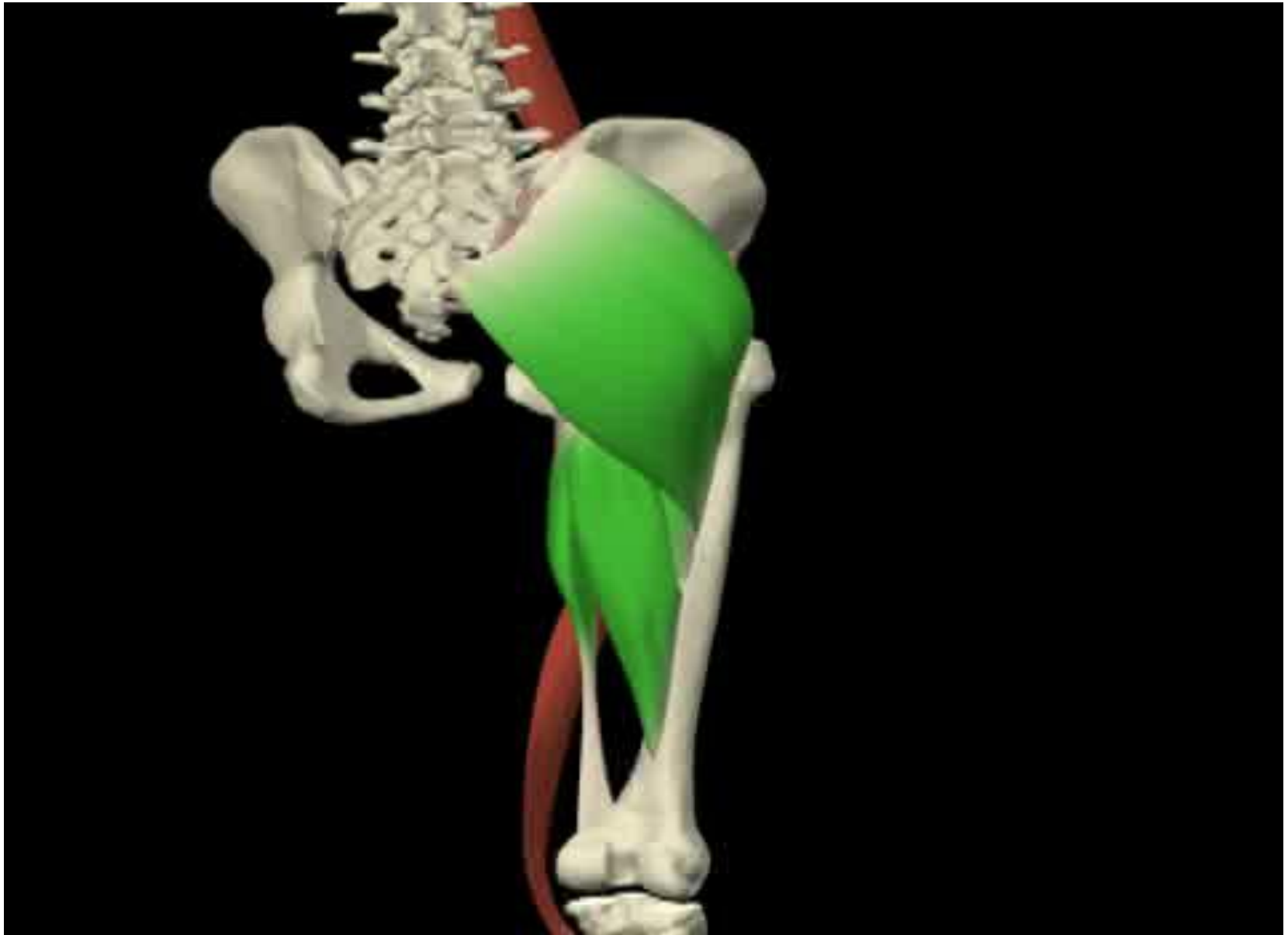






Extension(신전)

- Gluteus Maximus (대둔근)
- Hamstrings(뒤넙다리근)
 - Semimembranosus (반막근)
 - Semitendinosus (반힘줄근)
 - Biceps femoris (넙다리 두갈래근)

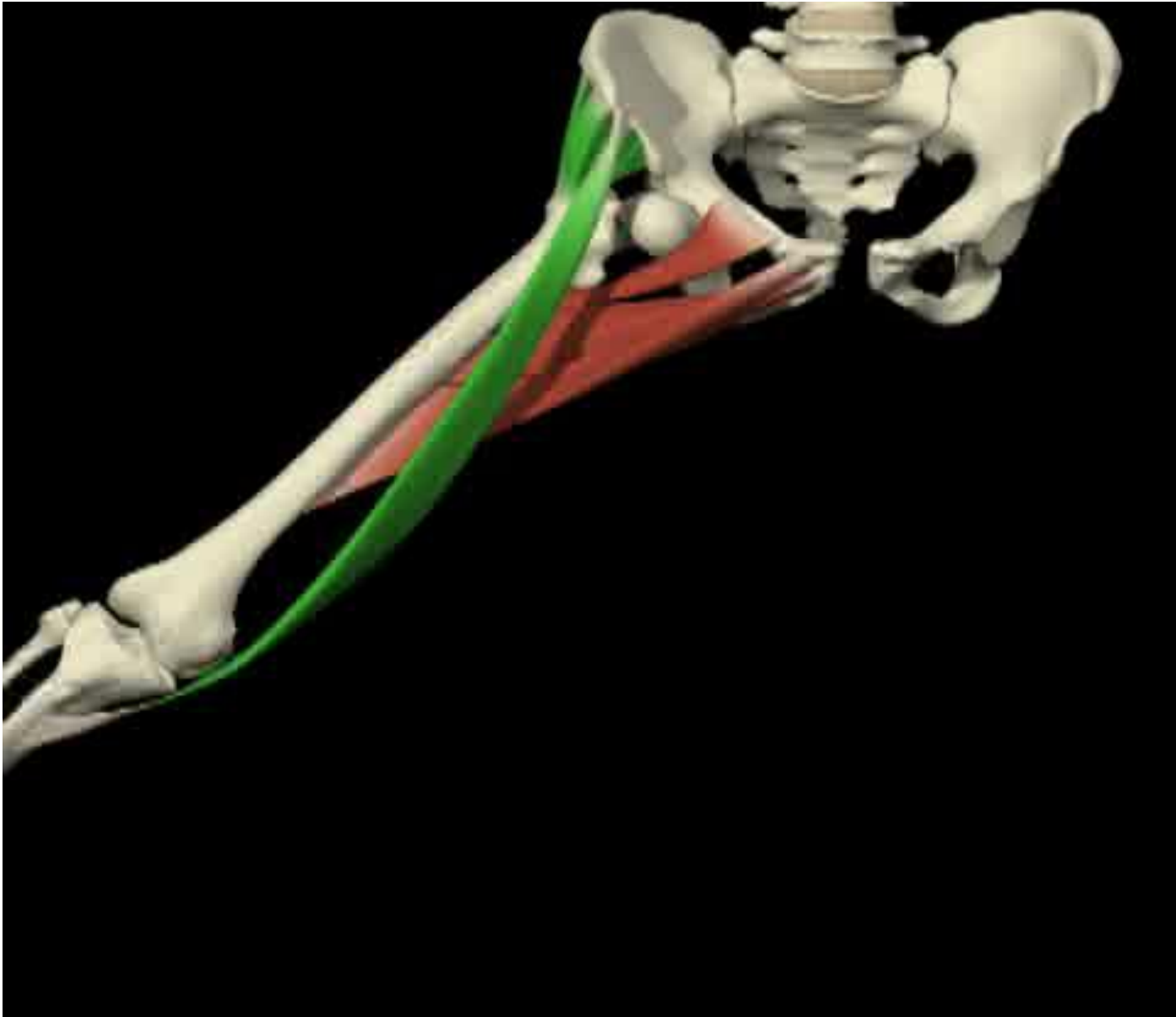


Abduction(외전)

- Gluteus medius (중둔근)
- Gluteus minimus (소둔근)

Adduction(내전)

- Adductors (내전근)
- Pectineus (두덩근)
- Gracilis (두덩정강근, 박근)

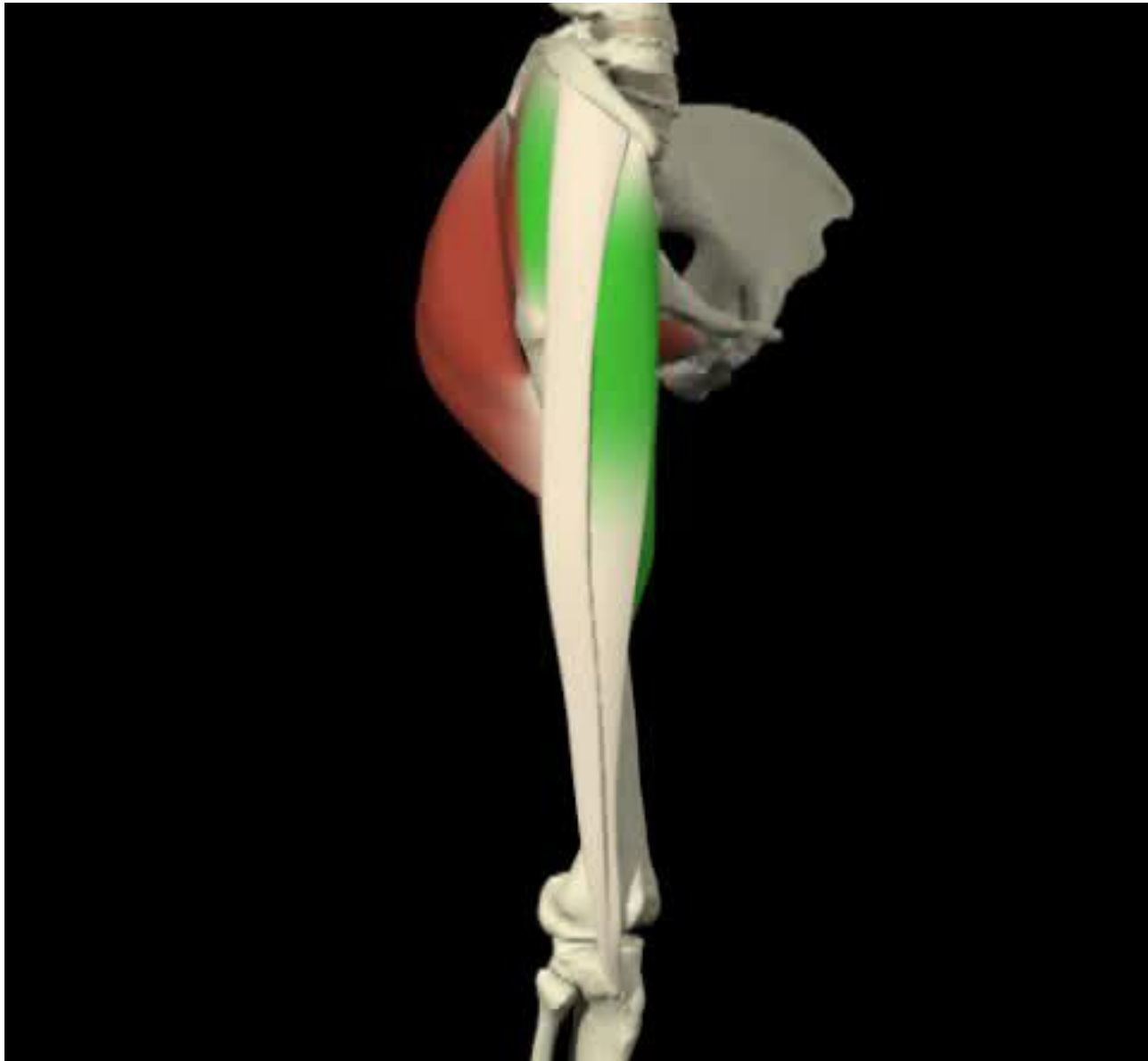


Medial rotation(내회전)

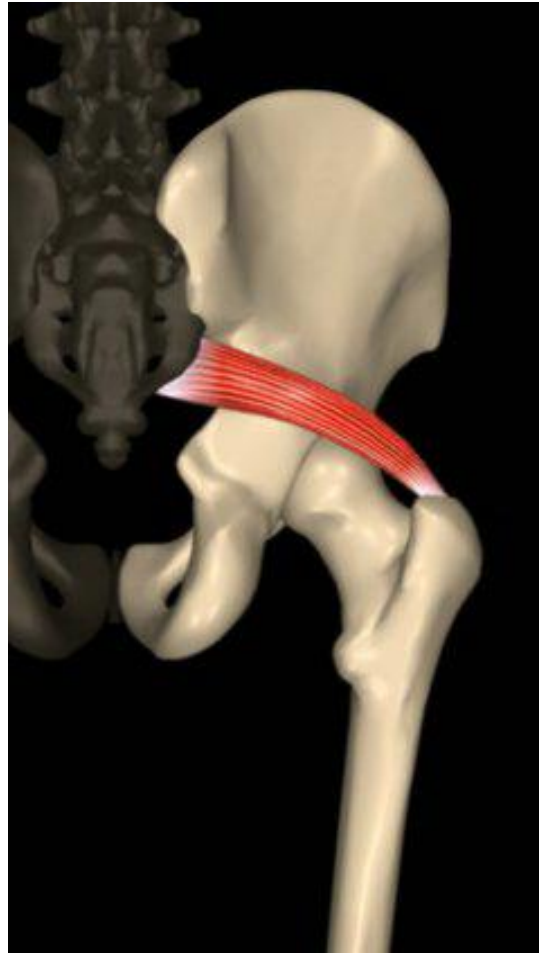
- Tensor fascia lata(대퇴근막장근)
- Anterior fibres gluteus medius(중둔근의 전방섬유)

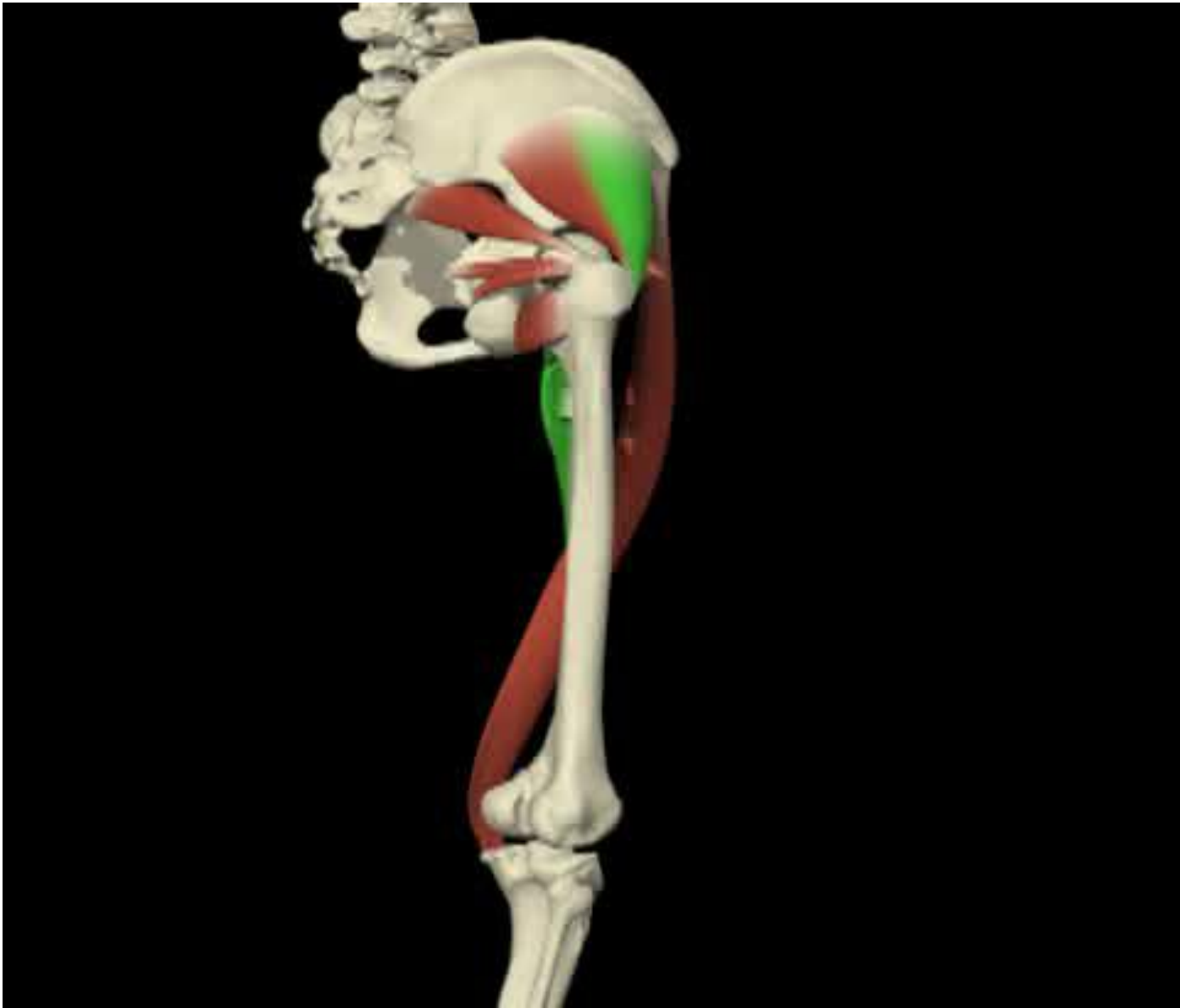
Lateral rotation(외회전)

- Psoas(요근)
- Piriformis (이상근)
- Gluteus maximus (대둔근)
- Sartorius(넓다리빗근, 봉공근)



