

## Three-Dimensional Measurement and Analysis of Facial Nerve Recess

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**Abstract :** Purpose: The three-dimensional anatomical structure of the facial nerve recess and its relationship were measured by high-resolution temporal bone CT to provide imaging reference for cochlear implant operation. Materials and Methods: By analyzing the high-resolution CT of 160 cases (320 pleural ears) of the temporal bone, the following parameters were measured at the axial window niche level: 1. The distance between the facial nerve and chordae tympani nerve d1; 2. Distance between the facial nerve and circular window niche d2; 3. The relative Angle between the facial nerve and the circular window niche a; 4. Distance between the middle point of the face recess and the circular window niche d3; 5. The relative angle between the middle point of the face recess and the circular window niche b. Factors that might influence the anatomy of the facial recess were recorded, including the patient's sex, age, and anatomical variation (e.g., vestibular duct dilation, mastoid gas type, mothoid sinus advancement, jugular bulbar elevation, etc.), and the correlation between these factors and the measured facial recess parameters was analyzed. Result: The mean value of face-drum distance d1 is  $(3.92 \pm 0.26)$  mm, the mean value of face-niche distance d2 is  $(5.95 \pm 0.62)$  mm, the mean value of face-niche Angle a is  $(94.61 \pm 9.04)^\circ$ , and the mean value of fossa-niche distance d3 is  $(6.46 \pm 0.63)$  mm. The average fossa-niche Angle b was  $(113.47 \pm 7.83)^\circ$ . Gender, age, and anterior sigmoid sinus were the three factors affecting the width of the opposite recess d1, the Angle of the opposite nerve relative to the circular window niche a, and the Angle of the facial recess relative to the circular window niche b. Conclusion: High-resolution temporal bone CT before cochlear implantation can show the important anatomical relationship of the facial nerve recess, and the measurement results have clinical reference value for the operation of cochlear implantation.

**Keywords :** cochlear implantation, recess of facial nerve, temporal bone CT, three-dimensional measurement

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