

A Multidisciplinary Approach to Pre-Operative Implant Diagnostics

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With the increasing acceptance of dental implants, there is a greater need for the dental profession to ensure the recipient site for an implant is adequate. The presence or absence of an anatomical limitation should always be confirmed beyond a reasonable doubt. Conventional two-dimensional radiographs (PAs, or panoramic films)¹ have limitations as diagnostic tools because they don't convey a three-dimensional image.²

This clinical case is presented to demonstrate the importance of a proper radiological diagnosis during the pre-surgical phase of implant therapy. The standard panoramic radiograph showed adequate bone height for the placement of dental implants, but a CT scan confirmed the absence of adequate bone volume and height.³

Clinical History

A 60-year-old man presented with a failed three-unit gold bridge on teeth # 35 to 37 (Fig. 1). The distal abutment was non-vital, with attachment loss on the distal surface and furcation involvement. The failure was determined to be a mid-furcal root fracture, which had led to failure of the abutment. The patient was interested in pursuing the option of an implant-supported fixed prosthesis to replace missing teeth # 36 and 37.

Pre-Operative Diagnostic Phase

The treatment plan called for a two-unit fixed prosthesis to replace 36-37, supported by two dental implant fixtures. Study models of both dental arches were fabricated and mounted on a semi-adjustable articulator. The incisal guidance was recorded with the use of a custom incisal table. The existing occlusal profile was recorded, and a diagnostic wax-up was performed to diagnose the excursive profile and any existing occlusal pathologies. Such occlusal limitations may need to

be corrected to avoid complicating the prosthetic design and implant osseointegration in the sextant involved.

A panoramic film (Fig. 2) was taken after 37 was extracted and three to four months of healing had elapsed. The panoramic film showed adequate vertical bone height for two dental implants. The position of the inferior alveolar canal did not contraindicate the surgical phase of implant therapy. Clinically, the edentulous ridge appeared adequate in volume, width and height. A radiographic index (stent) with radio-opaque markers indicating the ideal location for the two dental implants and an adjunctive CT scan (Fig. 3) were used to confirm our clinical findings and previous two-dimensional radiographic findings.

The CT scan with the radio-opaque markers clearly showed (Fig. 4) that the undercut below the internal oblique line (the attachment site of the mylohyoid muscle) was significant enough to contradict the previous radiographic and clinical interpretations. This additional radiological evidence demonstrated that bone height and volume were not adequate for the successful placement of two dental implants.

Conclusion

A comprehensive and thorough pre-operative diagnostic phase is crucial to the success of dental implant therapy. The restorative dentist, periodontist and dental radiologist form a multidisciplinary team for diagnosis and treatment. In this case, a three-dimensional radiograph, in conjunction with the restorative and periodontal evaluation, confirmed the anatomical limitations of the proposed surgical site and helped prevent unnecessary treatment and complications. ♦

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Figure 1: Intraoral view of failed distal abutment.



Figure 2: Panoramic radiograph.



Figure 3: CT scan of mandibular arch.



Figure 4: CT scan cross-sectional view of proposed implant location.

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