Piriformis



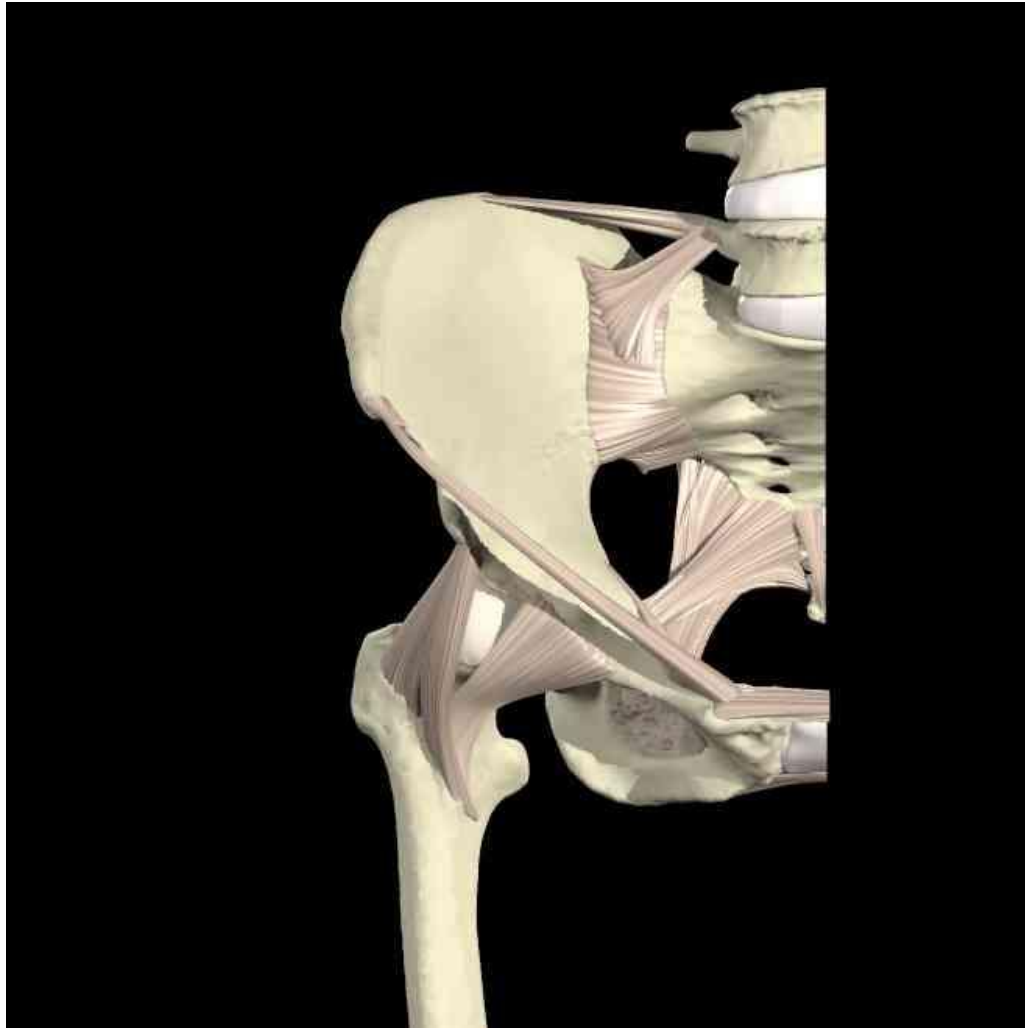




Nerve Entrapments of the Pelvis

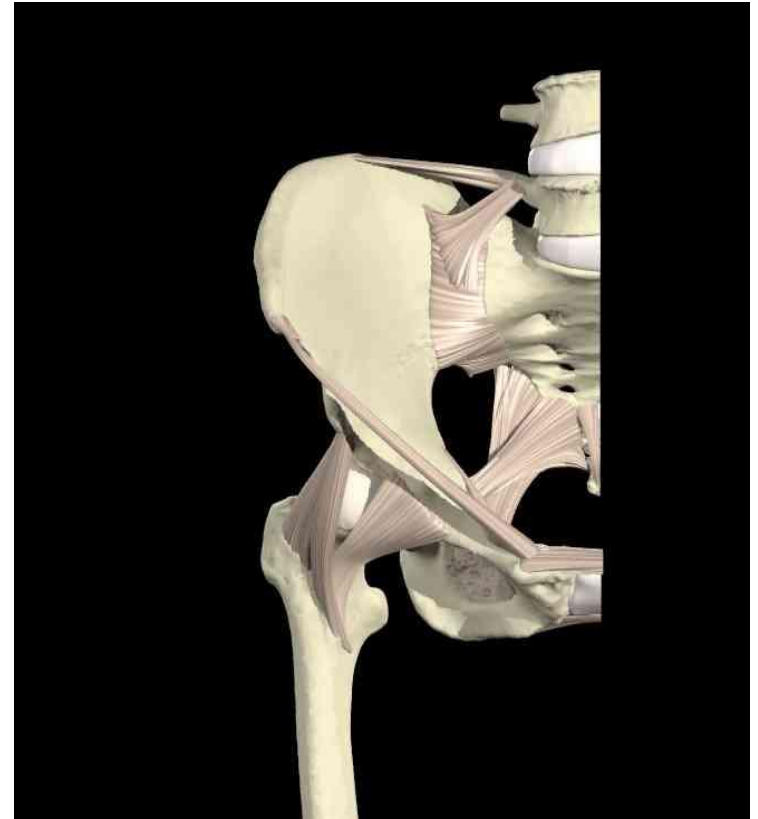
- L5 Entrapment-shortening of the Ileo-lumbar ligament.
- Femoral Nerve Entrapment
- Obturator Nerve Entrapment
- Piriformis Syndrome
- Lateral femoral Cutaneous Nerve Entrapment

Ilio-lumbar ligament(장요인대)

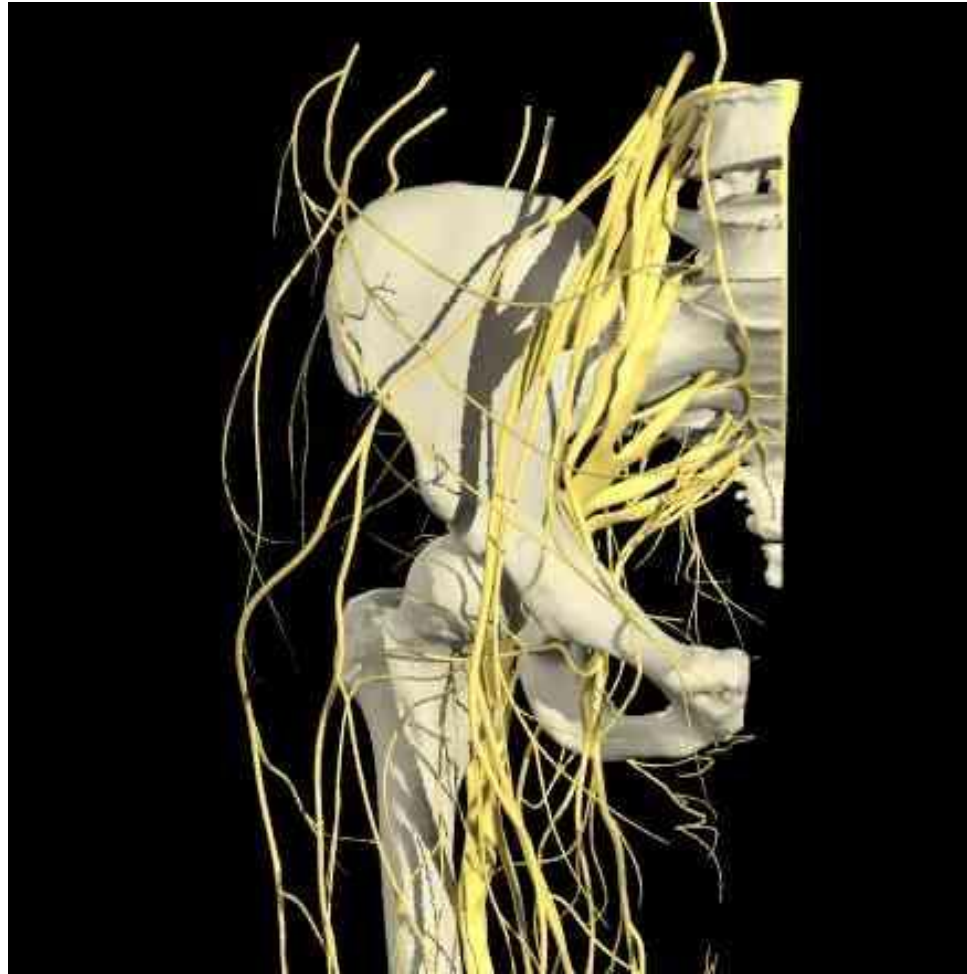


L 5 Nerve Root Entrapment

- This is normally when the lumbosacral-iliolumbar ligaments shorten or thicken causing an entrapment in the 'tunnel' created by the ligaments and the bony structures.(요천골인대와 장요인대의 단축이나 비대로 인해 뼈와 인대로 형성된 터널에서 신경죄임을 야기함)



Nerves in overview

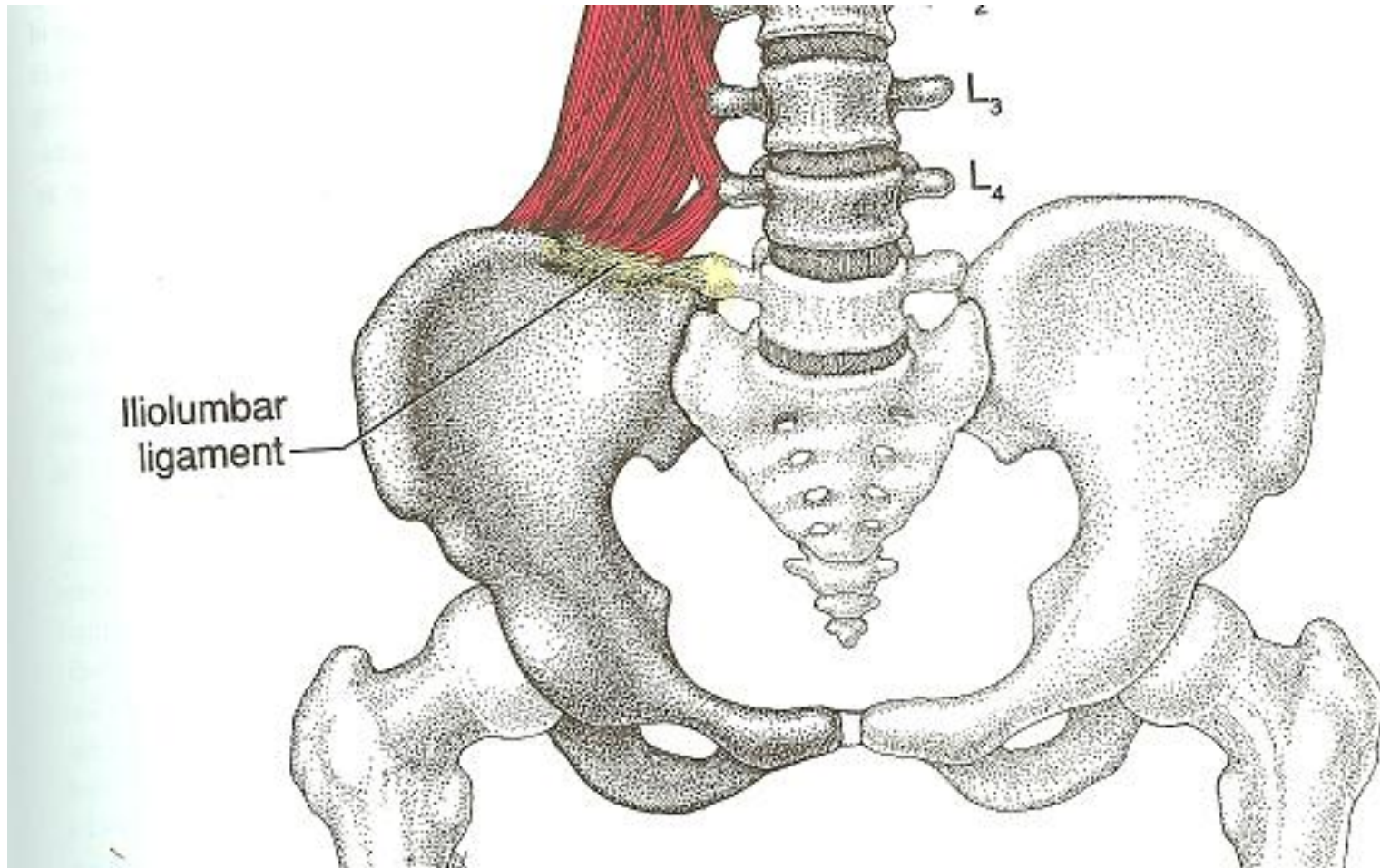


L 5 Nerve Root Entrapment: Treatment 1

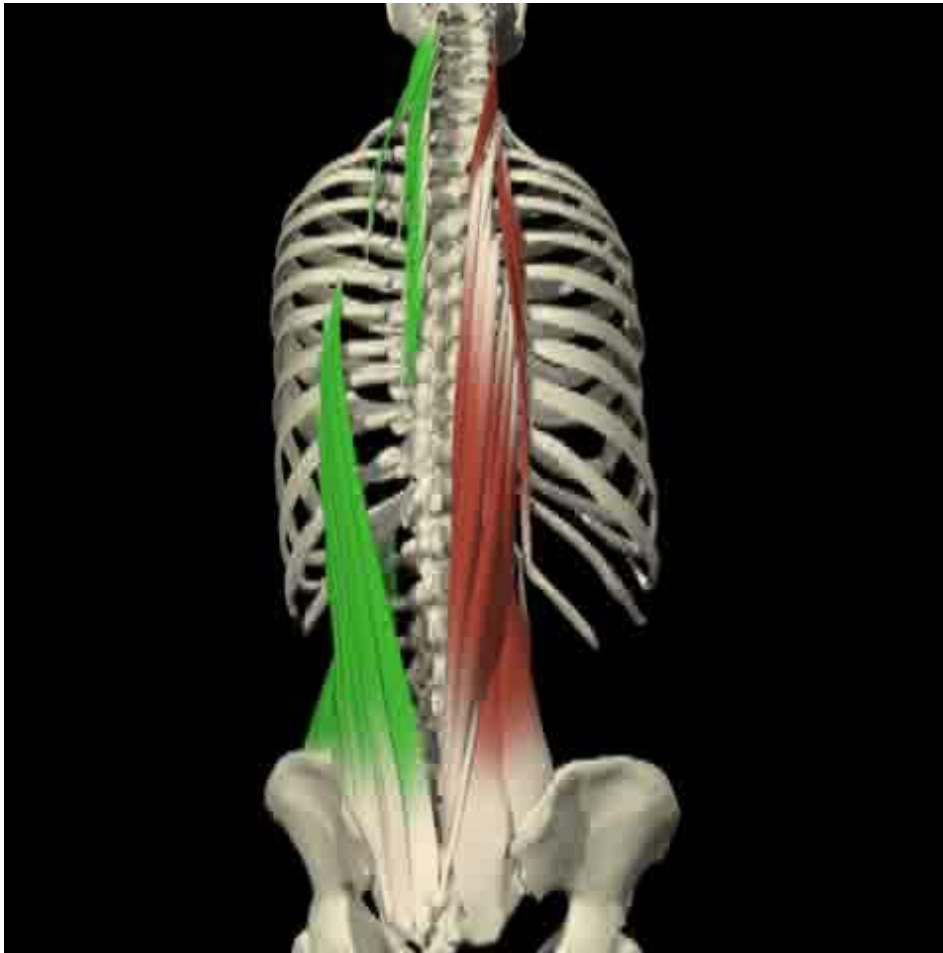
(5번요추 신경 죄임의 치료)

- **Major symptom** is discomfort on rotation and rigid lack of swing to the shoulders(주증상은 허리를 돌릴 때 불편하고, 어깨가 뻣뻣하고 걸을 때 회전이 잘 안됨)
- **Major Sign** = weakness of hamstrings on rotation(회전시 넓다리 뒷 근육의 약화)/ flexion or extension as the entrapment at the L5 tunnel is relieved.(굴곡이나 신전으로 터널에서의 신경죄임 완화)

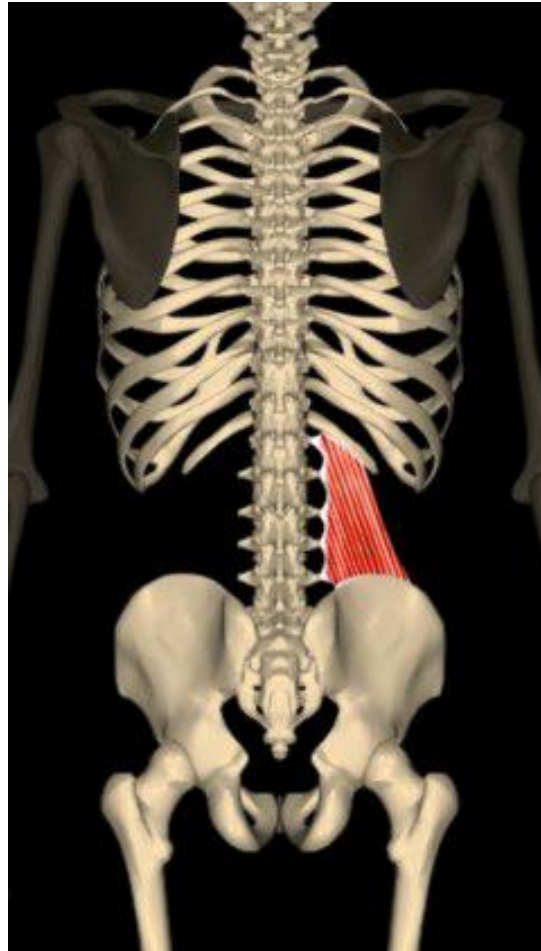
Quadratus Lumborum and the Ilio-Lumbar ligament(허리네모근과 장요인대)



Erector Spinae(척추세움근)



Quadratus Lumborum 허리 네모근



Muscle: Longissimus Lumborum

Origin:

Spinous processes of L3 through S2.

