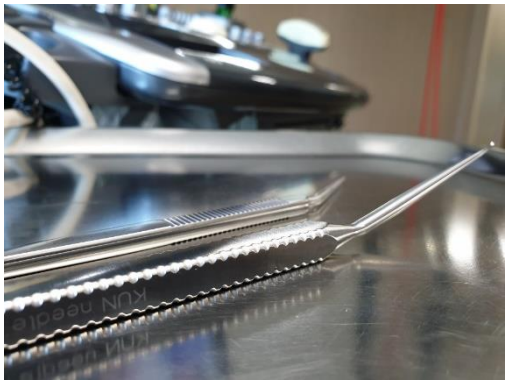
건 재활의학과

건니들이용한 초음파유도하 경피적 인대절제 및 박리술

2021년 대한재활의학회 추계학회

KUN needle

- 인대제거용 의료용 니들
- 2011년출원 2013년 특허획득
- 임상에서 경험축적
- 2018년 건니들시술연구회 창립
- 방아쇠수지, 손목터널증후군, 결절종, Baker's cyst 등의 질환에 좋은결과



YOUR INVENTION PARTNER

특 허 청

특허결정서

접수 No. 2013.05.02 특허법인 대아

출원인 성명 김병희 (출원인코드: 420110355308)
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대리인 명칭 특허법인 대아
주소 서울특별시 강남구 역삼로 123, 한양빌딩3층 (역삼동)(특허법인 대아)
지정된변리사 정병직 외 2명
발명자 성명 김병희
주소 경기도 성남시 분당구 동판교로52번길 19-3, 3층 (백현동)

출원번호 10-2011-0083375
발명의 명칭 인대 제거용 의료용 니들
청구항 수 3

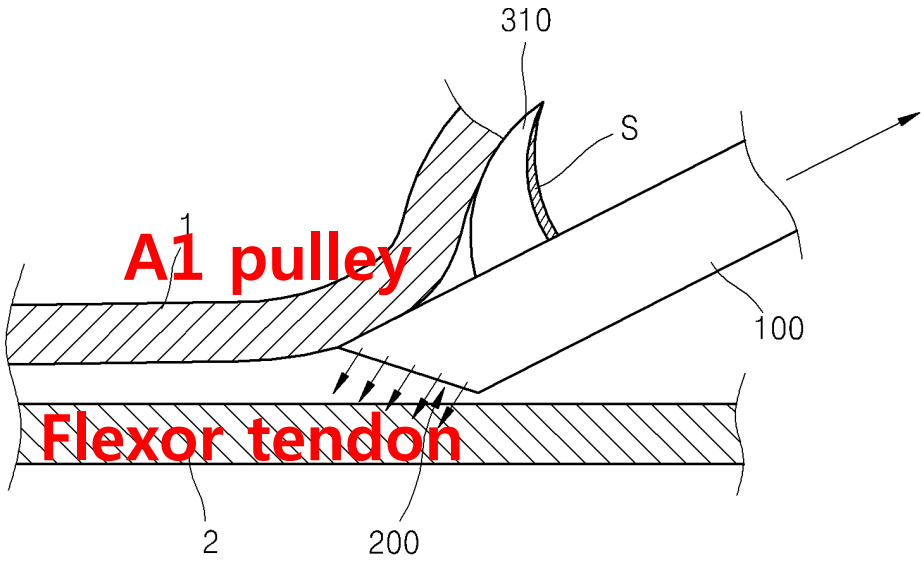
이 출원에 대하여 특허법 제66조에 따라 특허결정합니다.
(특허권은 특허료를 납부하여 특허법 제87조에 따라 설정등록을 받음으로써 발생하게 됩니다.) 끝.

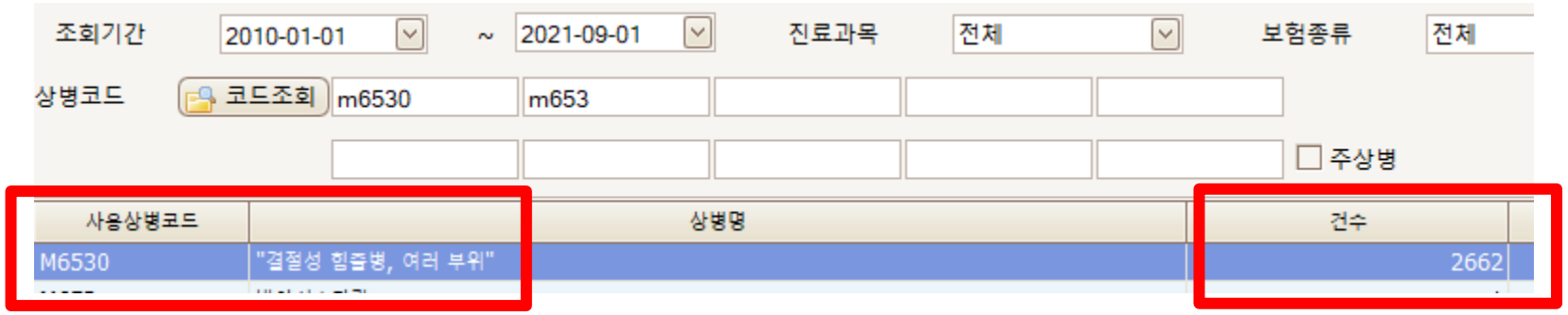
[참고문헌]

1. KR101035482 B1
2. US05029573 A
3. US05908433 A
4. US20100069944 A1

KUN needle

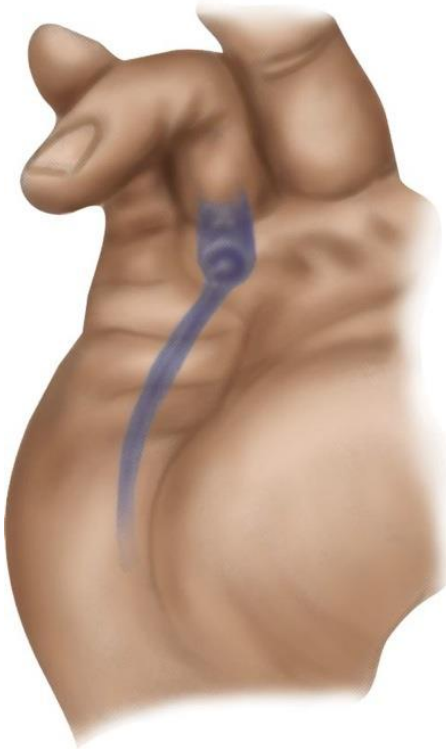
Tenosynovium

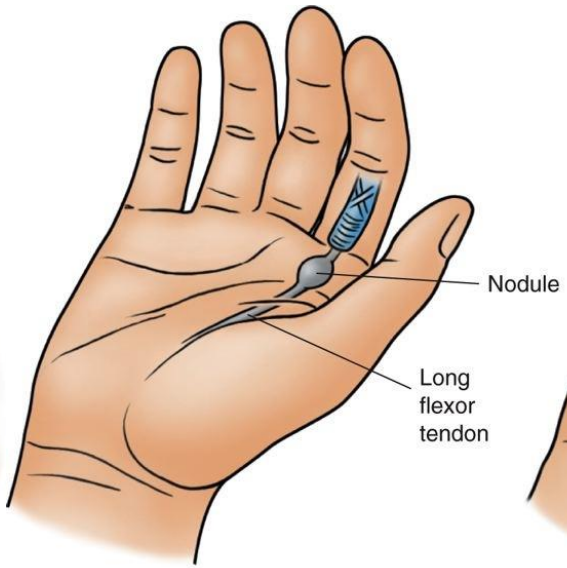


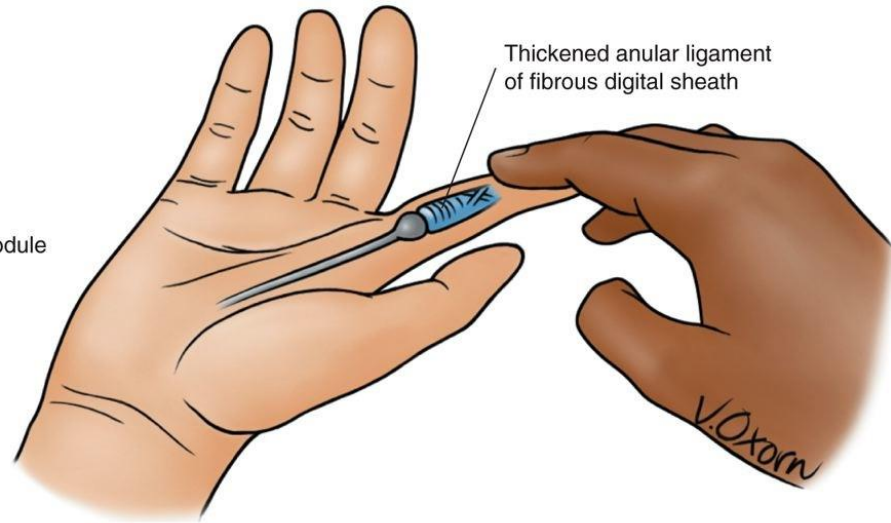


건 재활의학과 방아쇠수지 시술: 2009년 -2015년 1-2주 1케이스정도
현재는 하루 1-2케이스이상

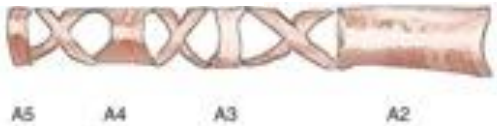
Trigger finger







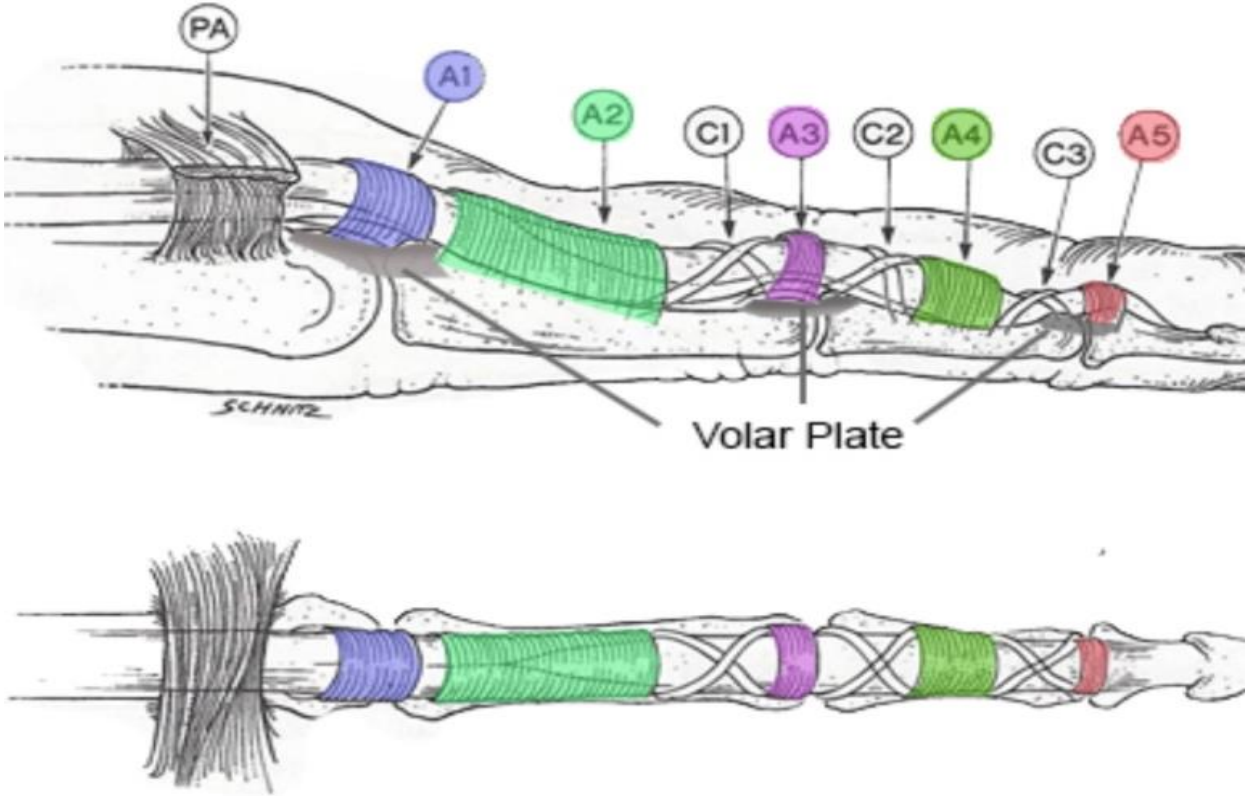
Digital tenovaginitis stenosans (Trigger finger)



Trigger finger classification(Quinnell)

*normal movement (Type 0),
*uneven movement (Type I),
*actively correctable (Type II),
*passively correctable (Type III)
*fixed deformity (Type IV).

Total active motion (TAM) method as advocated by the Committee for Tendon Lesions of the International Federation of Societies of Hand Surgery
A measure of hand range of motion in which the sum of the extension at the MCP, PIP, and DIP joints is subtracted from the total achievable flexion of the same joints.



- A2,4 most important in stability of finger : bond to shaft
- A2,4 injury will make bowstringing
- A1,3,5 lie upon MP, PIP, DIP joints

