Oblique Ulnar Styloid Osteotomy
A Treatment for Ulnar Styloid Impaction Syndrome

D'Agostino P, Townley WA, Le Viet D, Roulot E

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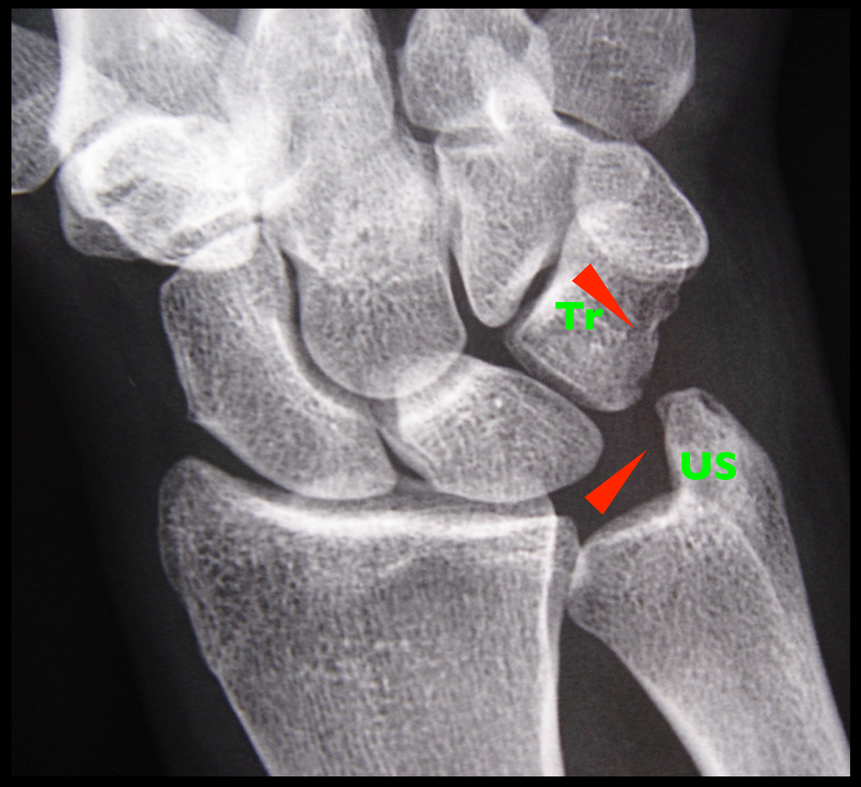
KATHOLIEKE UNIVERSITEIT
LEUVEN
kulak

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Mechanism

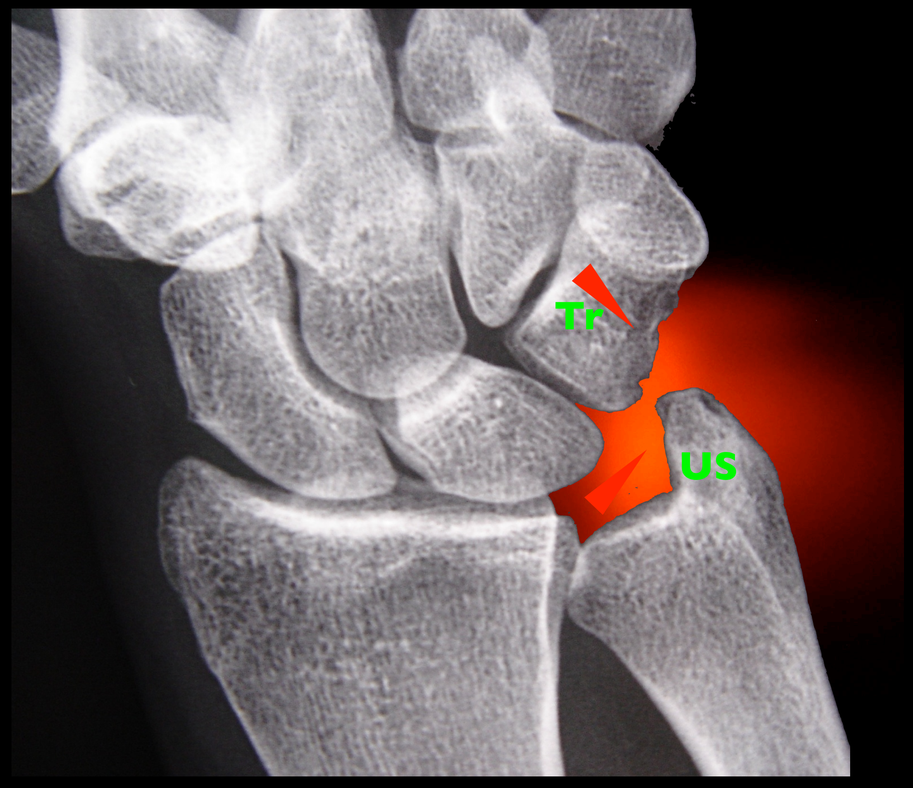
IMPINGEMENT tip of the Ulnar Styloid and Triquetrum



Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Major symptom

ULNAR-SIDED WRIST PAIN

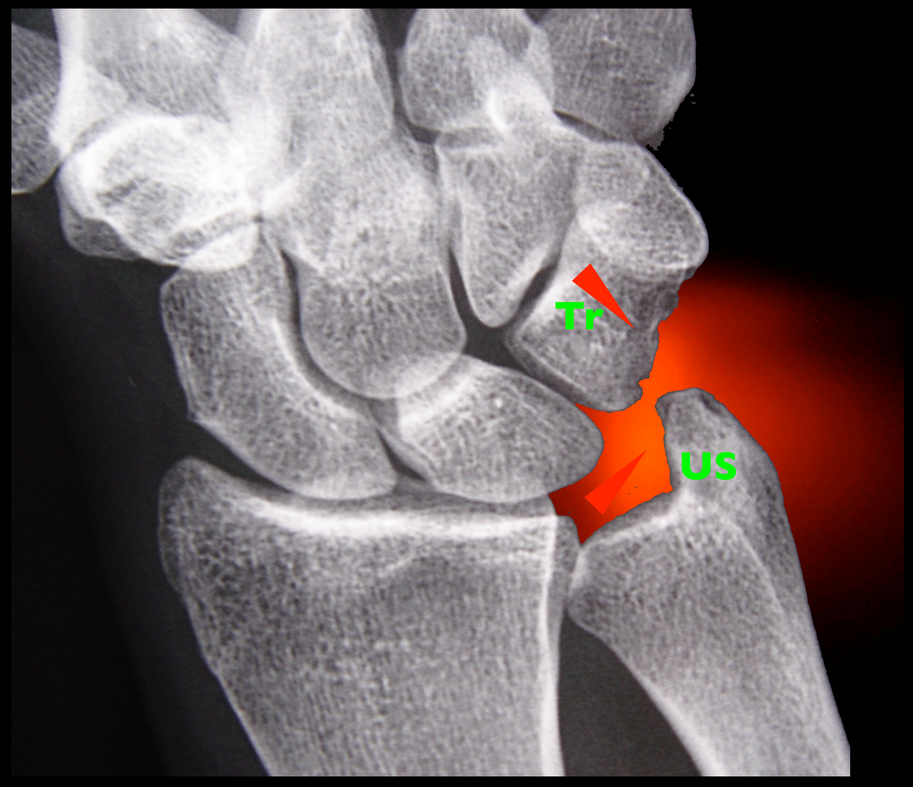


Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Major symptom

ULNAR-SIDED WRIST PAIN

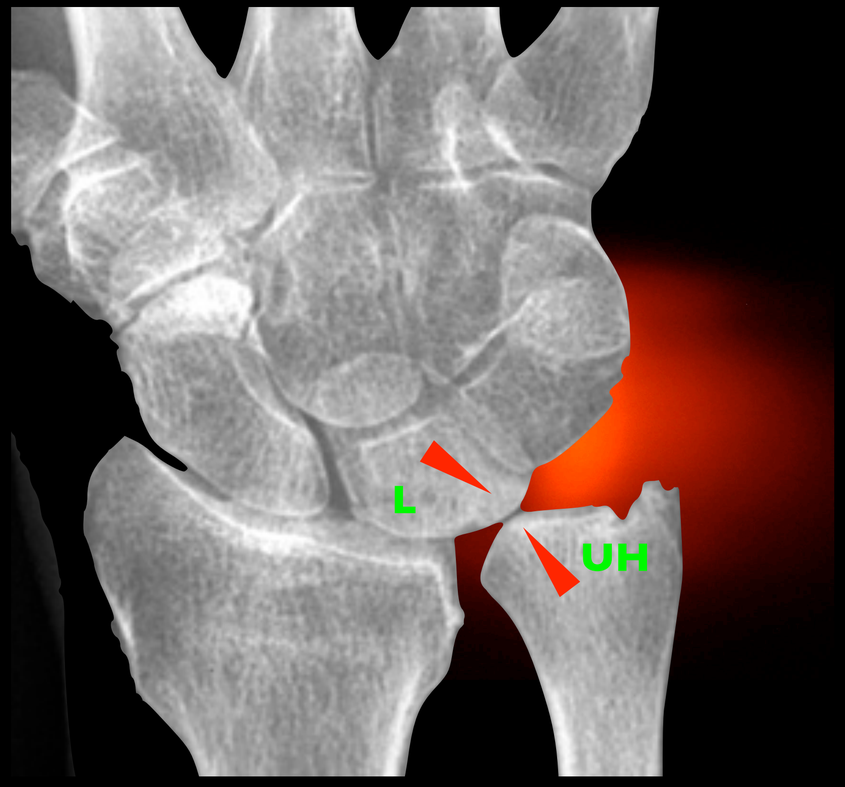
USIS



Mimic

Ulnocarpal Impaction Syndrome

UIS

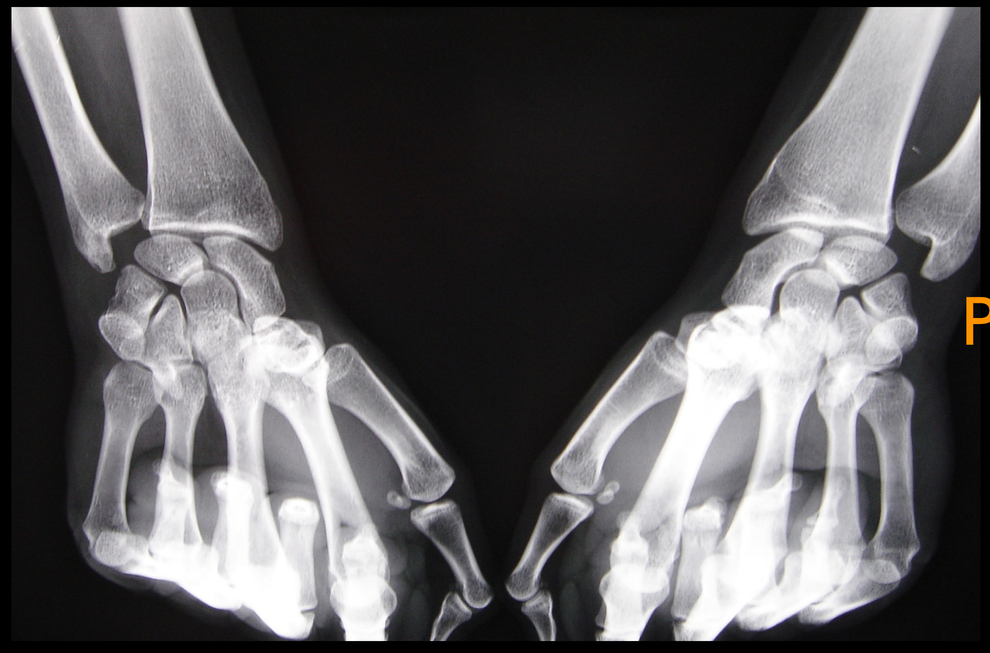


Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Clinical

Incidence : **RARE**, less frequent

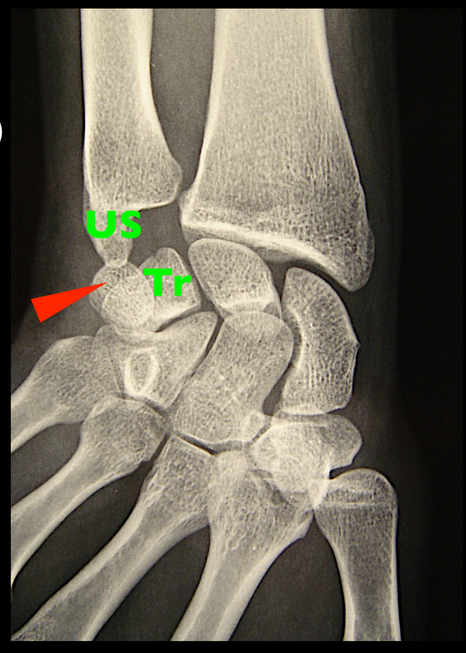
PROVOCATIVE TEST Topper 1997



Pronation

Positif in pronation