Insertion:

Ribcage – Lower inferior border of 9th through 12th ribs.

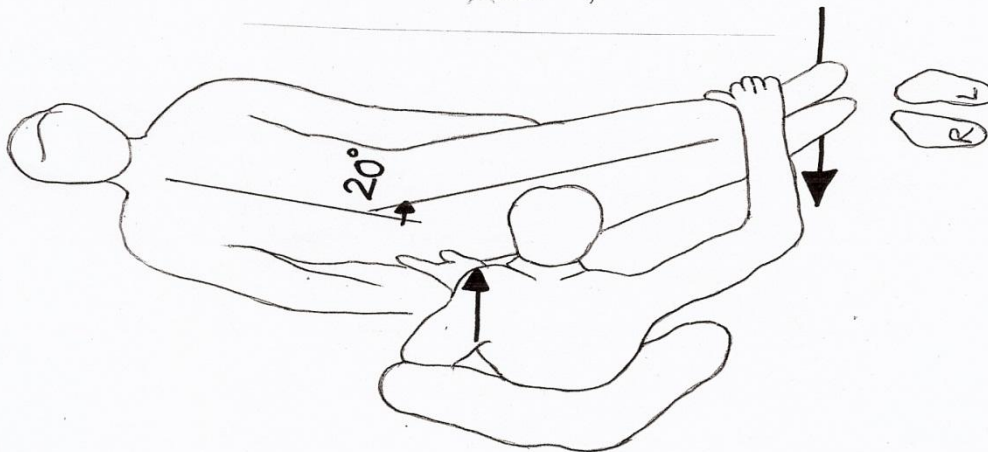
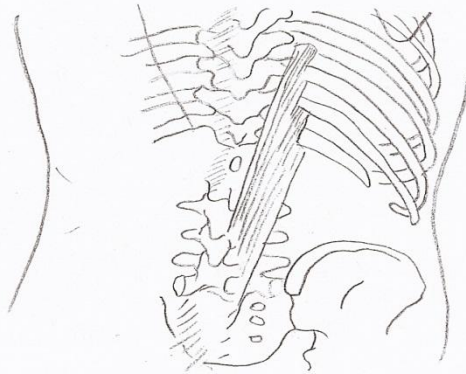
Test:

Patient – Supine, diagonal on table, abduct legs 20° ipsilaterally, lumbar slightly extended.

Dr. – Brace opposite greater trochanter, place arm over ankles and contact to adduct legs across table

V.L.: L2R

M.M.: L2



요최장근

- 천추2번까지의기시:
요추3번에서 극돌기
- 종지: 흉곽-9번에서 12번
늑골의 하연
- 검사방법

--환자: 테이블 중앙에 양와위로
누워 요추를 약간 신전한
상태에서 양다리를 동측 20도
외전하고 외전 방향으로 힘을 줌
--의사: 한손을 대전자에 올려
고정하고 반대손을 양쪽 발목
위를 잡고 양다리를 테이블을
가로질러 내측으로 당김

Muscle: Quadratus Lumborum (Costal Division)

Origin:

Iliolumbar ligament, posterior part of iliac crest.

Insertion:

Inferior border of 12th rib.

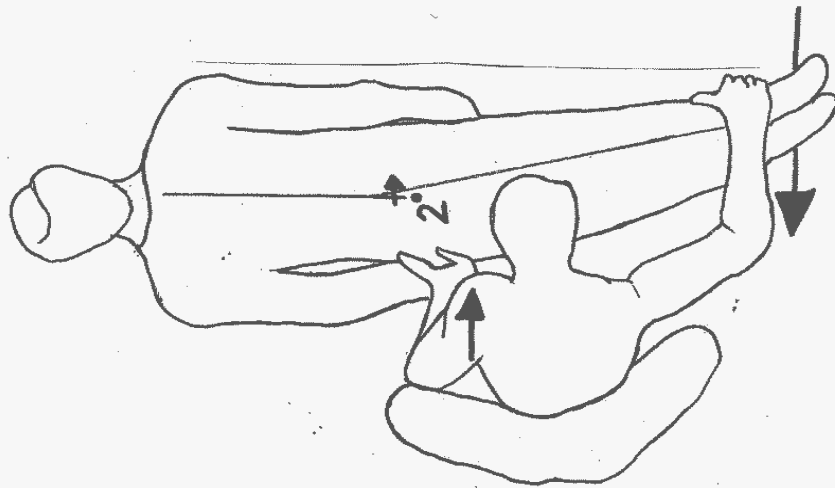
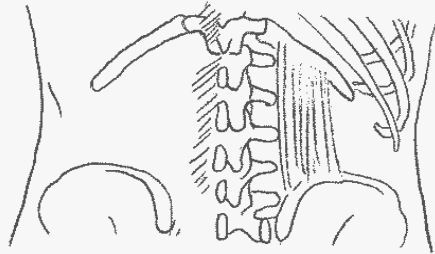
Test:

Patient – Supine, centered on table, abduct both legs 2° ipsilaterally, arch lumbar slightly.

Dr. – Brace opposite greater trochanter, with arm over ankles, contact to adduct legs across table.

V.L.: L4L

M.M.: L3



허리 네모근(늑골분지)

- 기시—장요인대, 장골능 뒷부분
- 종지—12늑골 하연
- 검사

--환자: 테이블 중앙에 양와위로 누워
요추를 약간 굴곡상태에서 양다리를
동측(검사할 근육방향)으로 2도
외전하고 외전방향으로 힘을 줌

--의사:한손은 대전자에 고정하고
반대손은 양발목 위를 잡고 테이블을
가로질러 내전시킴

Muscle: Iliocostalis Lumborum

Origin:

Anterior surface of broad tendon attached to sacrum, spinous of L5 to T11.

Insertion:

Inferior borders of lower 6th and 7th ribs at the angle.

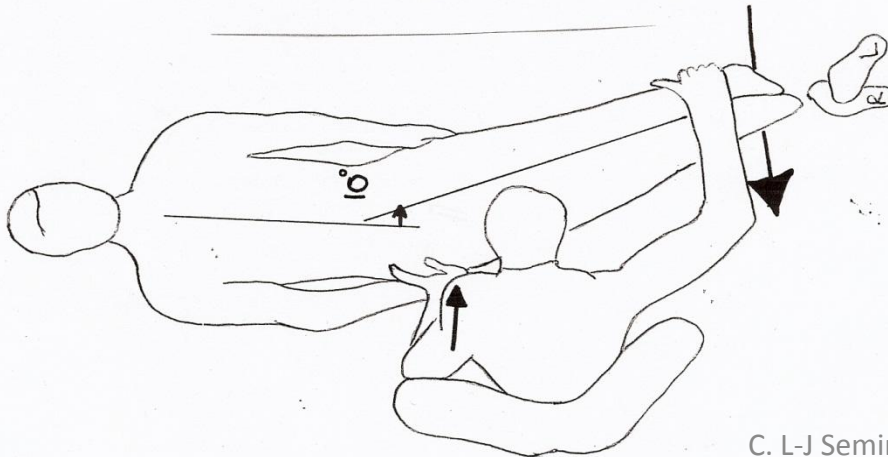
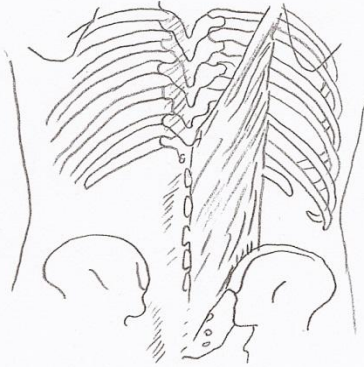
Test:

Patient – Supine, centred on table, abduct both legs 10° ipsilaterally, internally rotate ipsilateral femur, placing instep to opposite arch.

Dr. – Brace opposite trochanter, place arm over ankles and contact to adduct legs across table.

V.L.: T5

L4



허리엉덩 갈비근

기시—흉추 11번에서 요추 5번까지의 극돌기와 천골에 부착된 넓은 힘줄의 전면

종지—6번,7번 늑골의 늑골각 하연 검사

--환자: 테이블 중앙에 양와위로 누워 동측 대퇴를 내회전, 발등을 뒤로한 상태에서 양다리를 동측으로 10도 외전후 외전 방향으로 힘을 줌

--의사:한손은 대전자에 고정하고 반대손은 양발목 위로 잡고 테이블을 가로질러 내전시킴

Muscle: Quadratus Lumborum (Spinal Division)

Origin:

Crest of Ilium, posterior portion.

Insertion:

Transverse process of upper four lumbar vertebrae.

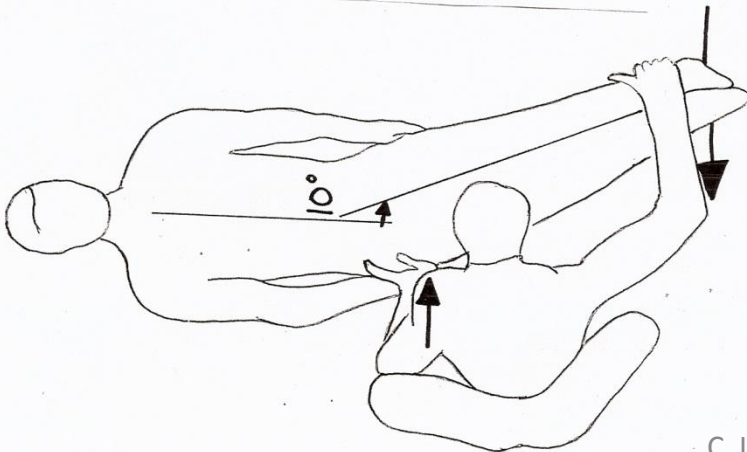
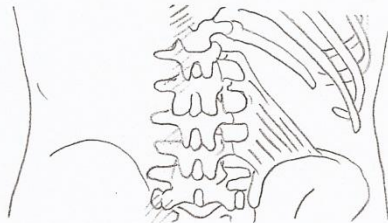
Test:

Patient – Supine, centered on table, abduct both legs 10° ipsilaterally, keep lumbar in slight extension.

Dr. – Brace opposite trochanter, place arm over ankles and contact to adduct legs across table

V.L.: T4R

M.M.: L2



허리 네모근(척추분지)

- 기시—장골능의 뒷부분
- 종지—상부 4개 요추의 횡돌기부
- 검사

--환자: 테이블 중앙에 양와위로 누워 요추를 약간 신전한 상태에서 양다리를 동측으로 10도 외전한후 외전방향으로 힘을 줌

--의사:한손은 대전자에 고정하고 반대손은 양발목 위로 잡고 테이블을 가로질러 내전시킴

Origin: Multifidus (Lumbosacral Division)

Origin:

Back of sacrum, medial and posterior iliac spine, mammillary processes of lumbar vertebrae.

Insertion:

Spinous processes of T11 through L5

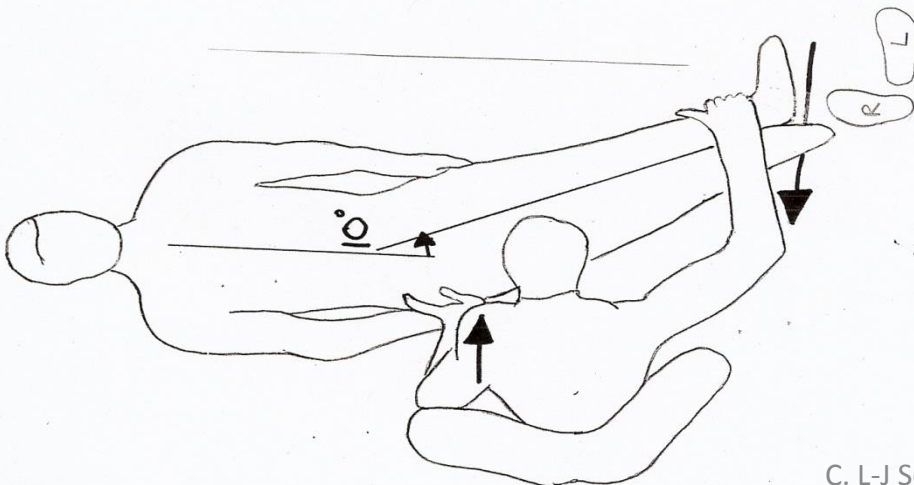
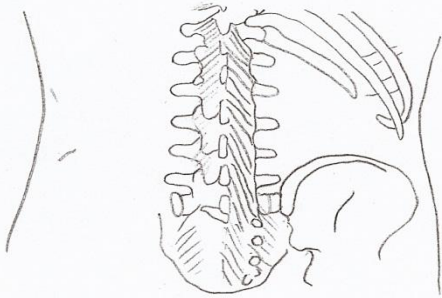
Test:

Patient – Supine, centered on table, abduct both legs 10° to ipsilateral side, full external rotation of ipsilateral femur.

Dr. – Brace opposite greater trochanter, place arm over ankles and contact to adduct legs across table.

V.L.: L1L

M.M.: L3



다열근 (요천추 분지)

- 기시—천골 뒷면, 후측 내측 장골극, 요추의 꼭지돌기
- 종지—흉추 11번에서 요추 5번까지의 극돌기
- 검사

--환자: 테이블 중앙에 양와위로 누워 동측 대퇴를 최대 외회전 상태에서 양다리를 동측으로 10도 외전한후 외전방향으로 힘을 줌

--의사: 한손은 대전자에 고정하고 반대손은 양발목 위로 잡고 테이블을 가로질러 내전시킴



L 5 Nerve Root Entrapment 요추 5번 신경죄임: Treatment 3

- Challenge ligament(인대유발검사)
- Test for ligament interlink(인대교차연결검사)
- Test L4 or 5 for holographic/intraosseous subluxation(홀로그래픽/골내 아탈구검사)



SERRE

L 5 Nerve Root Entrapment: Treatment 2

- Test muscles supplied by L5 in the neutral position(중립위치에서 요추5번에 지배받는 신경 검사)
- Have the patient rotate/and or flex/extend away from that side and retest(환자로 하여금 회전 굴곡 신전 하게하고 다시 검사)

Femoral nerve syndrome 대퇴신경 좌임 증후군

Femoral nerve syndrome - Treatment 2

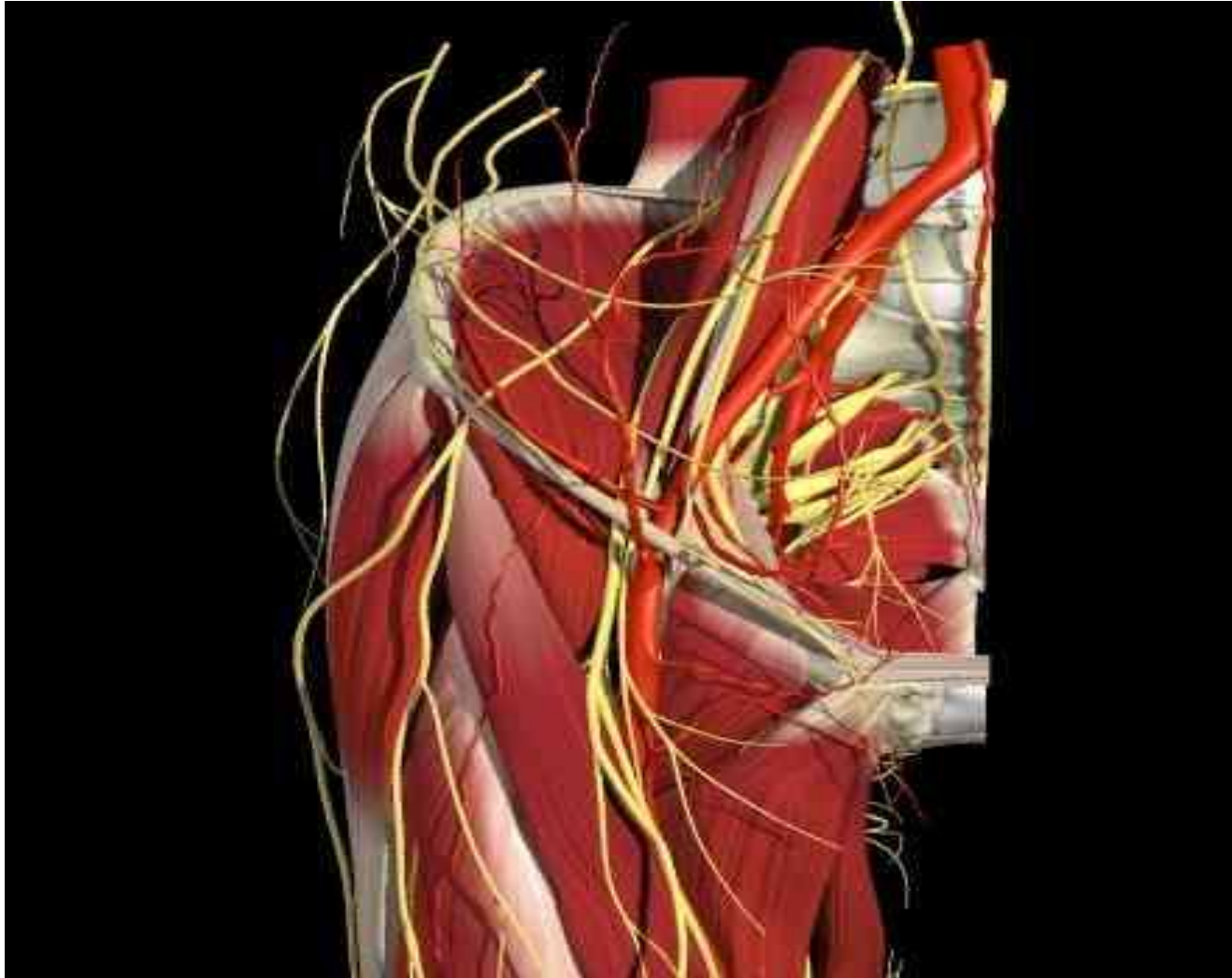
- IN LOOKING FOR PROBLEMS IN THE INGUINAL PSOAS ILIACUS TUNNEL (서혜부의 요근 장골근 터널의 문제 접근에 있어서)

