The Scapholunate Ligament Complex

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DISCLOSURES

~ There is no commercial support for this Talk

And….

~There are no conflicts of interest.

The Scapholunate ligament Complex

- the stability of the scapholunate joint is not dependent wholly upon the scapholunate interosseous ligament (SLIL) but rather upon both primary and secondary stabilizers, which form a scapholunate ligament complex (SLLC).
- Each case of SL instability is unique and therefore should be treated with tissue specific repairs, which may partly explain why one procedure cannot successfully restore joint stability in every case.

The Scapholunate ligament Complex

- Elsaidi et al sequentially divided the RSC, LRL,SRL, SLIL and finally the dorsal capsule insertion on the scaphoid.[1] There was no appreciable change in the radiographic appearance of the wrist.
- When the DRCL was then divided, a DISI deformity occurred
- Short et al determined that the SLIL is the primary stabilizer of the SL articulation and that the DRCL, DIC, ST and RSC ligaments are secondary stabilizers.[2]
- The SL joint is therefore dependent on a complex of ligaments, each having a separate role but working in concert.

1.Elsaidi GA, Ruch DS, Kuzma GR, et al: CORR:152-7, 2004
2. Short WH, Werner FW, Green JK, et al: J Hand Surg 32:297-309, 2007

Geissler Classification of ligament injury

Grade	Radiocarpal SLIL	Midcarpal Instability
I	Hemorrhage of SLIL, no attenuation	None
II	Incomplete partial or full substance tear, no attenuation	Slight gap (less than width of 3-mm probe)
III	Ligament attenuation, incomplete partial or small full substance tear	Probe can be passed between carpal bones
IV	Complete tear	Gross instability 2,7 mm arthroscope can be passed between SL gap (drive through sign)

This classification quantifies the resultant instability and not the actual size of the tear.

Geissler WB, Freeland AE, Savoie F et al.
JBJS(Am) 1996

Geissler II ?

Dynamic Wrist Arthroscopy

Hagert E, Lalonde DH. Wide-awake wrist arthroscopy and open TFCC repair. Journal of Wrist Surgery 2012;1:63– 68.
Ong M, Ho PC, Wong C, Cheng S, Tse W. Wrist Arthroscopy under Portal Site Local Anesthetic without tourniquet. Journal of Wrist Surgery November 2012.

Grade IV SLIL tear

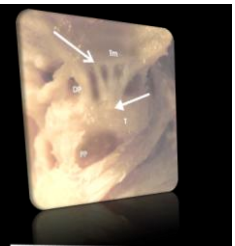
Scaphoid kinematics

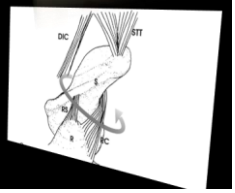
video courtesy of Gregory Bain M.D.

Type I Scaphoid

- The scaphotrapezial ligaments have a narrow proximal (scaphoid) attachment and is assoc. with a type I lunate

This facilitates rotation around the longitudinal axis of the scaphoid, as well as limiting flexion and extension of the bone.



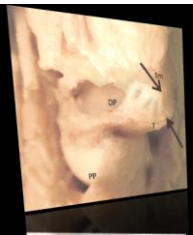


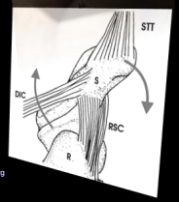
Galley I, Bain GI, McLean JM. J Hand Surg 2007

Type II Scaphoid

broad proximal attachment of the ST ligament limits longitudinal rotation of the scaphoid.

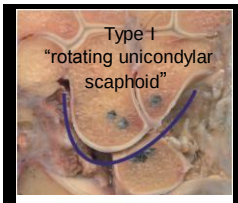
These scaphoids are associated with type II lunates and therefore are limited from rotation and Translation



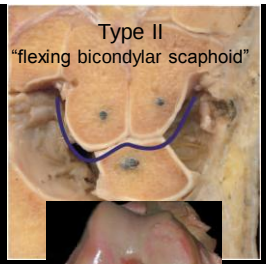


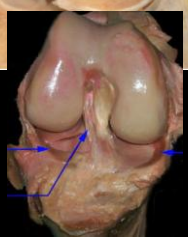
Galley I, Bain GI, McLean JM. J Hand Surg 2007

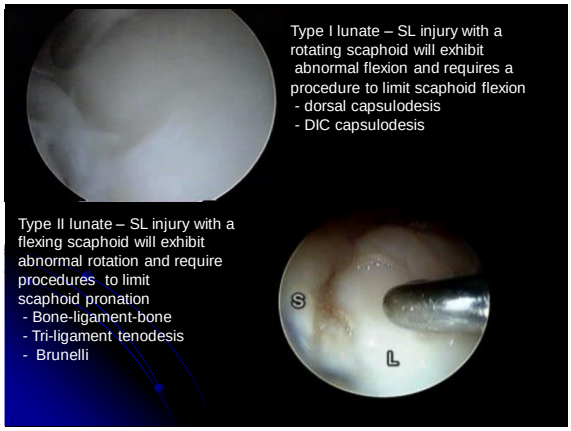
Type I
"rotating unicondylar scaphoid"

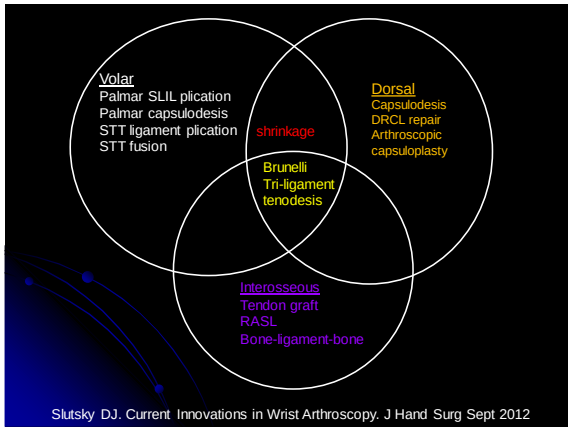


Type II
"flexing bicondylar scaphoid"







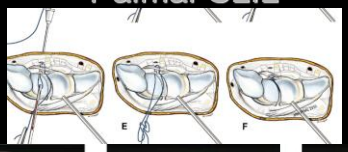


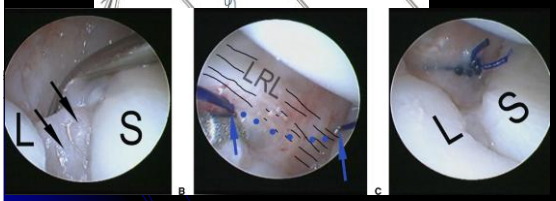
SLLC arthroscopic assessment

- Palmar SLIL – volar radial portal, MCR
- Dorsal SLIL – 3,4 and 4,5 portal, MCU
- Dorsal capsule – volar radial portal, 6R
- ST ligaments – MCR, STT portal

Structure	Instability	Classification A = ≤ 6 mths no midcarpal step B = ≥ 6 mths Midcarpal step drive through sign	Treatment Options
Palmar SLIL	Geissler I/II Geissler III/IV	P-1A P-1B	Shrinkage, volar plication, LRL transfer, SL pinning RASL, interosseous graft, limited fusion
Dorsal SLIL	Geissler I/II Geissler III/IV	D-1A D-1B	Shrinkage, DIC capsulodesis Acute repair, tenodesis, bone-lig-bone, limited fusion
Combined	Geissler I/II Geissler III/IV	C – 1A C- 1B	Shrinkage, combined volar/dorsal plication Interosseous graft, RASL, limited fusion
Dorsal Capsule	Geissler I/II Geissler III/IV	DC – 1A DC – 1B	Shrinkage, dorsal capsuloplasty
ST ligaments	Geissler I/II Geissler III/IV	ST – 1A ST – 1B	Blatt capsulodesis, ST ligament shrinkage/plication STT/SC fusion

Palmar SLIL





Arthroscopic suture of the Palmar SLIL. Del Pinal et al. J Hand Surg Sept 2011

VOLAR CAPSULODESIS FOR SCAPHOLUNATE DISSOCIATION

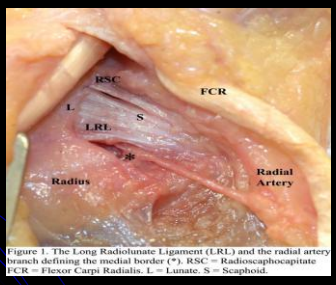
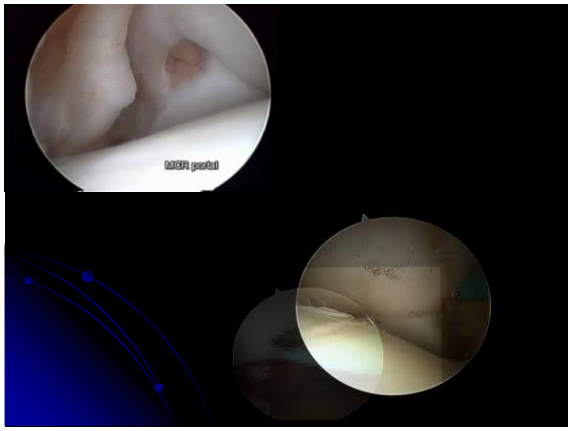


Figure 1. The Long Radiolunate Ligament (LRL) and the radial artery branch defining the medial border (*). RSC = Radioscaphocapitate FCR = Flexor Carpi Radialis. L = Lunate. S = Scaphoid.