= USIS

UD



(wrist flexion, UD, elbow 90° flexion)

Oblique Ulnar Styloid Osteotomy (OUSO)

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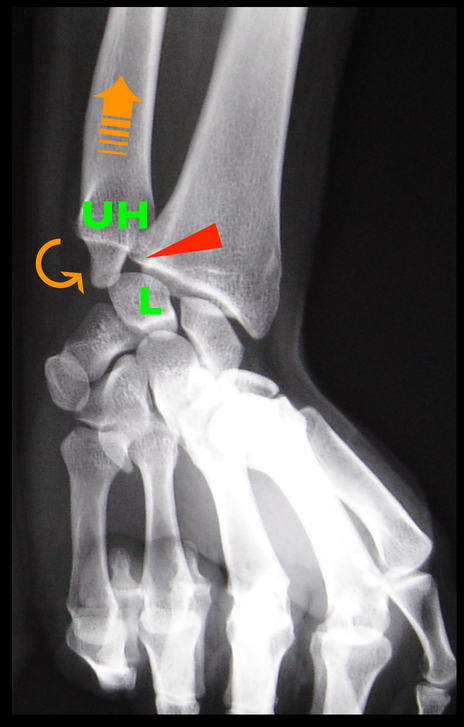
  - Clinical

Incidence : **RARE**, less frequent

PROVOCATIVE TEST Topper 1997

Supination

Positif in supination
= UIS

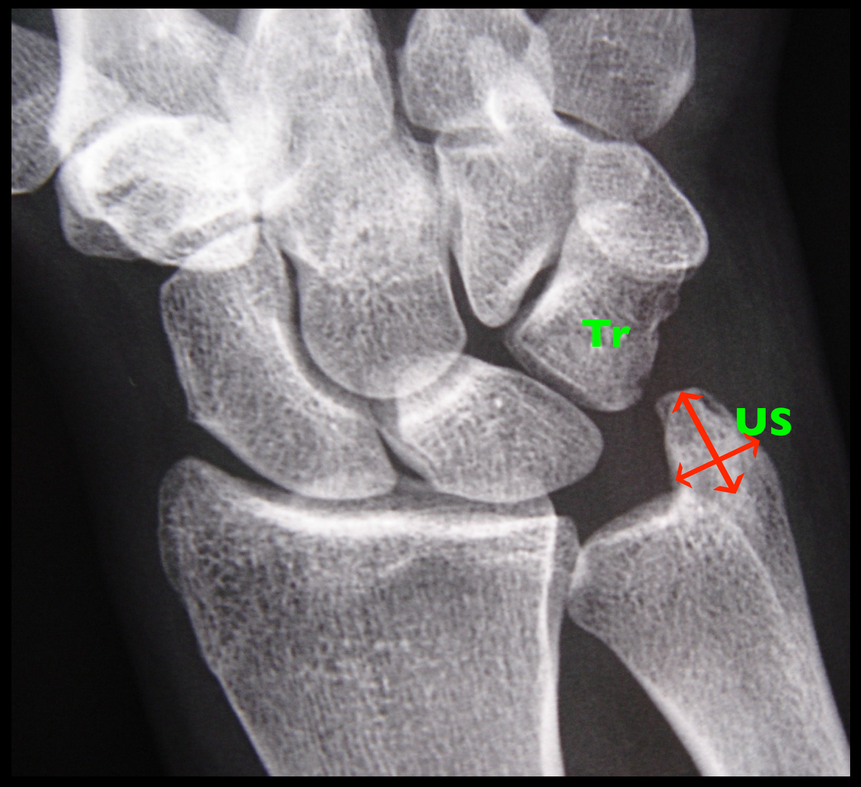


Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Radiological findings

Excesively long or hypertrophic US **Normal values 3-6mm** *Biyani 1990*

USIS



UIS

Oblique Ulnar Styloid Osteotomy (OUSO)