CHECK FOR:

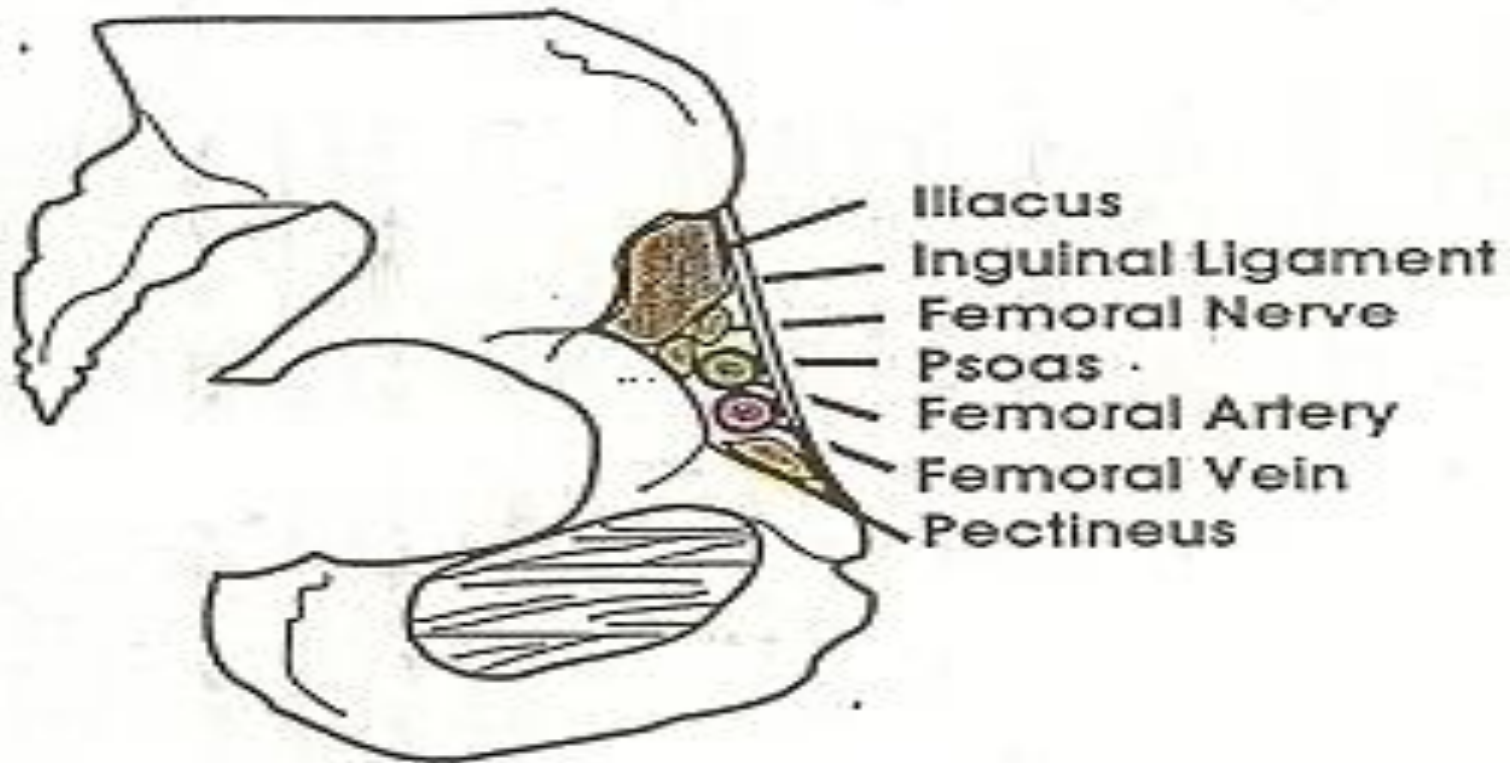
1. HISTORY OF LOCAL TRAUMA OR CARRYING HEAVY OBJECTS(외상이나 무거운 물건을 들기의 병력 확인)
2. HYPERTROPHY OF ILIOPSOAS(장요근의 비대 확인)
3. WEAK QUADRICEPS AND POSSIBLY SARTORIUS(대퇴사두근이나 봉공근의 약화 확인)
4. STRONG ILIACUS(장골근의 강함을 확인)



Femoral nerve pathway



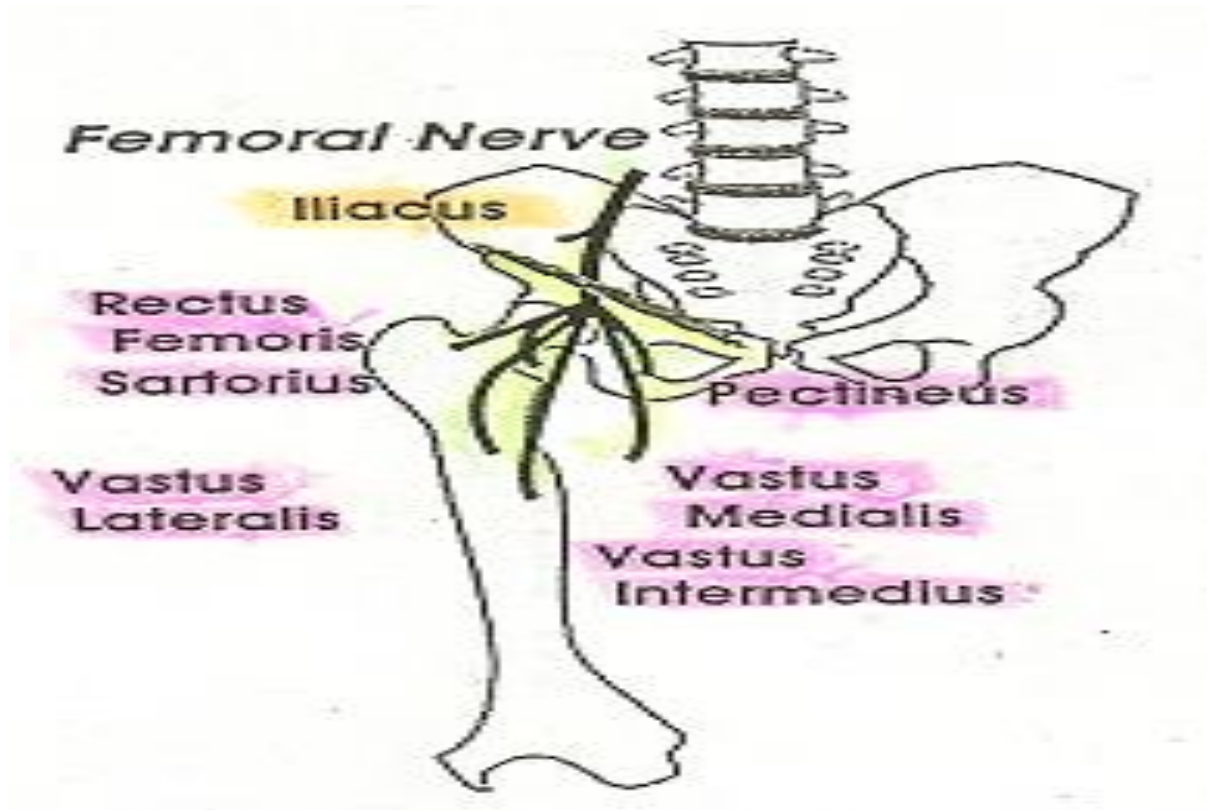
Lateral view of the Femoral nerve and other blood vessels and muscles under the Inguinal ligament



Symptoms

- Unexplained weakness of the Quadriceps

Anatomy I



Treatment 1

THE FEMORAL NERVE CROSSES THE PELVIS BELOW THE INGUINAL LIGAMENT ALONG WITH THE (대퇴신경은 서혜부에서 아래 나열한 것들과 같이 주행한다)

- ILIACUS,
 - PSOAS,
 - FEMORAL VEIN,
 - FEMORAL ARTERY
 - PECTINEUS
- SO THAT AN ENTRAPMENT HERE CAN BECOME A TRUE NEURO VASCULAR ENTRAPMENT (그러므로 여기서 발생하는 신경죄임은 신경혈관죄임의 개념이다)



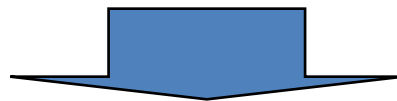
Femoral nerve syndrome - Treatment 1

- THE KEY IS TO TEST THE ILIACUS(중요한 것은 장골근을 검사하는 것이다)
- IF IT IS STRONG AND THE QUADRICEPS ARE WEAK THEN THE PROBLEM MUST BE COMING FROM THE INGUINAL LIGAMENT DOWN!(만약 장골근이 강하고 대퇴사두근이 약하다면 이는 서혜인대가 아래로 내려앉아서 생겼다고 볼 수 있다)
- TO ELICIT WEAKNESS YOU MAY NEED TO TEST REPEATEDLY OR PUT THE BODY INTO DISTORTION TO BRING OUT THE PROBLEM(반복적으로 검사하거나 문제를 일으키는 자세를 취해 검사함으로써 숨겨진 약화가 나타나기도 한다)



Femoral nerve syndrome - Treatment 3

1. CHALLENGE ENDS OF INGUINAL LIGAMENT – IT WILL NEED TO BE ELONGATED.(서혜인대의 끝부분을 유발검사해보라-이부분은 늘어나야할 필요가 있다)
2. TEST EXTERNAL OBLIQUE & TFL THESE ARE THE MAJOR MUSCLES THAT ATTACH TO THE INGUINAL LIGAMENT. IMBALANCES HERE COULD CHANGE THE LIGAMENT(외복사근과 대퇴근막장근이 서혜부에 부착하므로 이 근육들에 불균형이 있다면 서혜인대에 영향을 줄 수도 있다)



Femoral nerve syndrome - Treatment 4

IF QUADS ARE WEAK THE PATIENT CAN HELP WITH HOME TREATMENT BY;(만약 대퇴사두근이 약하다면 환자로 하여금 아래와 같이 홈케어 하도록 한다)

- CONTACTING THE ENDS OF THE IGUIAL LIGAMENT (서혜부 인대의 양끝단에 접촉하고)

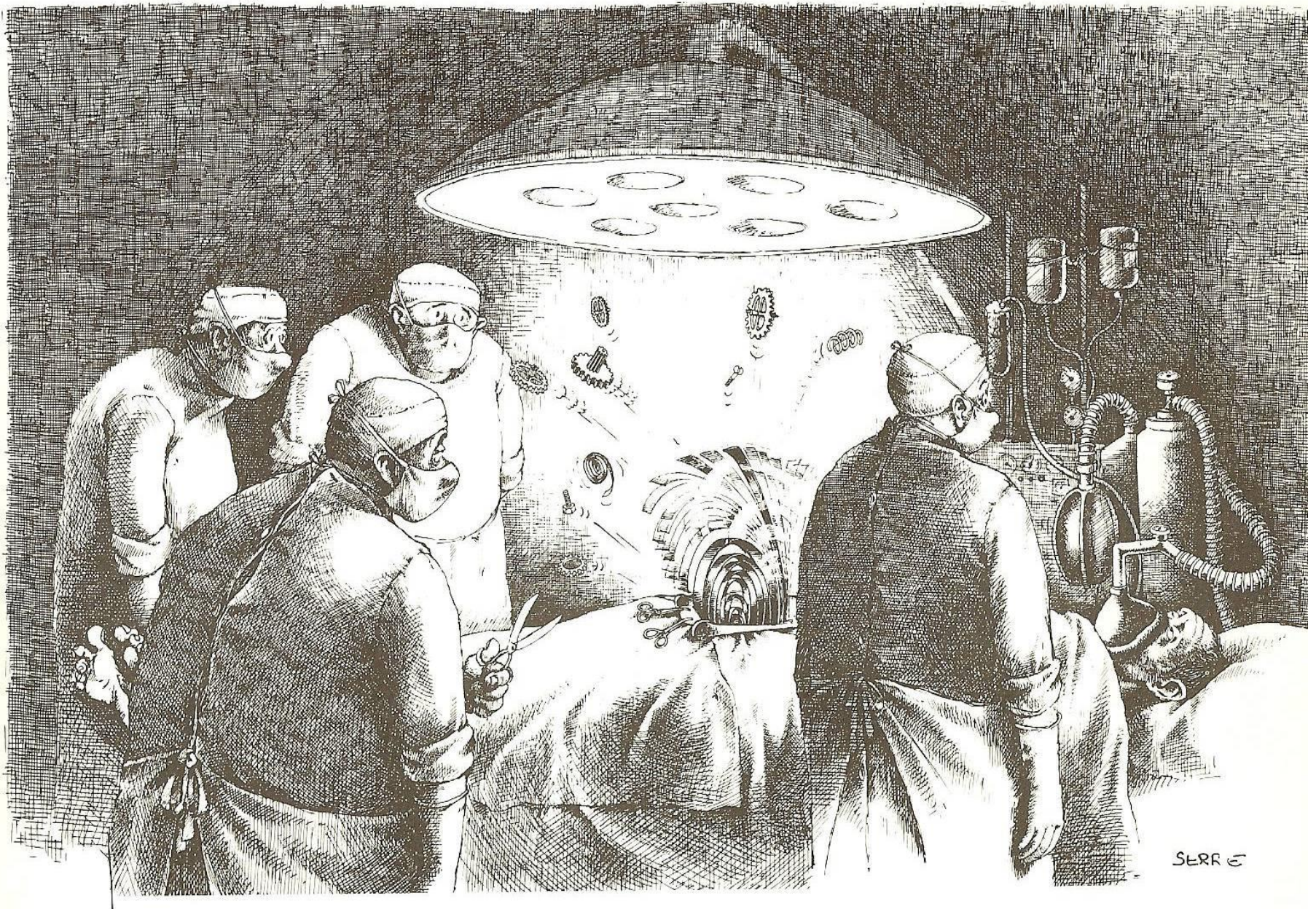
- APPLY PRESSURE TO PRESS APART TO LENGTHEN THE LIGAMENT(인대가 늘어나도록 압박을 줘서 벌린다)

TEST FOR STRENGTHENING OF QUADS. IF ABDOMINAL WALL IS WEAK YOU MAY NEED TO (대퇴사두근이 강해지는지 확인하고 만약 복벽이 약하다면 모든 골반의 연관요소를 정상화해라)

