

Endoscopic Carpal Tunnel Release ECTR

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Historics

Paget, 1854

Putnam , 1893

Hunt , 1909

Marie et Foix , 1913

Recommanded surgical release

Learmonth , 1933

First reported release CT

Phalen , 1950

Physiopathology and treatment



Surgical release of Carpal Tunnel (OCTR)

**Routine treatment for evolved CTS
from 60's to 90's**



OCTR : complications

Local tenderness

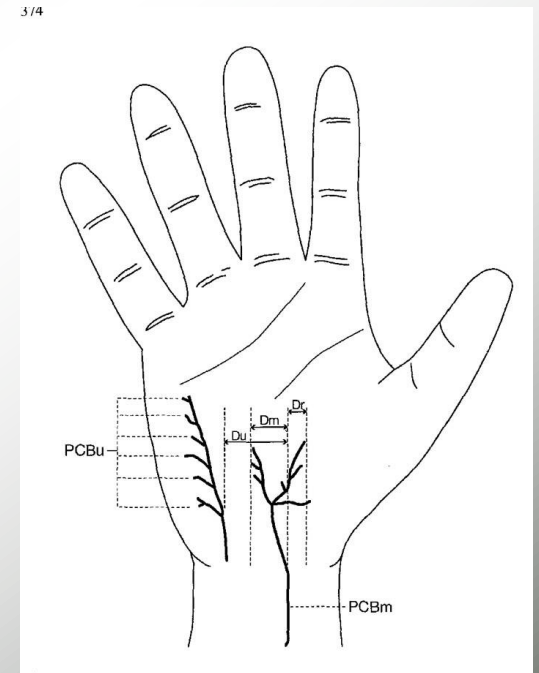
Swelling

Tinel sign

Reduced grip strength

Delayed return to activities and work

3/4



OCTR : questions

Teno-synovectomy?

Bleeding

Adhesions

Histology : non specific synovitis

Not recommended

Neurolysis?

Internal neurolysis : devascularization

Fibrosis

Not recommended

Incision?

Large : tenderness

Small : incomplete release



Another option? Small incisions

Mini-open techniques
Guided knife (Strickland)



