R-9. Difference between Panoramic radiography and CT/MPR(Computed Tomography/Multiplanar Reformatting) in dental implant diagnosis and the affecting factor

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I. Purpose

Recently, there has been tendency that more and more patient of dental clinic want dental implant. For the success of dental implant, preoperative diagnostic step is critical step and precision of diagnostic method or tool is very important. The most widespread and comfortable diagnostic method is radiography, that is, panoramic radiography. But panoramic radiography has inherent limitation; magnification and distortion. Thus many clinician insist on necessity of CT/MPR(Computed Tomography/Multiplanar reformatting) for some patient. This study was designed to know difference between panoramic radiographic value and CT/MPR value and magnification ratio of panoramic radiography to CT/MPR and to inspect anatomy of mandible(angulation of long axis of mandible, bucco-lingual width of mandible, site of inferior mandibular canal) affect magnification ratio of panoramic radiography to CT/MPR.

II. Material and Methods

We selected 15 patients who visited Seoul National University Hospital for dental implant surgery from January. 1997 to April. 2000. After first or second surgery, 15 patient was recalled for postoperative panoramic radiography and CT/MPR. Panoramic radiography was taken with 3mm or 5mm metal ball in the implant installation site under common panorama taking condition.

In panoramic radiography, vertical length of metal ball was measured to 0.1mm scale and length of metal ball in direction of implant installation(with same angulation) was too measured to 0.1mm scale. And length from alveolar crest to superior border of inferior mandibular canal was measured. In CT/MPR image, ① length from alveolar crest to superior border of inferior mandibular canal(c-c) ② horizontal length from lingual border of mandibular bone to inferior mandibular canal(c-l) ③ horizontal length from fixture to inferior mandibular canal(c-f) ④ bucco-lingual width of mandibular bone(b-l) ⑤ angulation of long axis of mandibular bone(angle) were measured to 0.1mm scale. Pearson's correlation coefficient test was used.

III. Results

1. Average of vertical magnification ratio of panoramic radiography with metal ball was 129% and average of magnification ratio of panoramic radiography with metal ball in the same angulation of implant installation was 132%, Average of magnification ratio of panoramic radiography to

CT/MPR was 135%

2. With the 129% vertical magnification ratio, average difference between panoramic radiography value and CT/MPR value was 0.6mm and with the 132% magnification ratio in the same angulation of implant installation, average difference was 0.3mm
3. Average of magnification ratio of panoramic radiography to CT/MPR has significant negative correlation with b-l($r=-0.604$, $p<0.05$), c-f($r=-0.515$, $p<0.05$) and c-l($r=-0.640$, $p<0.05$)
4. Average of magnification ratio of panoramic radiography to CT/MPR has significant positive correlation with angulation of long axis of mandible($r=0.446$, $p<0.05$)