Van Campen RJ, Moran SL. IWIW Chicago 2012


MCR portal


DRCL TEAR

Dorsal SLLC: capsuloplasty

36 patients, age 38 yrs - f/u 11 mths (7-19)

- Geissler II/III, pain 5.4 mths (3-14)
- F = 63º (40-80), E = 71º (40-90)
- DASH: preop 34 (16-48), postop 9 (0-40)
- VAS: preop = 3.4 (3-4) , postop 0.31 (0-3)
- MMWS: E/G = 29, F = 4 P = 2

(Mathoulin C, Dauphin N, Wahegaonkar AL. Hand Clinic 2011)

Arthroscopic Dorsal Capsuloplasty

Ch. Mathoulin, Adeline Cambon-Binder

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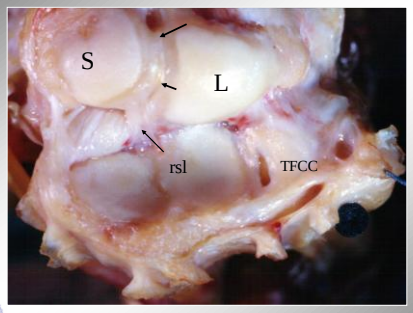
Andrea Tandara (Germany)
Marc Garcia-Elias (Spain)
Marina Carrara (Brazil)
Gustavo Mantovani (Brazil)
Martin Caloia (Argentina)
Gabriel Clemboski (Argentina)
Tanya Burgess (Australia)
Antonio Pagliei (Italy)

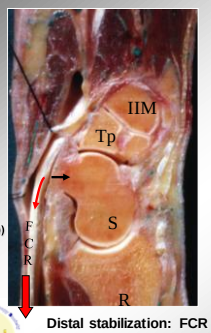
Classical ANATOMY

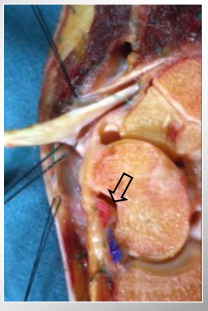


(Pagliei (I))

Scapho lunate ligament :
anterior, dorsal and intermediate

ANATOMY





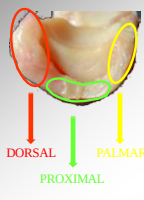
(Pagliei (I))

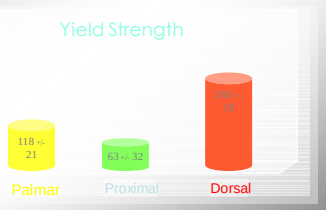
Distal stabilization: FCR + STT Ligt + RSC Ligt
Importance of FCR
(Salva-Coll, Garcia-Elias et al, 2011)

SCAPHOLUNATE LIGAMENT

Main scapholunate joint stabilizer

Meade et al 1990 – Short et al. – Looi et al. 2001

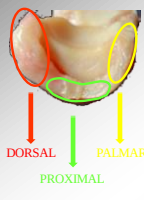


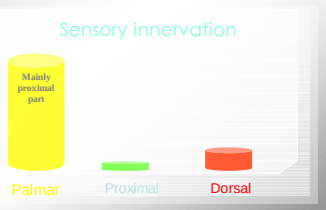


Berger et al. '99

SCAPHOLUNATE LIGAMENT

Contributes to carpal proprioception



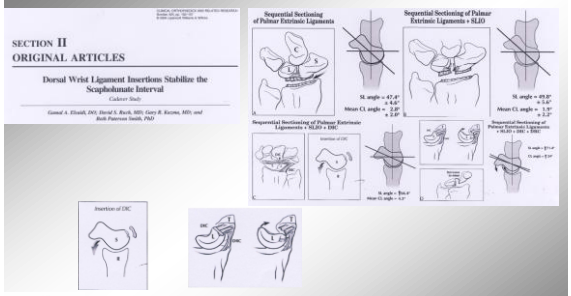


Mataliotakis et al. '09

Mataliotakis et al. '11

Importance of AIO nerve and PIO nerve too !!!!

ANATOMY



« Only with sectionning insertion of the DIC a dorsal intercalated scapholunate instability deformity (DISI) ensued »

ANATOMY

Normal aspect

Midcarpal

Isolated dorsal capsule tear with midcarpal SL spacing

ANATOMY

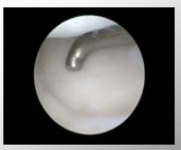
Normal aspect

Isolated dorsal capsule tear with midcarpal SL spacing

Midcarpal

ANATOMY

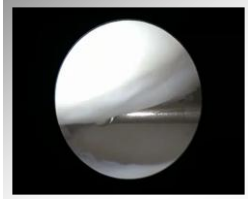
Normal aspect



Midcarpal

Radiocarpal

ANATOMY



Normal aspect

Radiocarpal

Midcarpal

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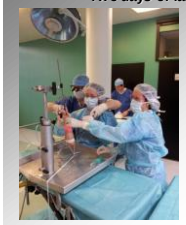
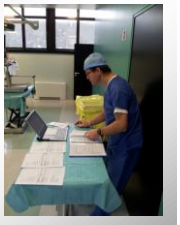
ANATOMY

Two days of laboratory work, 10 young fresh cadaver





Arthroscopic testing and X-Rays measuring with and without load

1/ Normal wrist,
2/ section of Dorsal Capsulo-SL attachment (DCSS)
3/ section of SLIOL
4/ DIC section

(J. Messina (I), L. Van Overstraeten (B), E. Camus (F), A. Wahegaonkar (In), A. Tandara (G), A. Cambon-Binder (F), C. Mathoulin (F))

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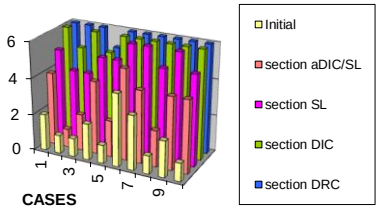
ANATOMY

SEVERITY SL LAXITY GRADE

CASES EVOLUTION AFTER SECTIONS



Systematic worsening of SL diastasis after simple detachment of DCSS from dorsal SL

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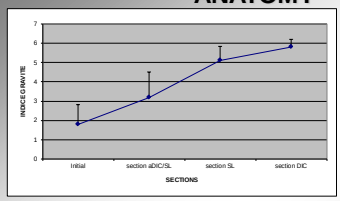
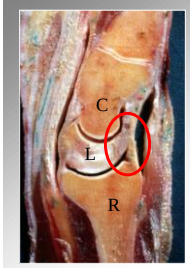
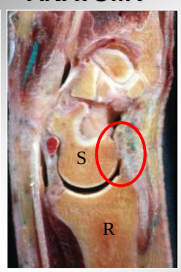
ANATOMY



This structure (Dorsal capsulo-scapholunate Septum) is a bridge between the DST ligt and the dorsal SL ligt, and seems to be essential to the SL stability, and probably its tears could be considered as a first stage of SL instability…!!!

ANATOMY





Prominent role of dorsal radiocarpal ligaments:

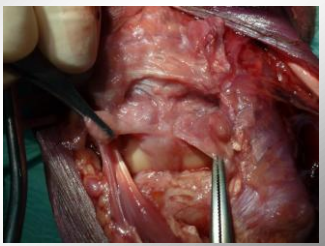
DIC/Dorsal ScaphoTriquetral Ligt
Dorsal Scapholunate Ligt
Dorsal Capsulo-Scapholunate Septum

ANATOMY

Four months of laboratory work, 17 fresh cadavers

The DCSS structure was identified between the scapholunate ligament and the DIC

DCSS always identified, consisting of three arches (two transverse arches in series along the distal line of the scapholunate interval, forming a confluence into the third which was larger than the previous mentioned)

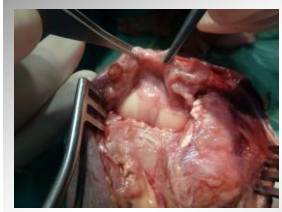


(M. Carrara (Bra), T. Burgess (Aus), C. Mathoulin (F))

ANATOMY

Four months of laboratory work, 17 fresh cadavers

It demonstrated a wide diffuse attachment along the scapholunate ligament and then arced dorsally fanning out to a longer insertion into the dorsal capsule.



Four months of laboratory work, 17 fresh cadavers

(M. Carrara (Bra), T. Burgess (Aus), C. Mathoulin (F))

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Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

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Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

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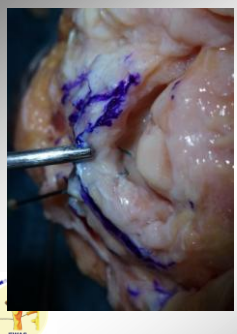
Arthroscopic Dorsal Capsuloligamentous Repair ADCLR



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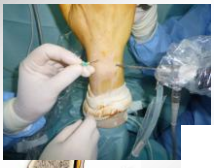
Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

1 thread through 3,4 P, then DWC and ULNAR remnant



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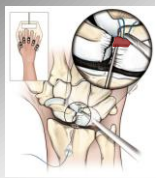
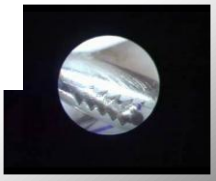
Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

Retrieval through RMCP





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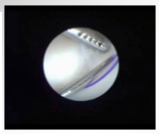
Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

Retrieval through RMCP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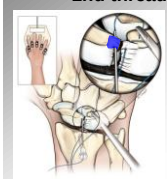
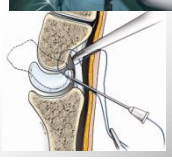
Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

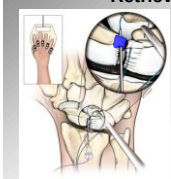
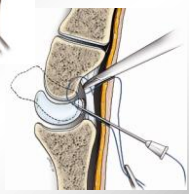
2nd thread through DWC and RADIAL remnant





Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

Retrieval through the same RMCP

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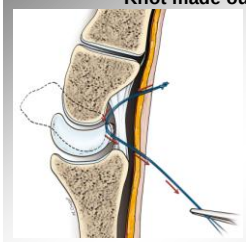
Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

Knot made outside patient (Nicky's knot)



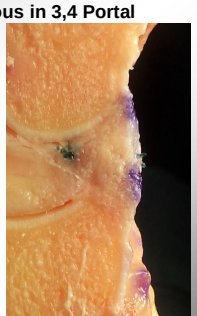
Pulled inside MCJ by proximal traction

Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

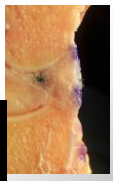
Second knot subcutaneous in 3,4 Portal

Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

Second knot subcutaneous in 3,4 Portal



Arthroscopic Dorsal Capsuloligamentous Repair ADCLR



W.A.D.C.L.R

Mathoulin Christophe, MD

Paris, France

Arthroscopic Dorsal Capsuloligamentous Repair ADCLR

SL K-Wires +/- SC K-Wires **only** if unreductible

Without pinning!!!