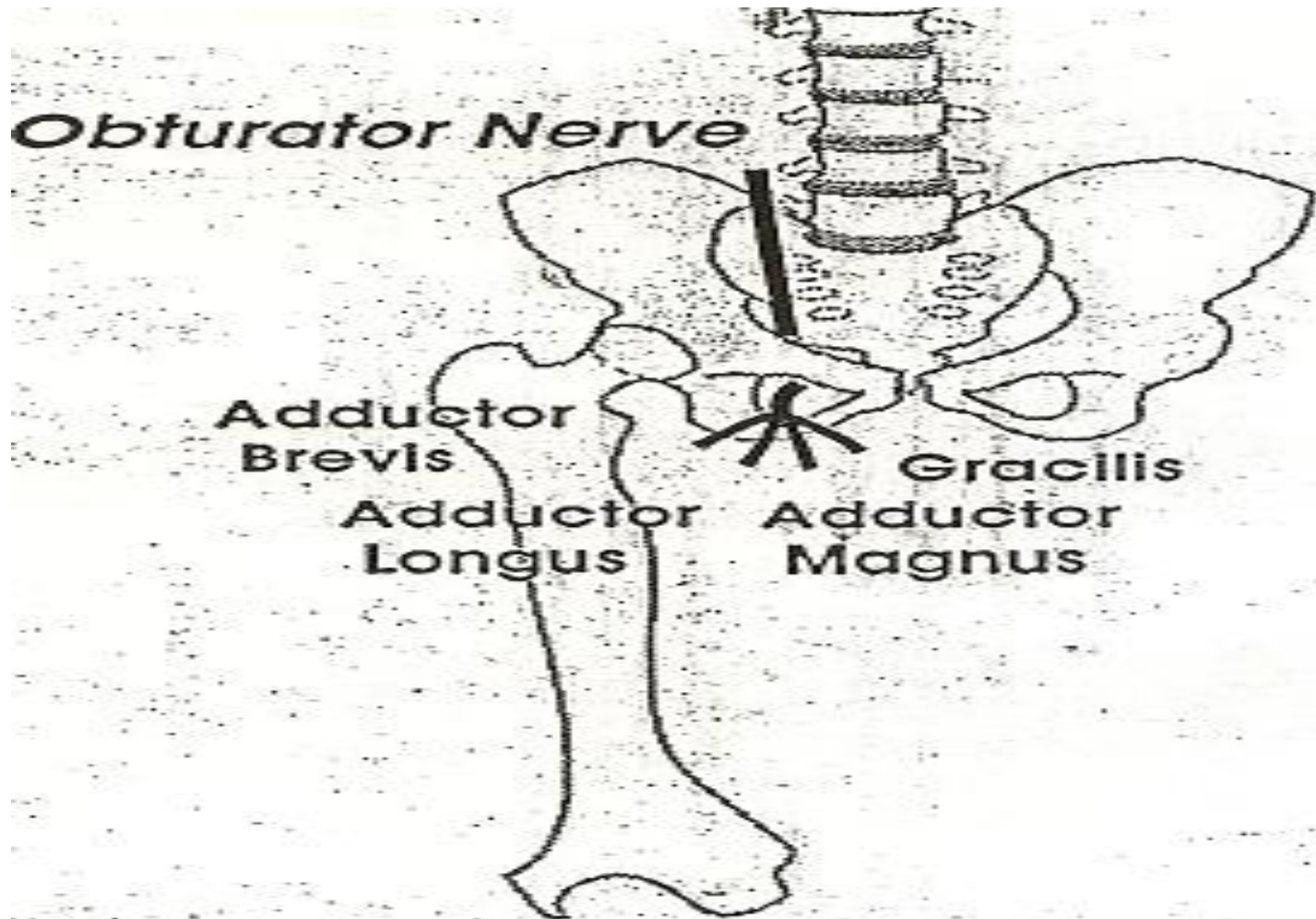


Femoral nerve syndrome - Treatment 5

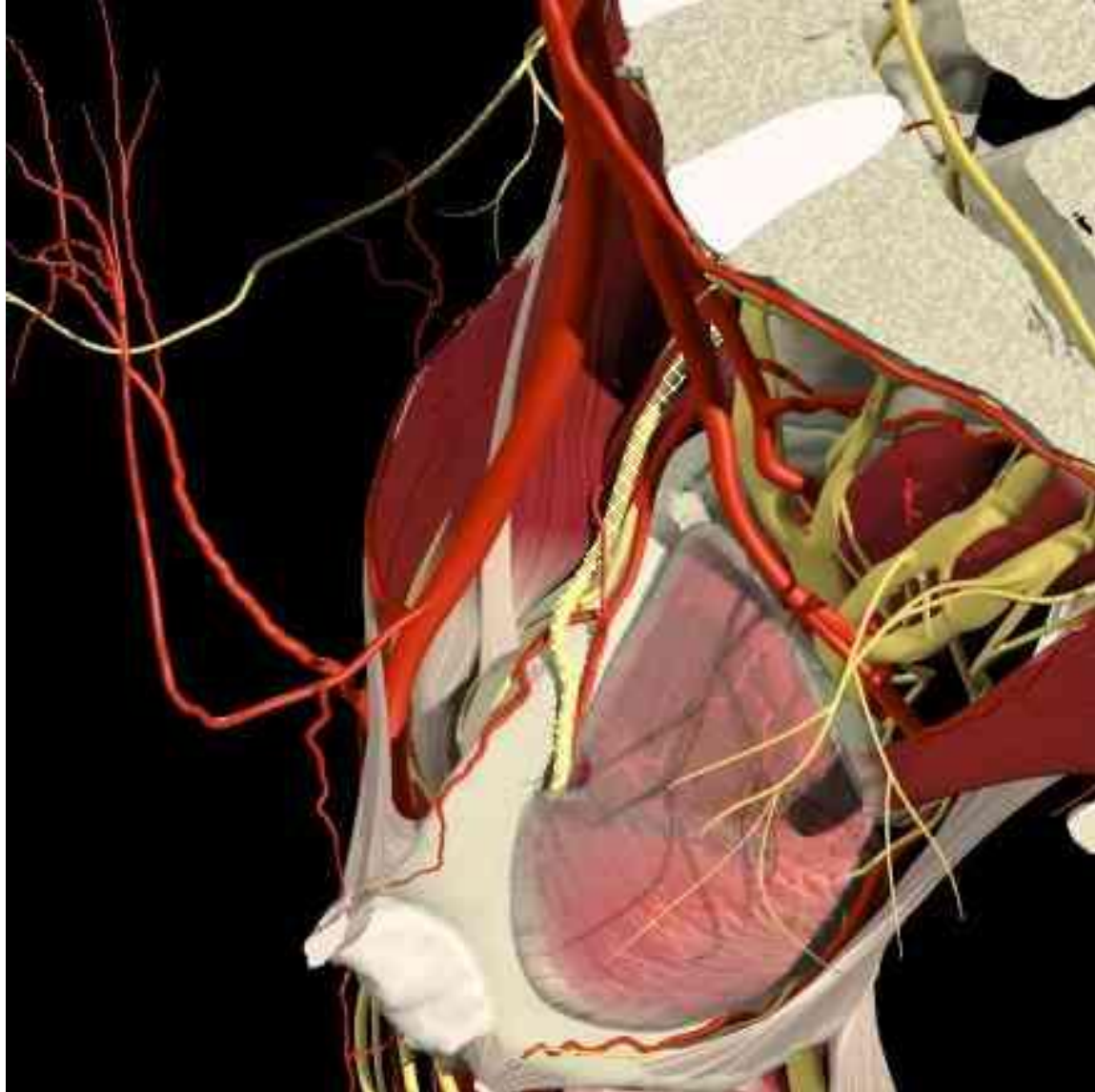
CORRECT ALL PELVIC INVOLVEMENTS 골반과
관련된 모든 문제를 교정해라.



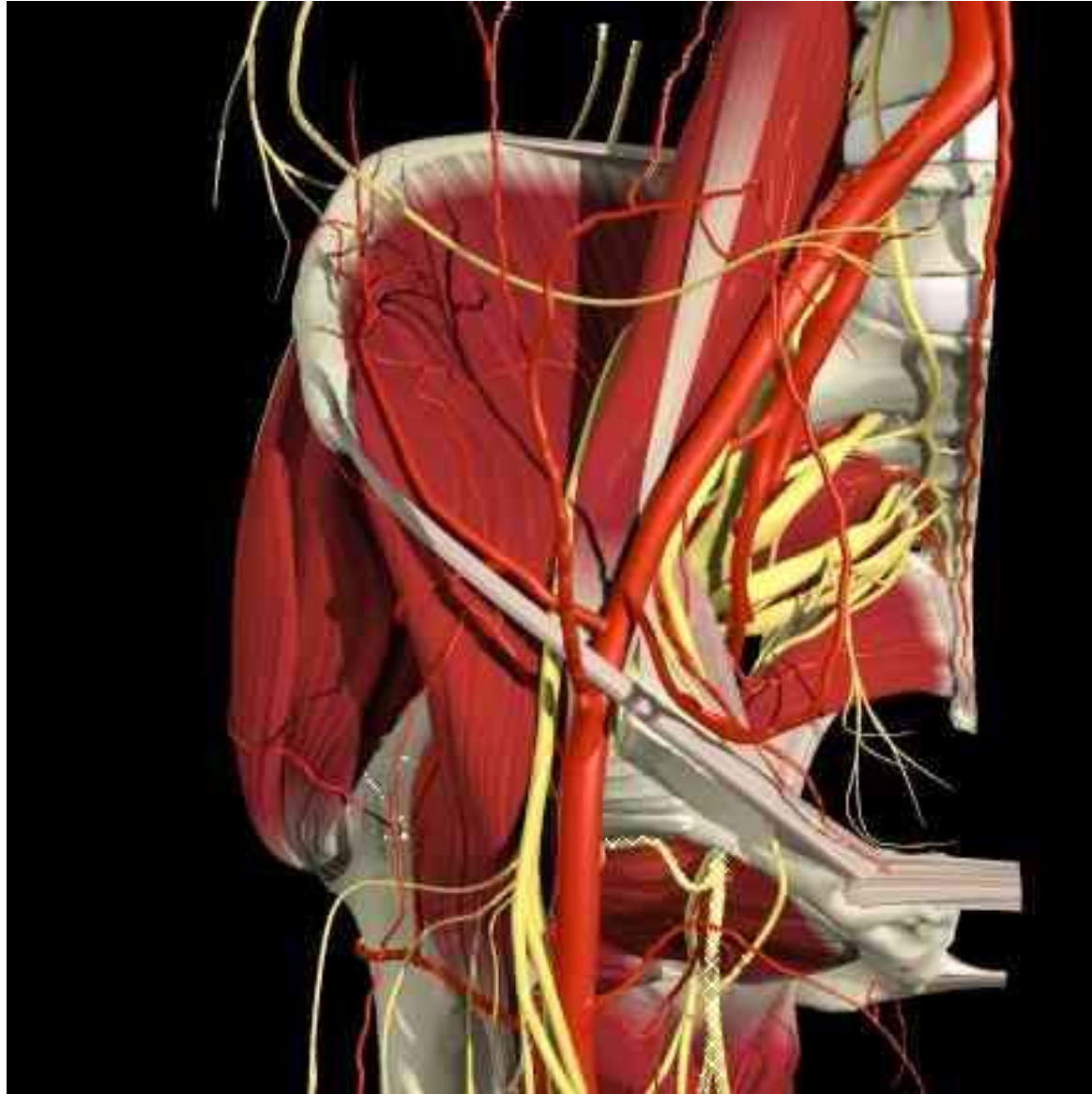
Obturator Syndrome(폐쇄신경증후군)



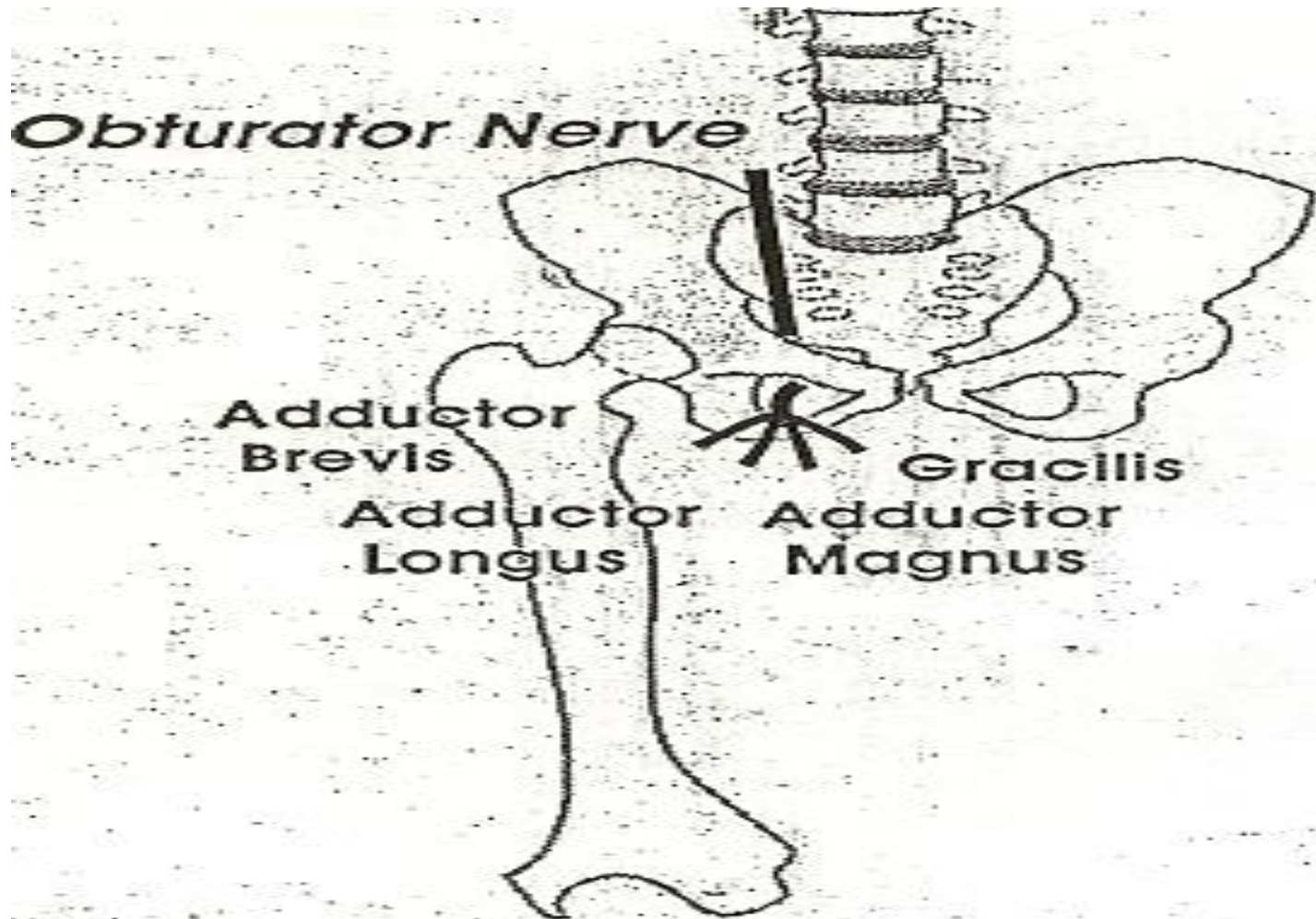
Obturator nerve pathway(폐쇄신경경로)



Obturator nerve(폐쇄신경) – anterior branch(앞쪽가지)

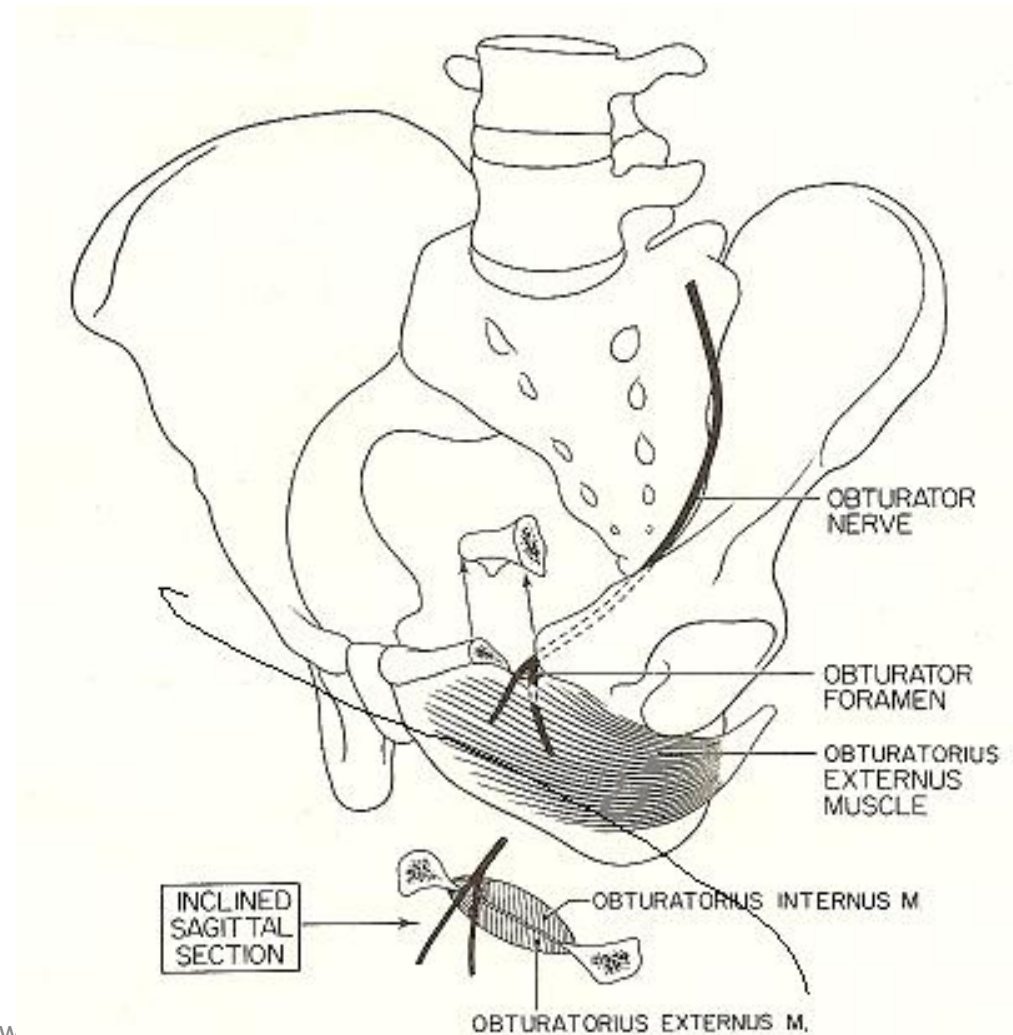


Obturator Syndrome(폐쇄신경 증후군)



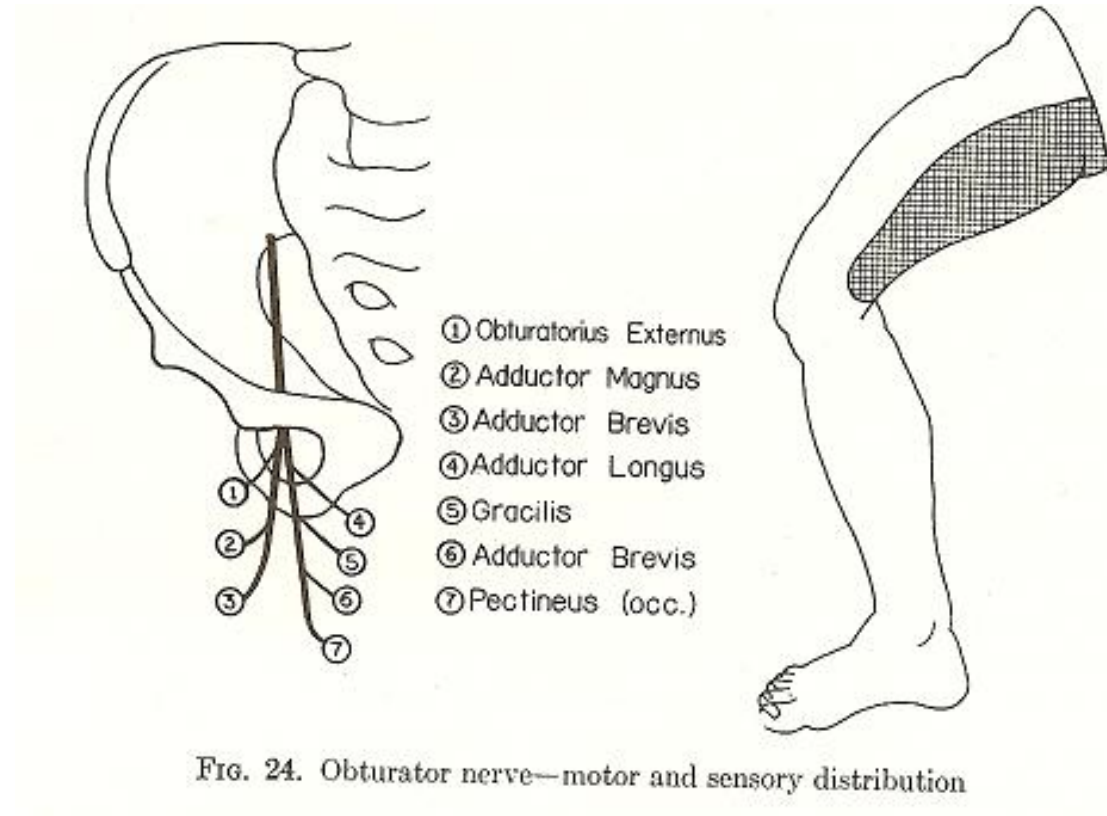
Obturator nerve(폐쇄신경) – anatomical relations(해부학적 관계들)

- Obturator foramen(폐쇄구멍)
- Obturator externus(바깥폐쇄근)
- Obturator internus(속 폐쇄근)



Obturator nerve(폐쇄신경)

- Motor supply
(운동지배)
- Sensory supply
(감각지배)



Obturator nerve- pathway(폐쇄 신경 경로)



Obturator syndrome - Treatment 1(폐쇄신경 증후군-치료)

- OBTURATOR NERVE RUNS THROUGH THE TUNNEL(굴을 통해 폐쇄신경 이 지난다).
- THE KEY TO SPOTTING THIS IS TO WATCH FOR THE PERSON WHO WALKS WITH THEIR LEGS ABDUCTED(요점은 다리를 벌리고 걷는 사람을 관찰하는 것이다).
- DUE TO ADDUCTOR WEAKNESS(모음근 약화로 인함).