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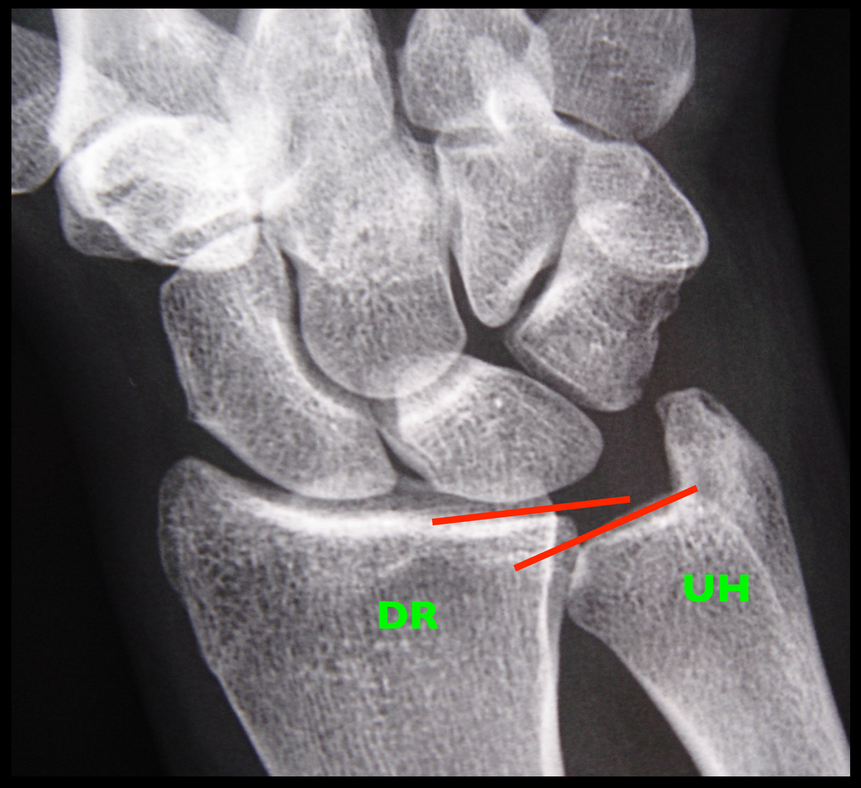
  - Radiological findings

