Prevalence and the influence of trapeziometacarpal arthritis on patients with carpal tunnel syndrome.

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Objectives
Carpal Tunnel Syndrome (CTS) is the most common peripheral compression neuropathy primarily affecting postmenopausal women. Trapeziometacarpal (TMC) arthritis is also commonly seen in postmenopausal women and is currently estimated to affect 1/3 of the women population. Although association between carpal tunnel syndrome and TMC arthritis has been suggested, it is not known how much of the patients with carpal tunnel syndrome have radiographically apparent TMC arthritis. The purpose of this study is to examine the prevalence and the characteristics of CTS in patients with TMC arthritis.

Materials and Methods
We studied 73 patients (94 hands) who had undergone carpal tunnel release with the clinical and electrophysiological diagnosis between January 2012 and June 2017.

Sex: 29 males, 65 females
Age at surgery: Avg 67.2 yr (range 44-92 yr)
Follow up: Avg 10 months

The diagnosis of TMC arthritis: based on plain radiographs
The severity of the arthritis: Eaton’s classification
Joints with stage2 and beyond were considered to as positive finding of osteoarthritis.

TMC+ group ⇒ stage2 and beyond (41 hands)
TMC- group ⇒ stage1 and less (53 hands)

Evaluation of CTS:
Manual muscle testing (MMT) of abductor pollicis brevis (APB)
Distal motor latency (DML) detected on APB

Results

<table>
<thead>
<tr>
<th></th>
<th>TMC- group n=53</th>
<th>TMC+ group n=41</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>32 (60.4%)</td>
<td>35 (85.4%)</td>
<td>P=0.008</td>
</tr>
<tr>
<td>Mean age (yr)</td>
<td>63.6 (44-83)</td>
<td>72.0 (53-89)</td>
<td>P=0.0001*</td>
</tr>
<tr>
<td>Follow up (month)</td>
<td>11</td>
<td>9.7</td>
<td>P=0.31</td>
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</table>

The prevalence of TMC arthritis was 43%.

Electrophysiological Study

<table>
<thead>
<tr>
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<th>TMC+ group n=41</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative DML (ms) (undetectable CMAP)</td>
<td>7.73 (13hands)</td>
<td>7.29 (17hands)</td>
<td>P=0.52</td>
</tr>
<tr>
<td>Postoperative DML (ms) (undetectable CMAP)</td>
<td>4.72 (8hands)</td>
<td>4.82 (8hands)</td>
<td>P=0.78</td>
</tr>
</tbody>
</table>

There was no statistical difference between the two groups.

MMT of the APB

<table>
<thead>
<tr>
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<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative MMT (Avg)</td>
<td>2.81</td>
<td>1.65</td>
<td>P=0.013*</td>
</tr>
<tr>
<td>Postoperative MMT (Avg)</td>
<td>3.87</td>
<td>3.12</td>
<td>P=0.067</td>
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Discussion

The relationship between CTS and TMC arthritis
TMC arthritis ⇒ DISI ⇒ Decreases anteroposterior dimension of the carpal tunnel ⇒ CTS (Crosby et al, 1978, J Hand Surg)
Intrinsic muscle dysfunction by CTS ⇒ Load on the TMC joint. (Cooney et al, 1977, JBIS)

Postoperative electrophysiological recovery in TMC+ patients

No significant electrophysiological differences in the recovery between TMC (+) and (-) CTS patients (Mitake et al, 2016, J Jpn Soc Surg Hand )

No statistical electrophysiological difference between TMC+ group and TMC- group.

Poor APB muscle strength in severer stage TMC arthritis (Eaton stage3,4) group.

Hypothesis for poor postoperative APB recovery
Flexion and adduction deformity of the TMC joint due to severe TMC arthritis
Insufficient APB output due to the mal-alignment despite the axonal regrowth into the muscle

In cases with severer stage of TMC arthritis, we should take the poor recovery of APB in to consideration in order to gain sufficient pinch strength

Conclusion
We conclude that the prevalence of CTS and TMC arthritis was 43% and that the presence of TMC arthritis in patients with CTS negatively affects the postoperative recovery of the APB muscle.