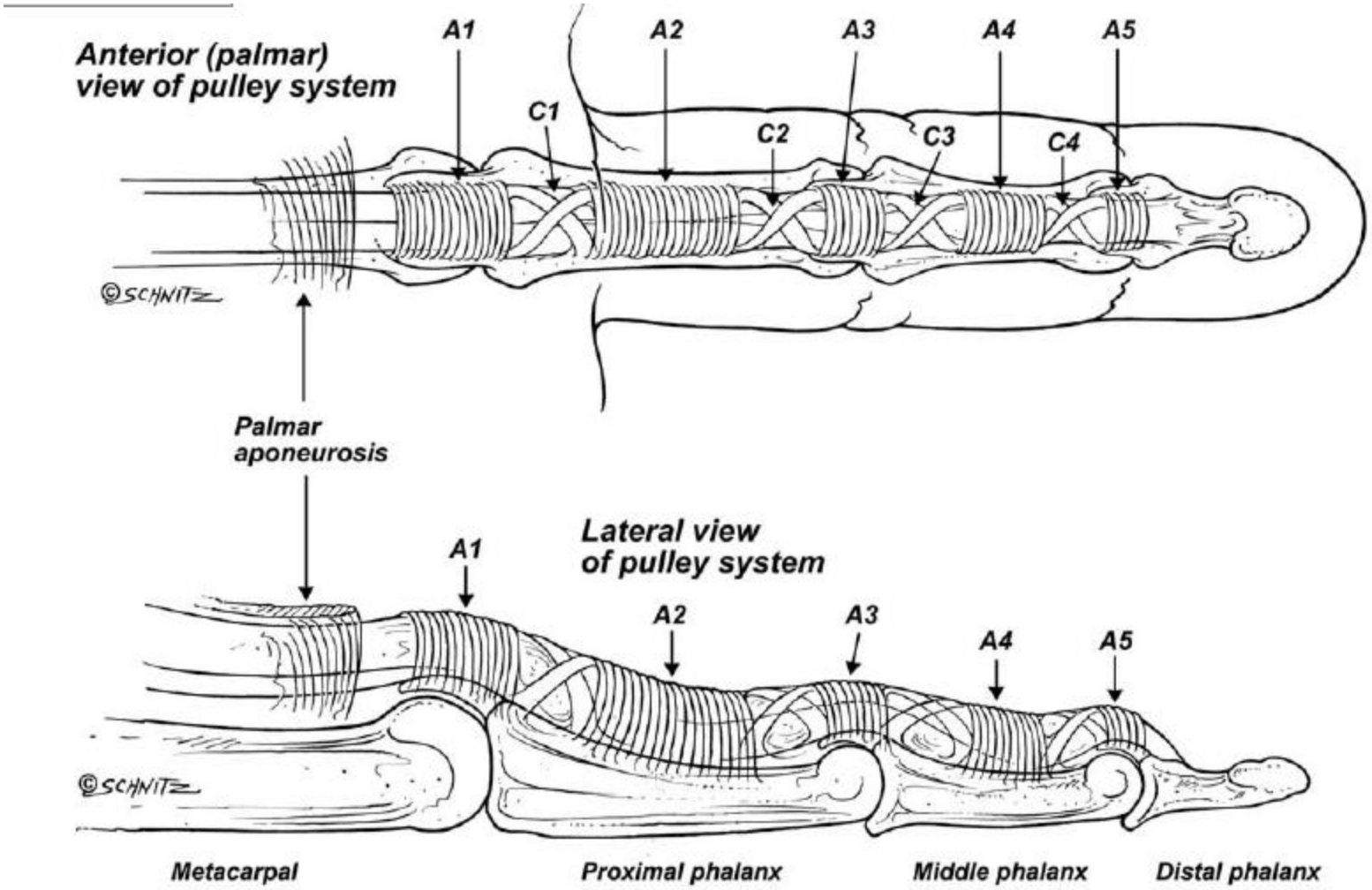
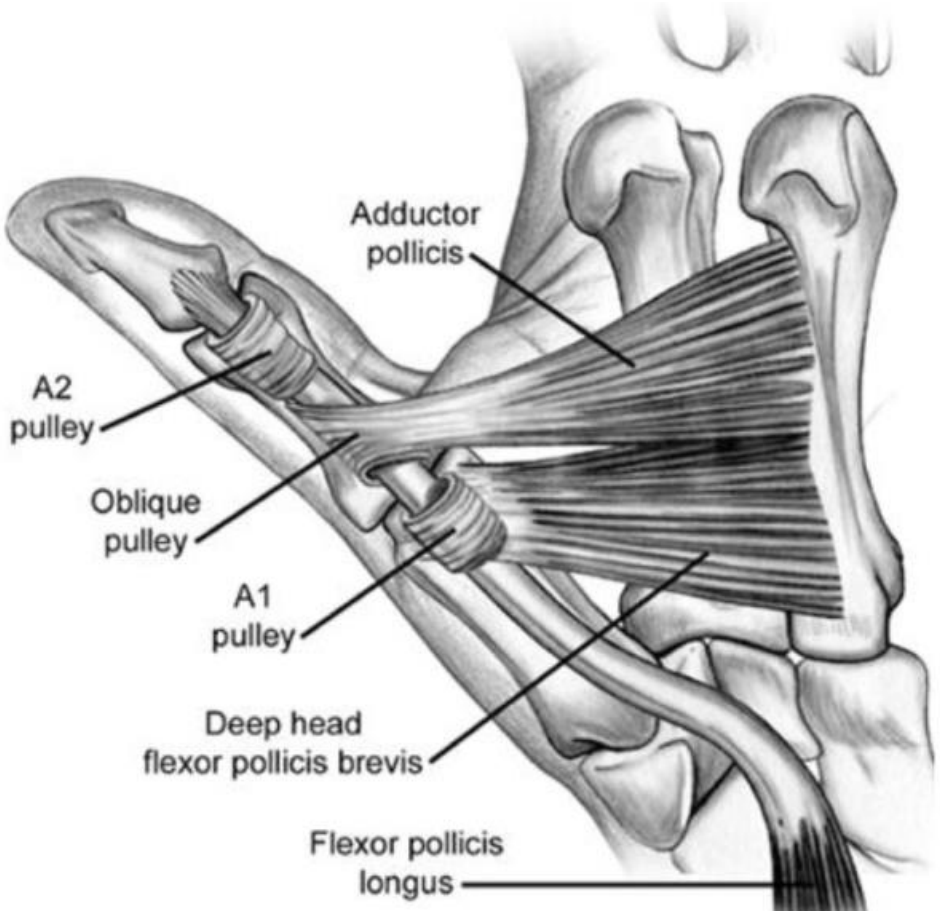
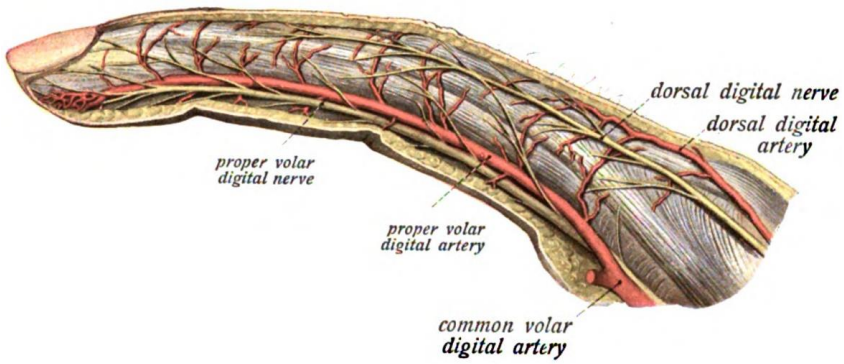
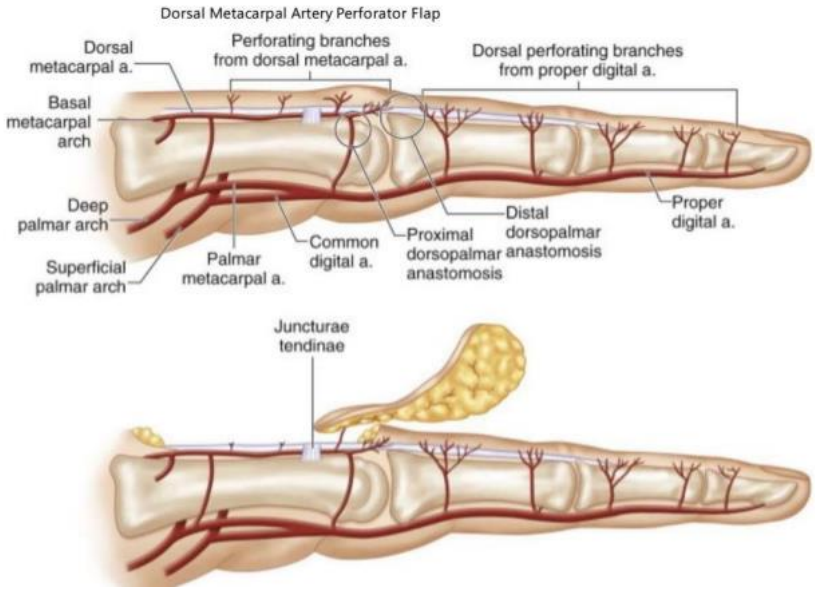


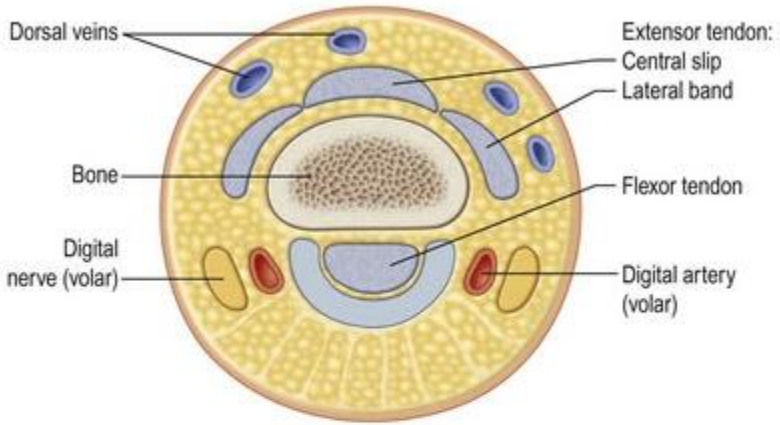
Figure 1. The digital pulley system of the fingers.

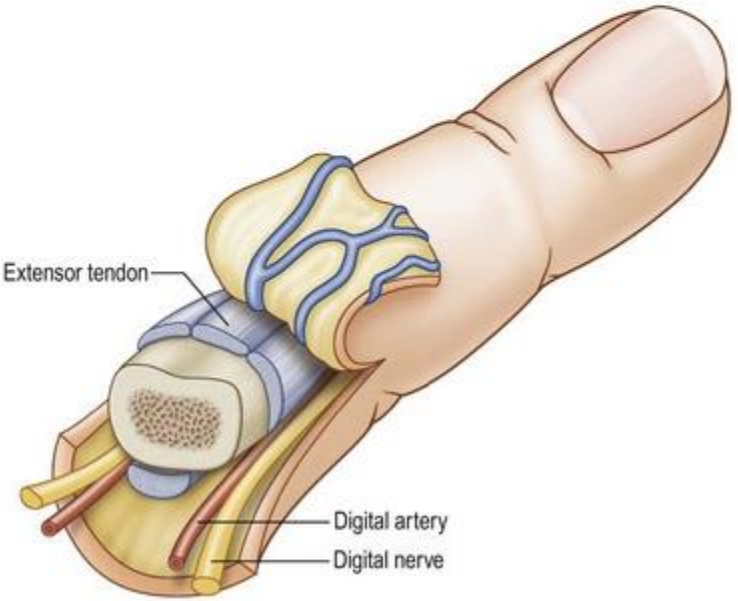


- Oblique pulley : originate proximal half of phalanx, prevent bowstringing of thumb
- Oblique pulley facilitate full excursion of FPL
- **We have to preserve Oblique pulley**

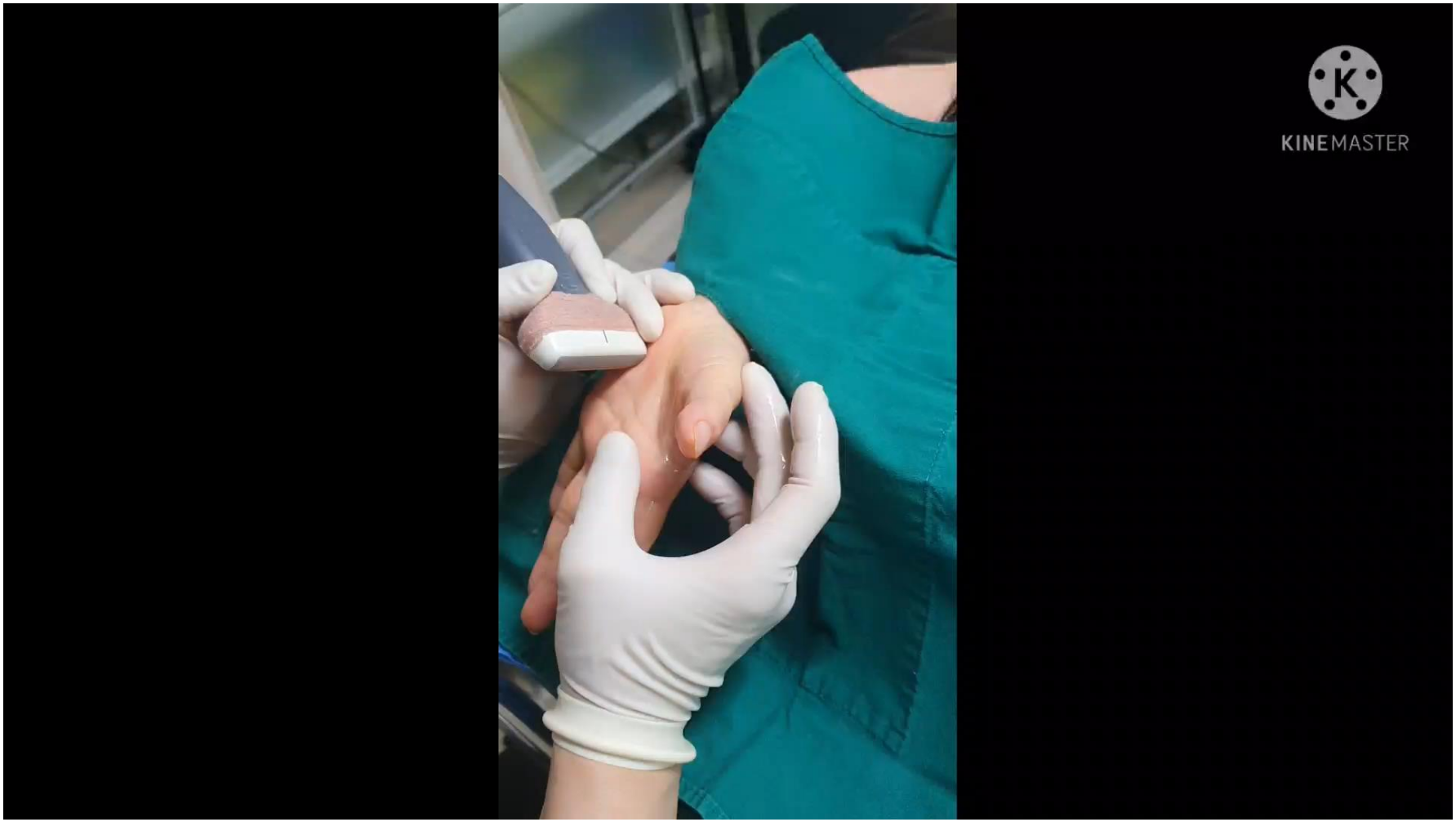

dorsal digital nerve
dorsal digital artery
proper volar digital nerve
proper volar digital artery
common volar digital artery


Dorsal Metacarpal Artery Perforator Flap
Dorsal metacarpal a.
Perforating branches from dorsal metacarpal a.
Dorsal perforating branches from proper digital a.
Basal metacarpal arch
Deep palmar arch
Superficial palmar arch
Palmar metacarpal a.
Common digital a.
Proximal dorsopalmar anastomosis
Distal dorsopalmar anastomosis
Proper digital a.
Juncturae tendinae

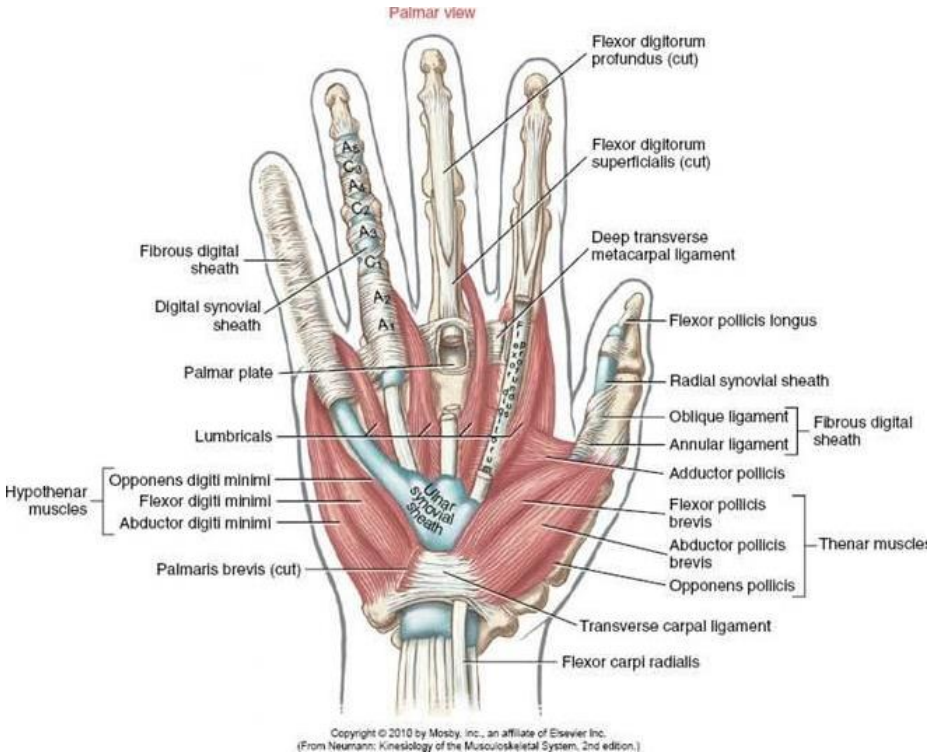

Cross section of digit
Dorsal veins
Extensor tendon:
Central slip
Lateral band
Bone
Flexor tendon
Digital nerve (volar)
Digital artery (volar)