Material

- 57 patients
- 34 men 23 women
- Mean age : 38.7 yo (range 17 to 63)
- Sports injuries : 46 cases
  high level : 12 cases
- Average time between injury and surgery: 9.24 months (range 3 to 24)

Material

EWAS Classification	Garcia-Elias' Suggestion
• Stage 2 : 7 cases	• Stage 2 : 3 cases
• Stage 3A : 1 case	• Stage 3 : 25 cases
• Stage 3B : 16 cases	• Stage 4 : 26 cases
• Stage 3C : 18 cases	• Stage 5 : 3 cases
• Stage 4 : 16 cases	

RESULTS

Follow-up : 30.74 months (range 18 to 43)

- **Pain :**
  Preop VAS : 6.17 Postop VAS : 0.7
  Failure 2 cases (Stage 5 according Garcia-Elias)
- **ROM :**
  normal flexion–extension in 28 cases (81,8%)
  normal pronation-supination in all cases (100%)
- **Strength** :
  Preop: 24.07 kgf Postop: 38.42kgf

Total functional outcomes

	Pre-op	post-op	controlateral
Flexion	52.45	63.55**(p<0,01)**	71.43(p=0,26)
Extension	50.62	74.56 **(p<0,01)**	77.89 (p=0,35)
Radial deviation	15.7	21.82 **(p<0,01)**	27.36 (p=0,48)
Ulnar deviation	26.75	35.52 **(p<0,01)**	37.28 (p=0,27)
Pronation supination	0-160	0-178 **(p<0,02)**	0-179 (p=0,16)
Wrist strength	24.07	38.42 **(p<0,01)**	40.81(p=0,18)

•No problem with sporty level +++

Results

Outcome **was** related to :

– Stage 5 Garcia-Elias (2/3)

Outcome **was** related to :

– delay surgery (better outcome if short delay)

Complications:

- Slight flexion stiffness 6 cases (range 40° to 60°)
- One Sudeck (healed)

Results

DASH:

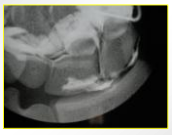
PreOp : Average 46.05 (range 13.64 to 90.91)

PostOp : Average 8.29 (range 0 to 40.91)

Mayo WS:

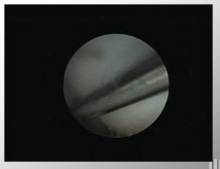
Excellent :	35	cases
Good:	18	cases
Average :	2	cases
Poor:	2	cases

Clinical case



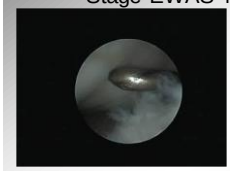
Clinical case

ADCLR
Stage EWAS 4, Geissler 4, Garcia-Elias 4



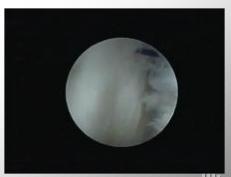
Clinical case

ADCLR
Stage EWAS 4, Geissler 4, Garcia-Elias 4



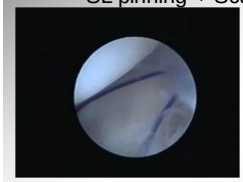
Clinical case

ADCLR
SL pinning + Scapho-capitate pinning



Clinical case

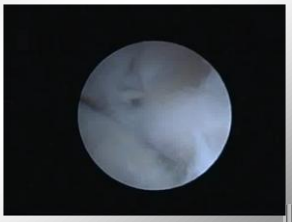
ADCLR
SL pinning + Scapho-capitate pinning



Clnical case

ADCLR
SL pinning + Scapho-capitate pinning

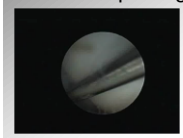
Pre ADCLR



Post ADCLR

Clnical case

ADCLR
SL pinning + Scapho-capitate pinning



Pre ADCLR

Post ADCLR

Clinical case

ADCLR
SL pinning + Scapho-capitate pinning

RESULTS

D + 2 months

Normal aspect

SLIOL unrepaired, Stability of dorsal part

RESULTS

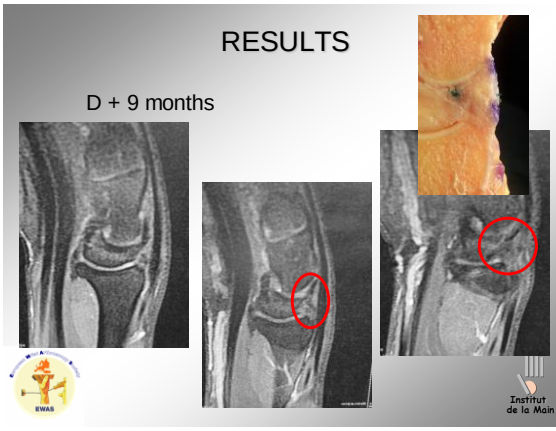
D + 2 months

Normal aspect

SLIOL unrepaired, Stability of dorsal part

RESULTS

D + 9 months



RESULTS

D + 19 months

RESULTS

D + 19 months

OUTSTANDING ISSUES

Is the SLIOL really useless ? **YES**

What is the real importance of proprioception? Do we act on proprioception with arthroscopic repair? **YES**

Does the distal volar ligamentous lesions (stt) exist? **??**

Are isolated lesions of the DCSS pre-unstable lesions, or are they another entity? **YES**

What is the real place of extrinsic ligaments? **SLLComplex**

Institut de la Main

Conclusion

DSL, DST, DCSS ligts seem essential in SL stability

SLLComplex: a new concept!!!!!!

Arthroscopic capsuloligamentous repair is a simple and reliable procedure convenient for the patient with chronic scapho-lunate tears, except in stage 5 (GE)

These encouraging first results need a longest follow-up.

Institut de la Main

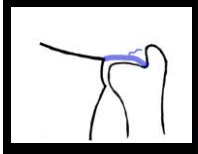
A TECHNIQUE FOR ARTHROSCOPIC REPAIR OF THE VOLAR S-L LIGAMENT

Francisco del Piñal, MD, Dr Med. (*)
Hand and Plastic Surgery. Private practice.
Hand-Wrist Unit and Department of Plastic Surgery. Mutua Montañesa.
SANTANDER. SPAIN.
(*) nothing to disclose.

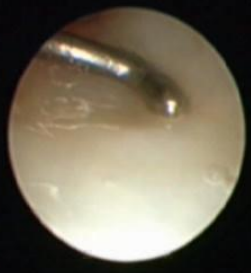
A TECHNIQUE FOR ALL-INSIDE SUTURING IN THE WRIST

Francisco del Piñal
Hand and Plastic Surgery. Private practice.
Hand-Wrist Unit and Department of Plastic Surgery. Mutua Montañesa.
SANTANDER. SPAIN.
pacopinal@gmail.com

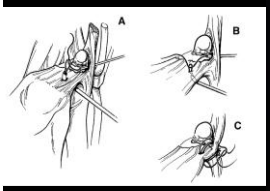
1B tear without instability



PERIPHERAL



1B tear without instability



De Araujo, Poehling, Whipple. *Arthroscopy* .1995.

The problem…THE KNOT

Technical Note

A Novel Technique of All-Inside Arthroscopic Triangular Fibrocartilage Complex Repair

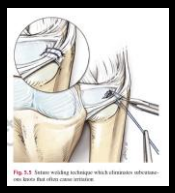
Jeffrey Yao, M.D., Phani Dantuluri, M.D., and A. Lee Osterman, M.D.

Arthoscopy 2007.

Abstract: Peripheral triangular fibrocartilage complex (TFCC) tears are amenable to repair. Limitations of current repair techniques include prolonged recovery and button or knot intolerance. We present a novel technique of an all-inside repair using existing technology (FasT-Fix; Smith & Nephew Endoscopy, Andover, MA) to circumvent these complications. This technique is faster, easily performed, safe, and potentially stronger than current repairs. Earlier motion and rehabilitation are instituted after this repair. The tear is debrided to stimulate angiogenesis. The FasT-Fix is inserted through the 3-4 portal with the arthroscope in the 6R portal. The first poly-L-lactic acid block is deposited peripheral to the tear. Upon penetration of the wrist capsule, a distinct decrease in resistance is felt. The introducer is withdrawn, depositing the block outside the capsule. The trigger on the introducer advances the second block into the deployment position. It is advanced and deposited central to the tear, forming a vertical mattress configuration. The introducer is removed, leaving the pre-tied suture. The knot is tightened and cut by use of the knot pusher/cutter. Multiple implants may be inserted to complete the repair. Postoperative care involves a sugartong splint for 2 weeks followed by a short arm cast for 4 weeks. Range of motion is begun thereafter with strengthening started at 10 weeks. **Key Words:** Wrist arthroscopy—Triangular fibrocartilage complex—All-inside repair.

pal joint. In fact, at our institution, 3 patients have had septic arthritis of the wrist develop from TFCC tears repaired over a button. All required a formal irrigation and debridement, and one required a radioscapholunate fusion for the sequelae of severe septic arthritis.

BÖHRINGER



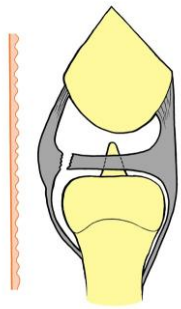
BADIA

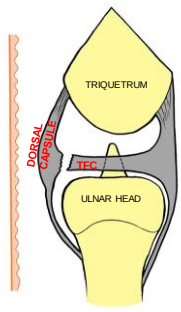
GEISSLER

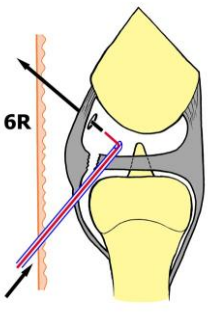
A TECHNIQUE FOR ALL-INSIDE SUTURING.