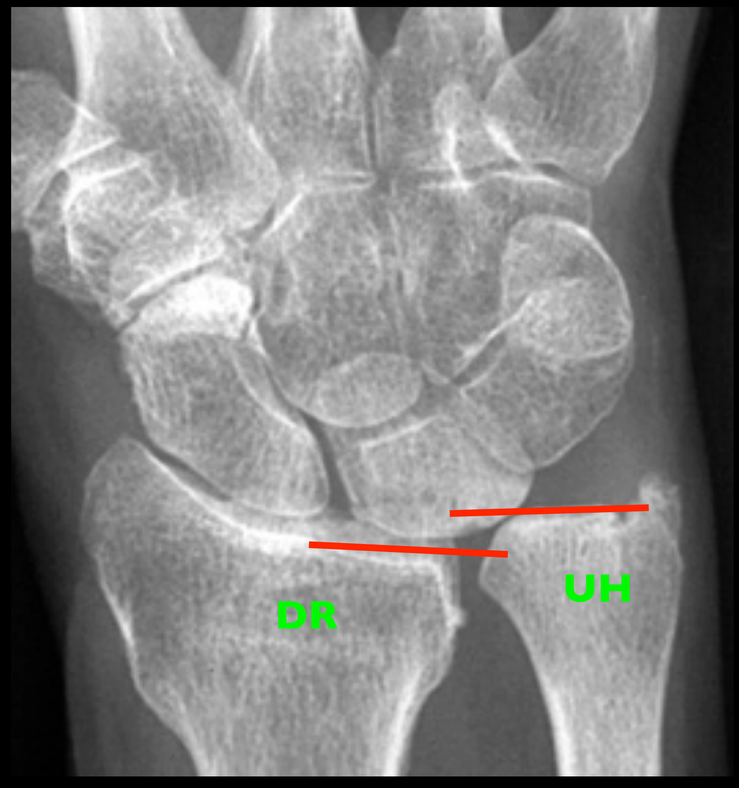
Neutral or negative UV

USIS



Positive UV

UIS

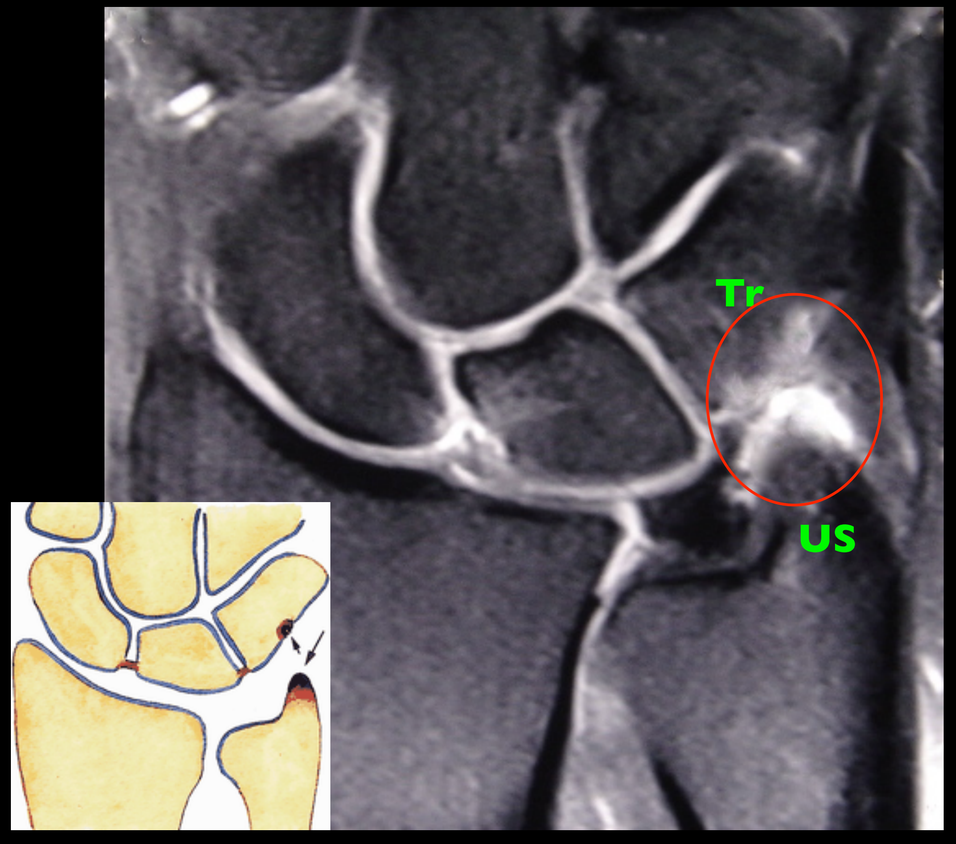


Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Radiological findings

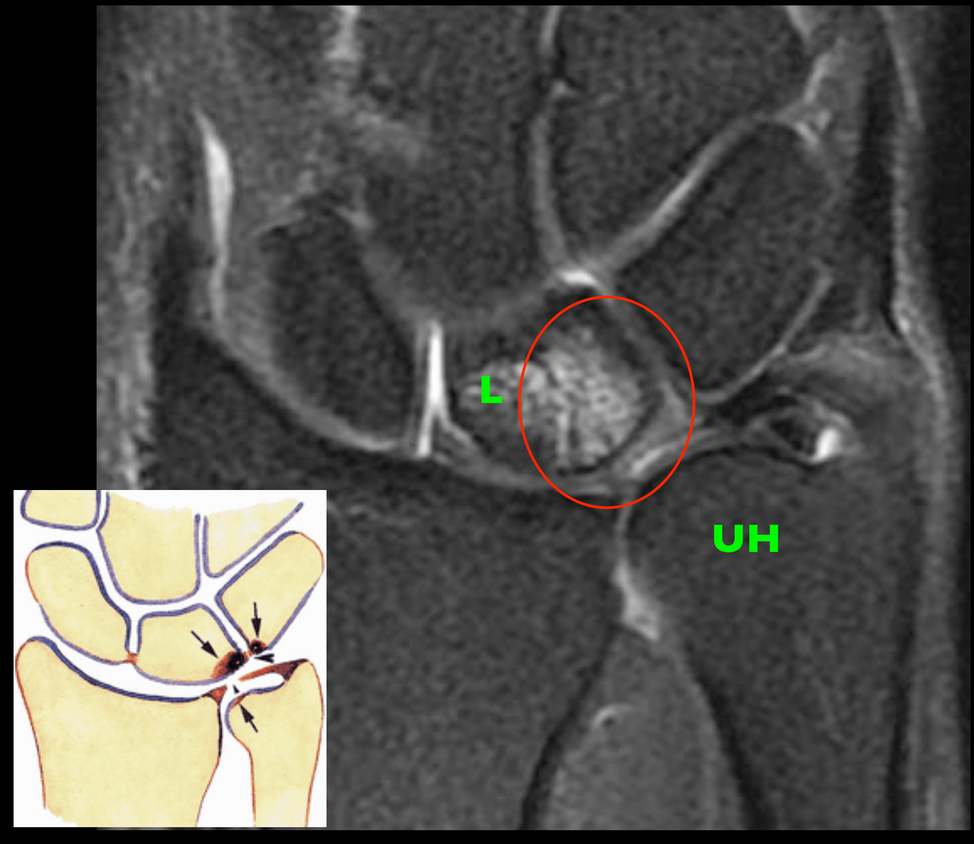
MRI bone edema

USIS



Cerezal 2002

UIS



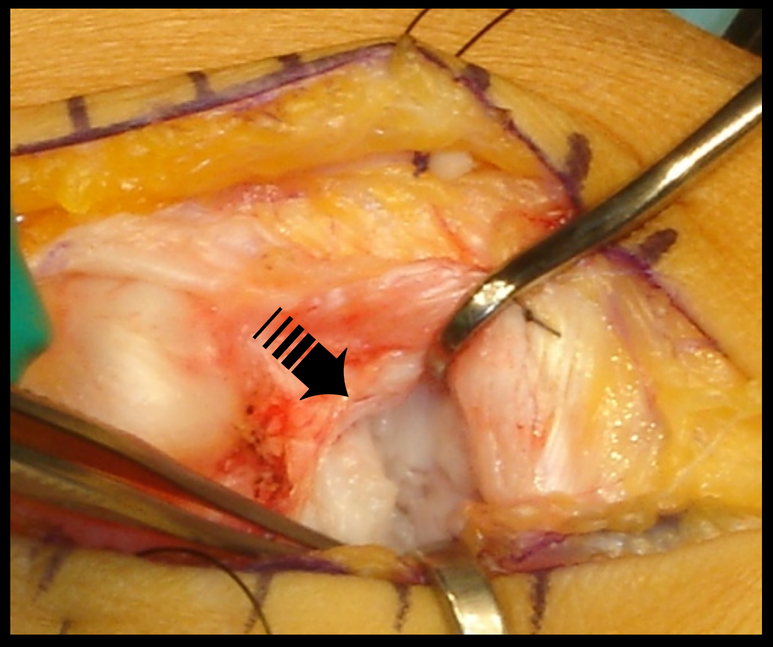
Cerezal 2002

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Peroperative view

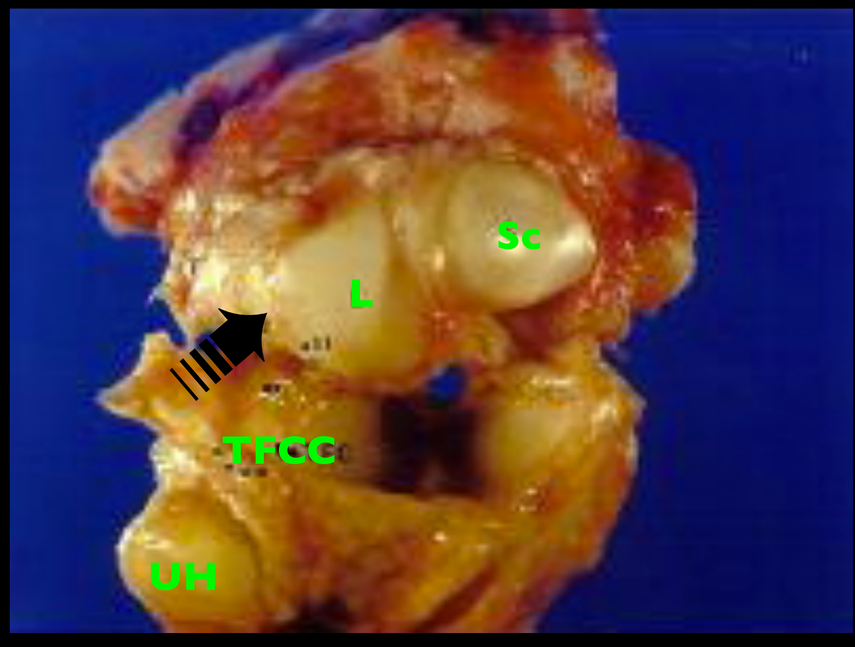