Obturator nerve syndrome(폐쇄신경증후군) -

Treatment(치료) 2

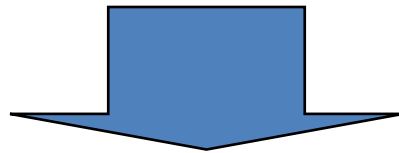
- TEST ADDUCTORS WEIGHT BEARING OR, EASIER , DURING A VALSAVA MANOEUVRE(체중을 부하하거나 혹은 좀더 쉽게는 발살바 술기 동안 모음근을 검사).
- THE MAJOR CAUSE OF PRESSURE ON THE OBTURATOR NERVE IS FROM DROPPING OF THE ABDOMINAL CONTENTS INTO THE LOWER PELVIC CAVITY ONTO THE NERVE AS IT EXITS THE OBTURATOR FORAMEN(하부 골반강으로 복부내용물 하강하여 폐쇄 구멍으로 신경이 나올 때 누르는 것이 주요 원인) .

Obturator nerve syndrome(폐쇄신경증후군) - Treatment (치료)3

OBTURATOR NERVE

SUPPLIES(폐쇄신경지배);

- ADDUCTOR BREVIS(짧은 모음근)
- ADDUCTOR LONGUS (긴 모음근)
- ADDUCTOR MAGNUS(큰모음근)
- GRACILIS(두덩정강근).

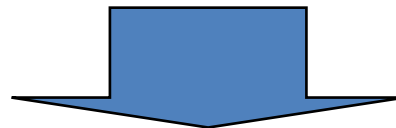


Obturator nerve syndrome(폐쇄신경증후군) – Treatment(치료) 3

EXCESSIVE PRESSURE IN THE ABDOMINAL CAVITY(복강내 과도한 압력) FROM;

- A FOETUS(태아)
- WEIGHT GAIN(체중증가)
- POOR ABDOMINAL MUSCLE TONE(복부근육 긴장도 약화)

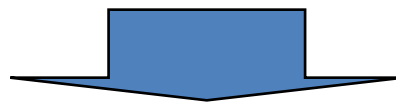
RESULTS IN THE DROPPING OF THE ABDOMINAL CONTENTS INTO THE PELVIC CAVITY AND APPLY PRESSURE TO THE NERVE(복부내용물의 골반 강으로 하강 및 신경으로 압력)



Obturator nerve syndrome(폐쇄신경증후군)

- Treatment (치료)4

- TEST FOR SORENESS AND WEAKNESS IN ADDUCTORS(모음근의 동통 및 약화).
- IF EITHER ARE REDUCED WITH PATIENT MANUALLY REDUCING THE VISEROPTOSIS OR INDUCED WITH INCREASED INTERNAL PELVIC PRESSURE(환자가 수기로 장기하수 감소 혹은 내부 골반 압력 증가로 유발)
- THESE ARE POSITIVE INDICATORS FOR AN OBTURATOR NERVE ENTRAPMENT(이는 폐쇄신경죄임에 대한 양성 적응증).



Obturator nerve syndrome(폐쇄신경증후군) - Treatment (치료)5

- CHECK FOR REACTIVE MUSCLE PATTERNS BETWEEN THE UPPER AND LOWER ABDOMINAL WALL(위 및 아래 복벽 사이의 반응성 근육 양상을 검사).
- COMMONLY THE LOWER ABDOMINAL WALL IS MADE WEAK BY CONTRACTION OF THE UPPER ABDOMINAL WALL(위복벽을 수축시키면 흔하게 아래 복벽은 약해진다).
- TREAT THE SPINDLE CELLS(근방추세포들을 치료)

Obturator nerve syndrome(폐쇄신경증후군)

- Treatment(치료) 6

- TEST BY STRETCHING THE ABDOMINAL WALL BY EXTENDING THE SPINE OVER YOU AND RAPIDLY TESTING FOR WEAKENING(척추를 확장시켜서 복벽을 신장시키고 빨리 약화를 검사).
- TEST FOR FASCIAL INVOLVEMENT OF THE ABDOMINAL WALL(복벽의 근막이상이 있는지 검사).
- TREAT WITH SPRAY AND STRETCH OR FACIAL FLUSH(있으면 분무 및 신장 혹은 근막이완술).





Piriformis syndrome

(궁둥구멍근 증후군)

Lower Extremity Anatomy



Pelvis – Superior Anterior view

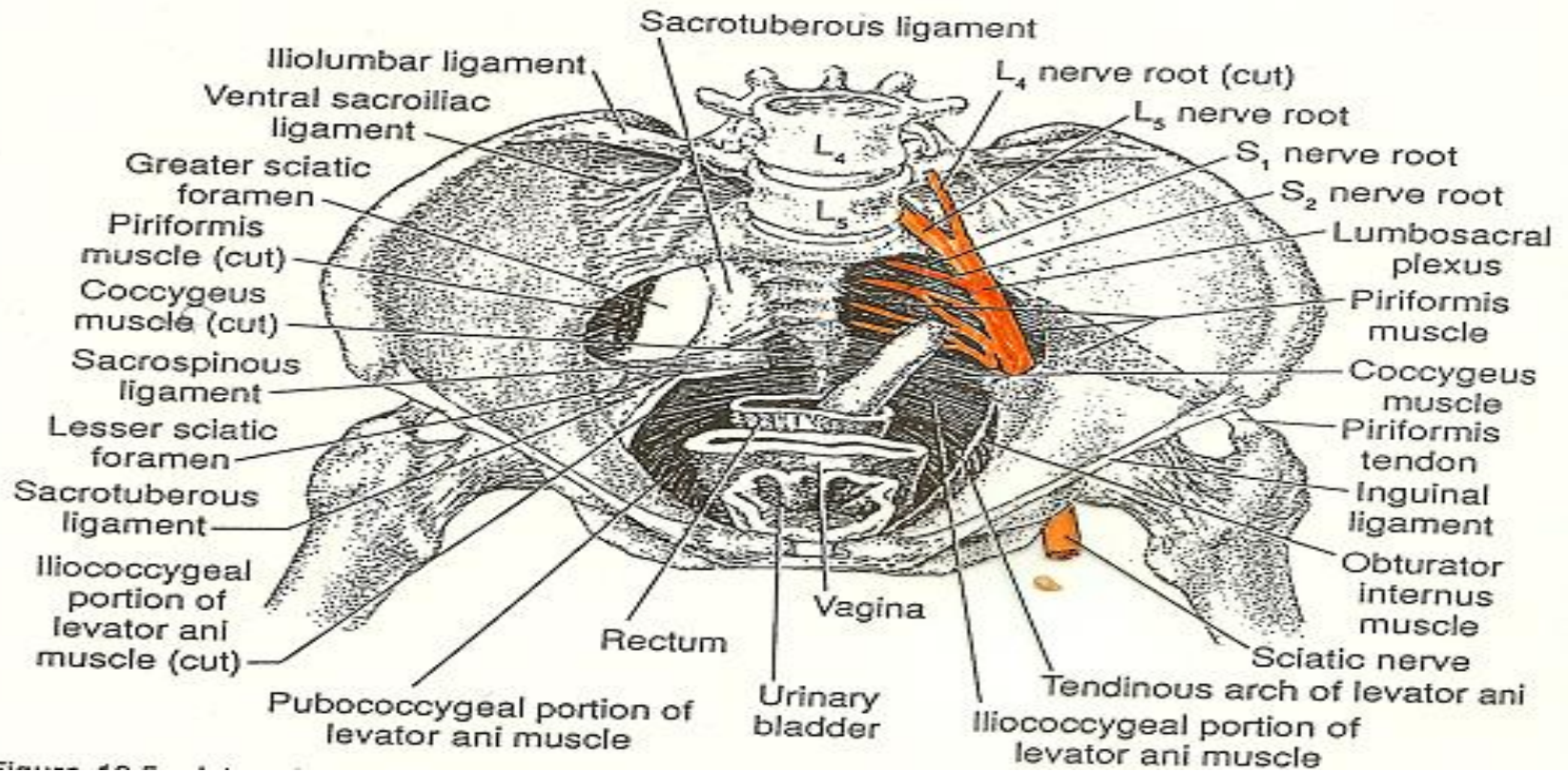
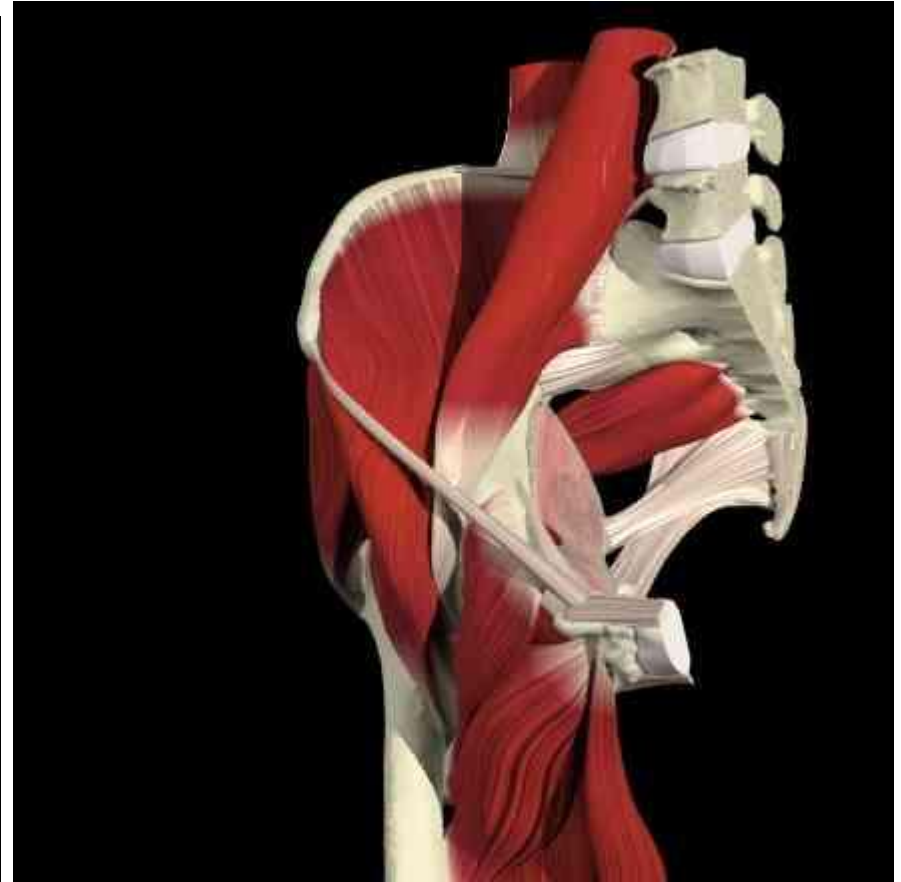