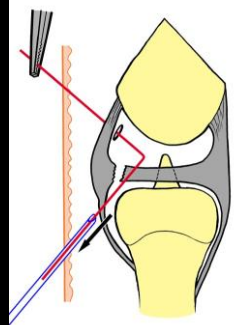
Piñal F del, et al. A technique for arthroscopic all-inside suturing in the wrist. J Hand Surg Eur 2010 ;35:475-9.

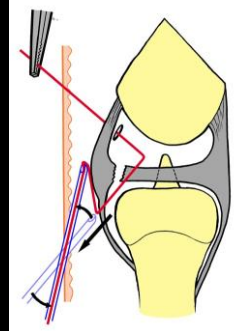
Requirements.

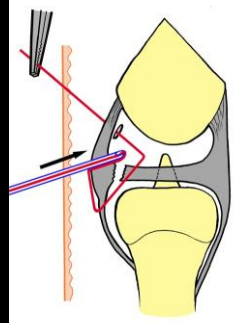


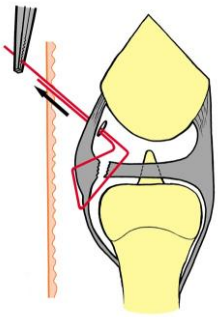

TRIQUETRUM
DORSAL CAPSULE
TFC
ULNAR HEAD

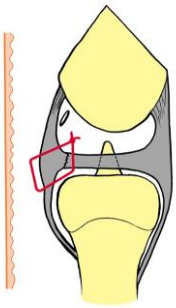

6R



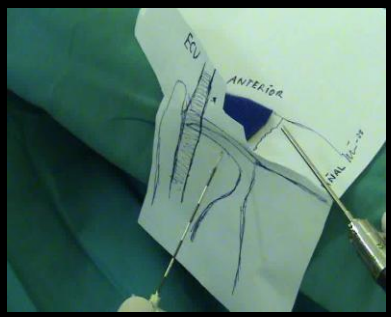




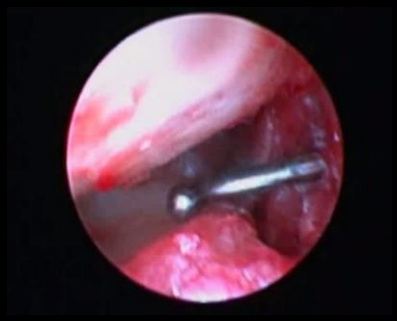




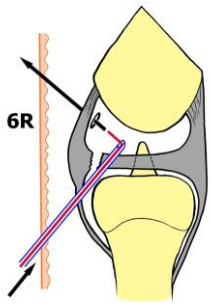
TECHNIQUE



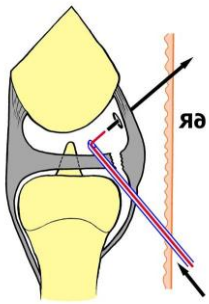
ALL-IN REPAIR



All-in VOLAR S-L suturing



All-in VOLAR S-L suturing



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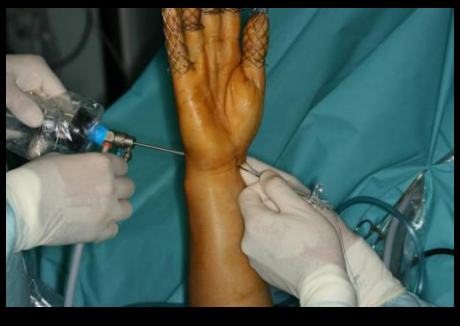
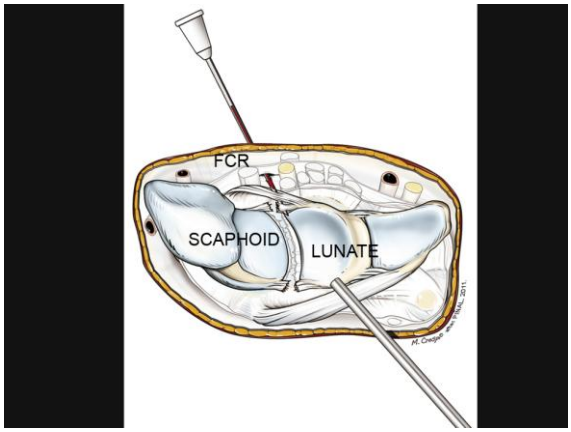
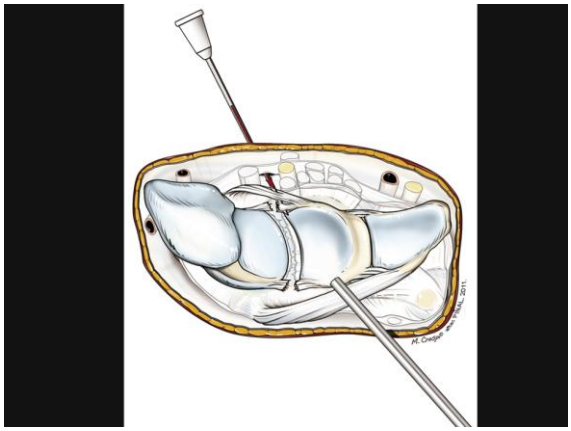
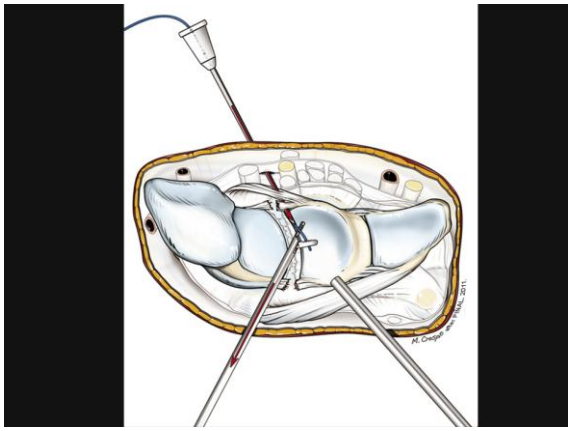
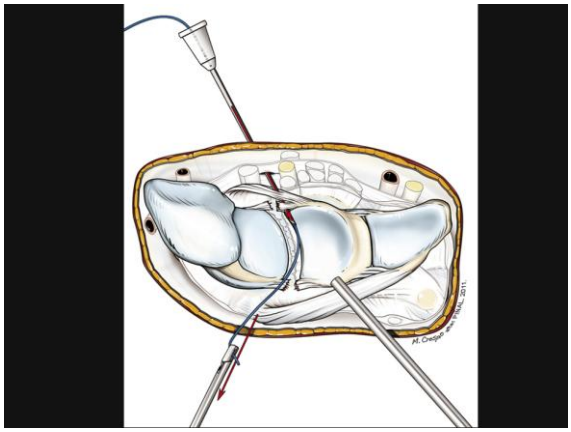
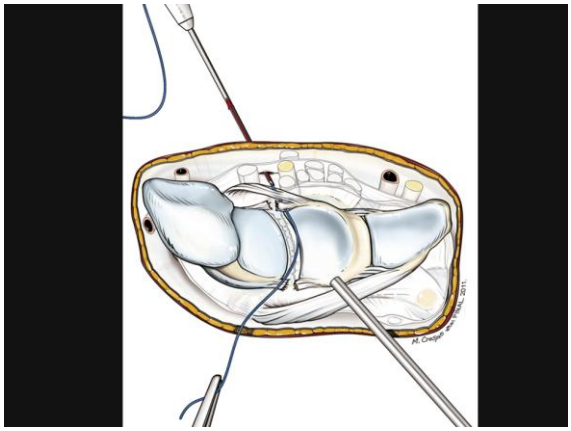