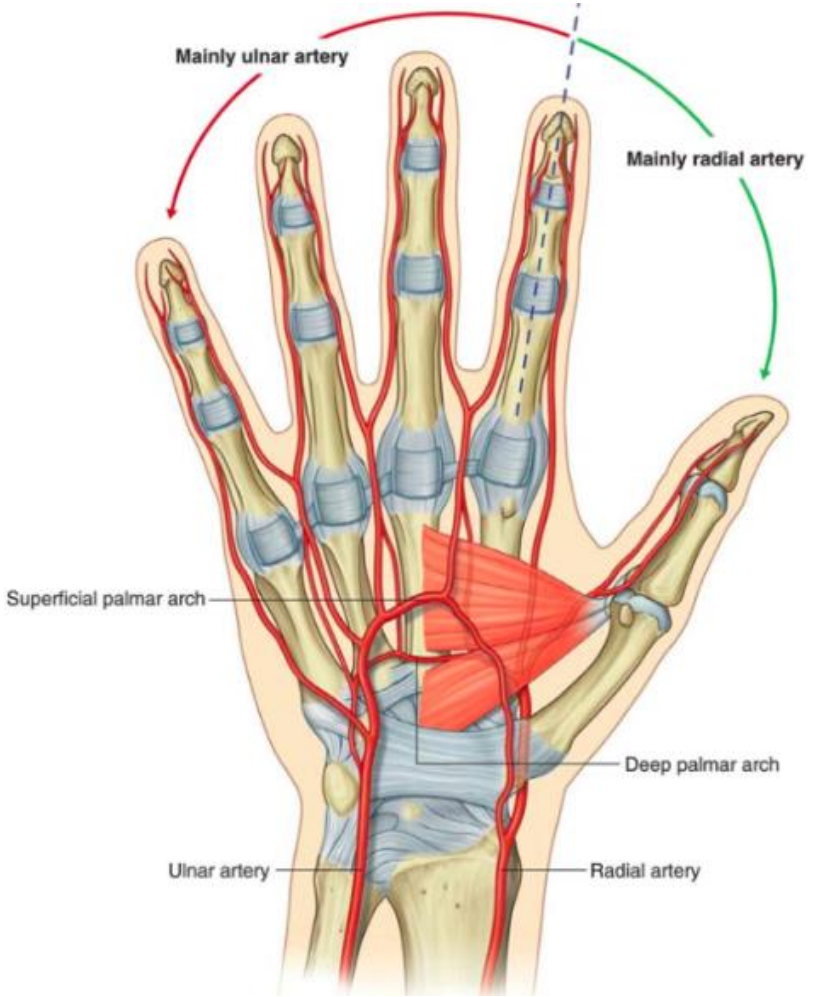

Extensor tendon
Digital artery
Digital nerve

KUN needle 시술 동영상



Thumb trigger finger





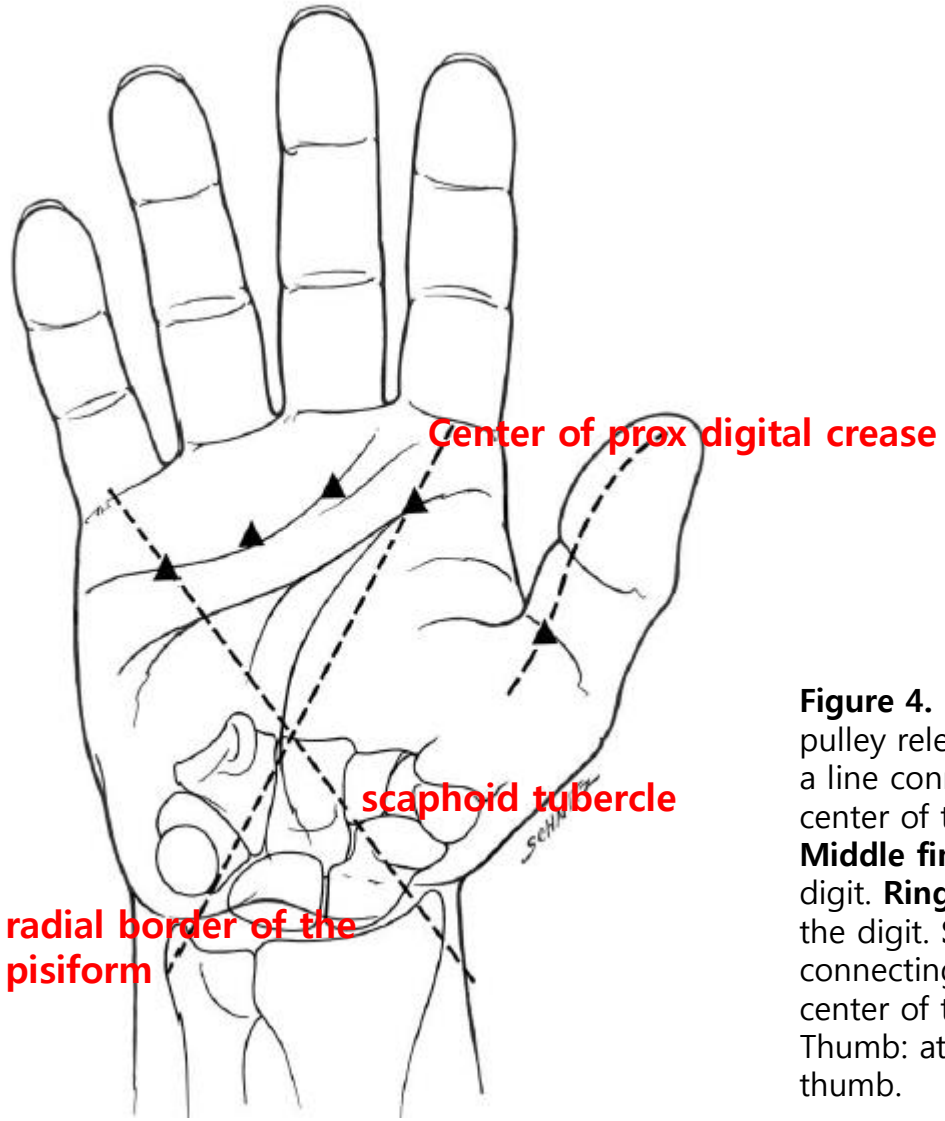
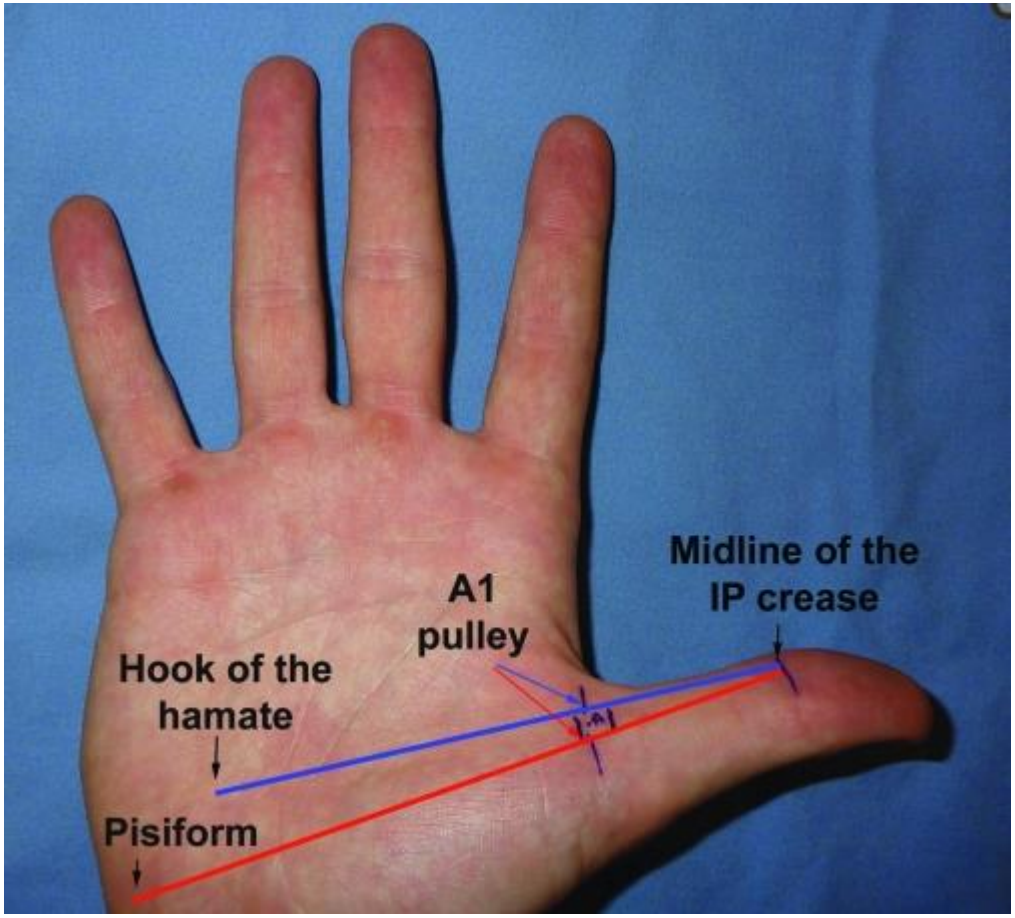


Figure 4. Use of surface landmarks for percutaneous A-1 pulley release. **Index finger**: at the proximal palmar crease at a line connecting the **radial border of the pisiform** and the center of the proximal digital crease of the index finger. **Middle finger**: at the distal palmar crease in the midaxis of the digit. **Ring finger**: at the distal palmar crease in the midaxis of the digit. **Small finger**: at the distal palmar crease at a line connecting the ulnar border of the **scaphoid tubercle** with the center of the proximal digital crease of the small finger. Thumb: at the proximal digital crease in the midaxis of the thumb.

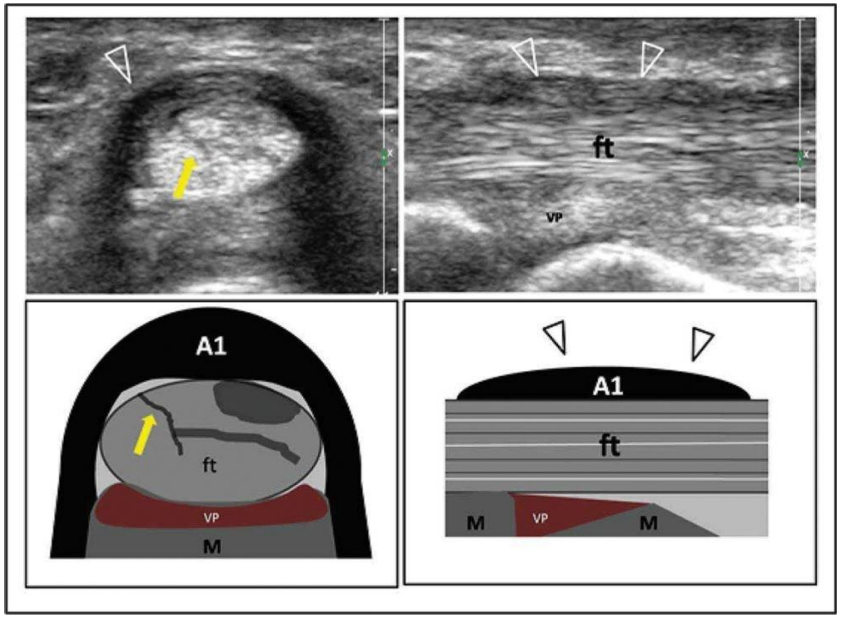
Safe Treatment of Trigger Thumb With Longitudinal Anatomic Landm

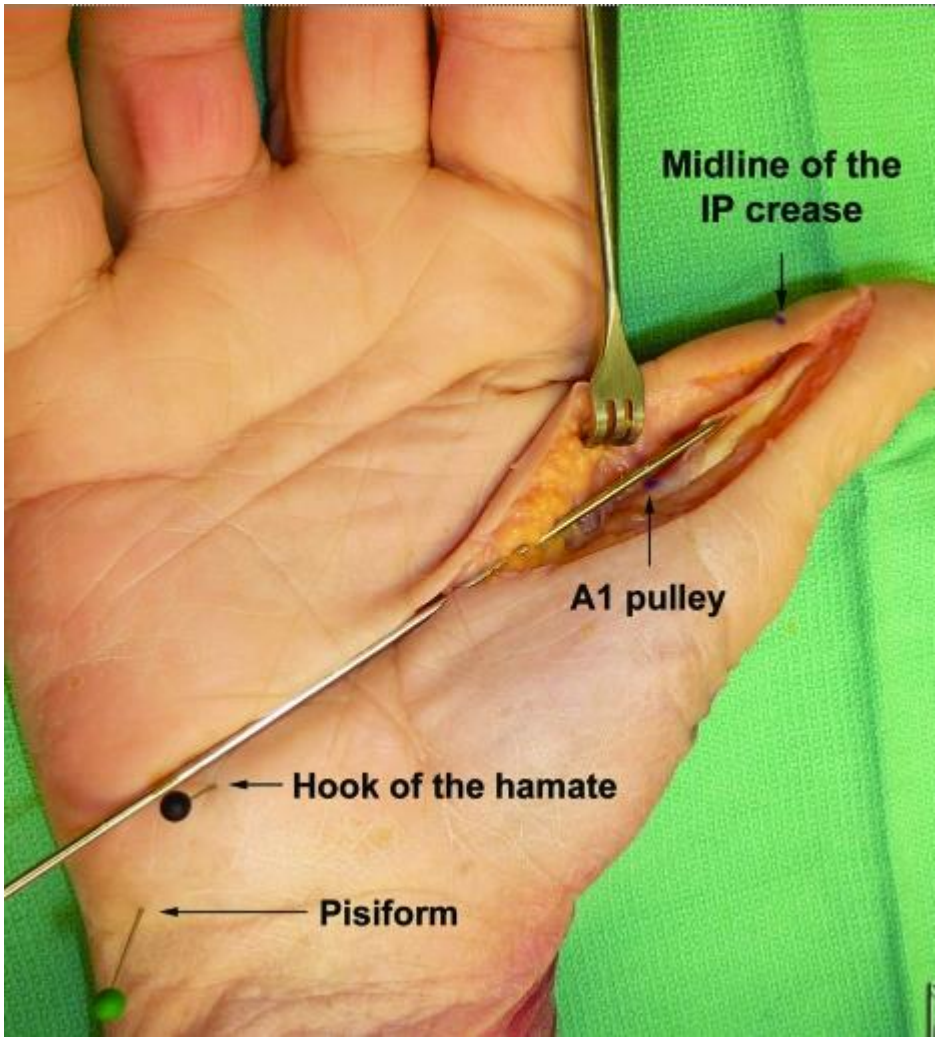
Ron Hazani, MD



Proposed longitudinal anatomic landmarks for the thumb A1 pulley

Thumb Trigger finger



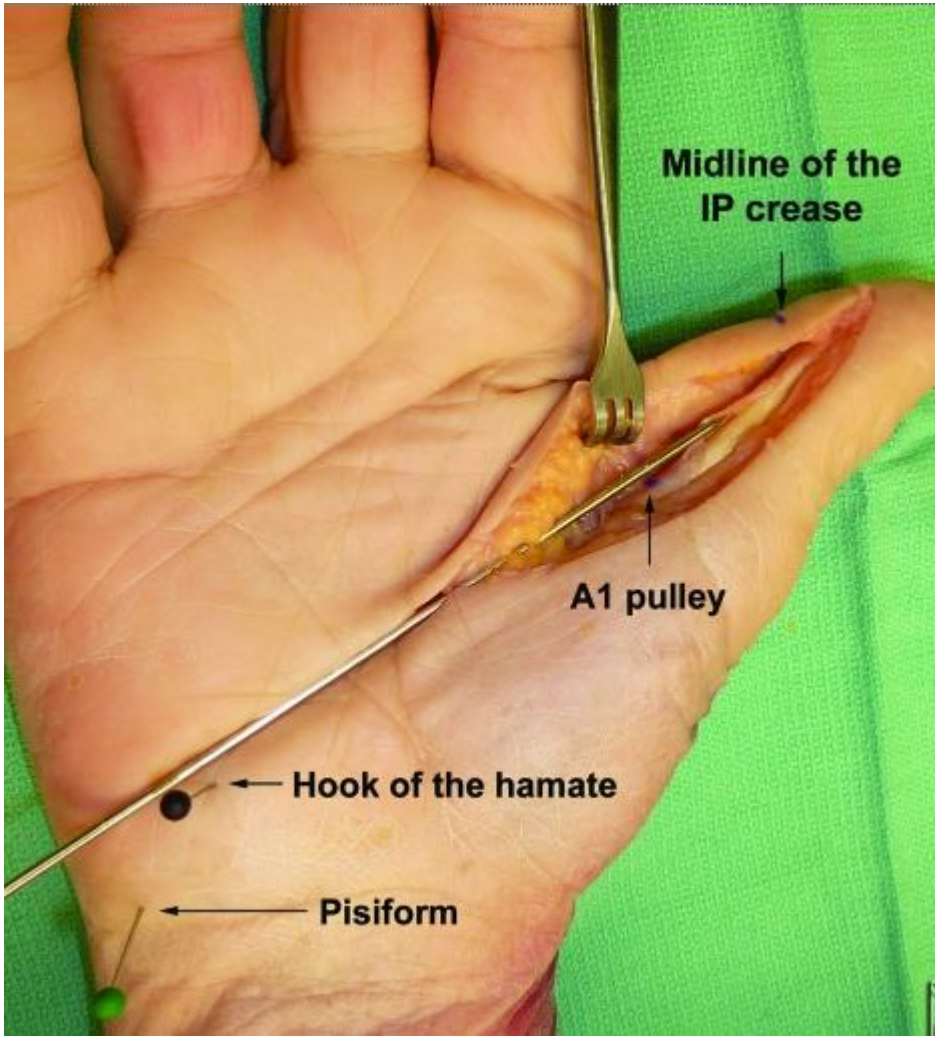


Fourteen fresh cadaveric hands Result

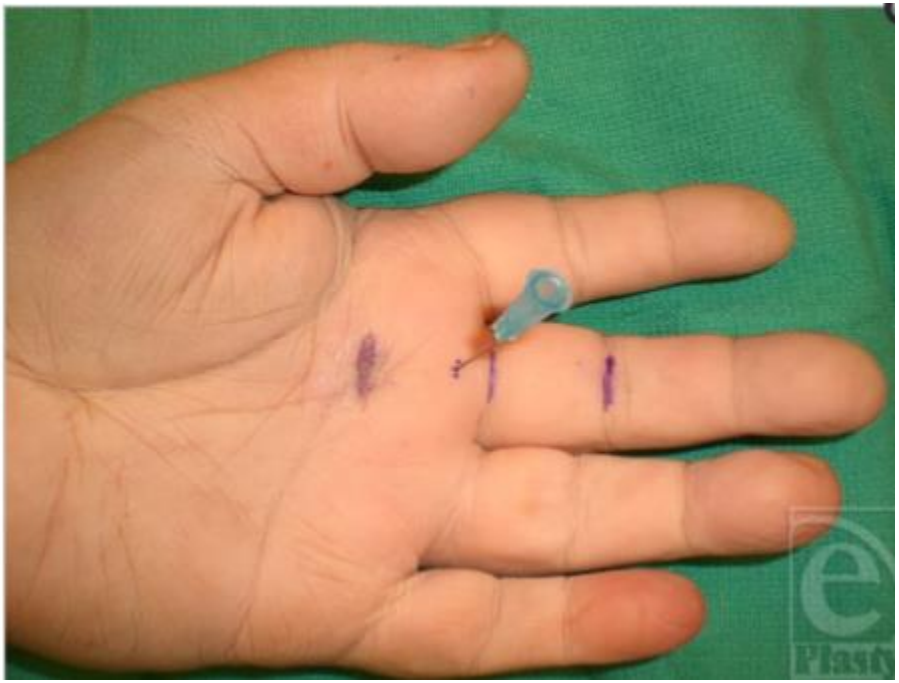
재활의학과

all cadaveric specimens, a longitudinal line from the midline of the thumb interphalangeal crease to the hook of the hamate corresponded to the flexor pollicis longus tendon at the A1 pulley

Transection of the A1 pulley along the course of our longitudinal line did not injure the neurovascular bundles.