FIGURE 40.7

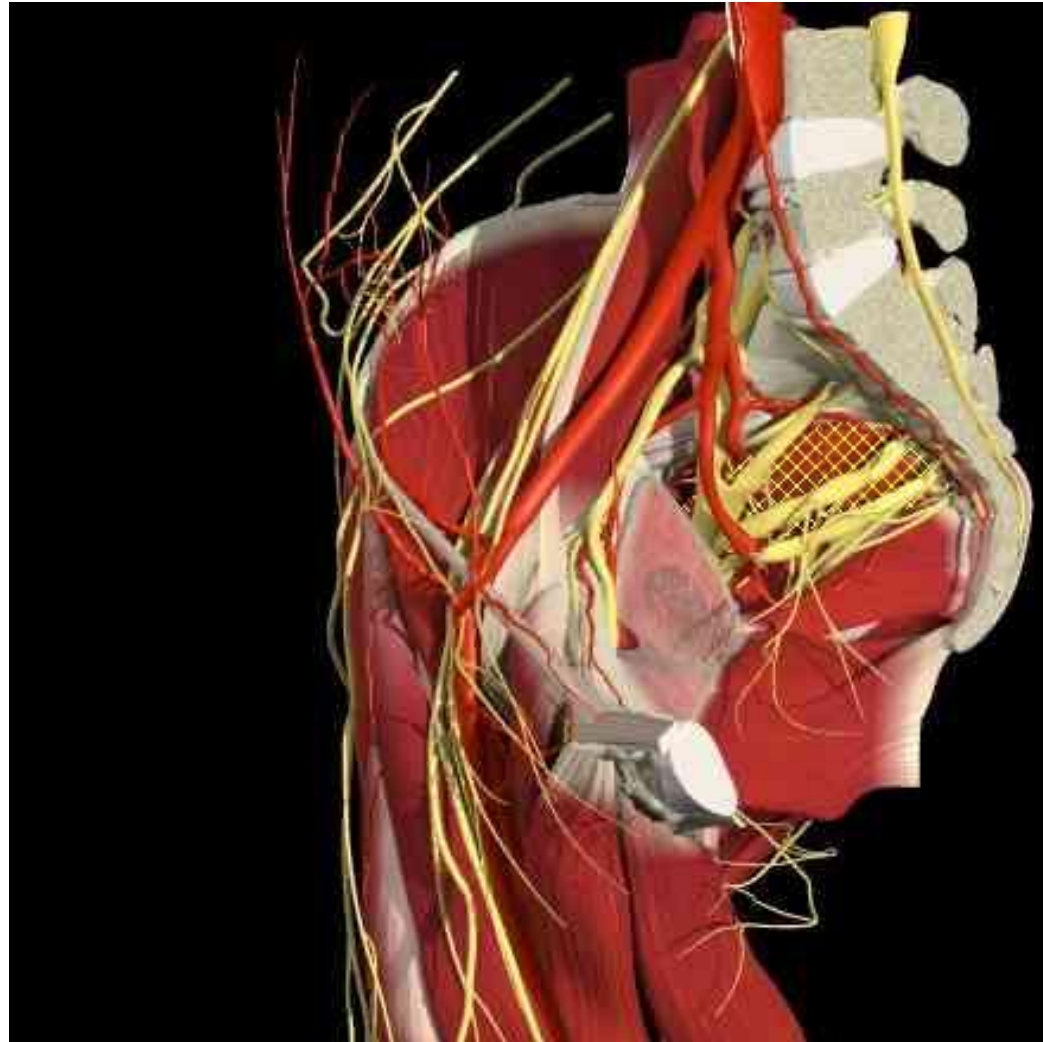
Piriformis – Anatomy



Piriformis



Piriformis with sciatic nerve



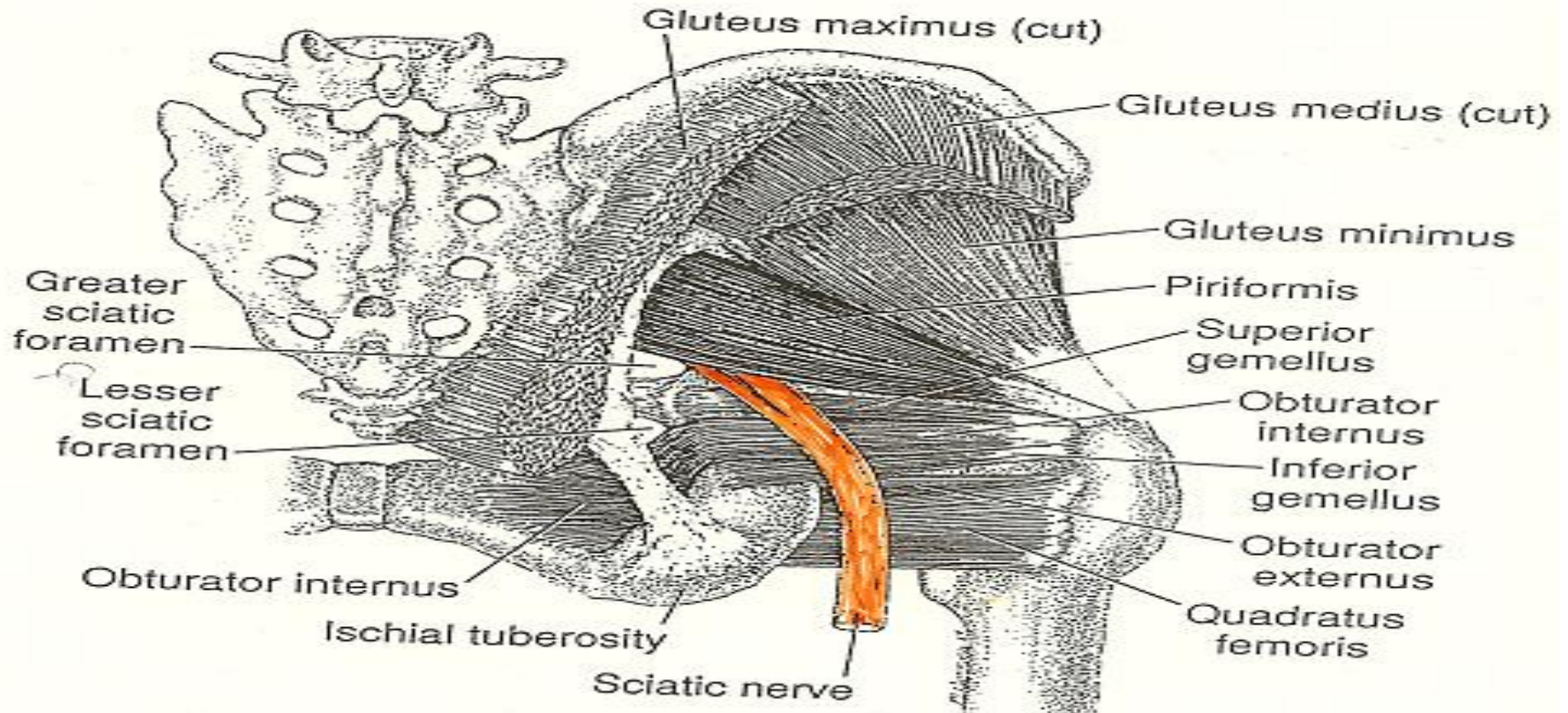
Sciatic nerve pathway



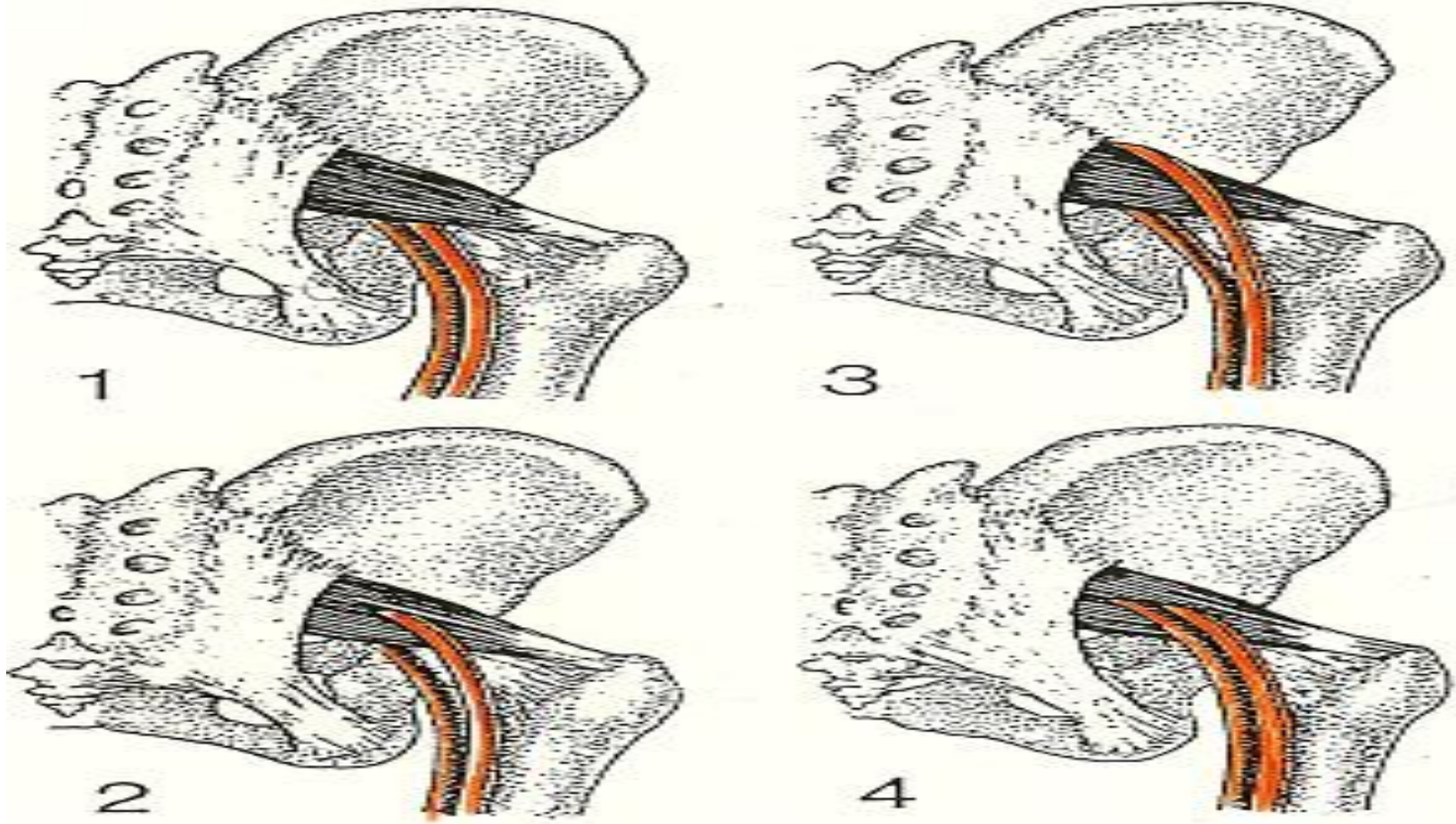
C. L-J Seminars

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Piriformis – Posterior View



Common variations by which the sciatic nerve exits the pelvis



Piriformis Syndrome

Symptoms

- SCIATIC TYPE PAIN
- WEIGHT BEARING하고 검사하면 GUTEALS, HAMSTRINGS AND FOOT MUSCLES 이 약해진다
- FEMUR ROTATION 감소

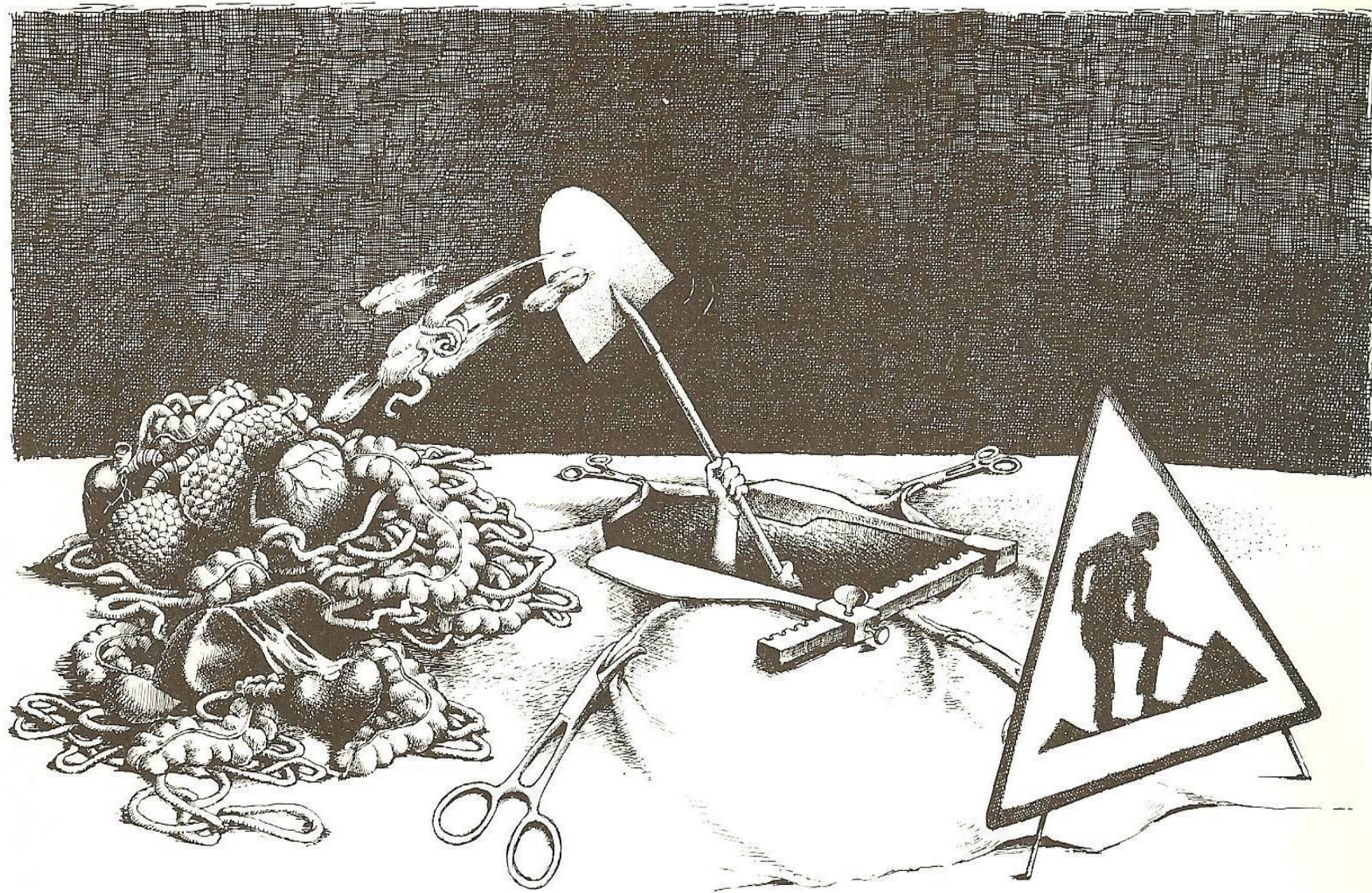
Piriformis syndrome - Treatment 1

THE PIRIFORMIS IS NORMALLY WEAK WHEN THERE IS CHRONIC SACRO ILIAC INSTABILITY:

CHRONIC SACRO ILIAC INSTABILITY가 있으면 PIRIFORMIS가 정상적으로 약해진다.

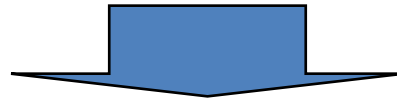
Piriformis syndrome - Treatment 2

- SITTING OR PRONE 자세에서 ROM을 검사.
- ENTRAPMENT로 인한 아래 근육의 약화를 검사;
 1. GLUT. MEDIUS, MAX or HAMSTRINGS.
 2. TEST GLUT. MAX. WITH AND WITHOUT APPROX. OF THE SACROILIAC JT. AND COMPARE.
THE SACROILIAC Joint를 늘리고 GLUT. MAX. 검사, 늘리지 않고 검사하여 비교한다.



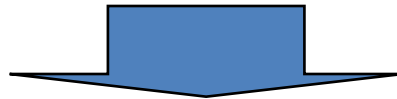
Piriformis syndrome - Treatment 3

- MANY TIMES APPROXIMATION MANUALLY OR WITH A BELT WILL SHOW A DRAMATIC STRENGTHENING OF THE MUSCLE.
- 여러 번 손으로 양쪽을 눌러거나 S-I belt를 하면 극적으로 근육이 강해진다.



- THE PIRIFORMIS CONTRACTS WHEN GLUT. MAX IS WEAK

- GLUT. MAX 가 약하면 PIRIFORMIS가 수축한다.



Piriformis syndrome - Treatment 4

- 1 모든 PELVIC IMBALANCE를 교정한다.
2. SACRO ILIAC LIGAMENTS를 유발 검사한다.
3. GLUT MAX.를 강화시킨다.
4. TROCHANTERIC BELT를 사용.



Piriformis syndrome - Treatment 5

5. MAY FIND REFLEX HYPERTONICITY OF PARASPINAL MUSCLES FROM PELVIS TO CERVICALS ON SIDE OF INVOLVEMENT.

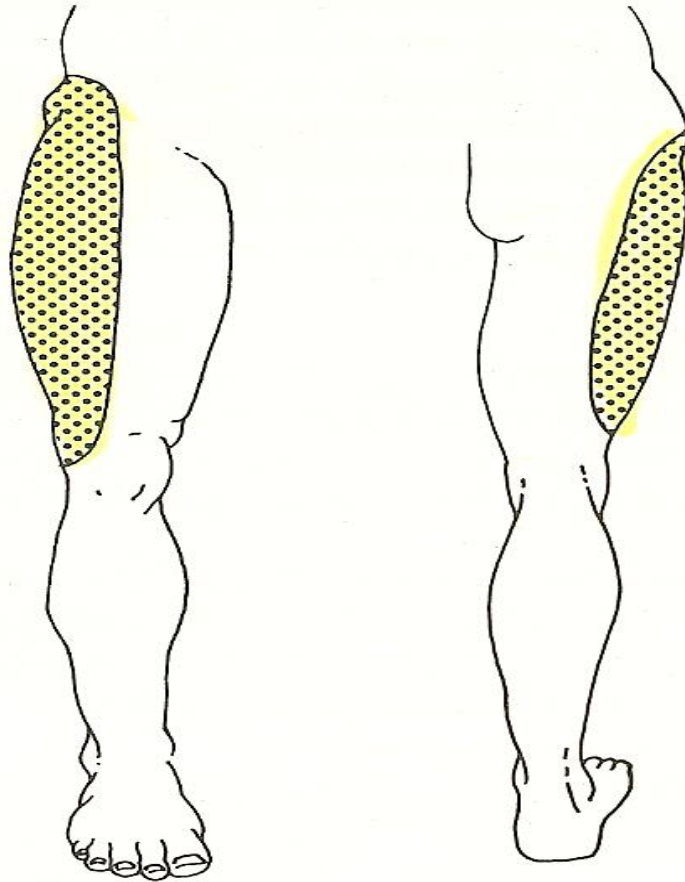
(이환된 쪽에 골반으로부터 목까지 척추 주위근의 반사성 긴장이 나타날 수 있다.)

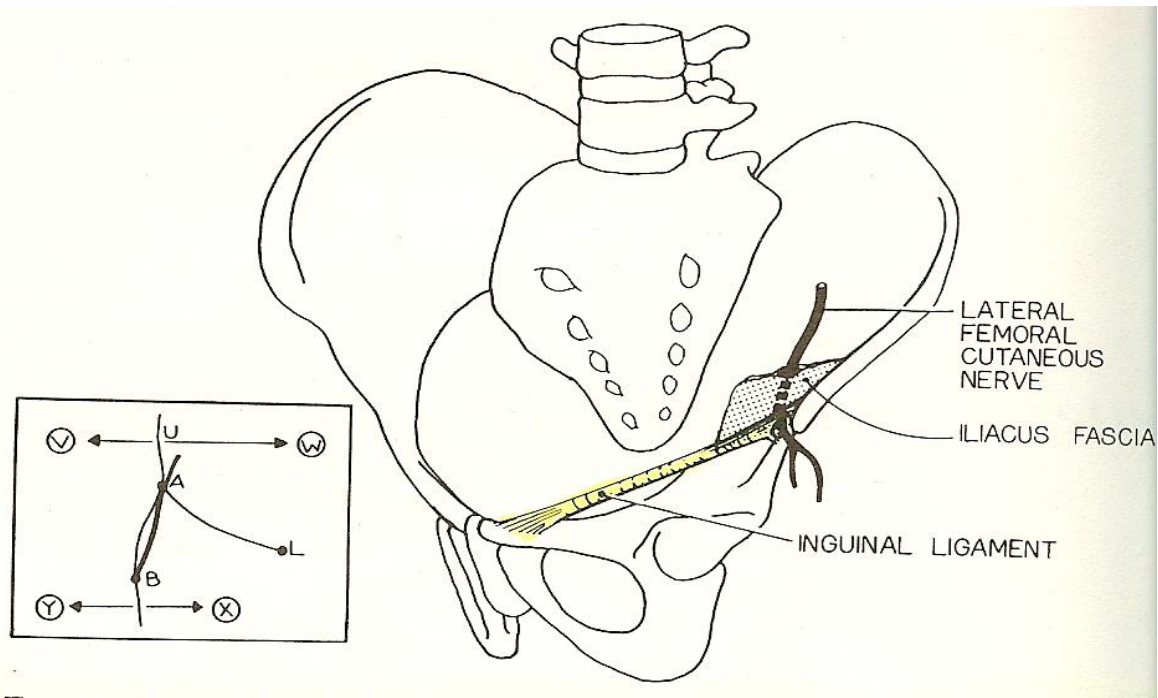
• APPROXIMATION OF S.I. JOINTS STOPS PAIN AND HYPERTONICITY (양쪽 천장관절을 모으면 통증과 긴장이 사라진다.)

Meralgia paraesthetica

Lateral Femoral Cutaneous Nerve

(이상 지각성 대퇴신경통
외측 대퇴피신경)





Iliacus fascia 내에서 경로를 확인한다.

- Point A 는 the **inguinal ligament**의 lateral end . 이 지점에 신경이 부착한다. 여기서 신경은 아래로 주행하여 point B에서 the **fascia lata**를 뚫고 나온다.
- 그러므로 그림으로 설명이 가능하며, 만약 다리가 내전되면 (Direction X) 신경은 포착 점에서 당기게 된다. 신체를 펴거나 굽히면(trunk shifts U-V) 또한 이 지점에서 신경에 자극을 줄 수 있다.

[\[1\]](#) Kopell, H. Thompson, W. *Peripheral Entrapment Neuropathies* 1976. pp.84, 86.

Lateral Femoral Cutaneous Nerve

- the anterior superior spine(ASIS)근처에서 entrapment 잘된다.
- Derives from the **L2, L3** nerve root.
- ***lateral boarder of the Psoas*** 에서 나와서 pelvis 바깥쪽으로 내려와 Iliacus muscle 위로 주행.
- Iliacus fascia 아래에 있으며 ***lateral attachment of the Inguinal ligament***에 있는 tunnel로 나온다..

Lateral Femoral Cutaneous Nerve

- Almost any disturbance in the area could theoretically cause an impingement to the nerve and it is rare to have any obvious traumatic history, so that care must be taken to find the imbalances that might be at the root of this easily overlooked problem. This nerve entrapment is eminently suited to non-surgical resolution and if cut unpleasant paraesthesias may increase rather than decrease.