Triquetrum Chondromalacia

USIS



Cadaver Lunate chondromalacia

UIS



Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Differential diagnoses

Ligamentous injuries (TFCC and LT)

DRUJ and PTJ arthritis

DRUJ instability

Ulnar styloid non union

ECU tendinitis

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Accepted R/ in literature

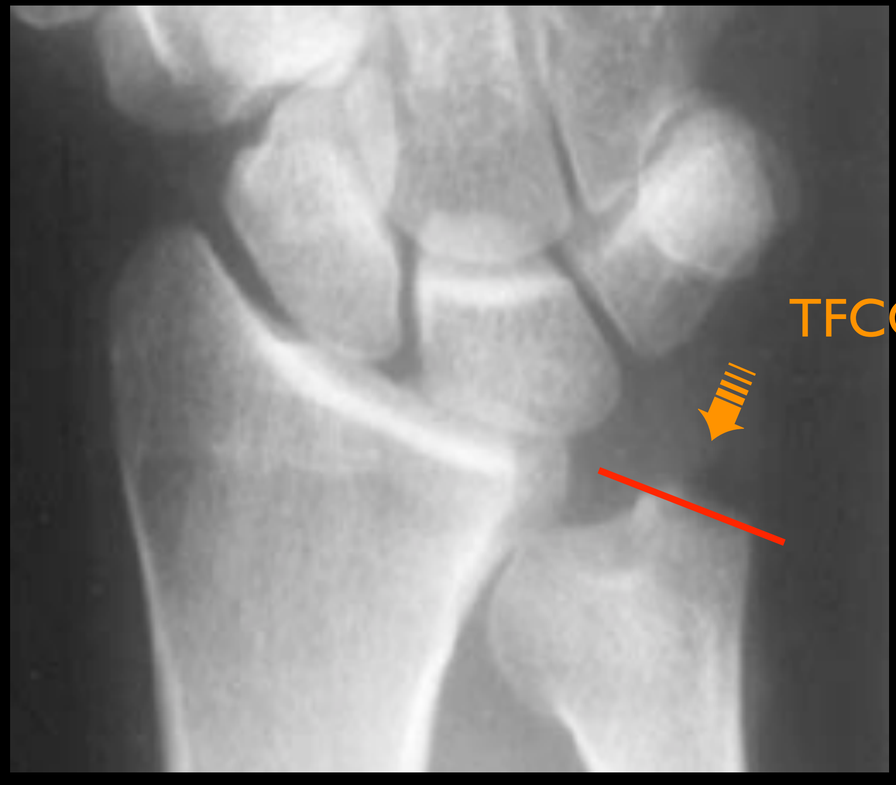
Open or Arthroscopic partial or complete ulnar styloidectomy