Another option? endoscopy

❖ **Okutsu 1987**

Glass tube

❖ **Chow 1989**

Double portal

❖ **Agee 1992**

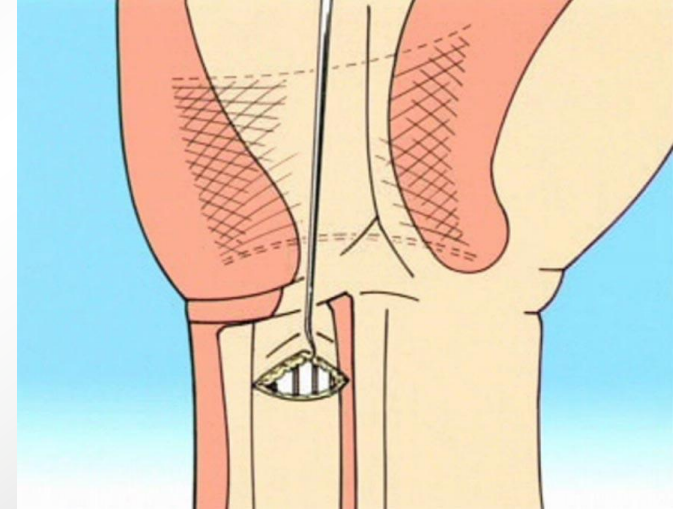
Single proximal portal



Chow technique two portals

Proximal portal

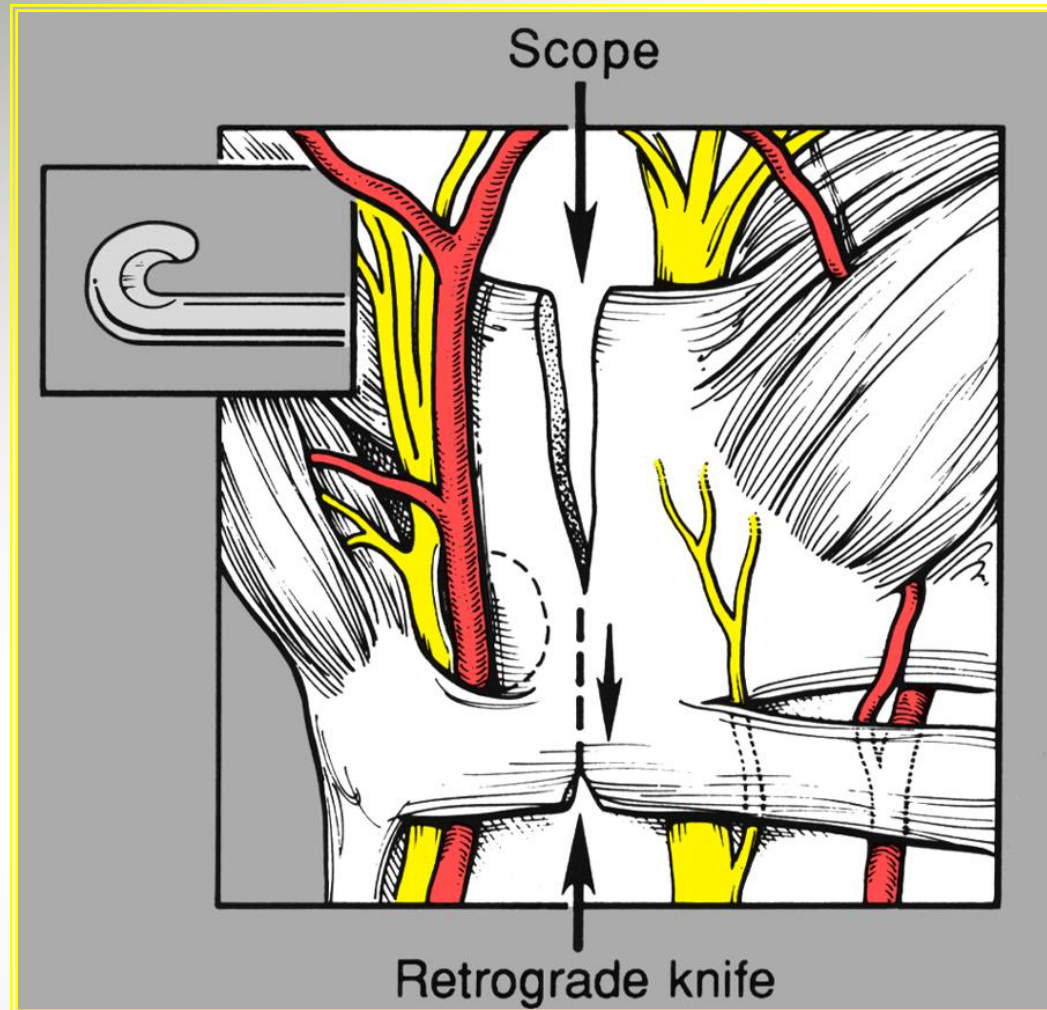
- proximal wrist flexion crease



Distal portal

- just distal to transverse carpal ligament

Chow technique two portals



Chow Technique instruments

Endoscope 4 mm 30° angle

Smooth dilatators

Synovium scraper

Wrist stand extension 30°

Knife: curved smooth



Chow Technique instruments

Knife: curved
Smooth outer edge



Chow Technique

Proximal incision

Between PL and FCU

Retract PL radially

Beware of palmar cutaneous

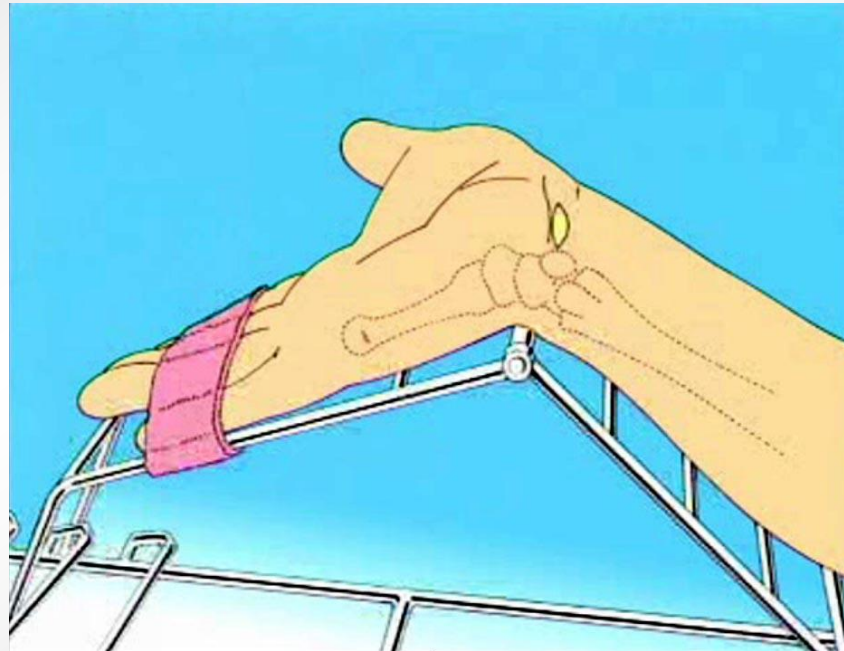
branch of median nerve