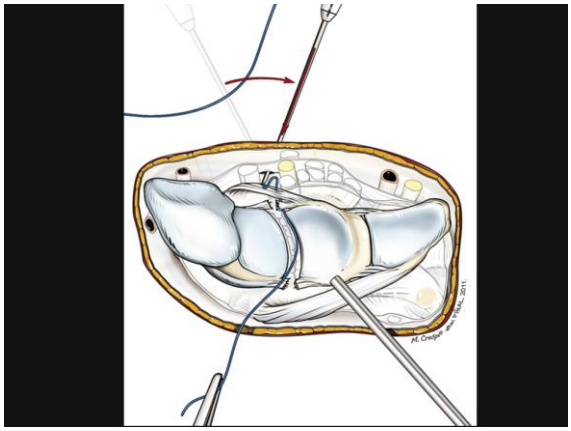


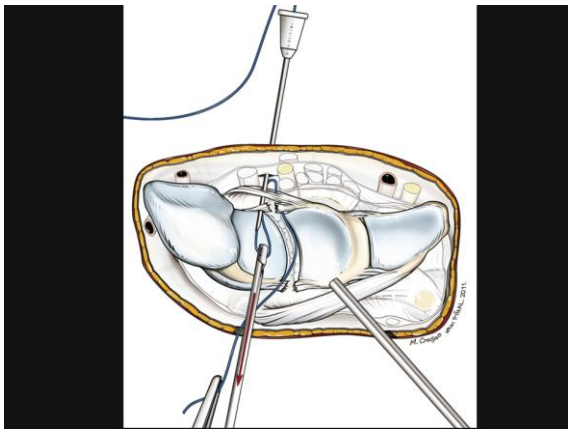


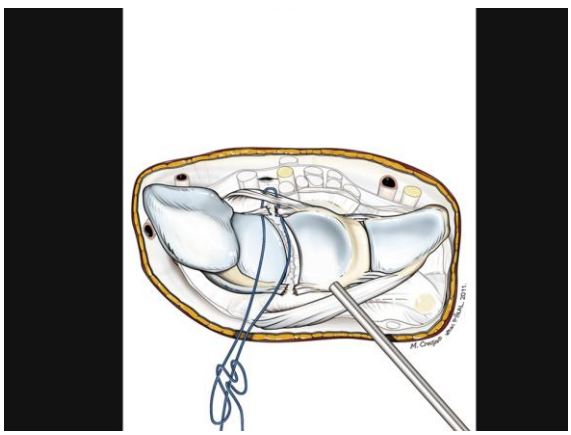


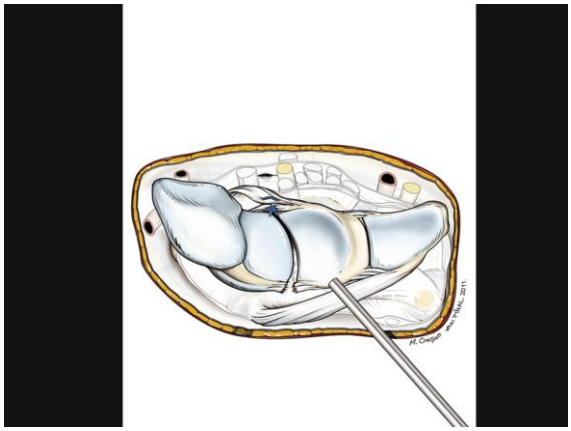




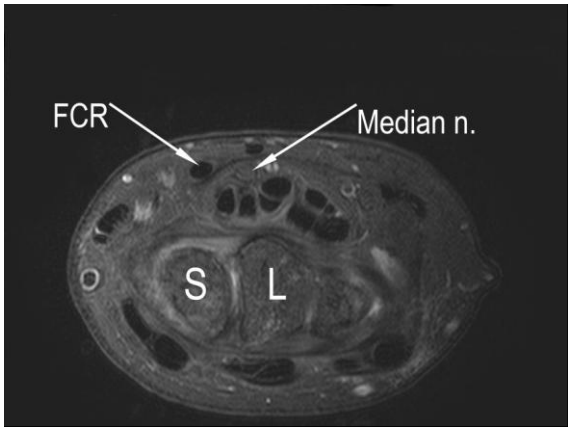


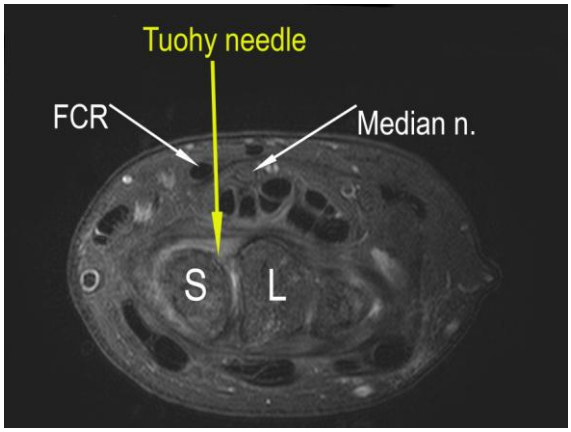


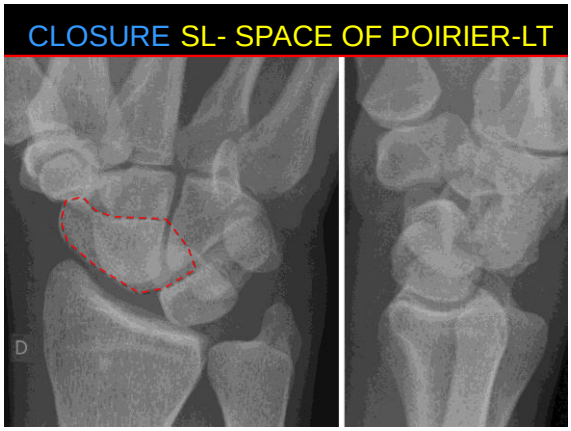


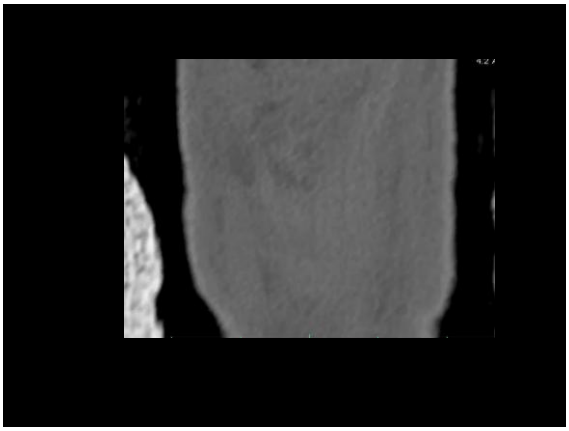


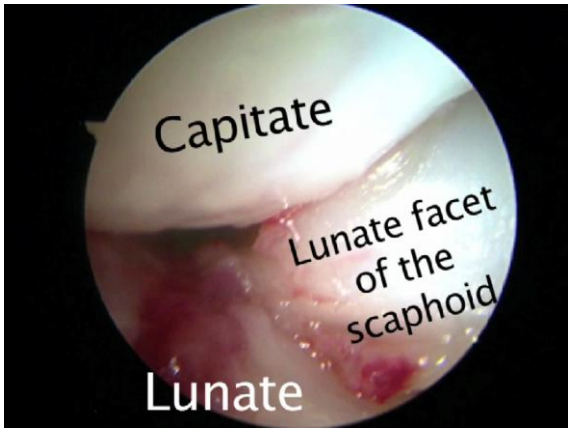
All-in VOLAR S-L suturing

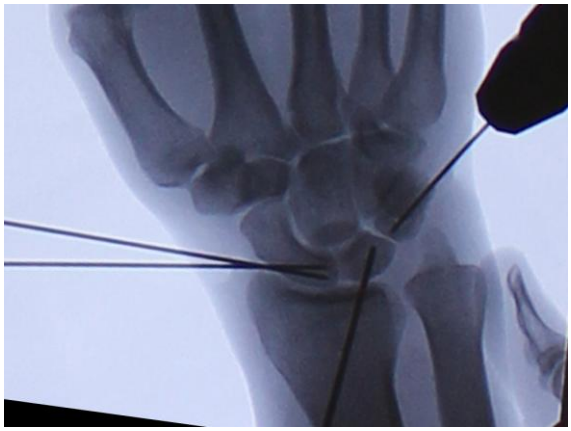

FCR
Median n.
S
L

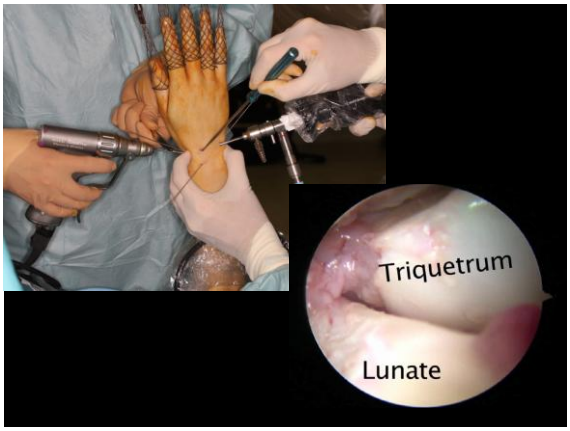

Tuohy needle
FCR
Median n.
S
L


CLOSURE SL- SPACE OF POIRIER-LT

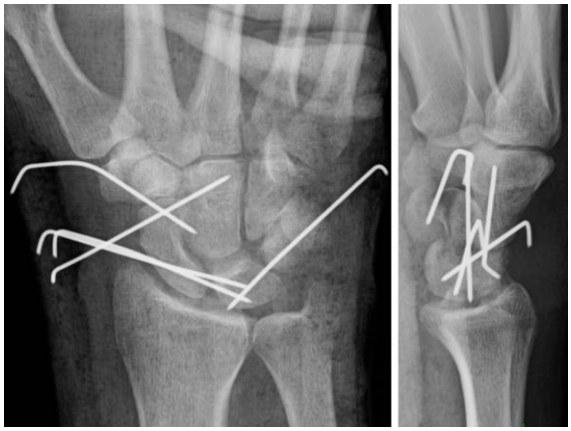


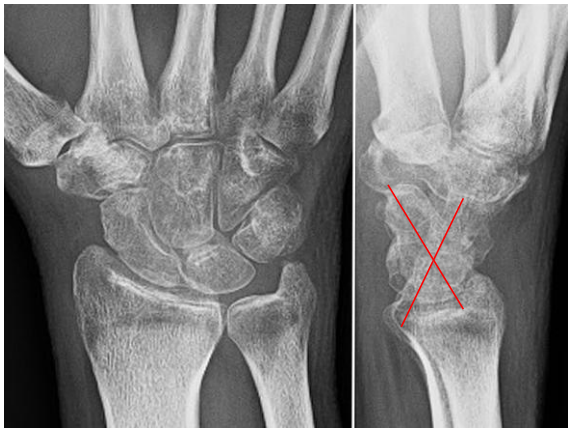

Capitate
Lunate facet of the scaphoid
Lunate



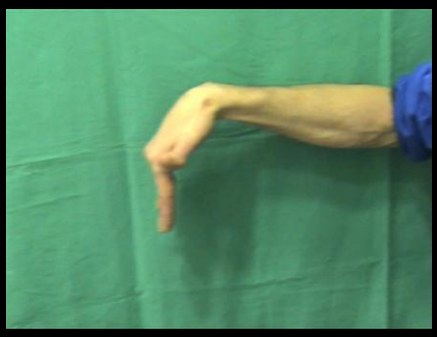

Triquetrum
Lunate


Scaphoid





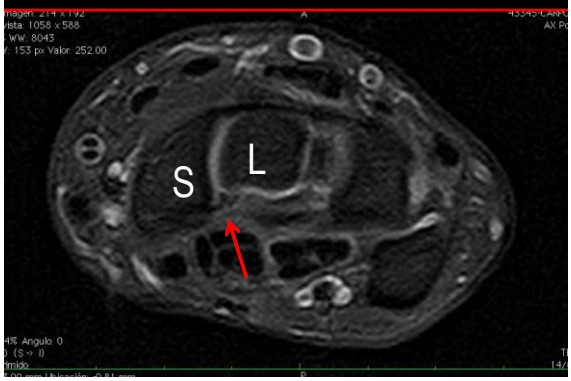
1 year postoper.