Topper et al., J Hand Surg 1997

Tomaino et al. J Hand Surg 2001

Bain and Bidwell, Arthroscopy 2006

Zahiri, Int Orthop 2010



Tomaino 2001

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - TFCC Anatomy

Palmer and Werner, J Hand Surg 1981

Nakamura et al., J Hand Surg 2001

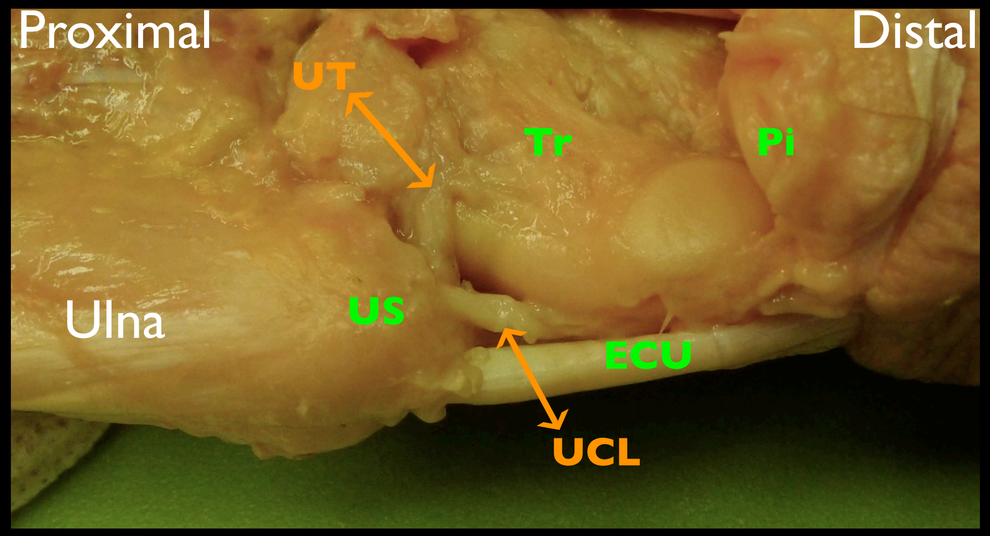
Nakamura 2001

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - New Surgical Technique : OUSO

Relieve USIS

Preserved TFCC ulnar stylocarpal components (UL, UT and UCL)



Purpose : Is this osteotomy an effective method for treating USIS ?

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Study design

Retrospective

Single Hand Surgery Center (Institut de la Main, Clinique Jouvenet, Paris)

5 patients with USIS (clinical and radiological findings)

OUSO surgical technique

PA X-ray, preoperative CT arthrography and MRI

Pre and postoperative Pain Scoring System

Mann-Whitney test. $P < .05$ was considered statistically significant.

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Study design

Pre and postoperative Pain Scoring System

TABLE 1. Pain Scoring System

Pain Score	Features
0	No pain
1	Mild pain; no pain medication (PM)
2	Slight, intermittent pain; occasional nonprescription PM
3	Slight to moderate, intermittent pain; frequent nonprescription PM
4	Moderate, intermittent pain; occasional prescription PM
5	Severe, constant pain; frequent prescription PM

Oblique Ulnar Styloid Osteotomy (OUSO)

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  - Study design

Patient demographics

TABLE 2. Patient Demographics

Case	Gender	Age (y)	Job	Injury	Affected Side	Dominant Side	Duration of Symptoms Before Treatment (mo)
1	Female	42	Accountant	Y	Left	Right	24
2	Female	71	Retiree	N	Right	Right	12
3	Female	47	Designer	N	Right	Right	12
4	Male	27	Baker	N	Left	Right	9
5	Female	20	Tennis player	N	Right	Left	14

Mean post-op F-Up 46 mo (range, 15–96 mo)

Oblique Ulnar Styloid Osteotomy (OUSO)

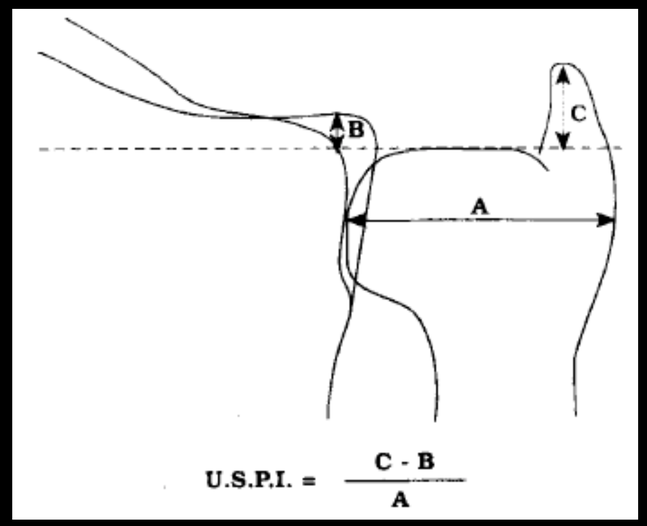
- Ulnar Styloid Impaction Syndrome (USIS)
  - Study design

Radiological findings

TABLE 3. Ulnar Styloid Morphology

Case	Ulnar Variance (mm)	Ulnar Styloid Length (mm)	USPI
1	−3	12	0.32
2	0	9	0.32
3	−2	7	0.29
4	−3	12	0.33
5	−3	8	0.33

USPI normal range 0.21± 0.07



Garcia-Elias 1987

In all patients : bilateral hypertrophic US and MRI bone edema

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - OUSO surgical technique

Axillary block

Upper-arm tourniquet

Forearm positioned in full pronation

Axial incision between the fifth and sixth dorsal compartments

The dorsal sensory branch of the ulnar nerve identified and protected

The extensor carpi ulnaris sheath left intact, and the extensor digiti minimi laterally retracted

Longitudinal arthrotomy, exposing the ulnar styloid

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - OUSO surgical technique

TFCC is left undisturbed

Ulnar styloid obliquely cut with a sharp osteotome

Distal cut first, parallel and distal to the proximal one

Proximal cut begins at the base of the styloid, just distal to the TFCC insertion, and proceeds distally and laterally at 45°

Bone resection for a styloid length ≤ 6 mm, according to Biyani value.