Transverse incision of wrist fascia



Chow Technique

Wrist extension: wrist stand



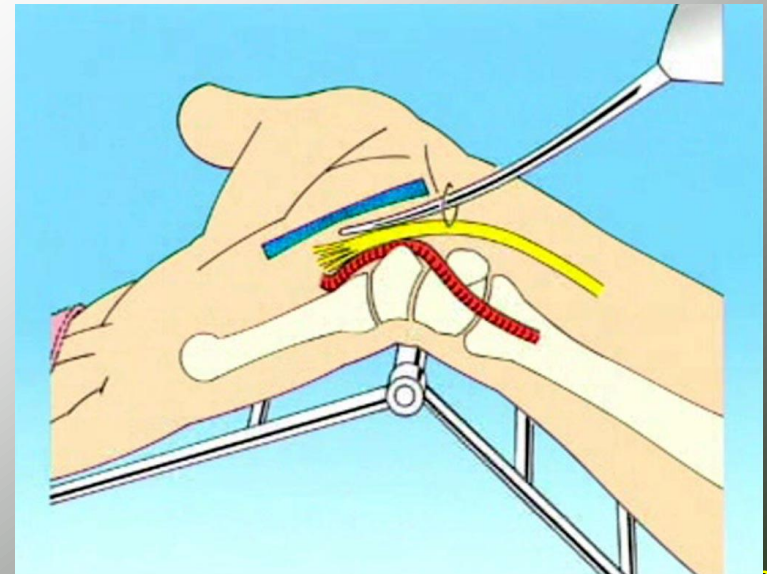
Chow Technique

Enter the carpal tunnel

- In line with axis of 4th finger**
- Just radial to hook of hamate**

Smooth dilatator or Mayo scissors

"washboard" sensation

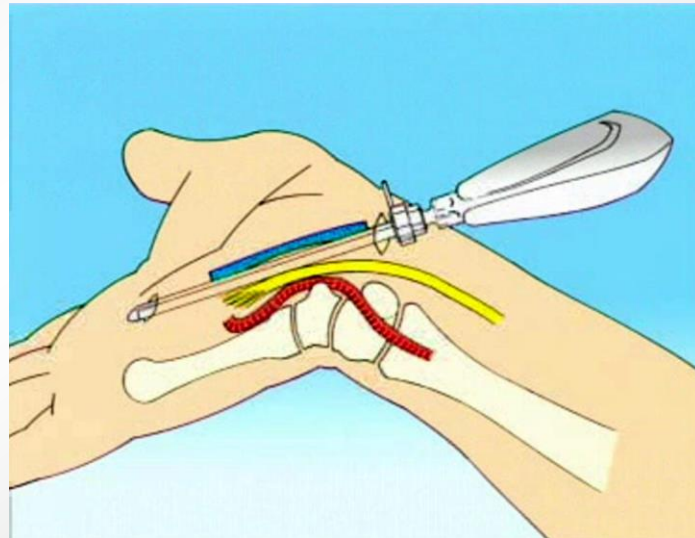


Chow Technique

Introduce probe and slotted cannula

The lifting test: should not feel the cannula

**Errors: superficial to TCL
or Guyon's canal**



Chow Technique

Create second portal at tip of the probe



Chow Technique

Visualize distal edge of ligament

Recognize transverse superficial palmar arch

And possible nerve abnormalities

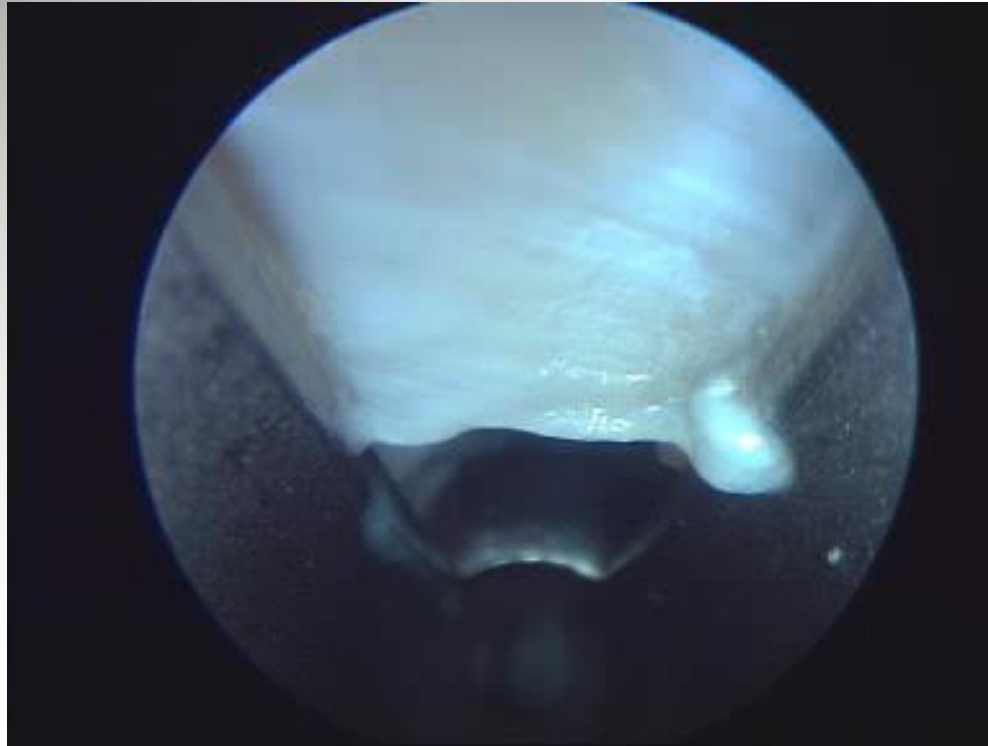
- **Motor branch**
- **Anastomoses M/U**