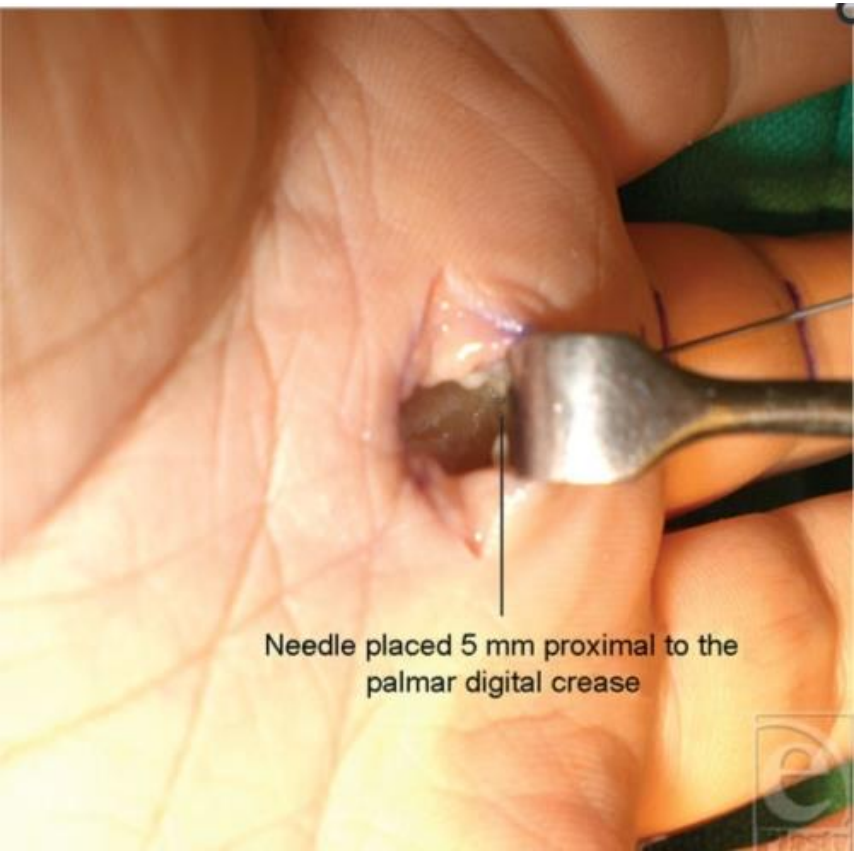


A longitudinal line from the hook of the hamate to the midline of the thumb interphalangeal (IP) crease marks the accurate location of the A1 pulley along the course of the flexor pollicis longus tendon.

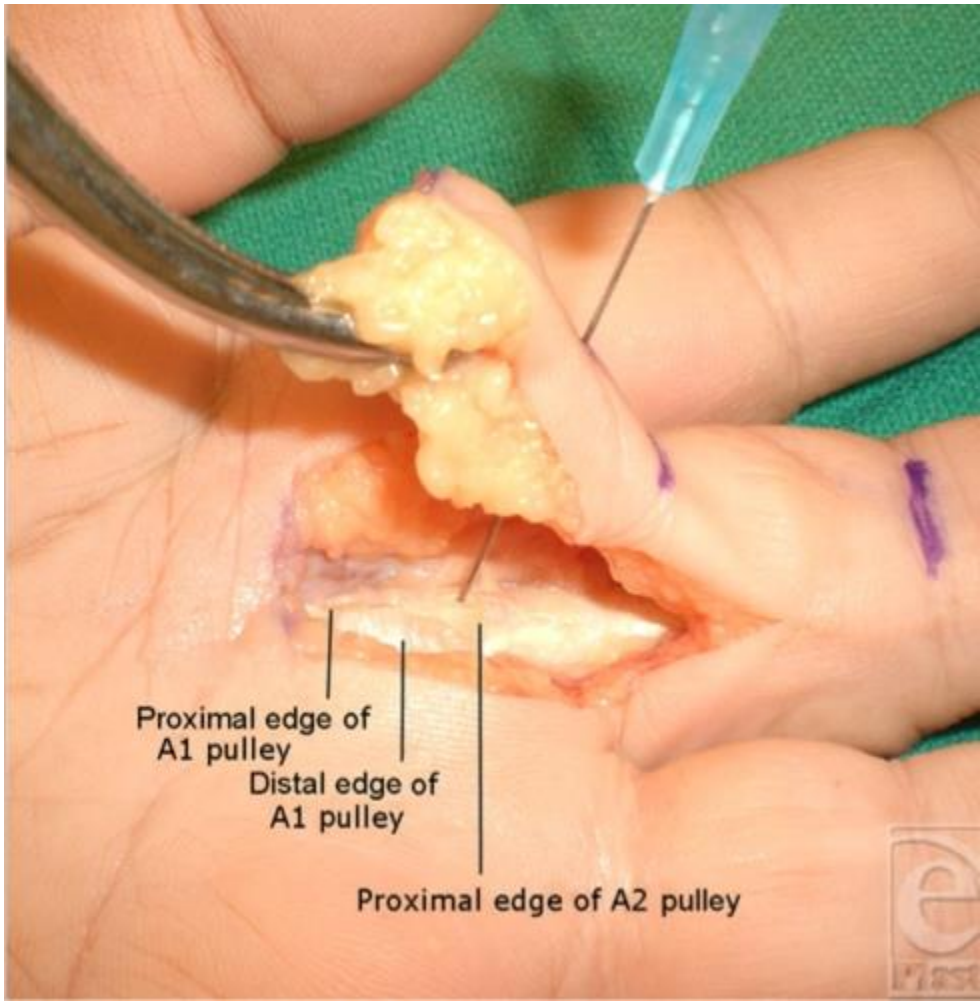


Placement of a 25-gauge needle at the distal edge of the A1 pulley

Percutaneous placement of a 25-gauge needle 5 mm proximal to the PDC marks the distal edge of the pulley and prevents injury to the A2 pulley

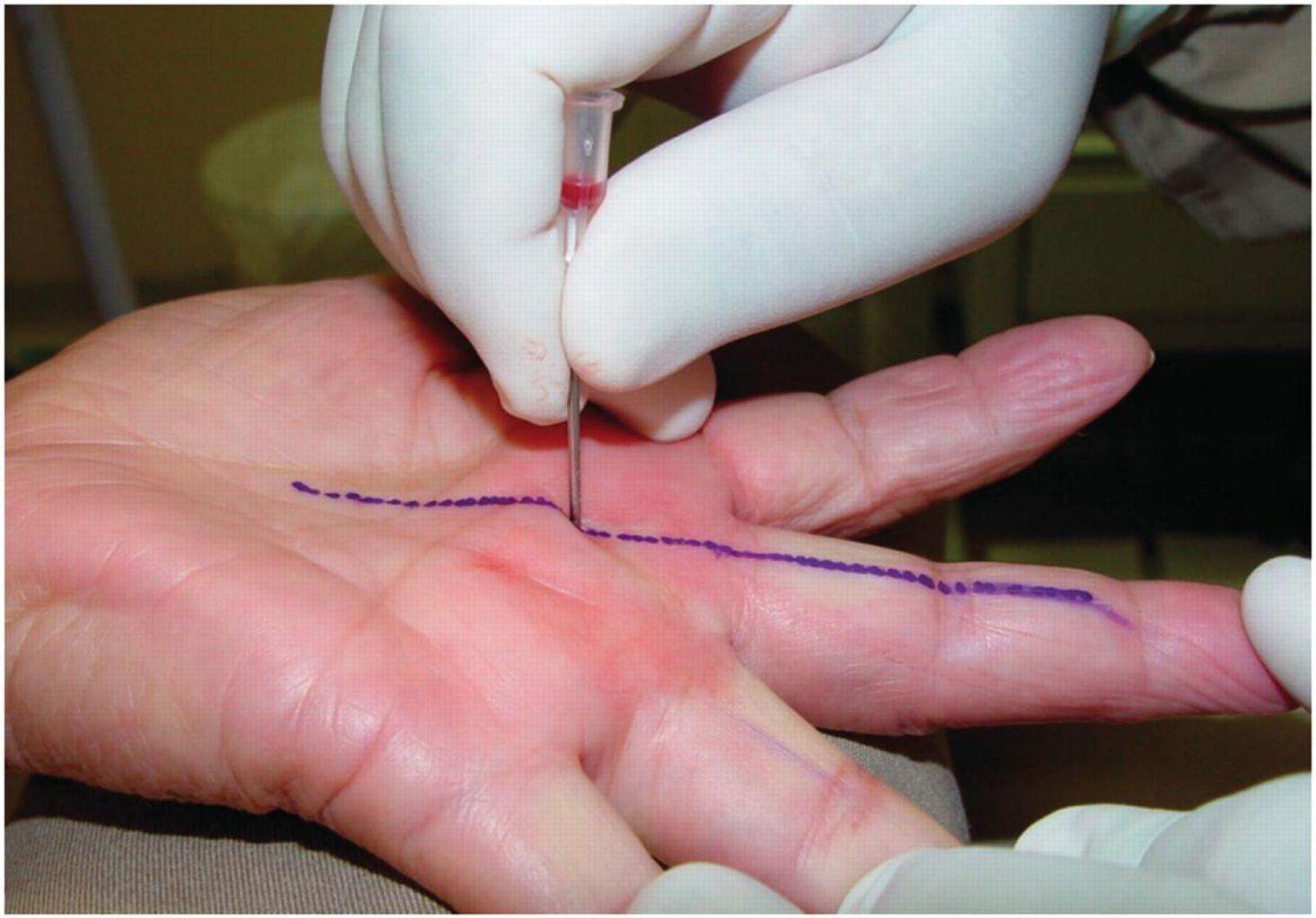


Percutaneous placement of a 25-gauge needle 5 mm proximal to the PDC marks the distal edge of the pulley and prevents injury to the A2 pulley



Exposure of the flexor sheath demonstrating complete division of the A1 pulley with preservation of the A2 pulley

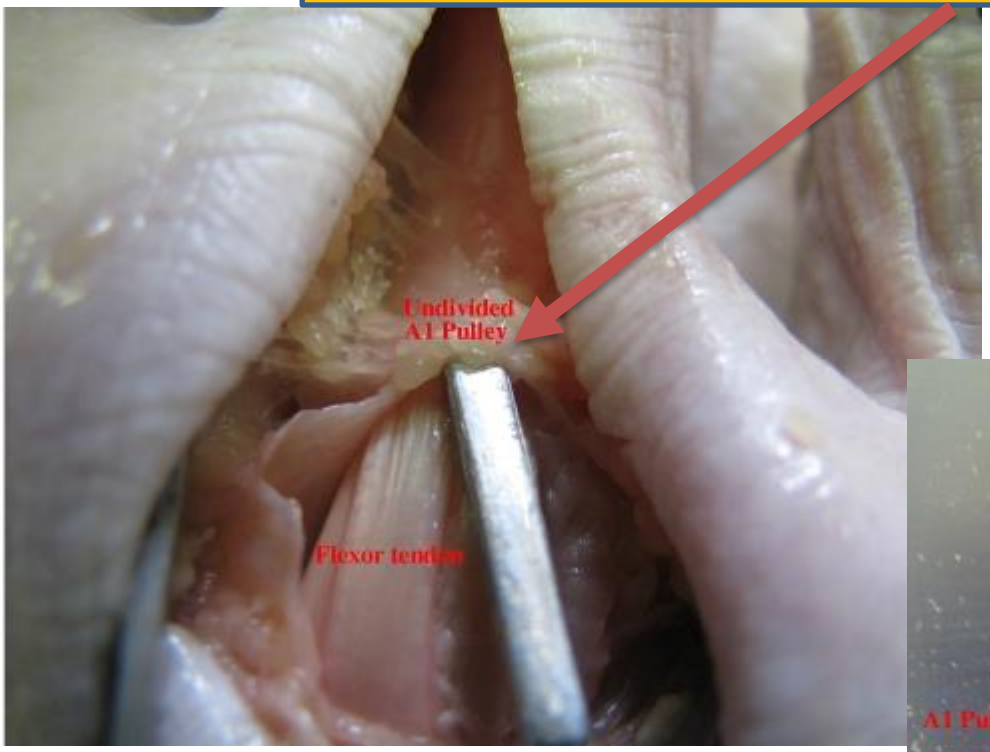
Percutaneous release.

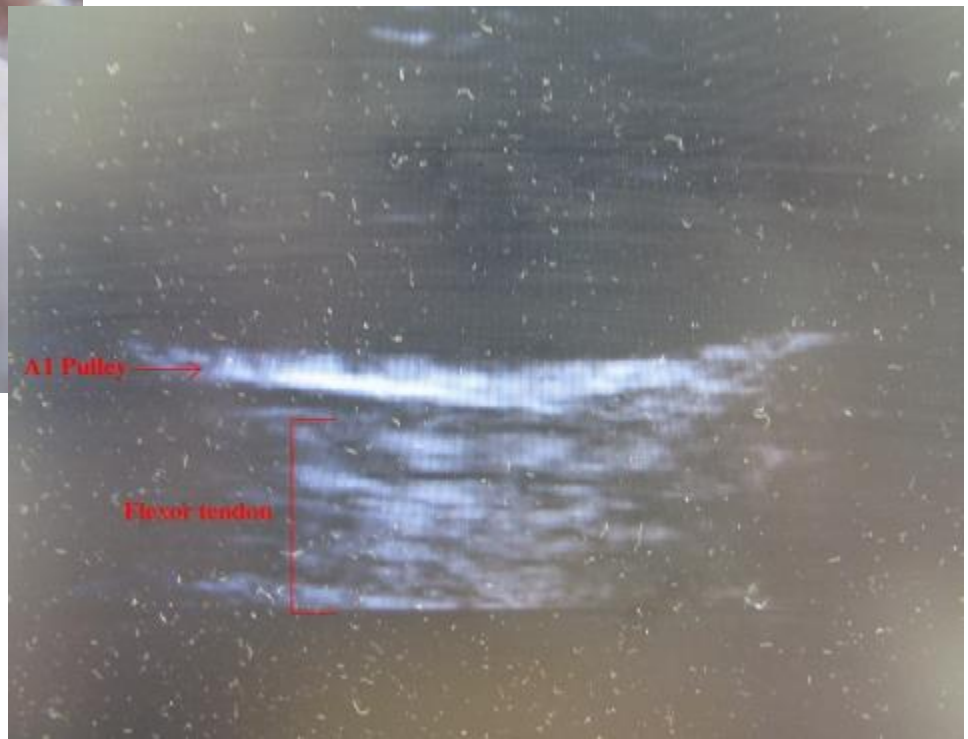


Sato E S et al. Rheumatology 2012;51:93-99

RHEUMATOLOGY

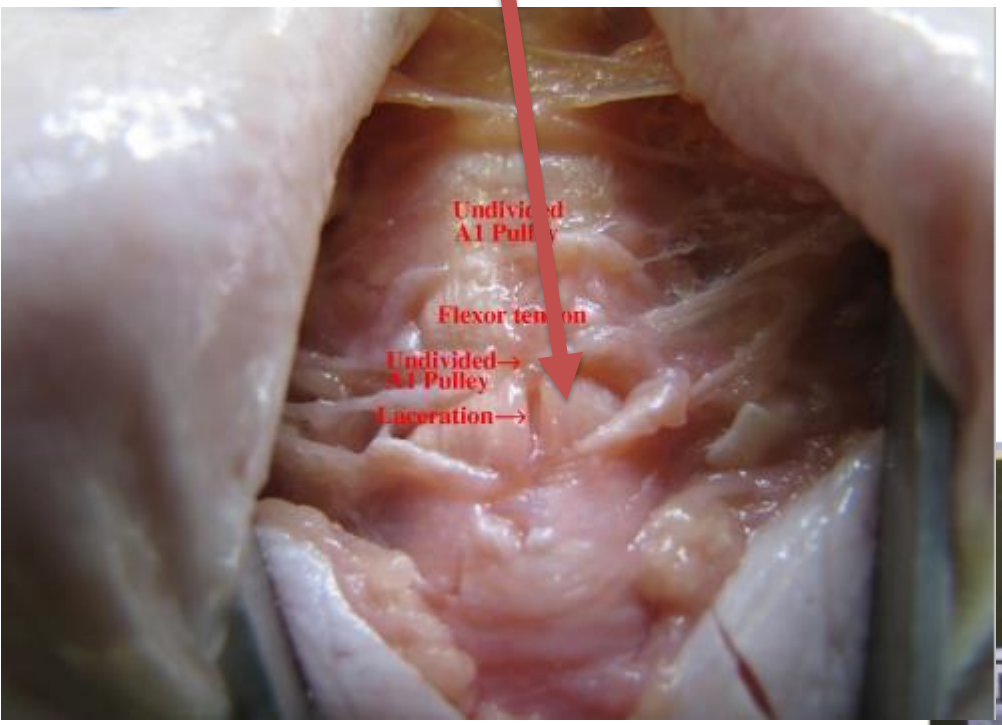
정확하지 않은시술로 계속 유착있는 도르레인대!!!





complete A1 pulley release was achieved in only three of the 18 fingers, with incomplete releases in the remaining 83%

긁어낸 시술로 주변조직이 상처입은모습!!



