

WHAT ARE THE APPLICATIONS AND LIMITATIONS OF CONVENTIONAL RADIOGRAPHIC TECHNIQUES

CDA OASIS DENTIST RESOURCE



CURRENTLY...

- Periapical and panoramic radiography are the most common initial dental radiographic examinations in implant dentistry
 - Panoramic radiograph: screening of maxillary sinus morphology and residual bone height
 - Periapical radiographs: provide complementary information, such as residual bone height and any adjacent pathoses



PERIAPICAL RADIOGRAPHY

Assessment of maxillary sinus augmentation

- Periapical radiographs are usually selected to assess the residual bone height to determine whether to use a lateral window or osteotome technique
 - Lateral window technique: less than 5 mm residual bone height and implemented to build up sufficient bone height for the placement of adequate implant length
 - Osteotome technique: suitable when a minimum of 5 mm residual bone height was present in the posterior maxilla

Examination of sinus proximity during indirect sinus augmentation

- A periapical radiograph can be taken during indirect sinus augmentation, with indicator direction in place, to assess sinus proximity



PERIAPICAL RADIOGRAPHY

Verification of implant osseointegration after implant placement

- Best spatial resolution with lower cost and radiation dose to examine implant osseointegration after healing
 - Radiographically: failure to achieve osseointegration: presence of peri-implant radiolucency along the entire length of the implant
 - Clinically: implant mobility

Assessment of implant-abutment seating during the procedure

- Can be a sensitive imaging method to assess implant-abutment interface as long as the vertical angulation of the tube is less than 5°, relative to the plane of the interface

Longitudinal assessment of peri-implant bone change

- Noninvasive diagnostic tool to evaluate the success and survival of dental implants by assessing the crestal bone level and fixture integration



PERIAPICAL RADIOGRAPHY

Detection of residual cement

- Excess cement in the gingival sulcus may harm the peri-implant tissues and can lead to peri-implantitis
- Identification of excess cement may be possible, if cement has sufficient radiopacity, is of sufficient quantity, and is located on, or extends to, the interproximal aspects of dental implant



PERIAPICAL RADIOGRAPHY: LIMITATIONS

- Geometric and anatomic limitations
- Lack of standardization between serial radiographs, due to low reproducibility
- Depiction of a 2-dimensional perspective of 3-dimensional anatomy: no value in gauging bucco-lingual width of sinus or thickness of sinus buccal wall
- Limited area of 3 teeth: limited in assessing sinus morphology and may lead to incomplete radiographic findings required for treatment planning of sinus grafting procedures
- Must always be used in conjunction with other imaging modalities, such as panoramic radiography and/or CBCT



PANORAMIC RADIOGRAPHY

- Fast, convenient and readily available
- Survey image allowing for assessment of anatomic structures, such as the maxillary sinus
- Dentoalveolar structures can be viewed in a single image with a small radiation dose



PANORAMIC RADIOGRAPHY

Assessment of the anatomic structures and morphology of the maxillary sinus

- Identification of the maxillary sinus septa: important for sinus augmentation surgery

Assessment of maxillary sinus pathologic abnormalities and malignancies

- Identification of pathologic abnormalities of the maxillary sinus



PANORAMIC RADIOGRAPHY: LIMITATIONS

- Image clarity is limited, particularly in the anterior area
- Magnification in the vertical plane
- Lack of 3-dimensional information
- May lead to false-negative diagnosis of maxillary sinus septa due to low sensitivity and specificity
- Risk of overestimating bone quantity after sinus grafting procedures



QUESTIONS/FEEDBACK

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Thank you