Chow Technique

Insert endoscope distally
Visualize TCL





Chow Technique

Insert knife proximally

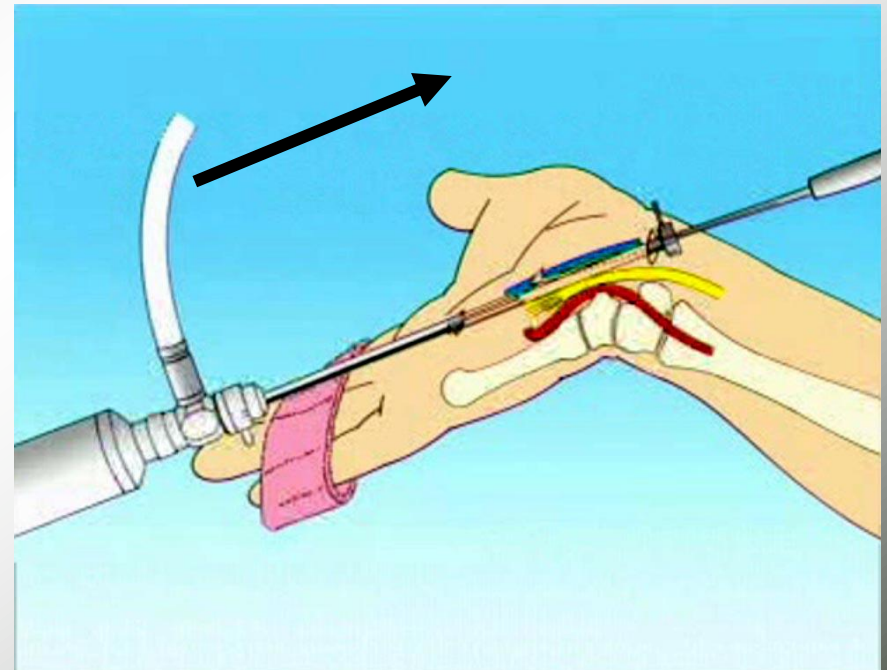


Chow Technique

Retrograde section of TCL

Push the endoscope

Pull the knife



Direct then retrograde
Change portal during division



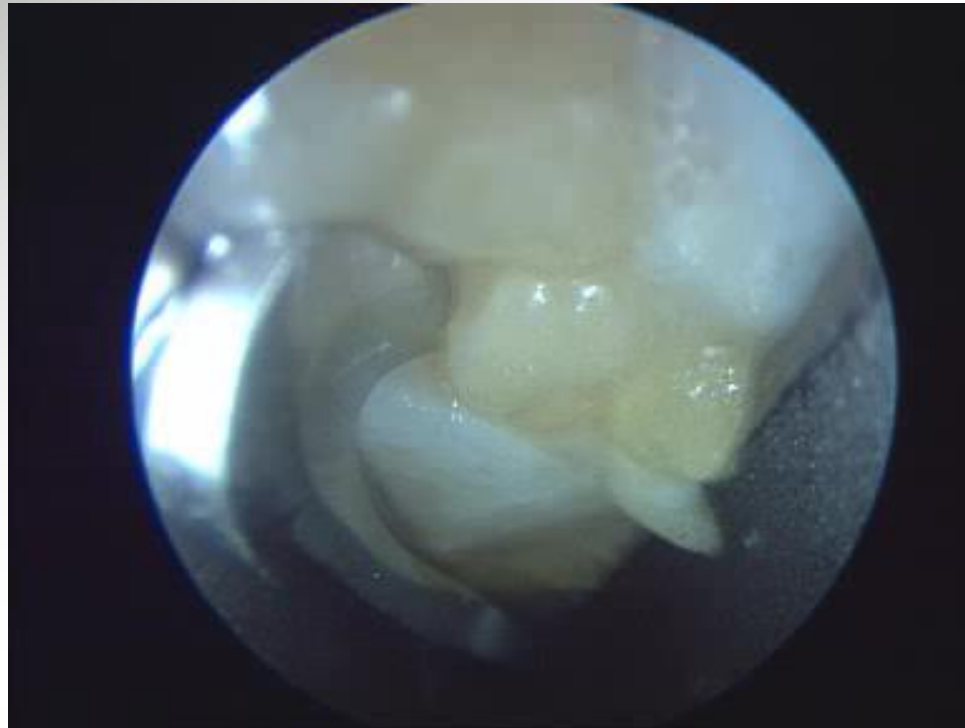
Institut
de la Main

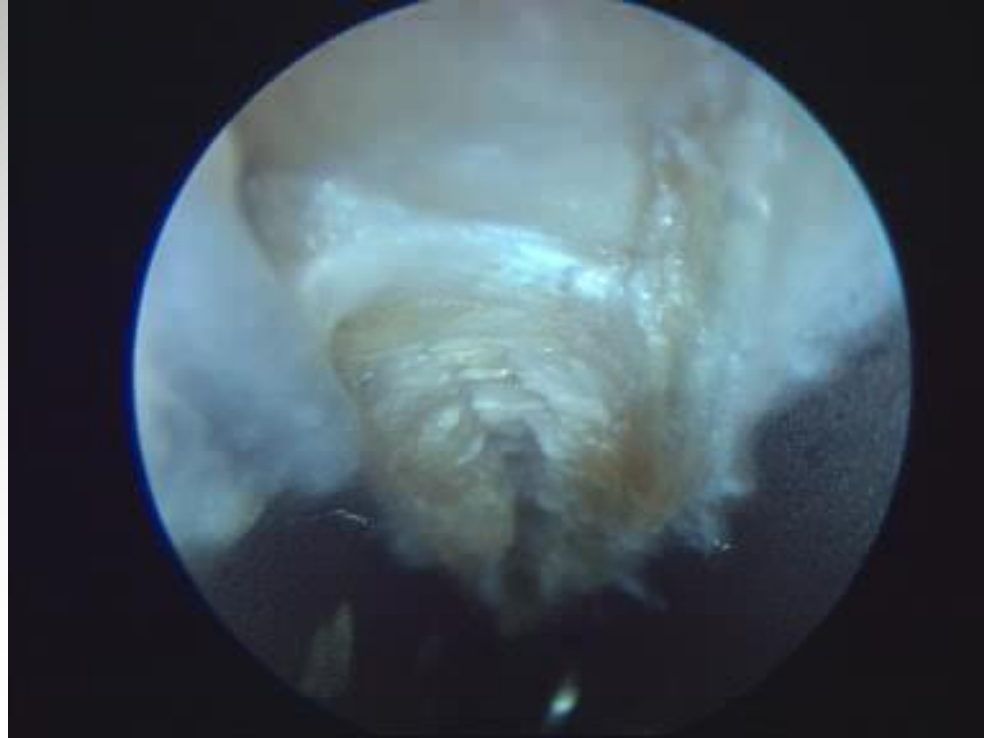
Chow Technique

complete section of TCL

Distal : thicker than proximal: 2 or 3 sections







Chow Technique

How to ascertain complete section?

-direct vision of gap

-soft tissues "hanging" in the gap

-palmar fascia: oblique fibers

-subcutaneous palpation of knife



Chow Technique

2 or 3 interrupted sutures or not !!!
(non absorbable)
Dressing 10 days
Immediate finger motion



Chow versus Agee

Visualize distal edge of ligament

Recognize transverse superficial palmar arch

And possible nerve abnormalities

- **Motor branch**
- **Anastomoses M/U**



Abnormal motor branch

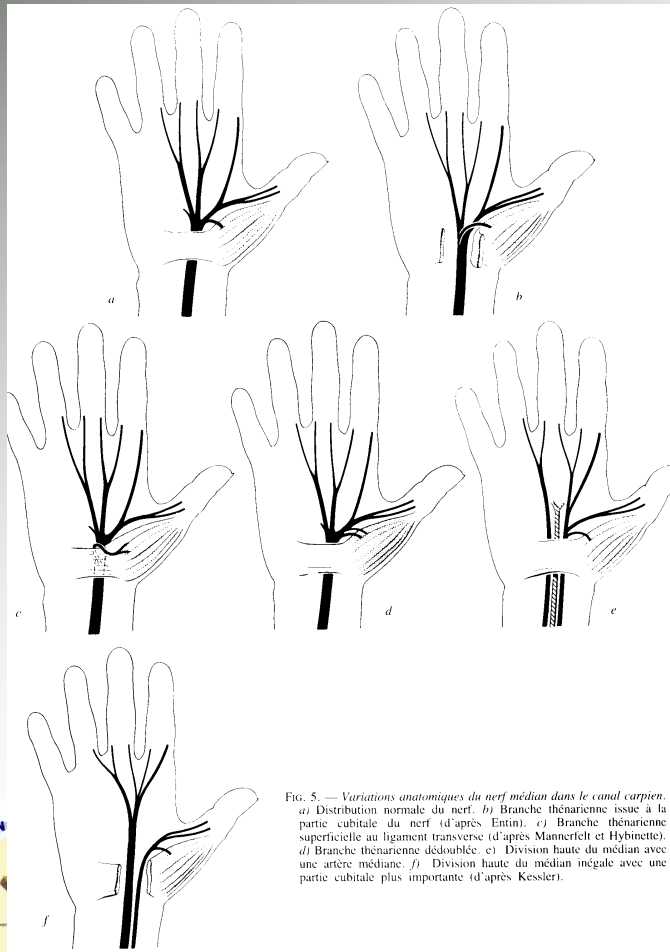
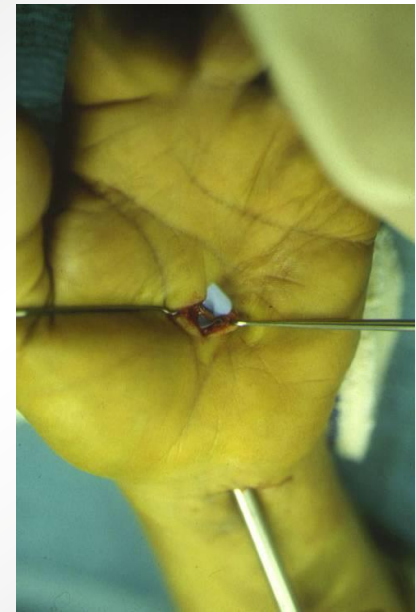
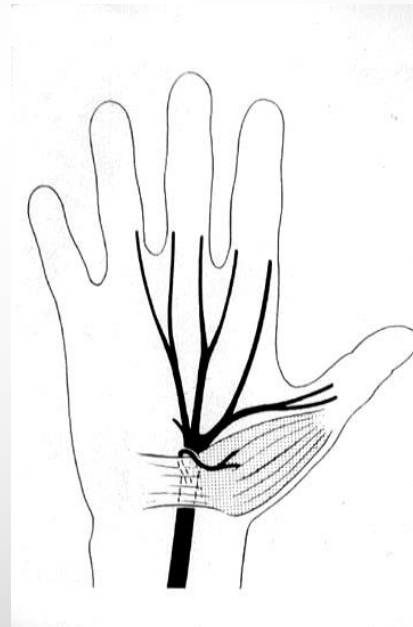