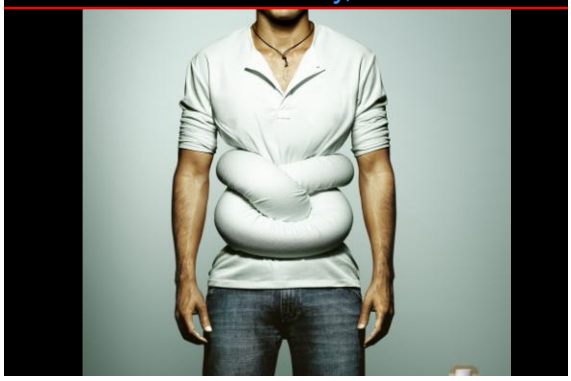
CLINICAL EXPERIENCE…

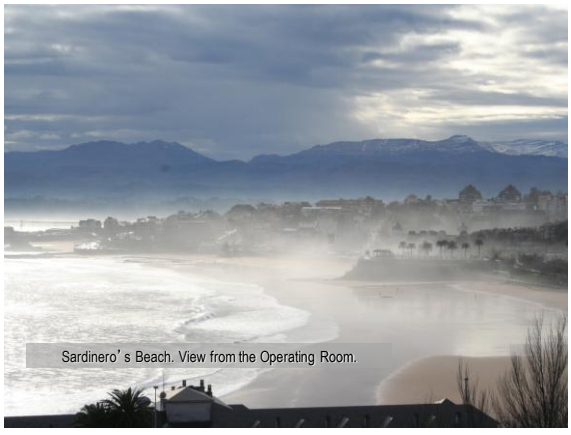
- 8 Volar S-L Repair.
- 6 Volar and Dorsal S-L Repair.
- 4 Volar capsule and Ligaments repair (PLFD).

CLINICAL EXPERIENCE…



In summary, …





WEBMINAR on SL lesion, 2013

Open scapholunate ligament repair and capsulodesis

Luchetti Riccardo

Rimini (Italy)

Stage	I	II	III	IV	V	VI
Partial injury	yes	no	no	no	no	no
SL Repairable	yes	yes	no	no	no	no
Integrity STT lig	yes	yes	yes	no	no	no
Reducible	yes	yes	yes	yes	no	no
Normal cartilage	yes	yes	yes	yes	yes	no

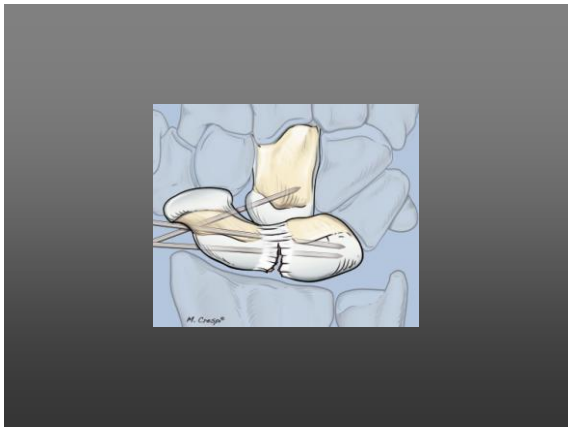
Percutaneous K-wire fixation and/or Dorsal capsulodesis

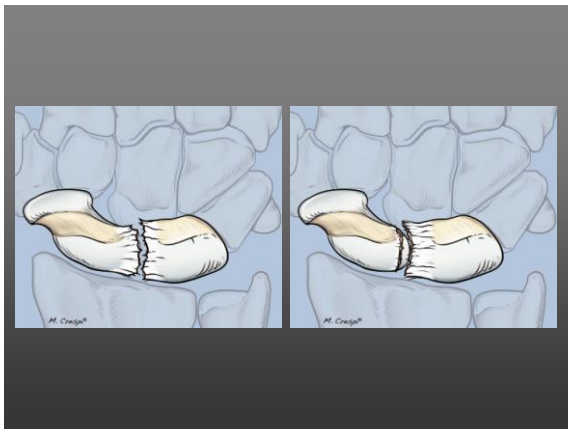
Garcia Elias M

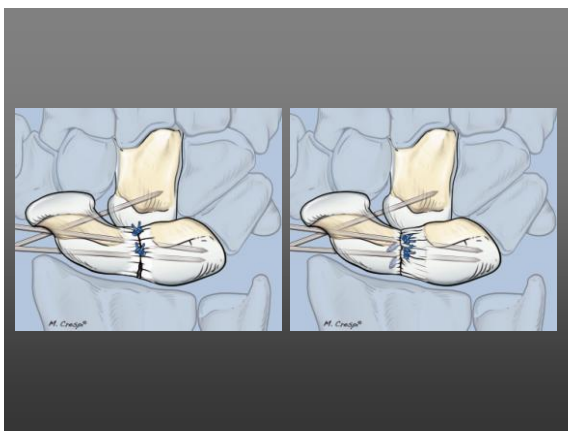
Stage	I	II	III	IV	V	VI
Partial injury	yes	no	no	no	no	no
SL Repairable	yes	yes	no	no	no	no
Integrity STT lig	yes	yes	yes	no	no	no
Reducible	yes	yes	yes	yes	no	no
Normal cartilage	yes	yes	yes	yes	yes	no

Ligament repair + K-wire fixation (+ Dorsal capsulodesis)

Garcia Elias M





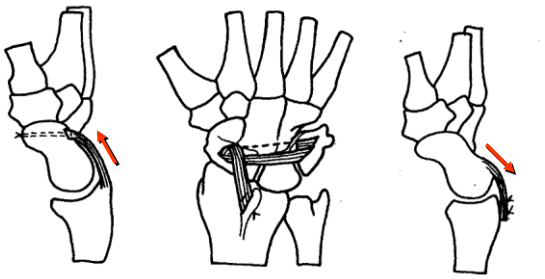


SLIL Tears

Algorithm of Treatment

- Arthroscopic Shrinkage & Pinning
- Open Repair
- Augmentation by Capsulodesis
- Reconstruction by B-L-B graft
- Reconstruction by Tenodesis

Historical Techniques



BLATT (1987) LINSCHEID (1992) HERBERT (1996)

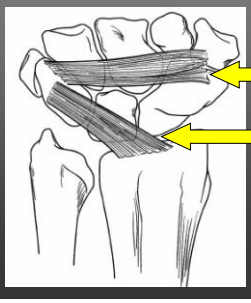
Historical Techniques

- All of them crossed the radio carpal joint

⬇ ⬇ ⬇

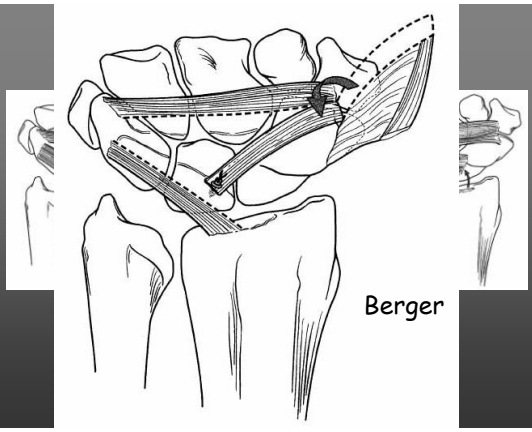
- Reduction of wrist flexion

Dorsal ligaments of the wrist



Dorsal Intercarpal Lig

Radio Triquetral Lig

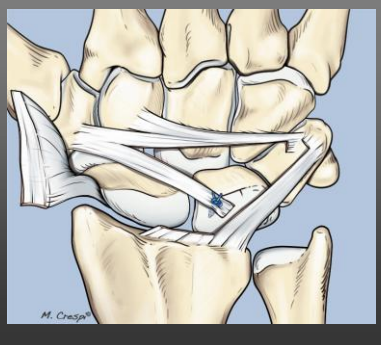


Berger

Procedure

- Isolated
- Associated, with SLIL repair

Surgical Technique

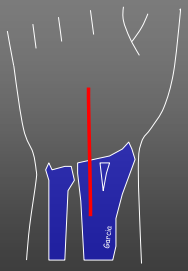


Surgical Technique

- Longitudinal skin incision (Traditional)
- Transverse skin incision (Short)

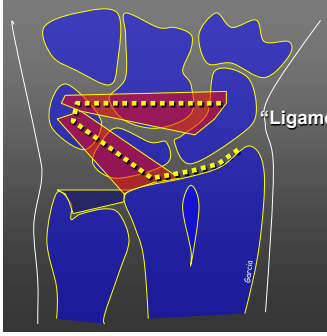
Traditional Technique

Surgical Technique



Longitudinal dorsal skin incision

Surgical Technique

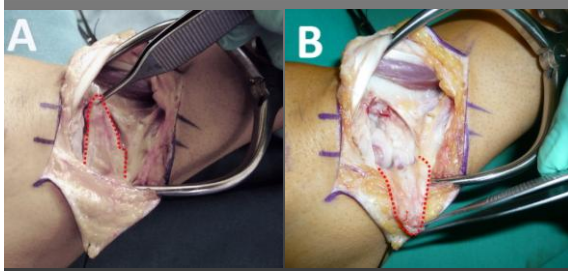


Capsulotomy

"Ligament splitting capsulotomy"