(이론적으로 이 부위의 어떠한 문제도 신경 죄임을 야기하나, 명확한 외상은 적으므로 흔히 간과되는 신경뿌리의 불균형을 주의 깊게 찾는다. 이 신경 죄임은 비수술적으로 탁월하게 치료된다. 만약 신경이 잘리면 불유쾌한 이상감각이 더 증가될 수 있다.)

Meralgia Paraesthetica

Lateral Femoral Cutaneous Nerve

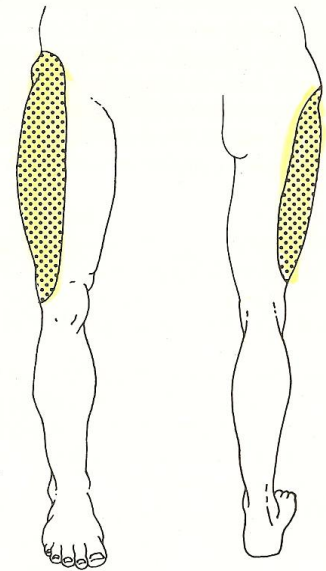
Treatment

- This will involve taking into account all the above. Remember the following:

(위의 모든 사항을 고려하고 아래
사항을 기억하라)

- There is no motor part to this nerve purely sensory.

(이 신경은 순수한 감각신경이며
운동신경은 없다)

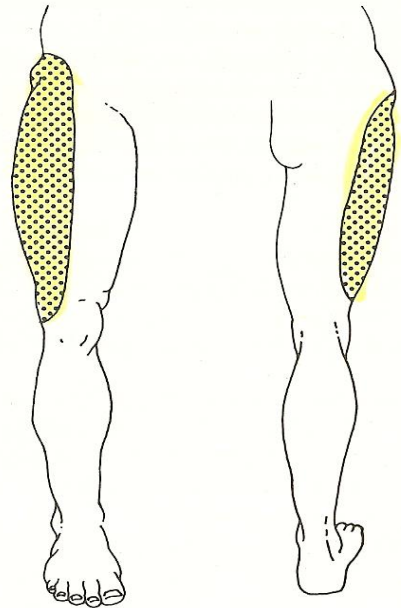


Meralgia Paraesthetica

Lateral Femoral Cutaneous Nerve

Treatment

- Transverse Abdominals attach to the lateral 1/3 of the inguinal ligament. Test this and Quadratus Lumborum. (복횡근이 서혜인대의 바깥 1/3에 부착한다. 복횡근과 요방형근을 검사)
- Abdominal oblique muscles and T.F.L. may also influence the state of the inguinal ligament. (복사근과 대퇴근막장근이 서혜인대에 영향)
- Look for disturbance at L2/3.



Meralgia Paraesthetica

Lateral Femoral Cutaneous Nerve

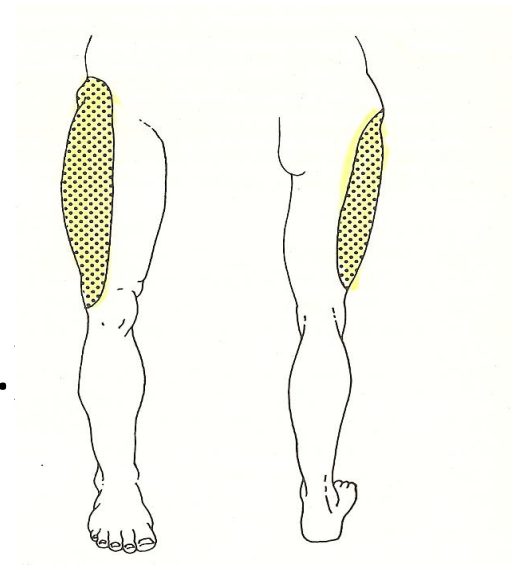
Treatment

- What is the state of the Ileo-psoas?
Does the numbness return after stretching the hypertonic Psoas?
Examine for S.C.S. & F.F.

(요근의 상태는? 과긴장한 요근을 신전하면 저린감이 재발하는가? S/C과 F/R를 검사하라)

- Remember the possible reactive inhibition of the neck flexors on Psoas.

(요근의 반응성 근육인 목굽힘근을 기억하라.)



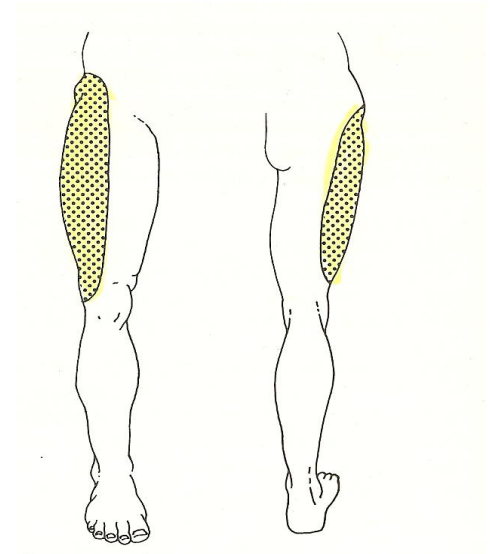
Meralgia Paraesthetica

Lateral Femoral Cutaneous Nerve

Treatment

- Examine all pelvic faults. Is there a short leg?
(모든 골반문제를 검사하라, 어느 쪽 다리가 짧은가)
- 감별진단: Femoral nerve entrapment.
- Think of all that can influence the area associated with the nerve.

(신경과 연관되어 영향을 줄 수 있는 모든 가능성을 생각)



MUSCLE: OBTURATOR INTERNUS

ORIGIN: Inner surface of anterolateral wall of pelvis surrounding the obturator foramen, obturator membrane, and obturator fascia.

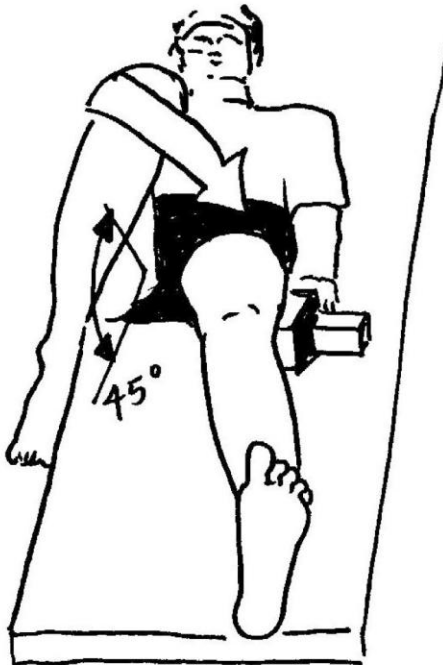
INSERTION: Medial surface of greater trochanter.

TEST: Patient – Supine, centred on table; flex ipsilateral hip 45 degrees and flex knee to place ankle below side of table. (Note: ipsilateral hip should have slight internal rotation).

Dr: Brace contralateral ilium on lateral side and with ipsilateral knee contact, adduct and internally rotate femur.

V.L : T9R

M.M S2



OBTURATOR EXTERNUS

ACTION: Flexes and externally rotates the femur.

ORIGIN: Rami of the pubes and ischium and external surface of the obturator foramen.

INSERTION: Trochanter fossa of the femur.

TEST:

PATIENT: Supine

Flex the thigh 110 degrees

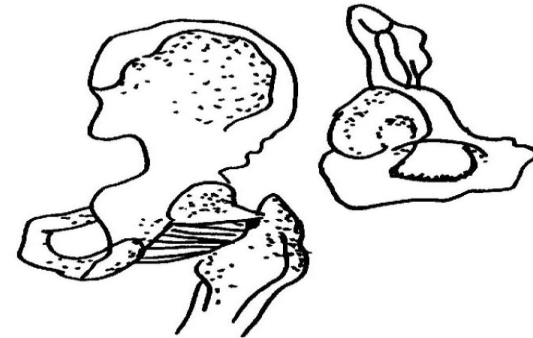
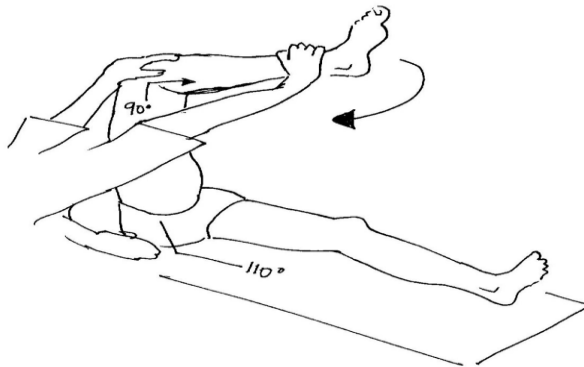
Flex the knee 90 degrees, with slight external rotation.

DOCTOR:

Brace the lateral side of the knee.

Internally rotate the thigh.

Myomere: L4



COCCYGEUS, SACRAL DIVISION

?

ACTION: Draws the sacral floor forward and supports the pelvic floor.

ORIGIN: Spine of the ischium and the sacrospinous ligament.

INSERTION: Side of the lowest segment of the sacrum.

?

PATIENT: Prone.

1. Flex the knee 90 degrees.
2. Abduct the thigh 23 degrees.
3. Externally rotate the thigh 45 degrees.

?

DOCTOR:

1. Brace the opposite knee
2. Contact the medial condyle of the thigh.
3. Abduct the thigh through a coronal plane.

?

Vertebral level: T1

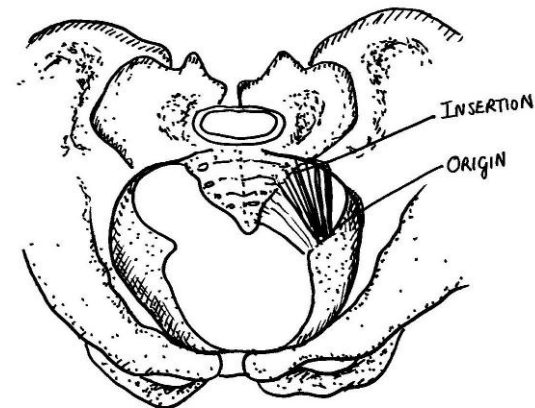
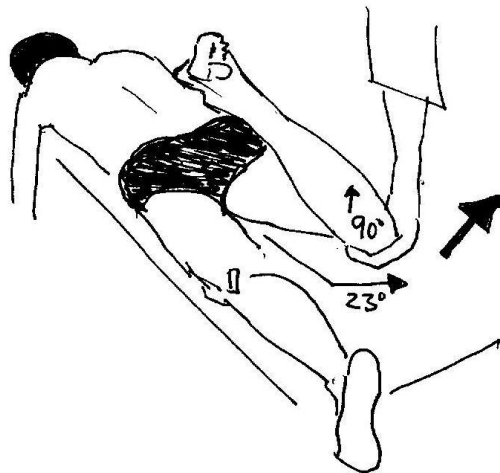
Myomere: 3

?

?

?

?



COCCYGEUS, COCCYX DIVISION

ACTION: Draws the coccyx forward and supports the pelvic floor.

ORIGIN: Spine of the ischium and the sacrospinous ligament.

INSERTION: Margin of the coccyx.

PATIENT: Prone.

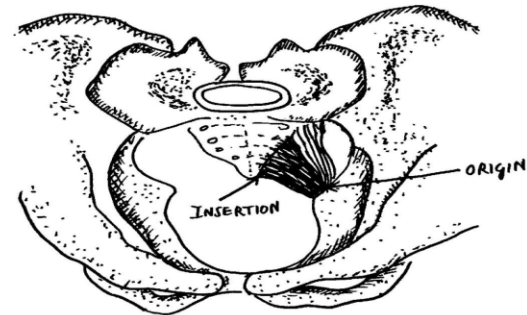
1. Flex the knee 90 degrees.
2. Extend the thigh 23 degrees.
3. Externally rotate the thigh 45 degrees.

DOCTOR:

1. Brace the opposite knee
2. Contact the medial condyle of the femur.
3. Abduct the thigh through a coronal plane.

Vertebral level: C4

Myomere: S2



PUBOCOCCYGEUS

ACTION: Supports the pelvic floor, draws the anus forward and constricts it.

ORIGIN: Dorsal surface of the pubes and anterior aspects of the Arcus Tendineus (Ileopectineal line on the inner aspect of the ischium).

INSERTION: Central tendinous points of the perineum around the rectal sphincter.

PATIENT: Prone.

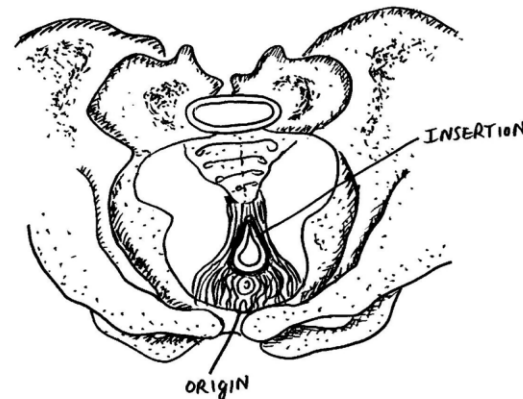
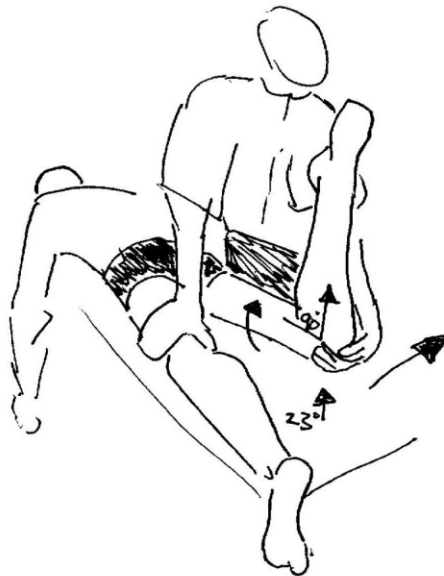
1. Flex the knee 90 degrees.
2. Extend the thigh 23 degrees.
3. Internally rotate the thigh 30 degrees with slight adduction.

DOCTOR:

1. Brace the opposite knee
2. Contact the medial condyle of the femur.
3. Abduct the thigh through a coronal plane.

Vertebral level: L5

Myomere: S2



ILEOCOCCYGEUS

ACTION: Supports the pelvic floor.

ORIGIN: Spine of the ischium, inner surface and Arcus Tendineus.

INSERTION: last two segments of the coccyx and coccygeal ligament.

PATIENT: Prone.

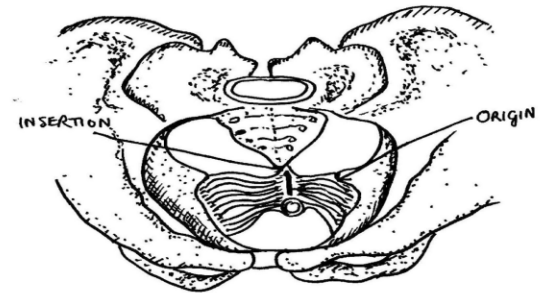
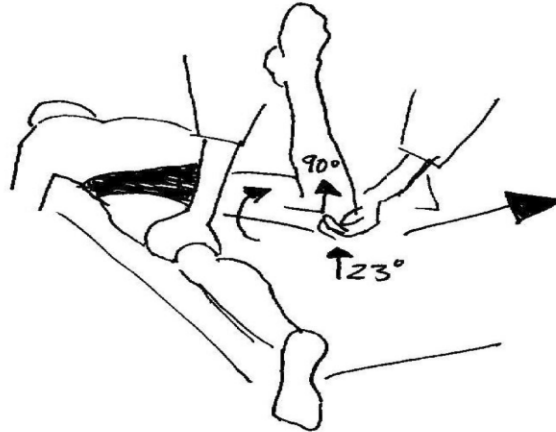
1. Flex the knee 90 degrees.
2. Extend the thigh 23 degrees with no rotation

DOCTOR:

1. Brace the opposite knee
2. Abduct the thigh through a coronal plane.

Vertebral level: L2

Myomere: S2







Dr. Goodheart





The End.

Thank you.

• 끝.

감사합니다.

REACTIVE MUSCLE CHART

Suspected Reactive Muscle	Sedation Required		Suspected Reactive Muscle	Sedation Required
Neck Flexor	Contralateral psoas		Lower rectus abdominus	Upper rector abdominus
Splenius capitis	Contralateral piriformis		Transverse abdominals	Sacrospinalis
Upper trapezius	Latissimus dorsi Biceps Contraateral upper trapezius		Psoas	Adductors Contralateral anterior neck flexors Diaphragm
Deltoid	Rhomboid Pectoralis minor		Gluteus Medius	Contralateral rectus abdominus
Supraspinatus	Rhomboid Pectoralis minor		Piriformis	Contralateral splenius capitis
Rhomboid	Deltoid Serratus anticus Supraspinatus		Gluteus maximus	Sacrospinalis Pectoralis major (clavicular division)
Latissimus dorsi	Contralateral hamstring Upper Trapezius		Hamstrings	Sacrospinalis Contralateral latissimus dorsi Quadriceps Popliteus
Pectoralis minor	Serratus anticus Supraspinatus Deltoid		Tensor fascia lata	Adductors Peroneous tertius
Pectoralis major (Clavicular division)	Gluteus maximus		Adductors	Tensor fascia lata Psoas
Serratus anticus	Rhomboid Pectoralis minor		Quadriceps	Gastrocnemius Hamstrings Rectus abdominis Sartorius
Biceps	Triceps Upper trapezius		Sartorius	Tibialis anterior Quadriceps
Sacrospinalis	Transverse abdominus Gluteus maximus Hamstrings		Popliteus	Gastrocnemius Hamstrings Upper Trapezius
Diaphragm	Psoas		Gastrocnemius	Popliteus Quadriceps
Upper rectus abdominus	Lower rectus abdominus		Tibialis anterior	Sartorius
			Peroneus tertius	Tensor fascia lata