FIG. 5. — Variations anatomiques du nerf médian dans le canal carpien. a) Distribution normale du nerf. b) Branche thénarienne issue à la partie cubitale du nerf (d'après Entini). c) Branche thénarienne superficielle au ligament transverse (d'après Marnett et Hybinette). d) Branche thénarienne dédoublée. e) Division haute du médian avec une artère médiane. f) Division haute du médian inégale avec une partie cubitale plus importante (d'après Kessler).



Distal median-ulnar anastomosis

Distal communicating branch ulnar / median : 67%

(Bas & Kleinert)

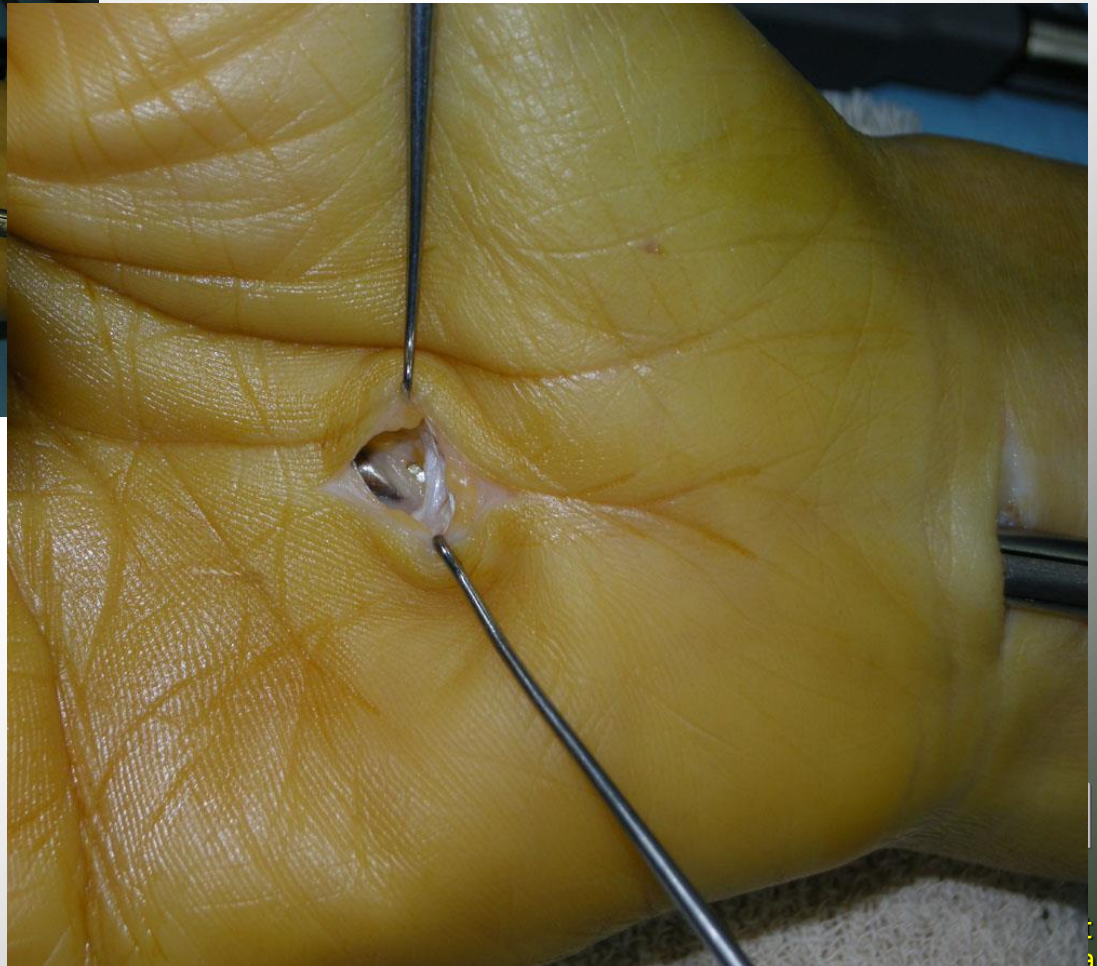
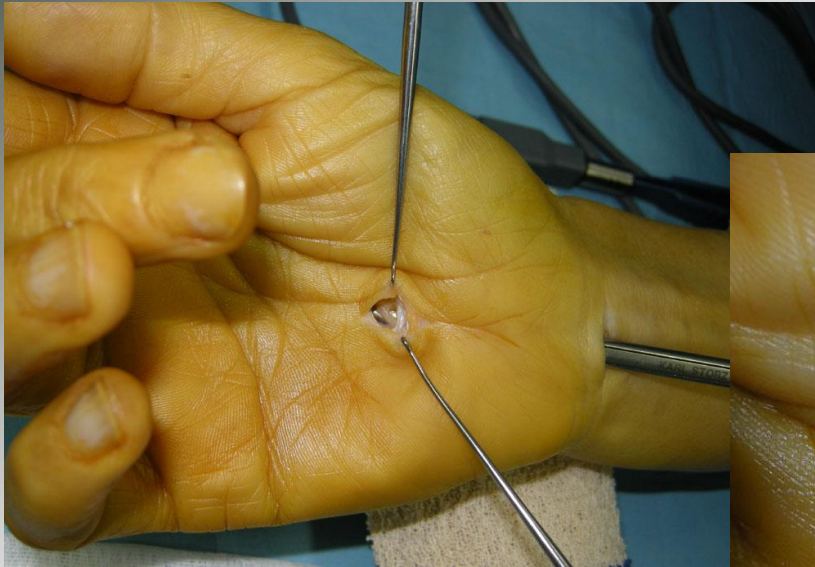
32% ulnar to median