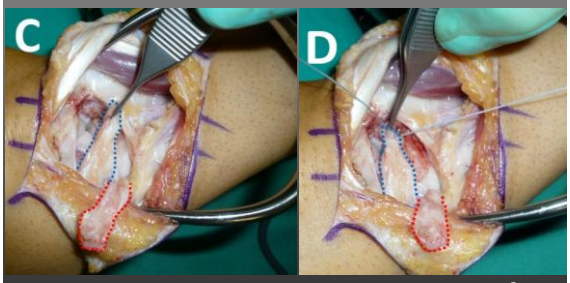
Berger – Bishop, 95

Surgical Technique



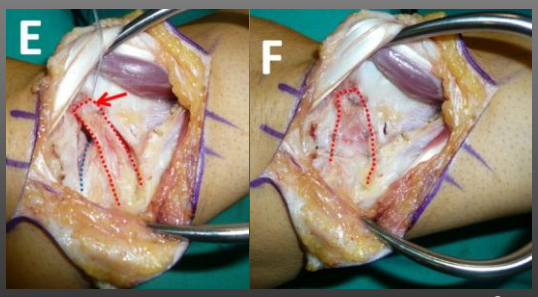
Step 1

Surgical Technique



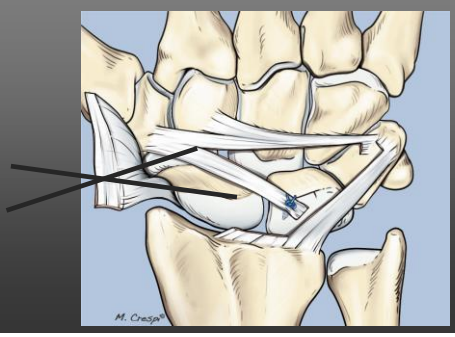
Step 2

Surgical Technique



Step 3

SL and SC pins fixation



Present Series

- 2001- 2004
- Cases : 18 (9 F, 9 M)
- Age (mean) : 35 y.o. (15 to 57 y.o.)
- Affected side : 11 L, 7 R
- Type of lesion : all hyperext. but one
- Time elapse from injury to surgery : 10 mo (2 to 24 mo)
- Watson test ++ in all cases

Wrist ARS

- RC and MC ARS (18 cases)
  - SL instability: 100% (Geissler type 3)
- Correlation with MRI : 87%
- Correlation with x-ray : 56%

ARS: gold standard

Type of SLIL lesion

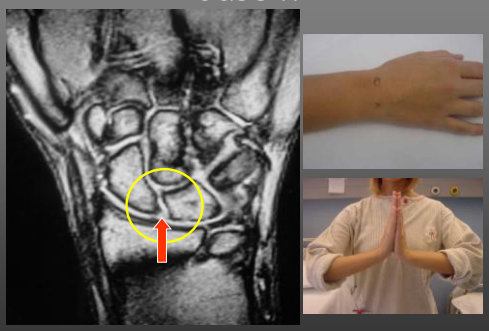
- Partial (stage 1) = 14
- Complete (stage 2) = 4

with SLIL tear
but still repairable

Postop Rehab

- Spica cast immobilization for 4 weeks
  - Immediate finger mobilization
  - Hand edema drenage
- Rehab after first month
  - Active and passive wrist mobilization
- Wrist splint protection for one month more
- Return to work after 3 months
- Sport activity after 3 months

Case # 1

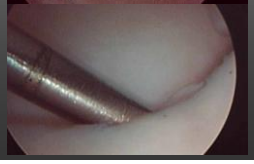


Case # 1

Wrist Arthroscopy

- SLIL instability type 3° according with Geissler

RC

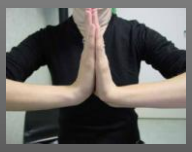


MC

Case # 1

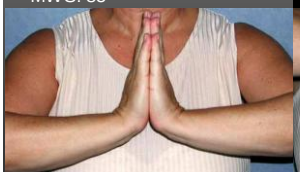
Results

- Pain: 2
- Complete wrist ROM
- Grip strength increased
- Retur to previous work
- Watson test: negative
- MWS: 100

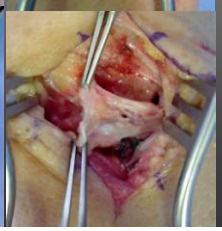


Case # 2

- CAS, f, 55 years old, right dominant.
- Right wrist partial SLIL tear
- X-rays: positive
- MRI: doubtful
- Watson test: positive
- MWS: 85

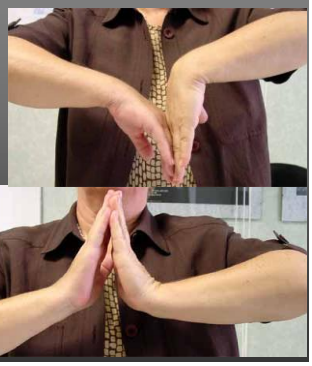


Case # 2



Case # 2

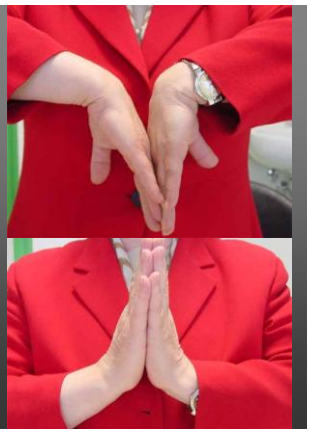
Follow up at 1 month



Case # 2

F-up: 10 months

- Pain: 0
- Incomplete wrist ROM
- Grip strength: 100%
- MWS: 95
- Return to prev. work



Clinical Results

18 cases

(F-up 15 mo)

Parameters	Preop	Postop	p
Pain (VAS)	8	5	<0,005
Flex – Ext (°)	127	123	ns
Grip Strength (Kg / %)	24 / 75	27 / 87	<0,05 / ns
MWS (Cooney)	62	84	<0,005
MWS (Krimmer)	72	90	<0,005
DASH	38	20	ns

Pts didn't require any more surgical procedure

Comparison with literature

AUTHORS	#	F-up (months)	Pain (VAS)	F/E (%)	Grip strength (%)	MWS
Moran	31	54	⬇	83	70	73
Minami	17	49	⬇	87	93	83
Kobayashi	21	14	⬇	?	81	?
Luchetti	18	15	⬇	80	87	84

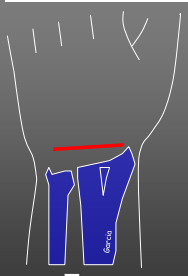
(Dorsal capsulodesis by using the DIC ligament)

Modification of the Surgical Technique

According to the SLIL lesion

Clinical eval: Watson test +/-
X-ray: no DISI def
Arthroscopy: stage 2/3

Surgical Technique



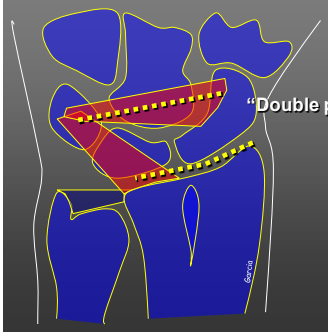
Dreant, 2009

Transversal dorsal skin incision with ext. retinaculum preservation

Surgical Technique

Double parallel incision with dorsal capsule preservation

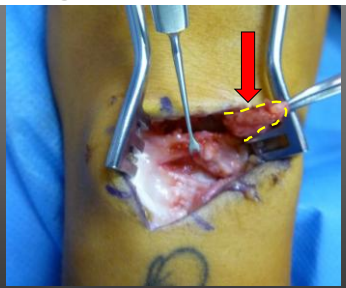
Surgical Technique



Capsulotomy

"Double parallel capsular incisiones

Surgical Technique



Ligament flap harvested from DIC

Surgical Technique

Ligament flap passed under the capsule ...

Surgical Technique

... and over the SL ligament ...

Surgical Technique

... and fixed to the lunate with anchor

Postop Rehab

- Immobilization (for 3 weeks)
- Earlier rehabilitation

Same results

… even better, related to minor SL lesion

Conclusion

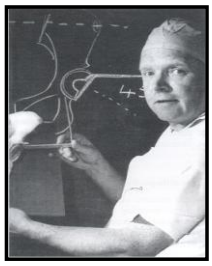
- Valid surgical procedure
- Indication for stage 1 to 3 (with SLIL repair)
- Easy technique
- Patients' informed consent about the risk of partial lost of wrist flexion

Thanks for your attention

Results of a Modified Brunelli Procedure for Chronic Scapholunate Instability

Mike Hayton
Consultant Orthopaedic Surgeon
HAND · WRIST · ELBOW

Wrightington Hospital, UK

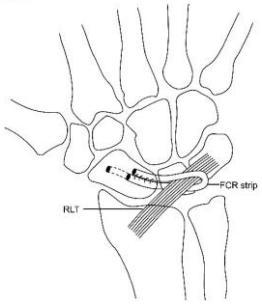


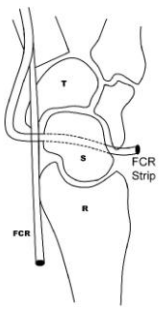
Sir John Charnley

- "Never operate on a bone that you can swallow"

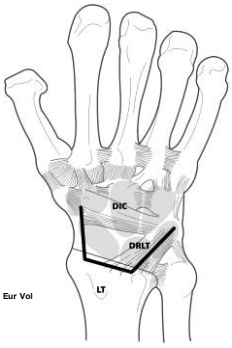
Some things have changed

Some things have changed





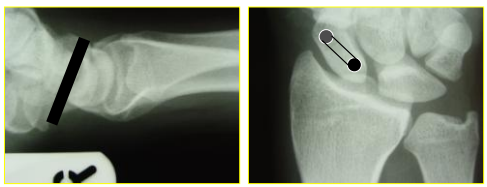
Berger Approach



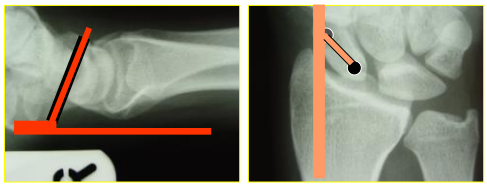
Anakwe R E et al. J Hand Surg Eur Vol 2012;1753193412453414