The subsequent open dissection showed lacerations of the flexor tendons in three out of 18 cases

Percutaneous Surgery: A Safe Procedure for Trigger Finger?

N Am J Med Sci. 2012 September; 4(9): 401–403.

PR returned to their **daily activities** **3 days**

control group(Op) took **7 days** **to return to their daily activities** (4-11 days).

KUN needle procedure : **1-2 days** for daily activities

Percutaneous Release, Open Surgery, or Corticosteroid Injection, Which Is the Best Treatment Method for Trigger Digits?

Hand
Clinical Orthopaedics and Related Research®
December 2012

Conclusion

The frequencies of treatment failure and complications were **no different between percutaneous release surgery and open surgery** for trigger digit in adults. Patients treated with percutaneous releases were **less likely to have treatment failure** than patients treated with corticosteroid injections

Fig. 1 A flow diagram summarizes the selection of studies, including numbers and reasons for excluding certain studies. RCT = randomized controlled trial.

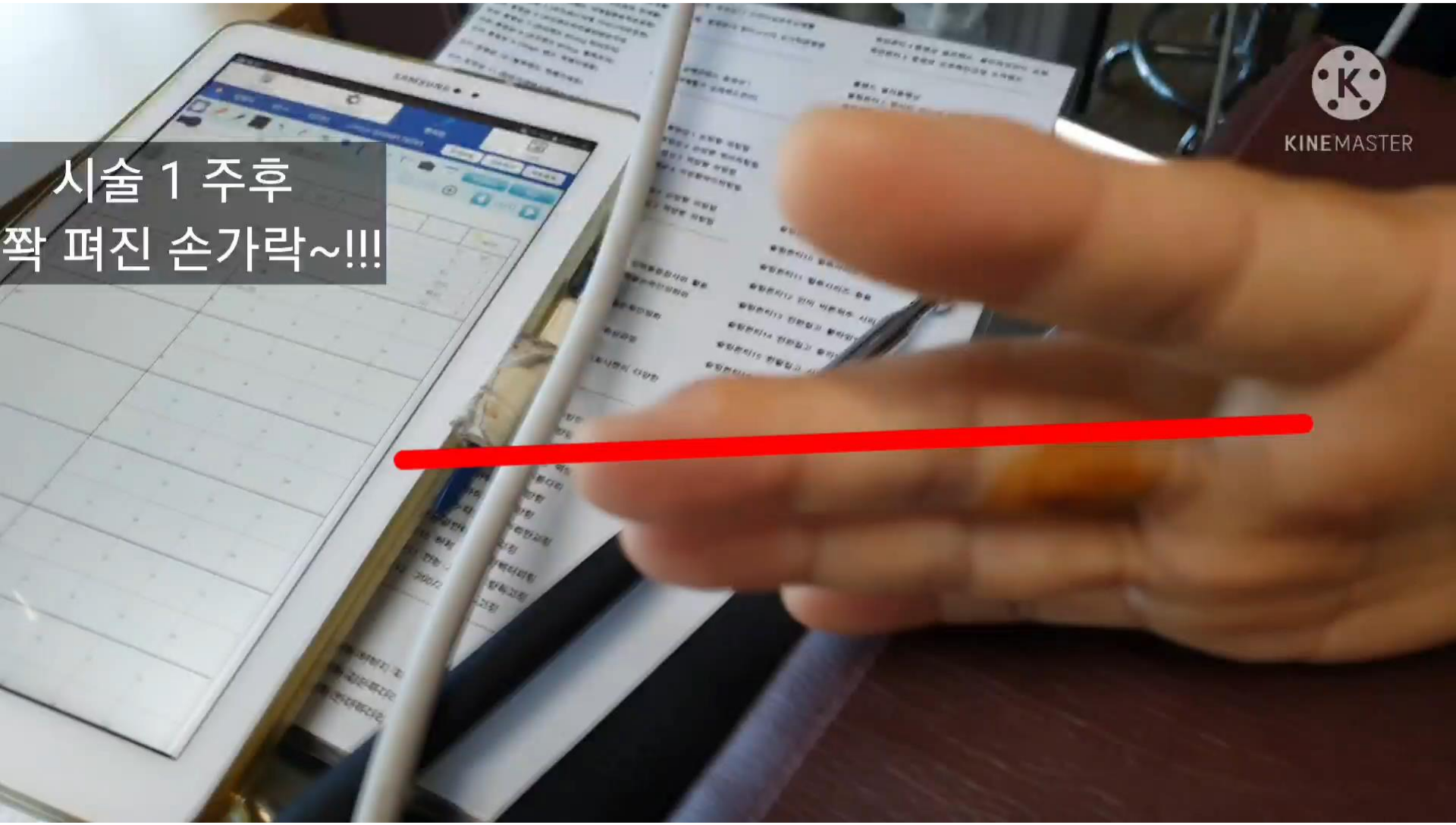
Sonographically guided intrasheath percutaneous release of the first annular pulley for trigger digits, part 2: randomized comparative study of the economic impact of 3 surgical models.

Rojo-Manaute JM

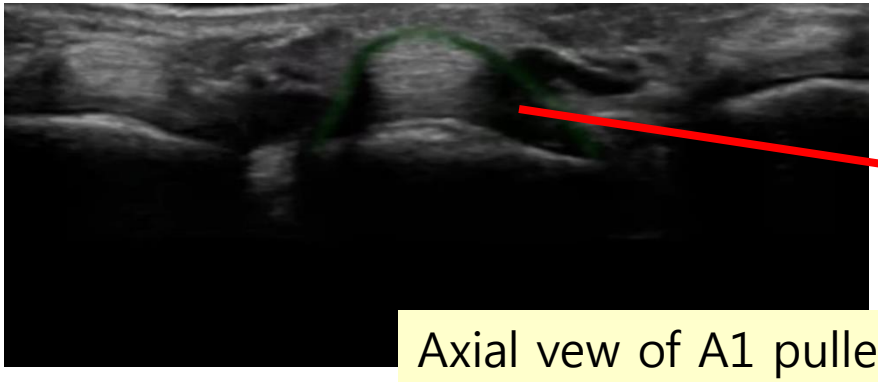
J Ultrasound Med. 2012 Mar;31(3):427-38

sonographically guided-office-based approach showed **shorter turnover times** and **better economic** results with a quick recoup of the costs of sonographically assisted surgery.

방아쇠수지 수술이후 유착된 환자 KUN needle로 치료증례

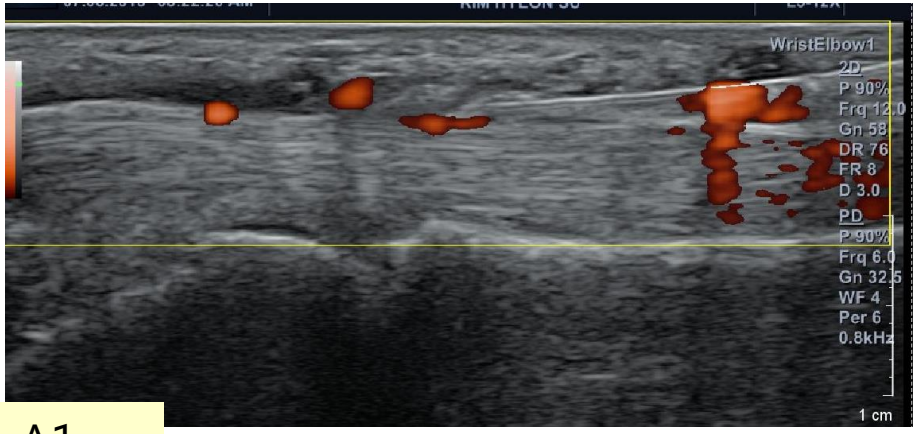


Percutaneous Sono guide release



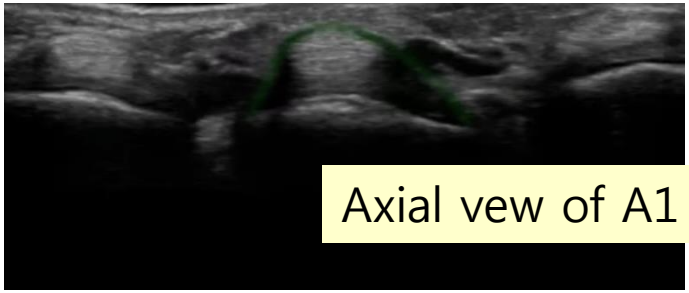
Hypoechoic tent like appearance
Bottom : volar plate

Axial vew of A1 pulley

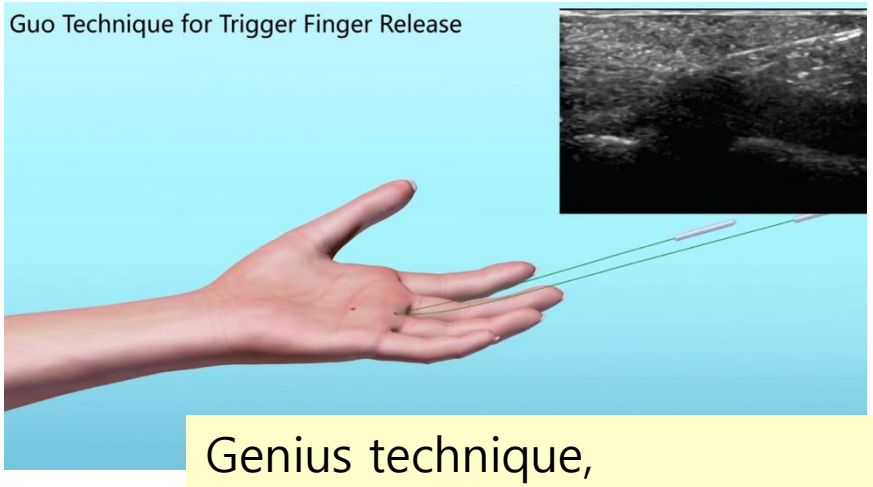


Trigger finger sono finding : A1 pulley hypoechoic, h/vascularity

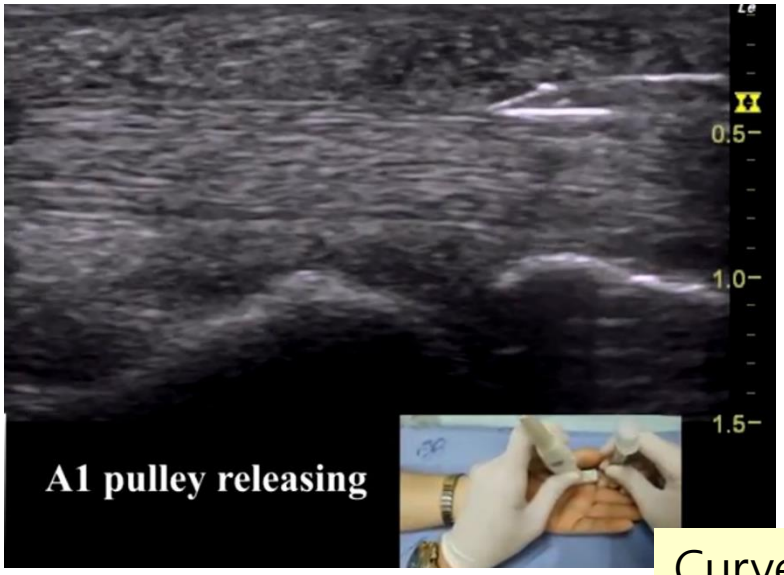
Percutaneous Sono guide release



Axial vew of A1 pulley

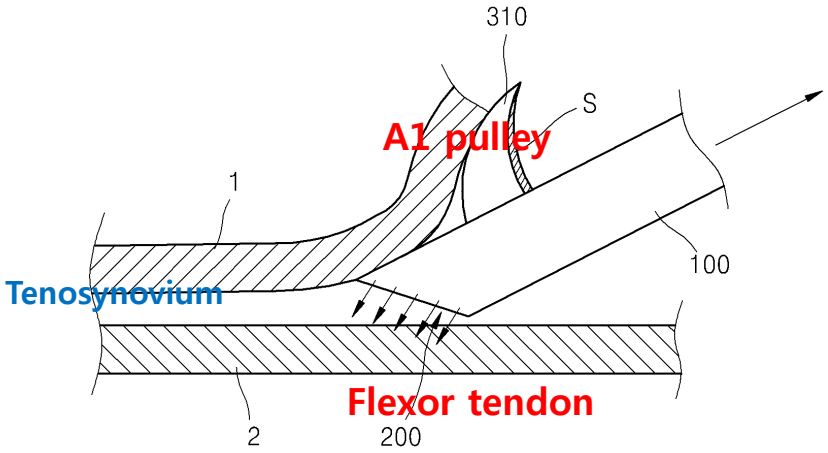


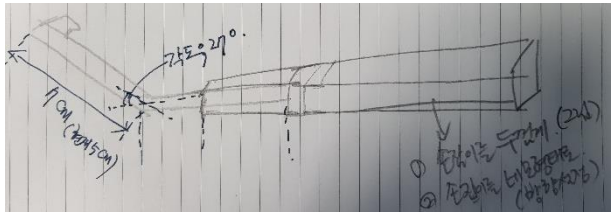
Genius technique,
expensive/contamination chance



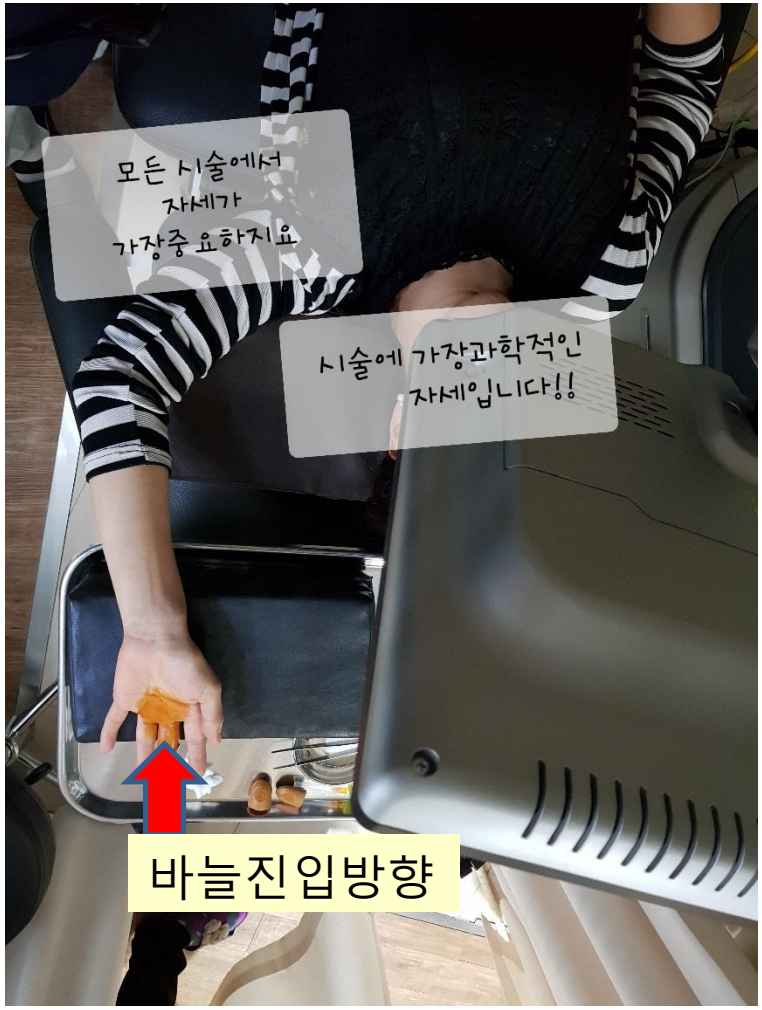
Curved needle incision

- **1단계** : 26G needle **sono guide dissection** with epi-lidocaine(2% lido 20cc + epinephrine 0.1ml) 2cc + 15% dextrose prolo10cc
- **2단계** : **sono guide A1 pulley excision**.





