THREE-DIMENSIONAL ULTRASTRUCTURE OF TRIANGULAR FIBROCARTILAGE OF THE WRIST

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Triangular fibrocartilage(TFC), which exists between the ulnar head and carpal bones, plays an important role in wrist function. We observed the collagenous ultrastructure of TFC under the light microscope and scanning electron microscope(SEM).

MATERIALS AND METHODS
Fifteen specimens from twelve cadavers, and three from three amputated forearms were studied. The specimens from cadavers were stained with hematoxylin-eosin, Safranin-O and Masson-Trichrome, and observed under conventional and polarized light microscopes. Samples from amputated forearms were prepared by a method described by Ohtani(Table 1). An aqueous solution of NaOH(10%) removed the cellular elements, and the collagenous architecture was observed under an S-2300 SEM (HITACHI,Tokyo) and an JSM-U3 SEM (JEOL,Tokyo).

RESULTS AND DISCUSSION
Light microscopy of the sagittal sections demonstrated that collagen fibers consist of many layers; in horizontal section, the collagenous fibrils are seen to be arranged in concentric circles whose centers are slightly deviated to the radial side(Fig.1), while the coronary section showed few collagenous fibrils running in a direction. Scanning electron microscopy of the carpal surface revealed collagenous fibrils forming a net pattern, and under the meshes collagenous fibrils oriented in one direction(Fig.2). On the ulnar surface, the collagenous fibrils formed a textile-like structure (Fig.3). The cut surface was made of collagens running in one direction.

Table 1 Modification of sample preparation method by Ohtani(1987)

<table>
<thead>
<tr>
<th>Step</th>
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<tr>
<td>Immersed in 10% aqueous solution of NaOH for 3 to 4 days</td>
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<tr>
<td>Put in 1-2% aqueous solution of tannic acid overnight</td>
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<td>Postfixed in an 1% aqueous solution of Os04</td>
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<td>Dehydrated and critical-point-dried with CO2</td>
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Fig. 1. Horizontal section (polarized)

Fig. 2. Carpal surface (S-2300)

Fig. 3. Ulnar surface (JSM-U3)

REFERENCE
Ohtani O. Arch histol jap 1987; 50:557-566.