20% median to ulnar

15% direct anastomosis



Distal median-ulnar anastomosis



Contraindications

Stiff wrist (distal radial fracture)

Space occupying lesion

Systemic disease with synovitis

Peroperative:

- poor visualization of TCL

- abnormal finding

: convert to open



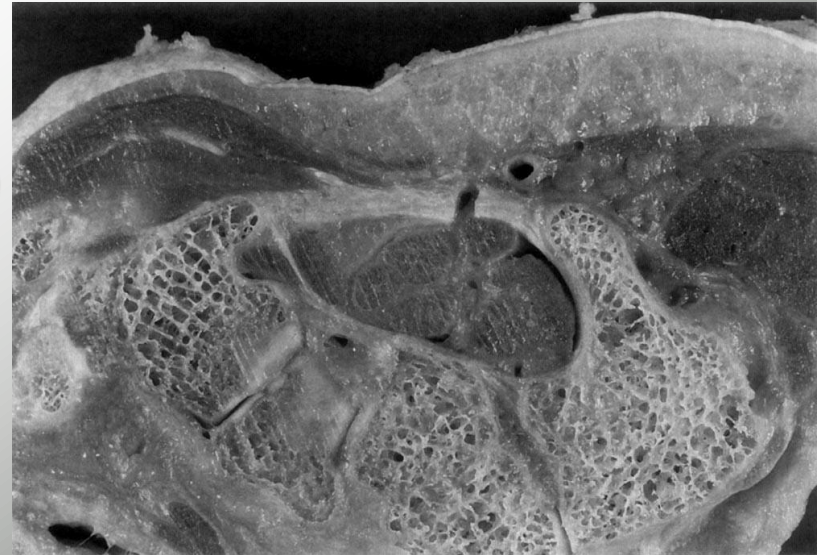
Results complications

Nerve laceration

- median
- ulnar
- sensory branch of median (3rd digital nerve)

Vascular laceration

- proximal: ulnar vein (or artery)
distal: superficial arterial arch



Results complications

Incomplete section of TCL : recurrence

Pillar pain: transient resolves in 2 to 4 months

Ulnar paresthesiae

RSD



Institut de la Main

1300 cases per year



ECTR

7209 cases from 1991 to 1998

6 275 double portal - 934 single portal



Complications

7209 cas

Per-operative → open : 50 (0.7%)

- **early experience**
- **or technical problem**



Complications

7209 cas

Vessels (superf. arch)	: 7	} 17 = 0.2%
Nerves (digital)	: 10	



Recurrence

7209 cas

Work compensation

9

Diabetis

2



11 = 0.1%



Complications

7209 cas

RSD

26 = 0.36%



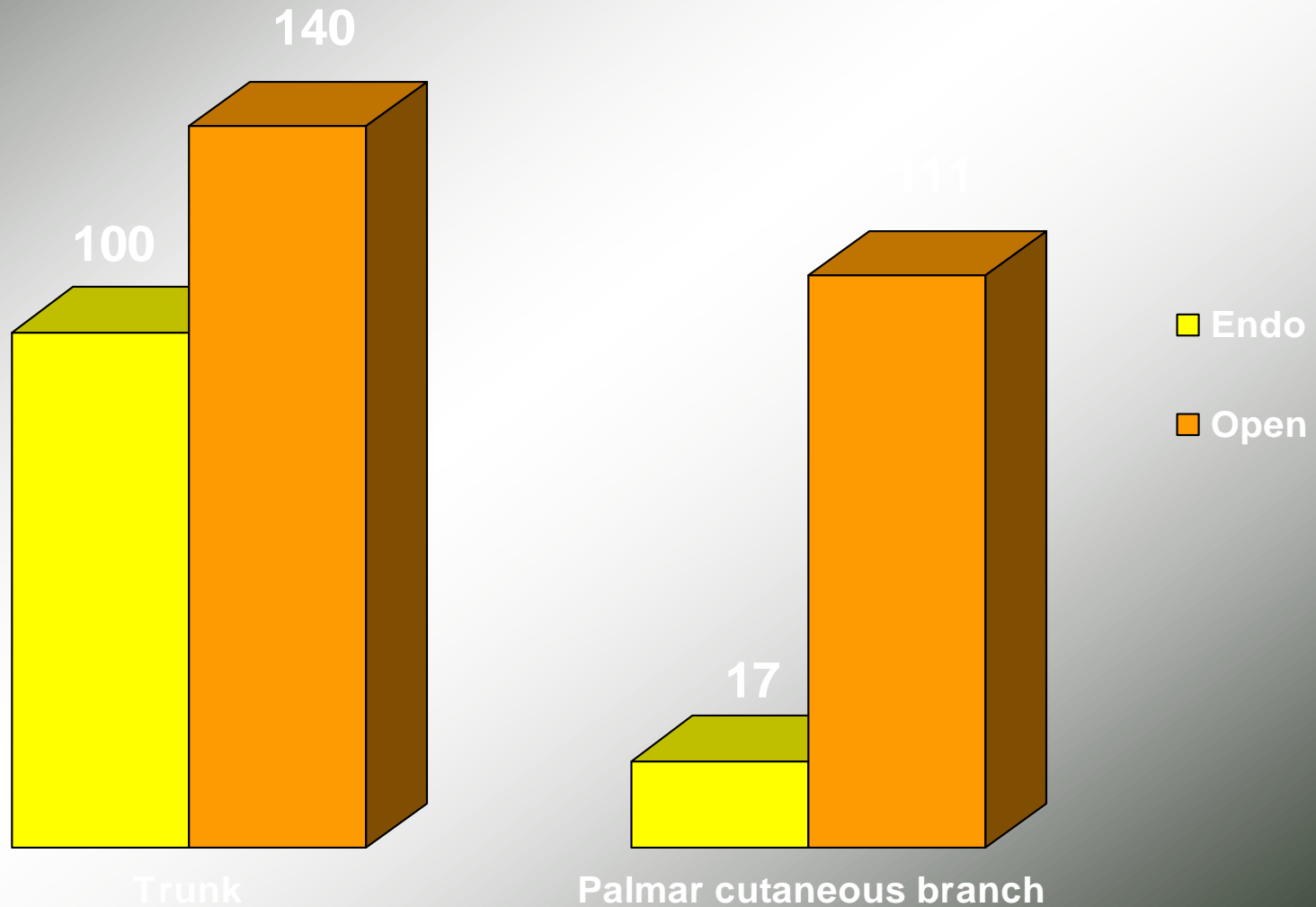
ASSH Members Survey (A. Palmer)