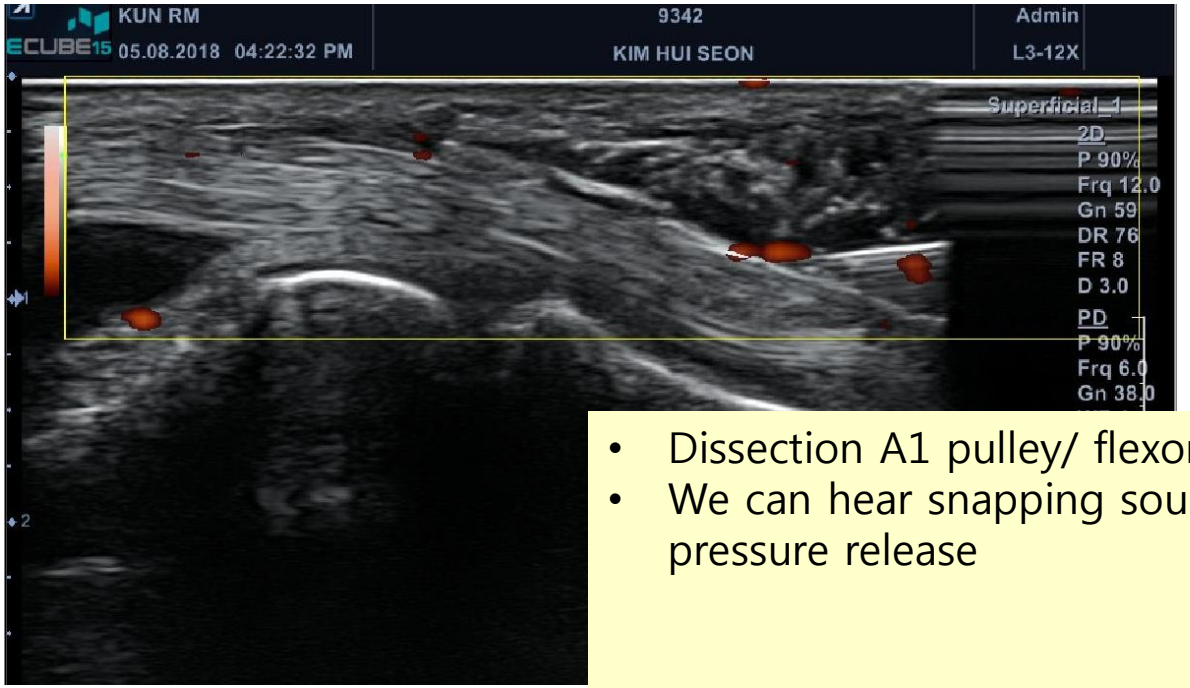
KUN's Posture!!



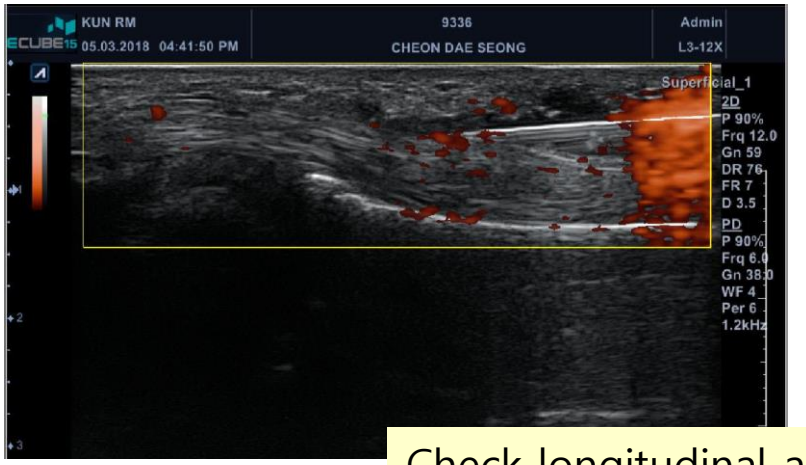
- Compotable for Pts and physitian
- Easy to see monitor
- Easy to cut
- **Can go through safty zone (Especially Thumb case)**
- Easy to go next procedure (PIP)

Injection site also very important

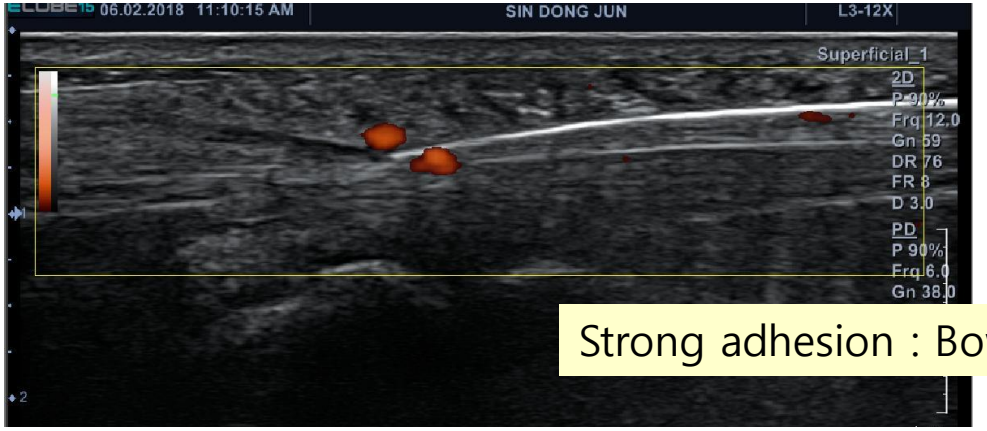
- Reduce infection chance
- Easy to bleeding control
- Easy to dissecting A1 / Flx DL
- Appropriate angle reach to A1 distal edge



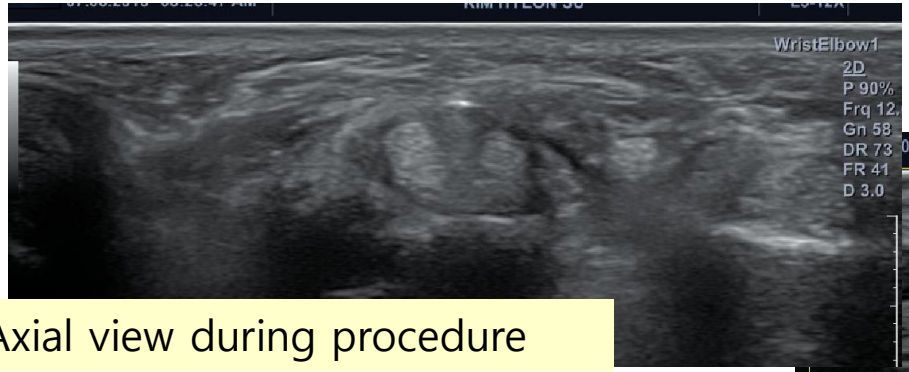
- Dissection A1 pulley/ flexor DL
- We can hear snapping sound of water pressure release



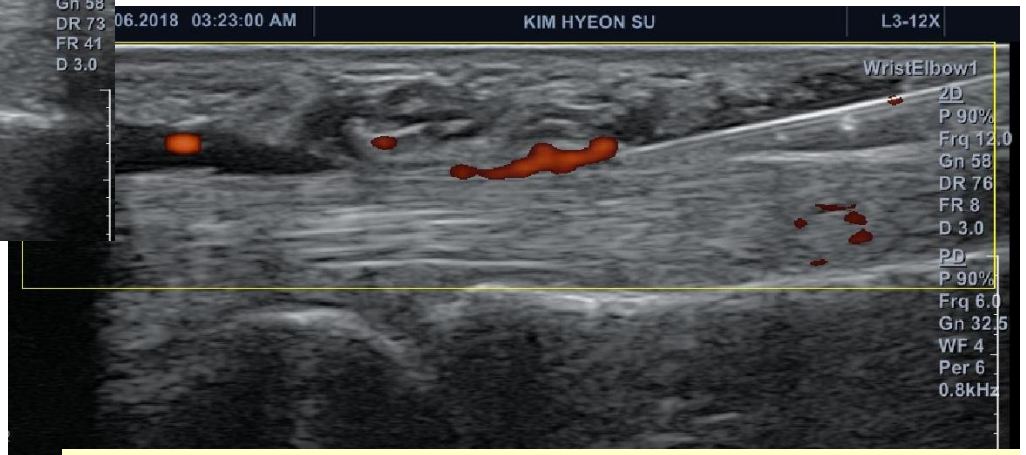
Check longitudinal and axial image in all procedure course



Strong adhesion : Bowed needle



Axial view during procedure



KUN needle A1 excision

방아쇠수지 초미세 SBN 시술소개

재활의학과

Complications of open trigger finger release.

Will R, Lubahn

J Hand Surg Am. 2010 Apr;35(4):594-6. doi: 10.1016/j.jhsa.2009.12.040. Epub 2010 Feb 26

major complications

- **synovial fistula** that required excision,
- **proximal interphalangeal joint athrofibrosis** that required cast application for pain relief
- complication rate was 3% per trigger release (2/78).

Minor complication

- minor complication rate was **28%** (22/78) : decreased **range of motion, scar tenderness, pain, and wound erythema**. : **surprising high**
- combined complication rate for these primary interventions was 31% (24/78).

재활의학과

Keloid formation after trigger finger release: A case report.

Tada K, Suganuma S,

J Plast Reconstr Aesthet Surg. 2012 Nov 19. pii: S1748-6815(12)00615-8. doi: 10.1016/j.bjps.2012.10.014. [Epub ahead of print]

- A 58-year-old male with trigger finger of the right index, middle and ring fingers was treated with open release
- Three months after this operation, a progressively enlarging skin lesion formed at the surgical site.
- keloid excision with full thickness skin graft and postoperative radiation therapy was done

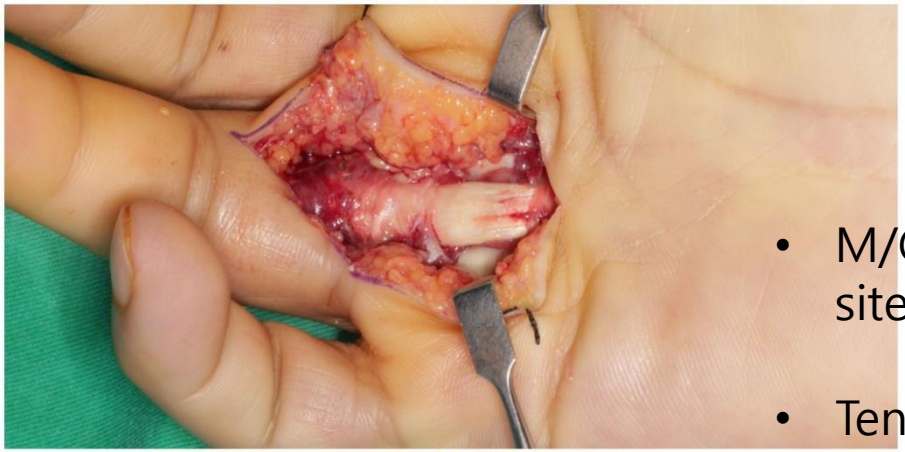
Neuroma of the radial digital nerve of the middle finger following trigger release.

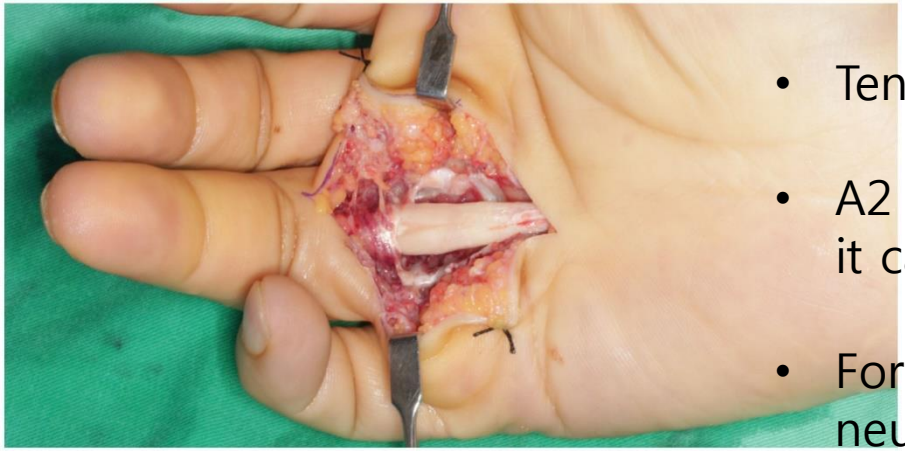
Sreedharan S

Hand Surg. 2011;16(1):95-7

- potential complications is digital nerve injury. Though uncommon, digital nerve injury can be significantly symptomatic to the patient
- radial digital nerve neuroma formation following trigger release

INFECTION with Incomplete incision

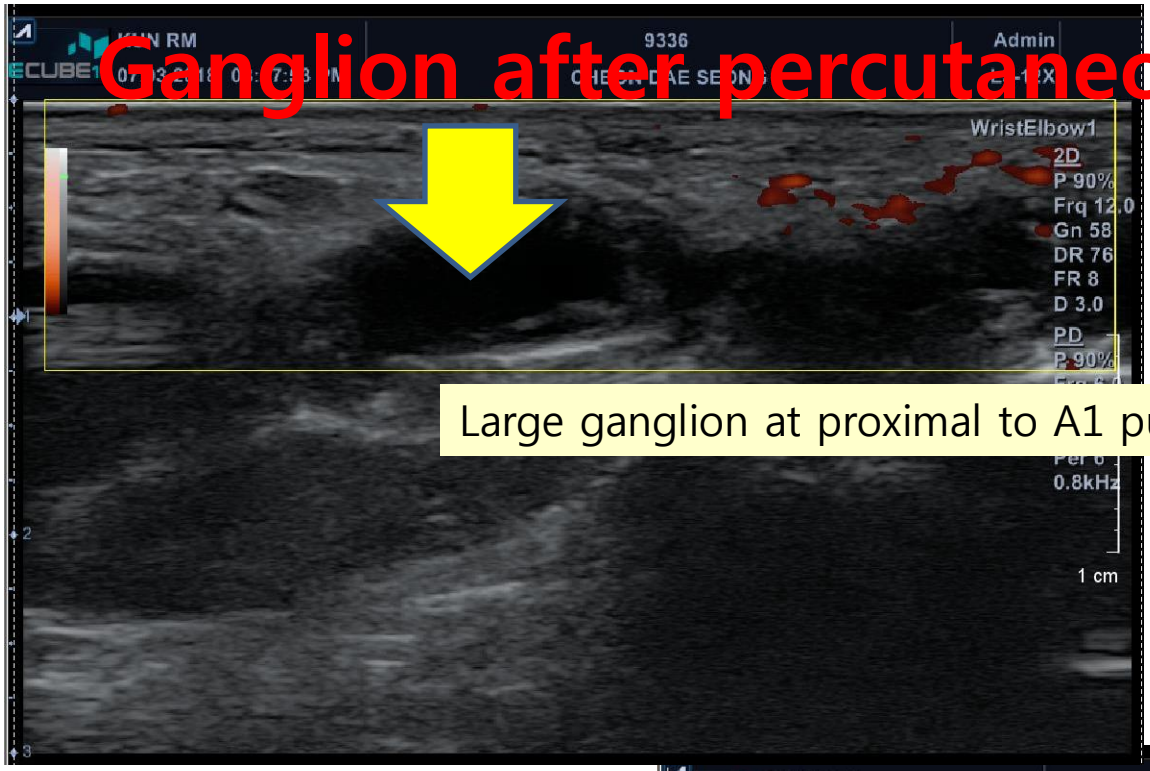




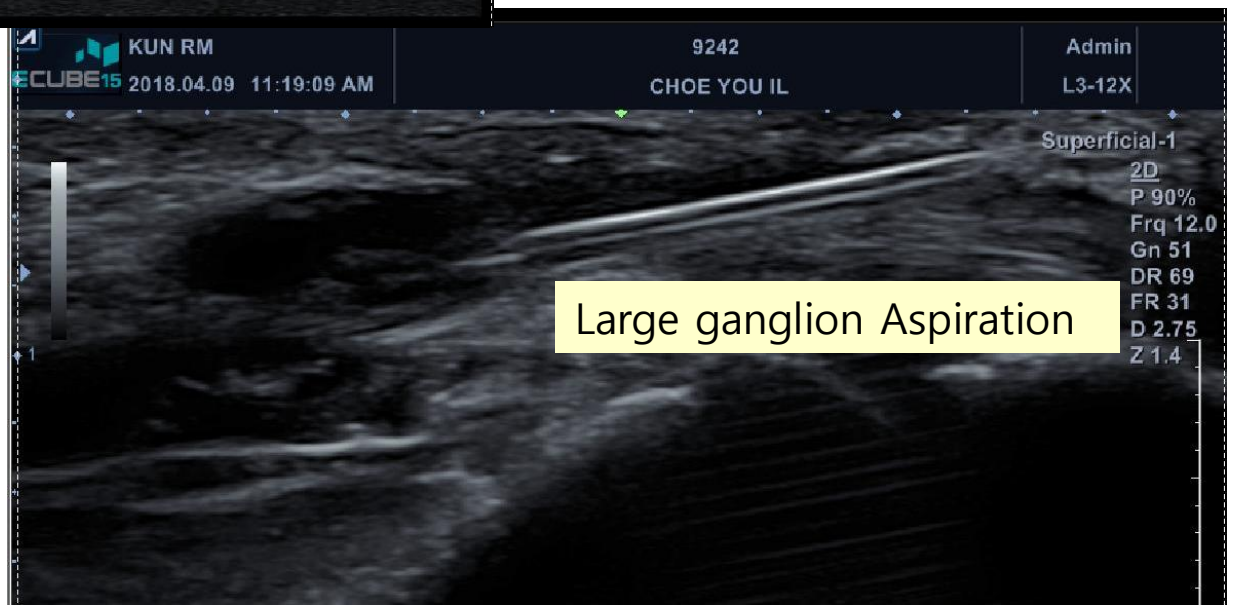
- M/C Sweat infection on Needle insertion site
- Tendon injury make worsen
- Tenosynovitis control is important
- A2 pressure increase after A1 release → it can make effusion
- Forearm fascia rehab, GOODband neuromuscular eccentric rehabilitation is good for Tx and other finger prevention

