Oblique Ulnar Styloid Osteotomy
A Treatment for Ulnar Styloid Impaction Syndrome

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• **Ulnar Styloid Impaction Syndrome (USIS)**
  
  ○ Mechanism

**IMPINGEMENT** tip of the Ulnar Styloid and Triquetrum
Ulnar Styloid Impaction Syndrome (USIS)

- Major symptom

ULNAR-SIDED WRIST PAIN
• Ulnar Styloid Impaction Syndrome (USIS)

- Major symptom

ULNAR-SIDED WRIST PAIN

USIS

Ulnocarpal Impaction Syndrome

UIS

Mimic
Oblique Ulnar Styloid Osteotomy (OUSO)

- Ulnar Styloid Impaction Syndrome (USIS)
  - Clinical

Incidence: **RARE**, less frequent

**PROVOCATIVE TEST**  Topper 1997

- Pronation
- Positif in pronation = USIS

(wrist flexion, UD, elbow 90° flexion)
• Ulnar Styloid Impaction Syndrome (USIS)

- Clinical

Incidence: RARE, less frequent

**PROVOCATIVE TEST** Topper 1997

Supination

Positif in supination = UIS
Ulnar Styloid Impaction Syndrome (USIS)

- Radiological findings
  - Excessively long or hypertrophic US
  - Normal values 3-6mm

INTRODUCTION

MATERIALS & METHODS

RESULTS

DISCUSSION

CONCLUSIONS

Biyani 1990
• Ulnar Styloid Impaction Syndrome (USIS)

- Radiological findings

Neutral or negative UV

Neutral or negative UV

Positive UV

Neutral or negative UV

Positive UV
Oblique Ulnar Styloid Osteotomy (OUSO)

• Ulnar Styloid Impaction Syndrome (USIS)

Radiological findings

MRI bone edema

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• Ulnar Styloid Impaction Syndrome (USIS)

- Peroperative view

**Ulnar Styloid Impaction Syndrome (USIS)**

**Triquetrum Chondromalacia**

**Cadaver Lunate chondromalacia**

**USIS**

**UIS**
• 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)

**INTRODUCTION**

**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

**DISCUSSION**

TFCC components on US?
• **Ulnar Styloid Impaction Syndrome (USIS)**

- **TFCC Anatomy**

  - *Palmer and Werner, J Hand Surg 1981*
  - *Nakamura et al., J Hand Surg 2001*
• **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.
• Ulnar Styloid Impaction Syndrome (USIS)

Study design

Pre and postoperative Pain Scoring System

<table>
<thead>
<tr>
<th>Pain Score</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No pain</td>
</tr>
<tr>
<td>1</td>
<td>Mild pain; no pain medication (PM)</td>
</tr>
<tr>
<td>2</td>
<td>Slight, intermittent pain; occasional nonprescription PM</td>
</tr>
<tr>
<td>3</td>
<td>Slight to moderate, intermittent pain; frequent nonprescription PM</td>
</tr>
<tr>
<td>4</td>
<td>Moderate, intermittent pain; occasional prescription PM</td>
</tr>
<tr>
<td>5</td>
<td>Severe, constant pain; frequent prescription PM</td>
</tr>
</tbody>
</table>
Oblique Ulnar Styloid Osteotomy (OUSO)

- **Ulnar Styloid Impaction Syndrome (USIS)**
  - Study design

**Patient demographics**

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

Mean post-op F-Up 46 mo (range, 15–96 mo)
• Ulnar Styloid Impaction Syndrome (USIS)

Study design

Radiological findings

**TABLE 3. Ulnar Styloid Morphology**

<table>
<thead>
<tr>
<th>Case</th>
<th>Ulnar Variance (mm)</th>
<th>Ulnar Styloid Length (mm)</th>
<th>USPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-3</td>
<td>12</td>
<td>0.32</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>9</td>
<td>0.32</td>
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<tr>
<td>3</td>
<td>-2</td>
<td>7</td>
<td>0.29</td>
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<tr>
<td>4</td>
<td>-3</td>
<td>12</td>
<td>0.33</td>
</tr>
<tr>
<td>5</td>
<td>-3</td>
<td>8</td>
<td>0.33</td>
</tr>
</tbody>
</table>

USPI normal range $0.21 \pm 0.07$

Garcia-Elias 1987

In all patients: bilateral hypertrophic US and MRI bone edema
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 arthroscopy, exposing the ulnar styloid
• 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 \( \leq 6 \) mm, according to Biyani value.**
• **Ulnar Styloid Impaction Syndrome (USIS)**

- OUSO surgical technique

![](image)

1.5-mm compression screw

S-T distance
Oblique Ulnar Styloid Osteotomy (OUSO)

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- Ulnar Styloid Impaction Syndrome (USIS)

- OUSO results

<table>
<thead>
<tr>
<th>Case number</th>
<th>Pain Score before treatment</th>
<th>Pain Score after treatment</th>
<th>Follow-up Duration after treatment (month)</th>
<th>Patient satisfaction</th>
<th>Return to prior employment</th>
<th>Associated factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>1</td>
<td>96</td>
<td>Excellent</td>
<td>Y</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>0</td>
<td>48</td>
<td>Excellent</td>
<td>Y</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>1</td>
<td>15</td>
<td>Good</td>
<td>N</td>
<td>Depression</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>1</td>
<td>50</td>
<td>Excellent</td>
<td>Y</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>0</td>
<td>19</td>
<td>Excellent</td>
<td>Y</td>
<td>0</td>
</tr>
</tbody>
</table>

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

Pain level significantly reduced $P=.006$
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 before surgery is 8 mm, increased to 13 mm after surgery.

Ranges of motion and grip strengths ≥ preoperative levels.
Ulnar Styloid Impaction Syndrome (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
• **Ulnar Styloid Impaction Syndrome (USIS)**

  - **OUSO for USIS**

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

  OUSO preserves all ligamentous attachments of the TFCC to the US

  Anatomical structures that maintain joint stability are undisturbed