Major complications

ECTR	: 475	(709 answers)
OCTR	: 374	(600 answers)



Median nerve laceration (ASSH)



Boeckstyns

summaries of articles up to 1998

Meta-analysis nerve injuries

- ECTR 0.3%
- OCTR 0.2%



Discussion

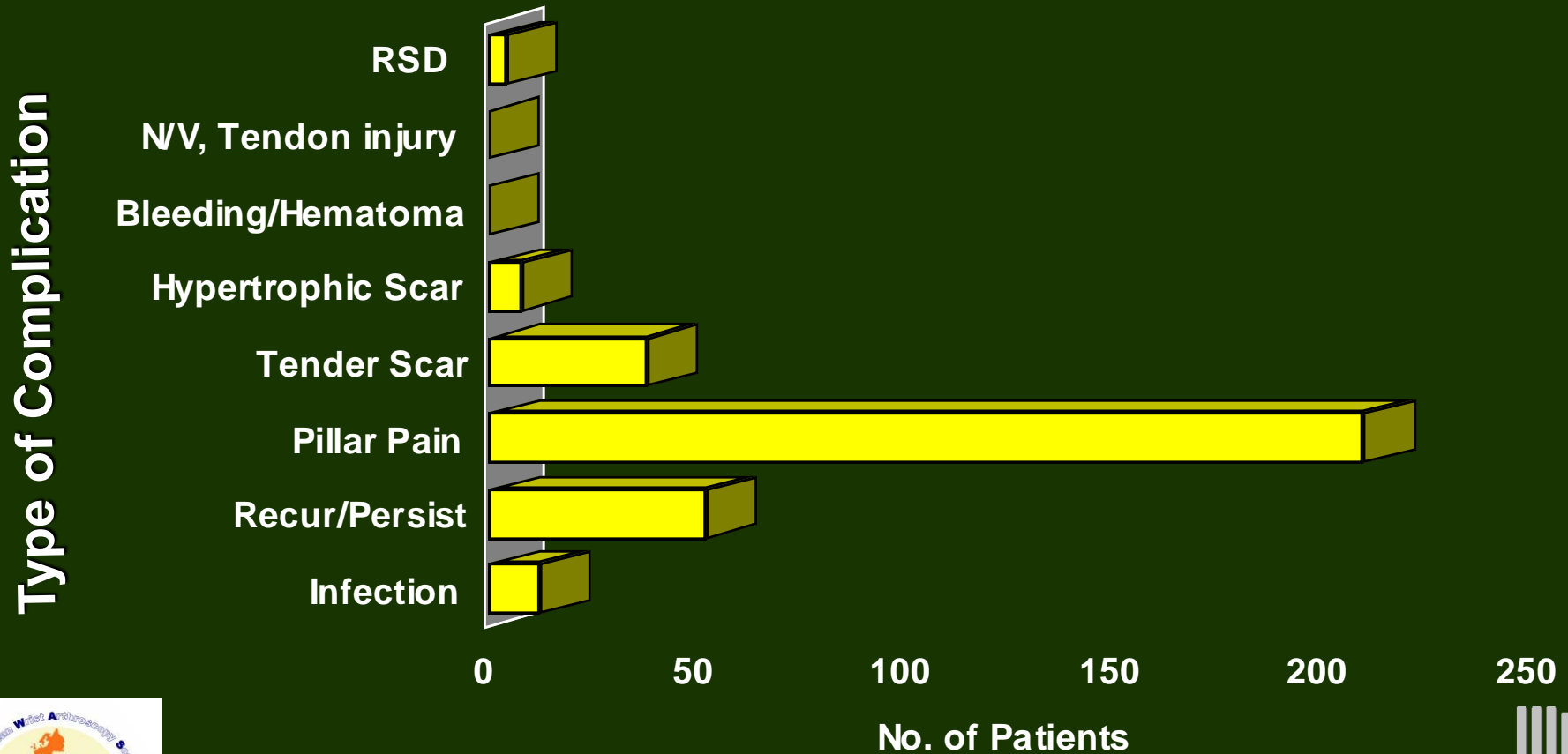
retrospective studies

	Hurst/Al-Yafi 1998	Agee 1995	VanHeest 1995	French study1998	OCTR (Schenck)
No. of hands	800	1042	49	7209	3035
Infection	1.5%	0.1%			
Bleeding / hematoma	0	0	2.3%		0.06%
Nerve injury	0	0.6%	29%	0.2%	0.8%
Tendon injury	0	0.08%		0	
Recur / persist	6.5%	1.2%		0.1%	0.6%