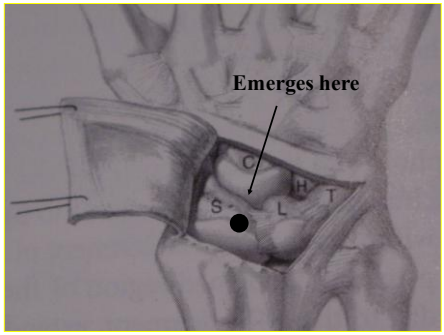
THE JOURNAL OF HAND SURGERY (European Volume)

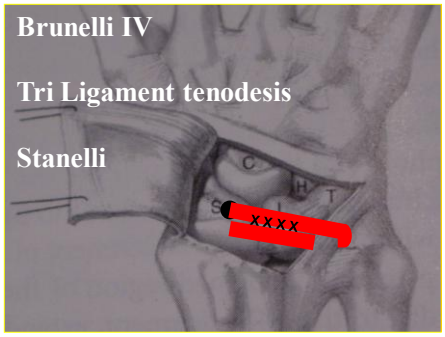
dorsal to volar
1.6mm K wire
2.9mm cannulated drill hole



1/3 FCR passed along tunnel





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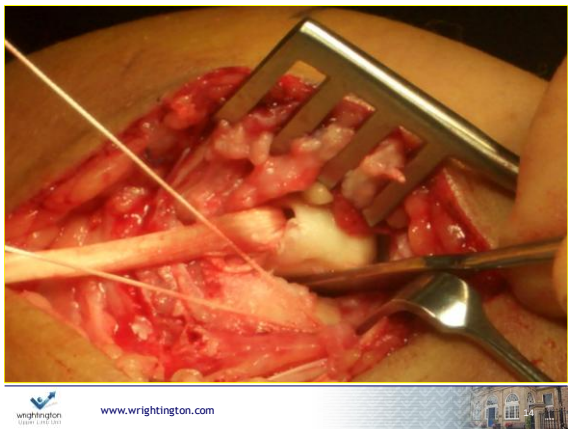
Upper Limb Unit
www.wright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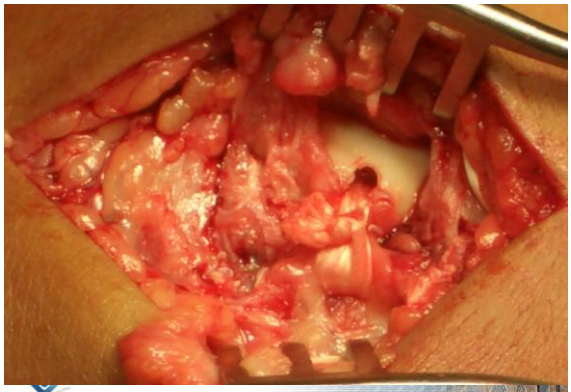


RESULTS OF TRI-LIGAMENT TENODESIS: A MODIFIED BRUNELLI PROCEDURE IN THE MANAGEMENT OF SCAPHOLUNATE INSTABILITY

S. C. TALWALKAR, A. T. J. EDWARDS, M. J. HAYTON, JOHN H. STILWELL, I. A. TRAIL and J. K. STANLEY

From the Centre for Hand and Upper Limb Surgery, Wrightington Hospital for Joint Disease, Wigan, UK

One hundred and sixty-two patients with a diagnosis of scapholunate instability underwent a modified Brunelli procedure over a 7-year period. One hundred and seventeen were assessed with the help of a questionnaire and, of these, 55 patients attended for clinical evaluation. The mean follow-up was 4 (1–8) years. There were 72 patients with dynamic scapholunate instability and 45 patients with static instability. The average age was 38 years. There were 50 males and 67 females. A total of 77 (62%) patients had no to mild pain with a mean visual analogue score of 3.67 (SD = 2.5). The loss in the arc of flexion–extension was due to a reduced range of flexion (mean loss 31%), while 80% of extension was maintained, compared with the contralateral side. The grip strength on the operated side was reduced by 20% of the non-operated side. There was no statistically significant difference ($P > 0.05$) in the range of movement or the grip strength between the static and dynamic group and patients with or without legal claims. Ninety (79%) patients were satisfied with the result of the surgery (good to excellent) and 88% of the patients felt that they would have the same surgery again. We feel that these results compare favourably with the early results published from this unit and recommend this procedure for dynamic and static scapholunate instability.

Journal of Hand Surgery (British and European Volume, 2006) 31B: 1: 110–117

Keywords: scapholunate dissociation, carpal instability, dynamic, static, tenodesis

Methods

- 162 patients with chronic SLD '95-02
- Part 1
  - Postal questionnaire
    - VAS
    - Problem solve
    - WWS
    - Satisfaction
    - Surgery again
    - Compensation

Methods

- 162 patients with chronic SLD '95-02
  - 74 Male 88 Female
- Part 2
  - Clinical review
    - Grip Strength
    - Range of movement
    - Employment status

Results

- Part 1 Questionnaire
  - 117 replied (72%)
  - Male 52 Female 65
  - Mean follow up 50.2 months (9-100)
- Part 2 Clinical Review
  - 55 Reviewed
  - Male 25 Female 30
  - Mean follow up 45.1 months (10-98)

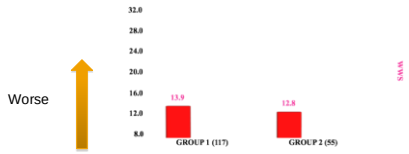
Wrightington Wrist Score

- Hand in back pocket
- Straight lift grip
- Take change
- Personal care
- Hand to face
- Use a screw driver
- Do usual work
- Rise from a chair

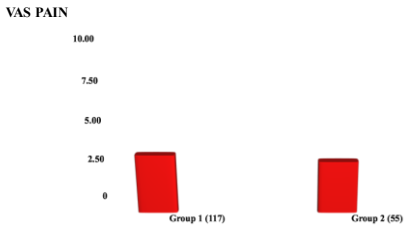
- 1=no problem
- 2= with difficulty
- 3= with aid
- 4= unable

8 = best score
32 = worst score

Wrightington Wrist Score



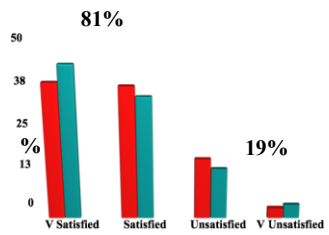
VAS PAIN



VAS Problem solved = 6.03 (sd 2.85)

Satisfaction

All responders
Reviewed

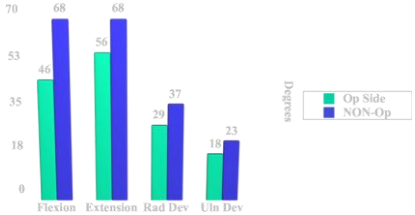


Grip Strength = 79%

Range of Motion

35˚ Loss of Flexion - Extension (26% of non operated side)

13˚ Loss of Radial - Ulnar deviation (12%)



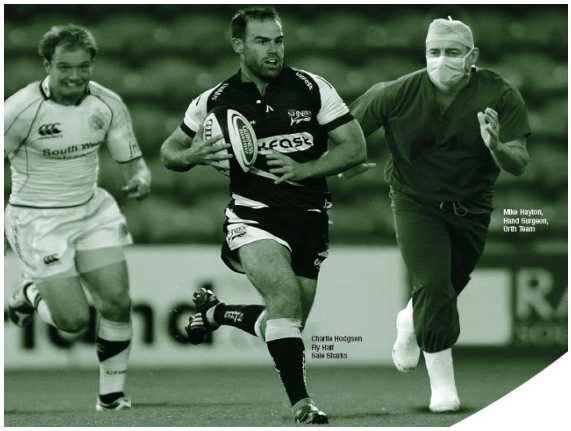
Employment

- 21 (34%) of those reviewed were taking part in heavy or light manual labour
- 4% unemployed

- 24 patients (43%) had changed their occupation or duties

Surgery again ?

- 88% would have the same again overall



Outcomes of Modified Brunelli Procedure in Professional Athletes with Scapholunate Instability

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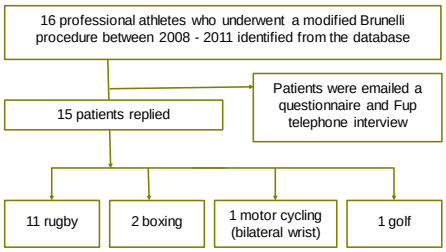
[1] University of Manchester, Manchester, UK.
[2] Wrightington Hospital, UK.

Presented BSSH 2012 York

Methods

- Retrospective review
- All procedures performed by senior author (MJH)

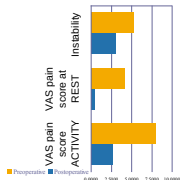


Results

Patient demographics

Number of operations	16
Age	Mean 30 years (range 18 - 42)
Gender	All male
Dominance of hand operated on	9 dominant, 7 non dominant
Level of competition before injury	9 international, 7 national
Time to surgery after injury	Mean 30 weeks (range 2 - 78)
Follow up	Mean 24 months (range 3 - 43)

Subjective outcome measures



	Mann-Whitney U test *p* value
instability	0.047
VAS pain score at REST	<0.001
VAS pain score ACTIVITY	<0.001

Functional scores at final review

Quick DASH

- 7.66 SEM 2.11 (range 0-25)

Wrightington activity of daily living, assessment for wrist function[2]

(8 is normal – 32 most abnormal)

- 9.25 SEM 0.38 (range 8-13)

[2] Taliwalkar SC, et al. *J Hand Surgery (British and European Volume)* 2006; 31: 110-117.

Return to play

• 10 of 15 (67%) returned to play at their pre-injury level of competition.

•5 of 15 (33%) returned to a lower competition level:

- 3 directly related to the wrist injury
- 2 due to other unrelated injuries

But for other injuries 12 out of 15 (80%) returned to playing

Summary

Modified Brunelli procedure in professional athletes generally

- Relieves wrist pain with ($p<00.1$)
- Appears to improve stability (not significant)
- Improves functional outcome scores

But for other injuries 12 out of 15 (80%) returned to playing