Ganglion after percutaneous release

재활의학과



Large ganglion at proximal to A1 pulley



Large ganglion Aspiration

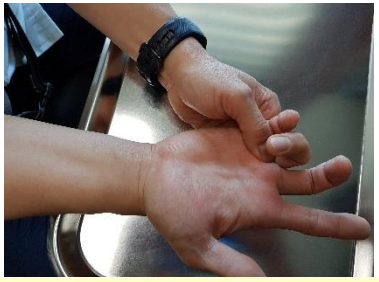
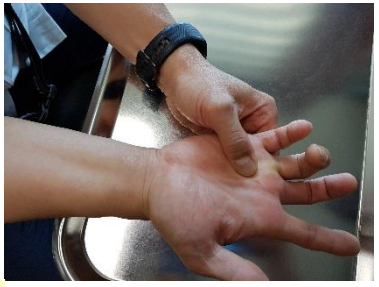
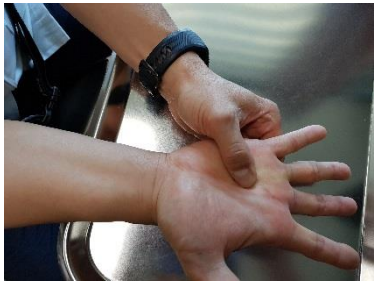
방아쇠수지 수술이후 유착된 환자 초미세 SBN 치료증례

방아쇠수지 Quinnell 1,2 의 치료및 다른손가락 발생예방에 좋은 자가재활법

Rehab program for trigger finger



3rd finger A1 functional friction technique

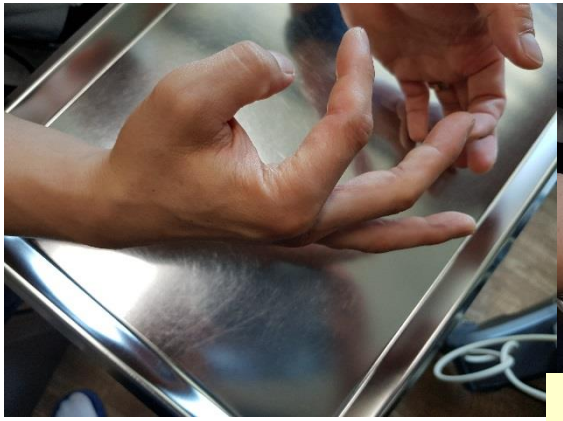




4th finger A1 functional friction technique



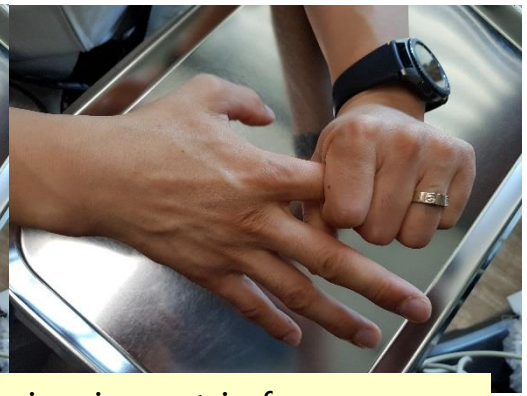
Thumb A1 functional friction technique

Rehab program for trigger finger



PIP j line press→ traction effect

바닥마찰로 당기기: traction, ossilation



J line 감싸쥐고 꽉쥐고 → traction, ossilation → PIP extension isometric force

Rehab program for trigger finger

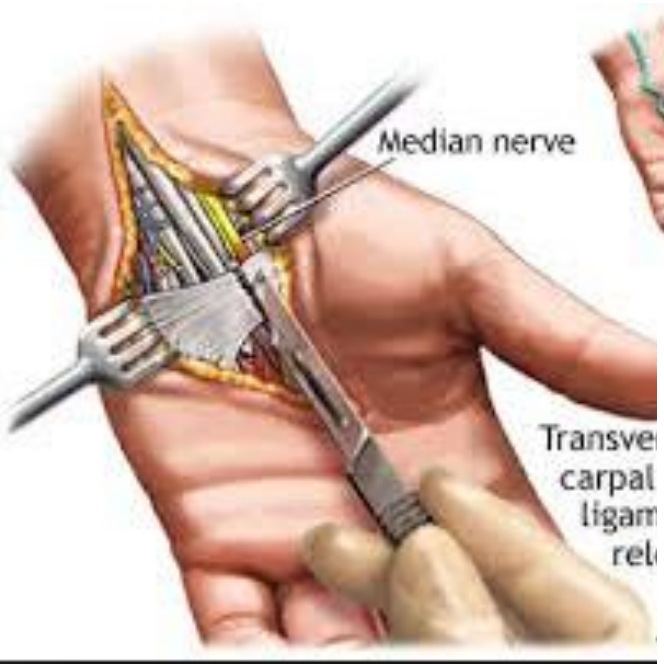


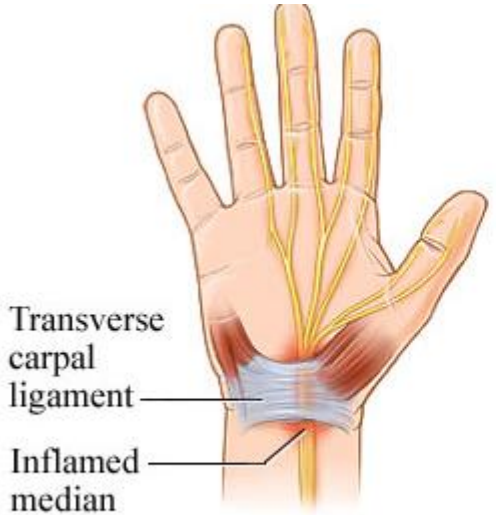
손목굽힌상태에서 젖히면서 손가락벌리기 : Extension strengthening → flexor tunnel and tendon neutralization

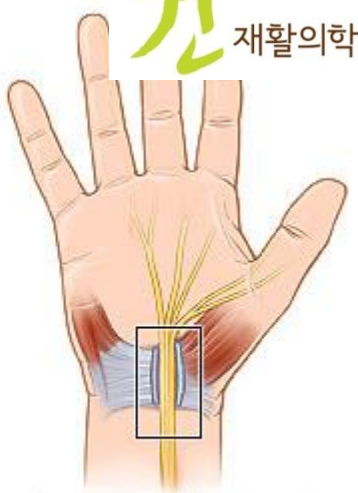

탄성밴드로 PIP 단단히 감아쥐고(traction,ossilation) → extensional force (PIP 관절가동술)

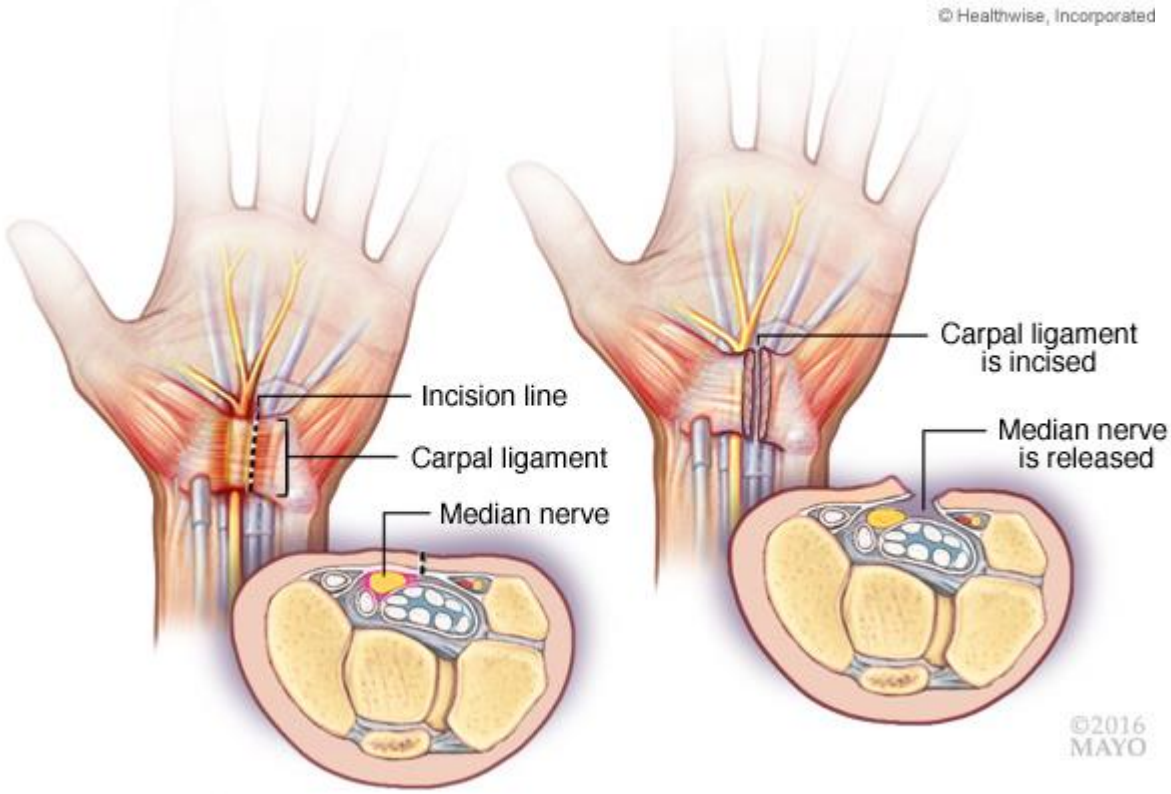

탄성밴드로 몸통을 둘러메고 손가락 full extension 해서 flexion force주는 훈련

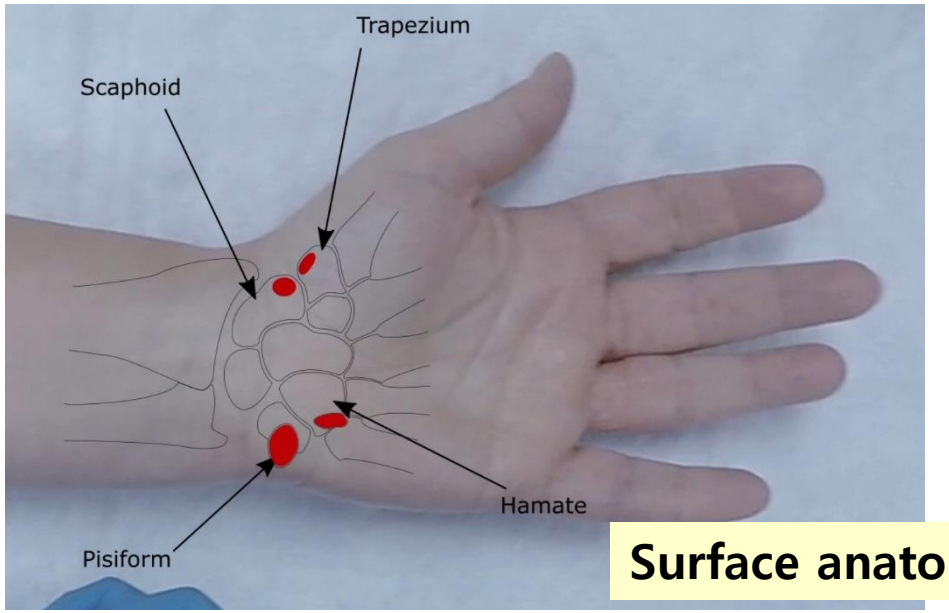
CTS operative Tx



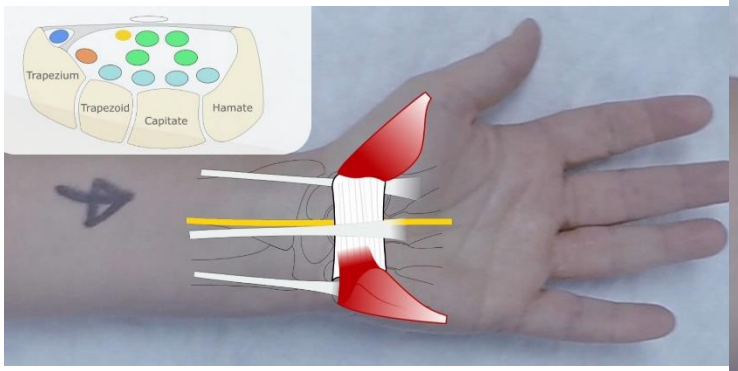


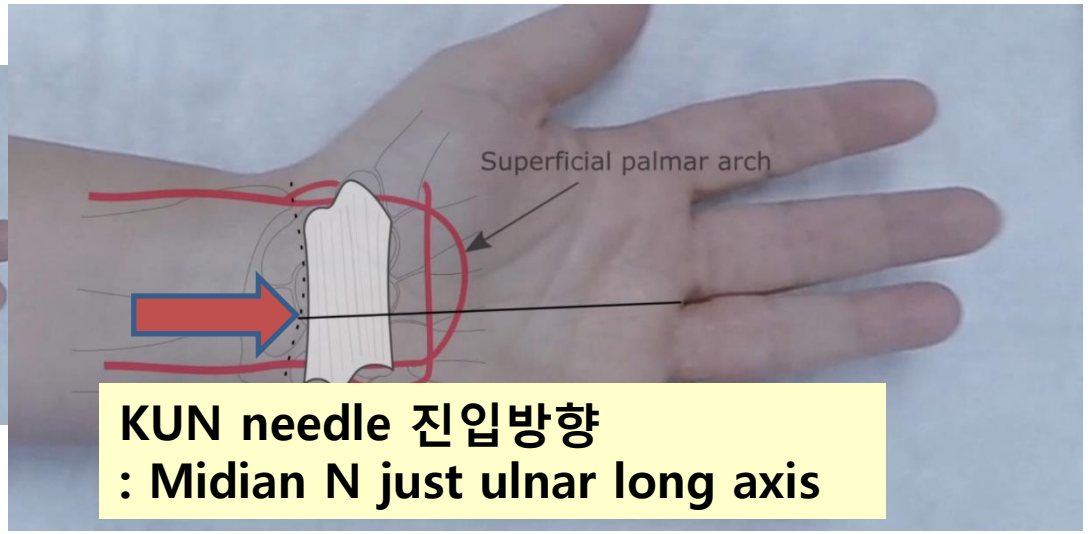






Surface anatomy 확인!!





KUN needle 진입방향
: Midian N just ulnar long axis

Fig. 3. (A) Surgical instruments for ultrasonography-guided percutaneous Carpal tunnel release: probe, Freer elevator, di slotted cannula, trocar, endoscopic cutting devices. **(B–D)** The anatomical landmarks: superficial palmar arch (SPA), median r (M), ulnar artery (UA), transverse carpal ligament (TCL) (arrowheads). **(E)** Check the course of the median nerve in longitu view. FDS, flexor digitorum superficialis.

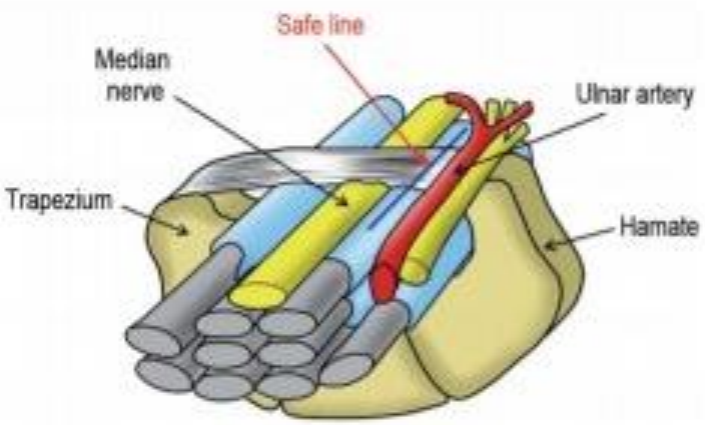
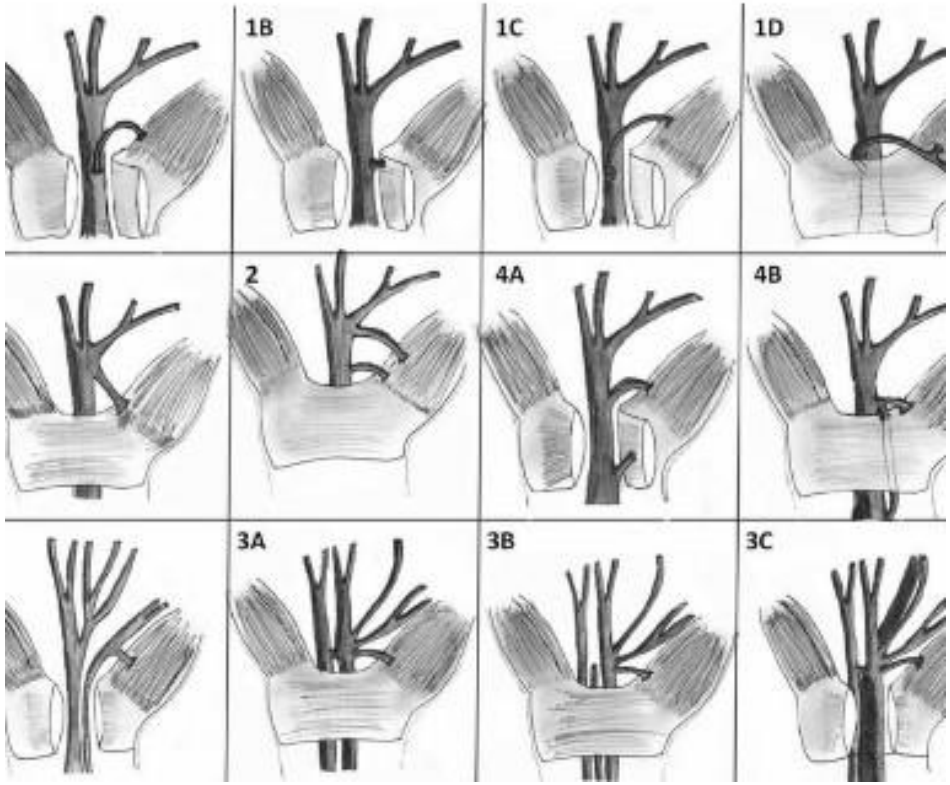
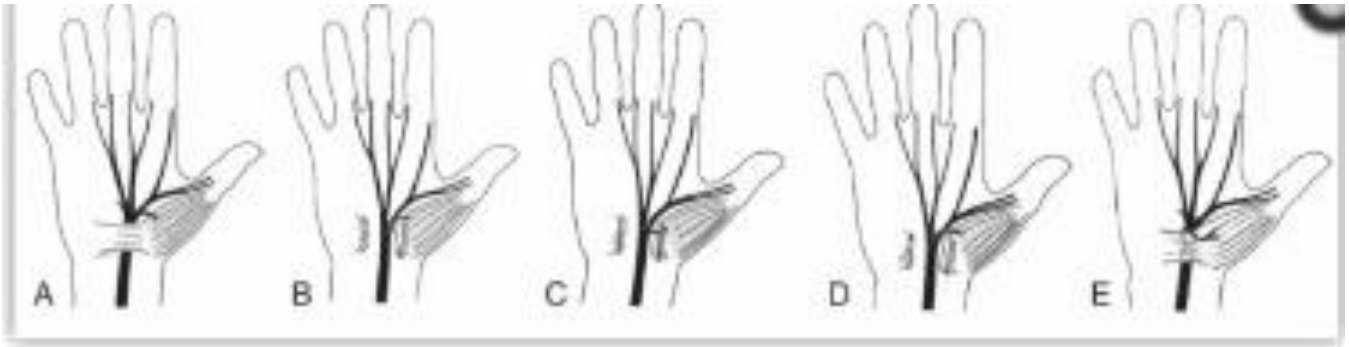


Fig. 4. The safe line is defined as midline between the ulnar margin of the median nerve and the radial margin of the ulnar artery. All instruments must be passed along this line under ultrasonographic monitoring.