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - OUSO surgical technique

1.5-mm compression screw

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - OUSO results

Table 4 Pain Score and Evolution

Case number	Pain Score before treatment	Pain Score after treatment	Follow-up Duration after treatment (month)	Patient satis-faction	Return to prior employment	Associated factors
1	5	1	96	Excellent	Y	0
2	5	0	48	Excellent	Y	0
3	5	1	15	Good	N	Depression
4	5	1	50	Excellent	Y	0
5	4	0	19	Excellent	Y	0

Mean post-op F-Up 46 mo (range, 15–96 mo)

Pain level significantly reduced *P*=.006

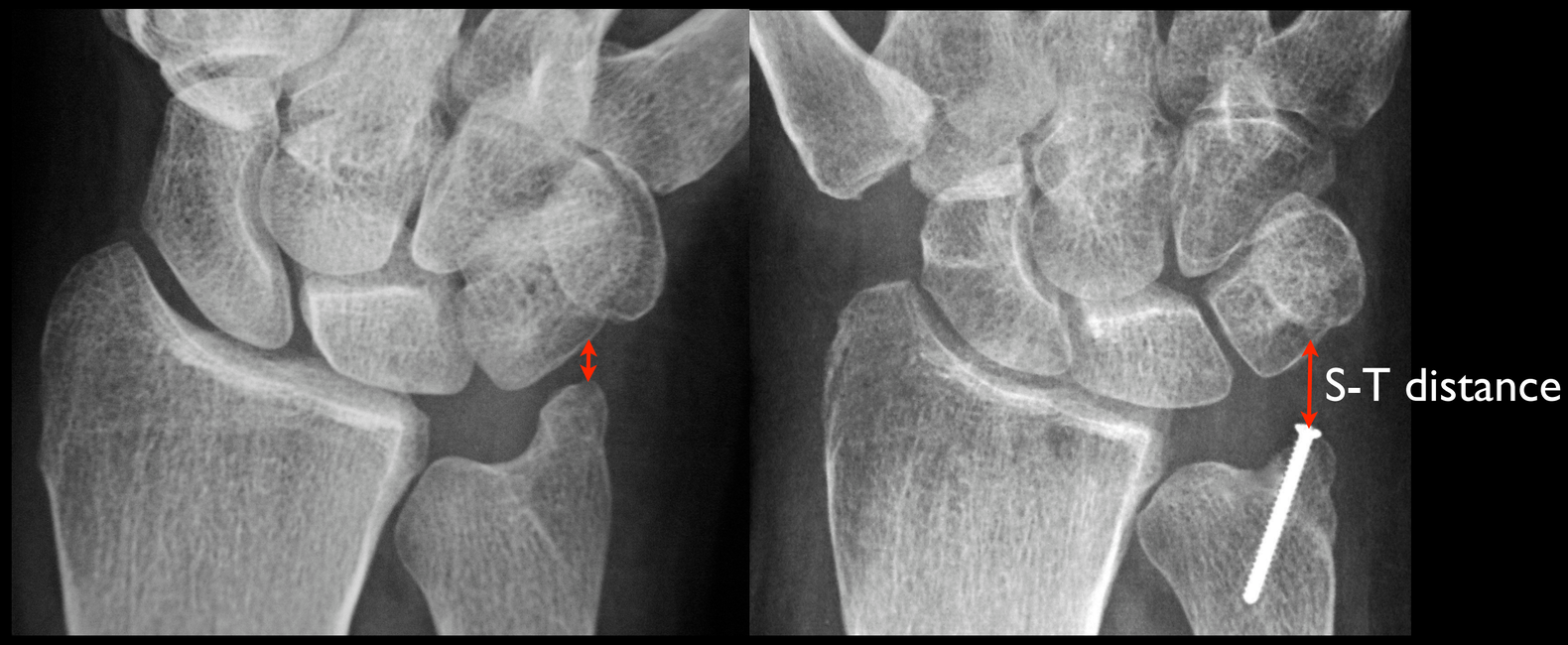
Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - OUSO results

No clinical or radiographic DRUJ instability or nonunion

Styloid disimpaction demonstrated on X-rays > mean S-T distance : 8 mm before surgery - 13 mm after surgery

Ranges of motion and grip strengths ≥ preoperative levels.



Oblique Ulnar Styloid Osteotomy (OUSO)

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  - USIS

Recognized cause of ulnar-sided wrist pain

Typical association : short ulna - long styloid

In early stages, TFCC is intact. Persistent impingement can result in a TFCC tear

Prolonged bone-on-bone contact leads to chondromalacia

Ulnar styloidectomy can relieve pain but risks weakening important ligamentous structures that can lead to DRUJ instability

Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - OUSO for USIS

OUSO is a safe, effective and reproductible means of treating USIS

OUSO preserves all ligamentous attachments of the TFCC to the US

Anatomical structures that maintain joint stability are undisturbed