Clinical outcomes of volar oblique ligament reconstruction in thumb basal joint arthritis

Dong Ho kwak, Yong-Suk Lee, Jin-Woo Kang, Seung Han Shin, Yang-Guk Chung
Department of Orthopedic Surgery, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea

Introduction
- The instability of the volar ligament complex of the joint, particularly the deep anterior oblique ligament (volar oblique ligament, VOL) is the main cause of thumb basal joint osteoarthritis.

Abnormally lax joint -> incongruent contact
-> ↓ Joint contact area -> ↑ contact stresses
- Eaton and Littler reported their technique of VOL reconstruction for the thumb CMC joint arthritis (J Hand Surg Am, 1984).

Stage I & II : 95% achieved good or excellent results
Stage III & IV : 74% achieved good or excellent results

The purpose of study : We evaluated clinical outcomes of VOL reconstruction in patients with stage I, II and even early stage III thumb basal joint arthritis.

Materials and methods
- We analyzed 42 patients who had undergone surgical treatment for thumb basal joint arthritis in our hospital from January 2010 to March 2013 and had a minimum 12 month follow-up.

Fig. 1. The radial half slip of FCR tendon passed through the bony tunnel at 1st metacarpal base from volar to dorsal and secured to the periosteum of dorsal metacarpal bone. The free FCR graft end is looped around the remaining FCR tendon and sutured to itself.

- All patients except 3 were women.
- The mean age at diagnosis: 57 (range: 43-78) years.
- Eaton stages

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage I</th>
<th>Stage II</th>
<th>Stage III</th>
<th>Stage IV</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Pts</td>
<td>13</td>
<td>25</td>
<td>4</td>
<td>0</td>
<td>42</td>
</tr>
</tbody>
</table>

- Postoperative care

1) Thumb spica splint immobilization was maintained for 4 weeks and then progressive use & ROM exercise were begun.
2) Unlimited activities were permitted at 12 weeks.

- Functional outcome were evaluated using New York Orthopedic Hospital Wrist Scoring Scale, which assessed ROM, grip power, radiologic findings, pain and hand function.

- Stability of joint, progression of arthritis were also evaluated.
- The mean follow up period was 27.2 (12-72) months.
- Statistical analysis: Wilcoxon rank sum test (nonparametric test)

Results
- The overall functional outcome (p<0.05)

<table>
<thead>
<tr>
<th>Eaton-Littler stage</th>
<th>Functional outcome</th>
<th>No of Pts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>Excellent</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Stage II</td>
<td>Good</td>
<td>16</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Stage III</td>
<td>Good</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

- At last follow up, average grip power was 26.4 kg, 82% of normal side, and average pinch power was 11.7 kg, 96% of normal side.
- The stability of VOL-reconstructed basal joint were restored and maintained in 32 out of 42 joints (72%). 3 patients showed subluxation of joints (7%) at the last follow up.
- The arthritis was progressed in 13 joints (31%), 10 out of 25 Eaton stage II and 2 out of 4 Eaton stage III joints. Only one out of 33 stage I joint revealed progression of arthritis.
- In three patient, secondary procedures (one arthroplasty, one LRTI and one arthrodesis) were performed due to progression of disease.

Cases
Cases 1. 55/F, Eaton stage I: no progression of arthritis. stable joint and good functional result

Case 2. 63/F, Eaton Stage II: no progression of arthritis. stable joint and good functional result

Case 3. 64/F, Eaton stage III: no progression of arthritis, stable joint, mildly subluxated, and fair functional result

Conclusion
- Our results suggested VOL reconstruction is a reliable method for management of Eaton stage I and II osteoarthritis and can be applied to even early Eaton stage III osteoarthritis before performing salvage procedures.