Result

Al-Yafi & Hurst, 1998



Trumble, 2000

prospective randomized study
75 ECTR / 72 OCTR

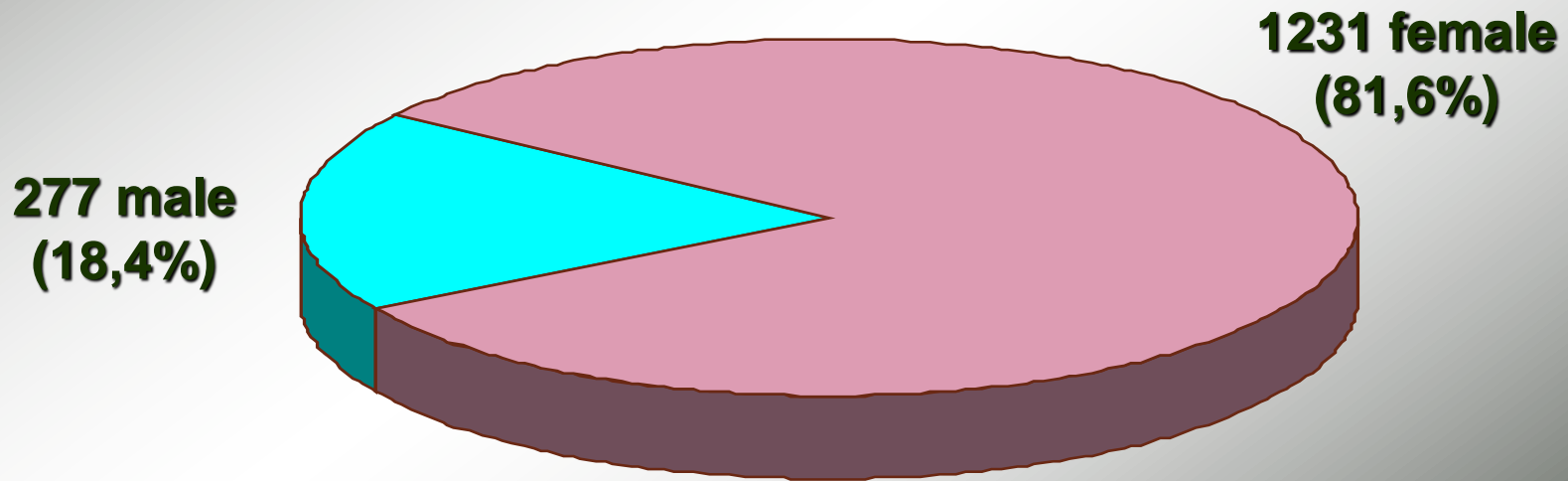
Most rigorous recent study

- less pain scar
- recovery of strength quicker
- return to work 20 days earlier

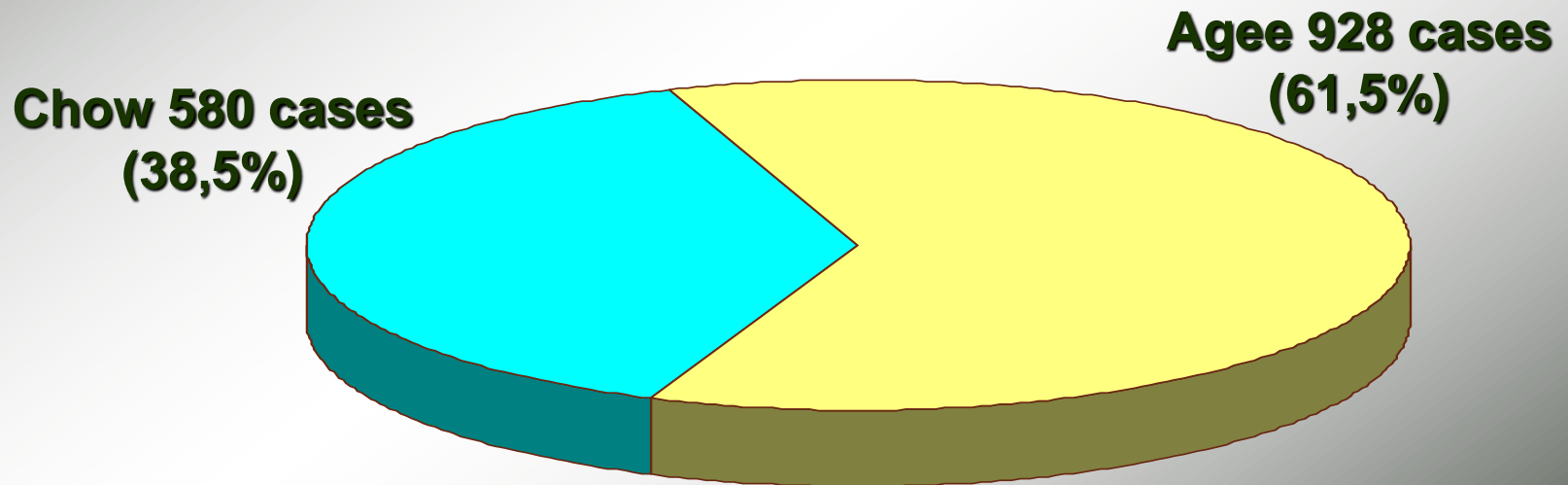


Complications

In the last 1508 patients
operated at l'Institut de la Main
average age 54 yo (19-96)



The last 1508 patients operated at l'Institut de la Main



Complications

RSD	11	(0,72%)
superficial infection	2	(0,13%)
Painful scar	16	(1,06%)
Varied pain (except recurrence)	20	(1,32%)
Paresthesiae (recurrence)	9	(0,59%)
Œdema	4	(0,26%)
Hematoma	10	(0,66%)

Conclusion

**In the hands of trained surgeons
ECTR is a safe and predictable treatment of CTS**

**It allows rapid return to work
with minimal postop discomfort**



Conclusion

**There is no significant difference
between 1 or 2 portal techniques**

Major complications disappear with experience

The learning curve is the main problem



Conclusion



25 seconds !!!