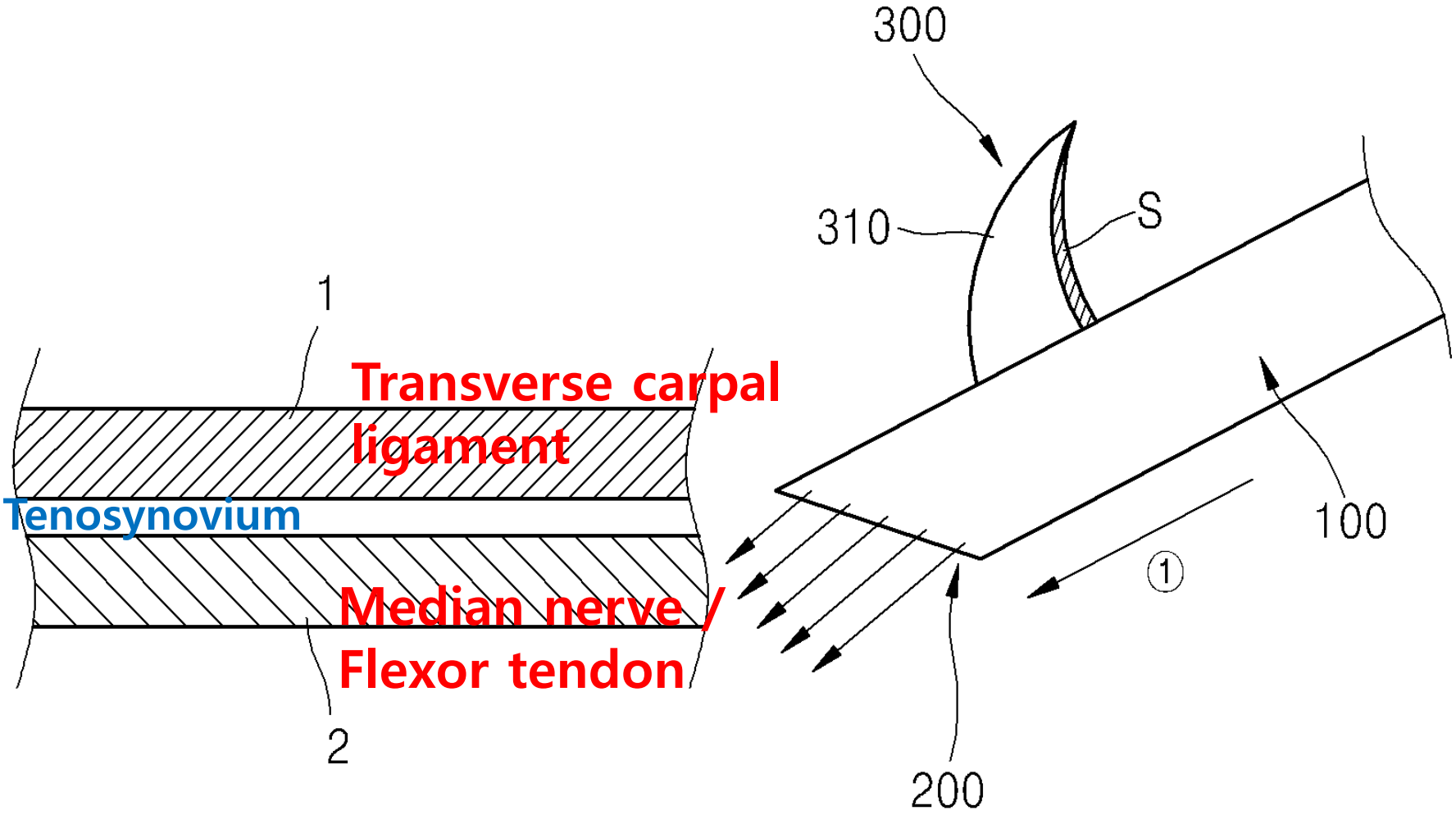


Lanz classification of the median nerve anatomical variations at the wrist. Group I, Thenar branch variations; 1A: subligamentous; 1B: transligamentous; 1C: ulnarwards; 1d: supraligamentous. Group 0, extraligamentous thenar branch. Group II, distal accessory thenar branch. Group IV, proximal accessory thenar branch; 4A: running directly in the thenar muscles; 4B: joining another branch. Group III, high division of the median nerve; 3A: without an artery of muscle; 3B: with artery; 3C: with lumbrical muscle.

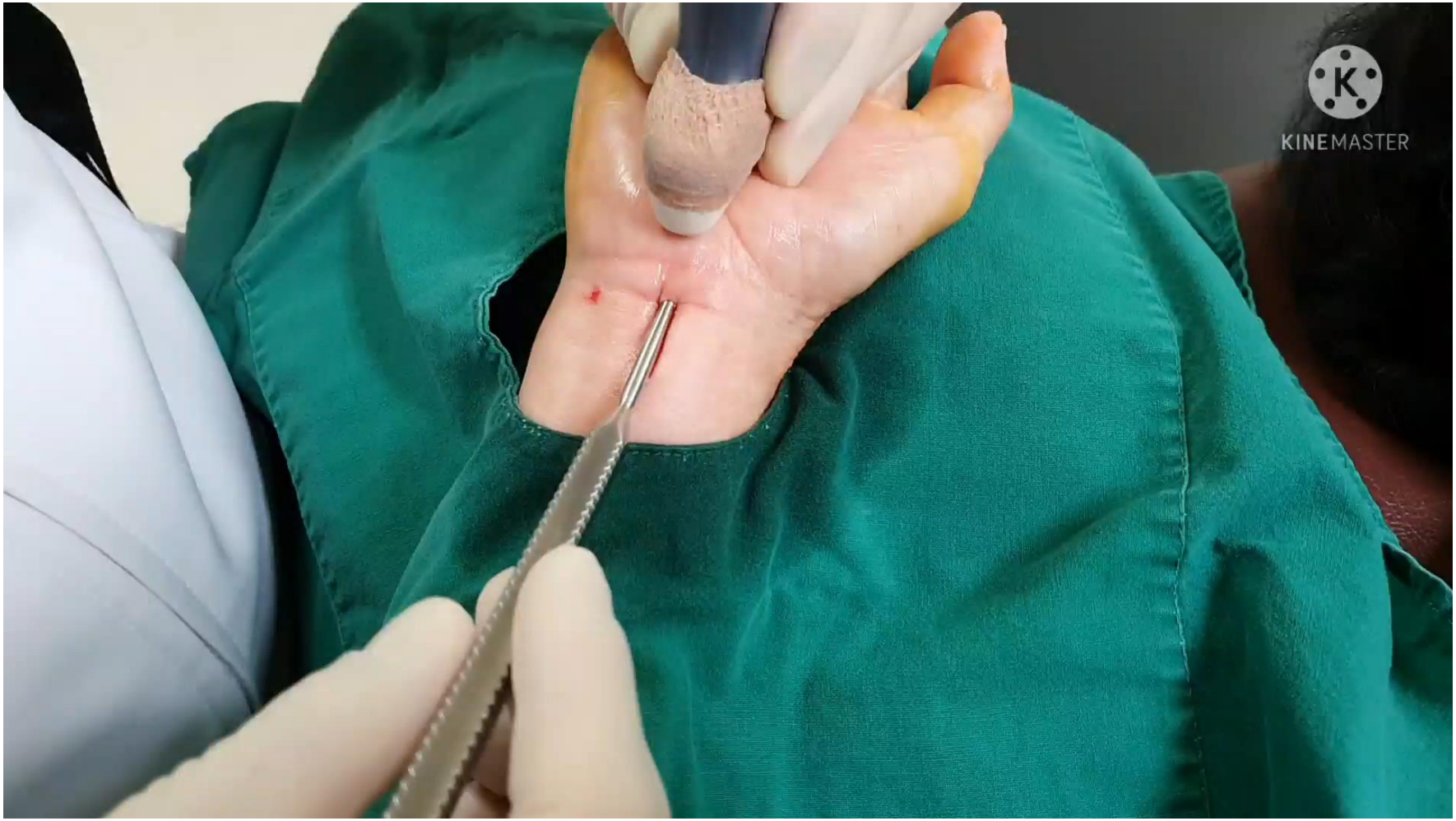


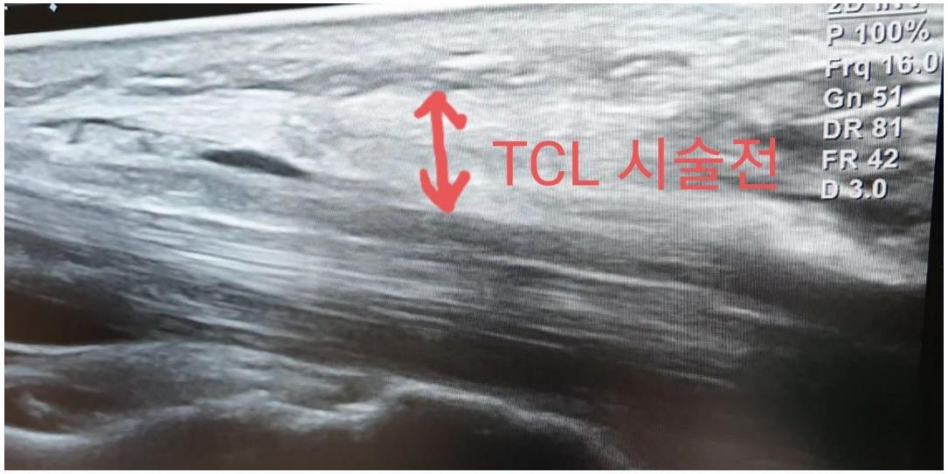
A. Normal B.C.D. median nerve motor branch variation

KUN needle


300
310
S
1
Transverse carpal ligament
Tenosynovium
Median nerve / Flexor tendon
2
100
①
200

CTS KUN neele 시술소개

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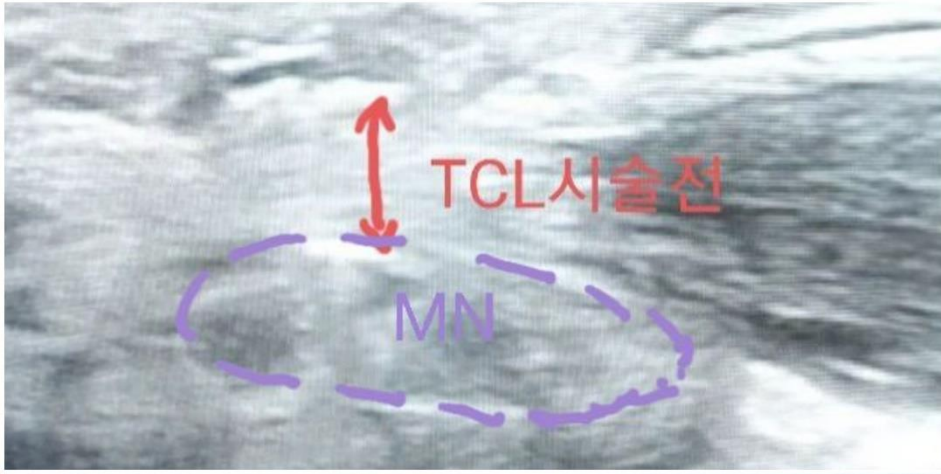
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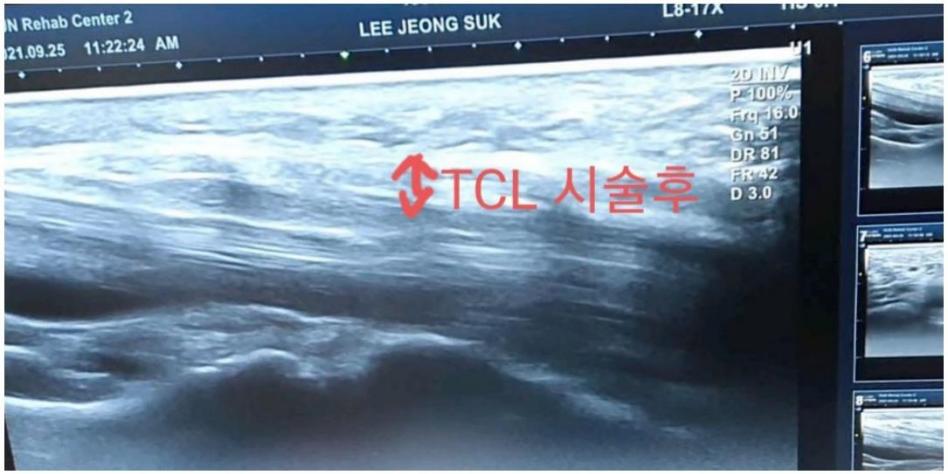
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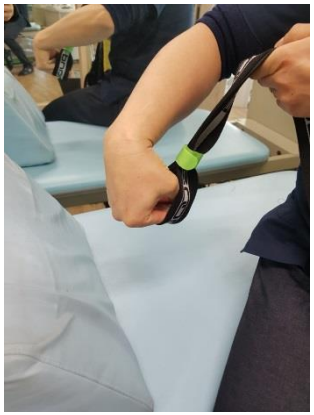
P 100%
Frq 16.0
Gn 51
DR 81
FR 42
D 3.0

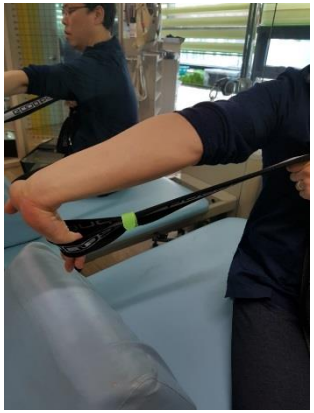
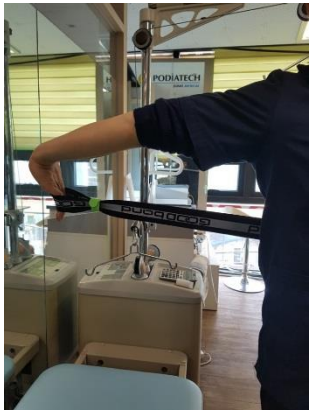
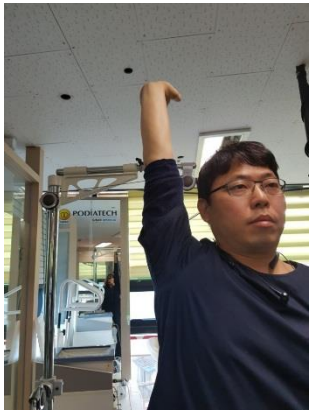
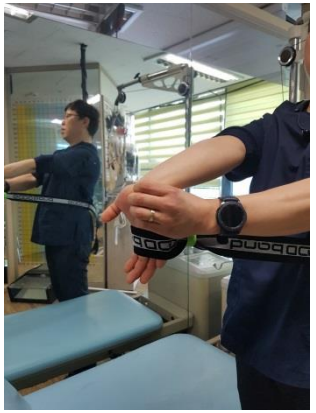

TCL 시술후
MN

CTS 치료와 예방을 위한 자가재활법

수근관증후군 예방및 치료운동법





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