8 Years Follow-up of 6 mm Wide-Diameter Implants

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Introduction

The rationale for introducing wide diameter implants into the posterior areas is based on:
1. Larger bone-to-implant contact (BIC) for better primary stability (picture 1) (ref 1).
2. Increased prosthetic-base surface area (picture 2) to improve the distribution of the occlusal forces and the stability of the prostheses (ref 2).
3. Reduced risk of screw loosening and fracture was found with wide diameter implants (ref 3).

- A search of the English scientific literature reveals several articles regarding 5 mm diameter implants with conflicting results of the survival rates (ref:4-8).
- The numbers of studies including 6 mm diameter implants is negligible (ref:9-10).

Surgical methods

By single surgeon (the author).
15 implants placed in adequate bone.
30 of the implants placement involved bone augmentation procedures:
- 2 implants were placed immediate to extraction (first part of case report 1).
- 28 implants were placed at second stage to socket preservation procedures (case reports 1 and 2).

Follow-up recalls

The patients were recalled at least once a year after prosthetic loading for clinical and x-ray examination (case report 1).

Restorations

By 20 referral dentists

Clinical tips

1. Anatomic limitations at the posterior areas - lingual depression underneath the mylohyoid ridge (ref: 11, picture 7). 3D imaging is recommended.
2. Wide implant at the anterior maxilla - The implant shoulder margins may enter the dangerous esthetic zone (ref: 12). Not recommended.
3. Type of Bone Density - type 1 is not recommended, type 2 with extra care. Types 3 & 4 - recommended.
4. Residual Bone Width - the implant must ideally be surrounded by at least 1.5 mm of bone over all of its surfaces (picture 8).
   Not less than 9 mm width.
5. Residual bone height - sufficient BIC (bone to implant contact) is necessary (picture 9). At least 9 mm height.
6. The ideal mesio-distal distance for restoring a missing molar using a 6 mm diameter implant (picture 10) is 9 - 12 mm.

Materials

Between February 1999 and July 2003, 43 patients received treatment that involved 45 implants, 6mm - wide diameter.

The population:
- Average age = 48y, 21 male, 22 female,
- 32 systemically healthy,
- 11 chronic systemic conditions, treated and stable,
- 27 moderate to severe periodontitis, treated and stable,
- 5 heavy smokers.

All implants were tapered, Hydroxyapatite (HA coated, (Replace™ or Replace Select™, Nobel Biocare, Yorba Linda, CA) (picture 3). All implants supported a fixed prosthesis at the posterior areas only:
- 41 implants - posterior mandible (picture 4),
- 4 implants - posterior maxilla (picture 5),
- 35 implants supported single tooth replacement (picture 4)
- 10 implants supported multi-unit tooth replacement (picture 6).

Results

- Average follow-up of implants was 58.07 months (range 4 - 97).
- No fracture of implant abutment or prosthetic screws.
- The survival rate was 100%.

Conclusions

- The 6 mm diameter tapered HA-coated implant is a favorable treatment modality for posterior single or multi-unit tooth replacement, presenting high survival rates.
- Special consideration should be given to the anatomic limitation and the dimension of the alveolar bone prior to implant placement procedure.
- Extraction site preservation is highly recommended for single tooth wide - diameter implant placement.
- Large-scale prospective studies are needed to confirm these results.

Case Report 1

May 1999 - extraction of tooth 47 and immediate placement of 6mm diameter implant.

Recall visit once a year - implant at 47 is clinically stable, tooth 46 has increasing furcation involvement and decay.

5 years later - tooth 46 extraction and socket preservation.

6 years follow-up for implant at 47 and placement of 6 mm wide implant at 46.

Final prosthesis by Dr. Haddad F.

Case Report 2

First step: a - traumatic extraction of tooth 47.

And preservation using demineralized bone matrix and Teflon membrane.

3 weeks later - early membrane exposure and removal.

6 months later - non-submerged implant placement at 47.

3 months later - abutment connection.

Final prosthesis by Dr. Goldstein S.

3 years follow-up

References:

5. Residual bone height - sufficient BIC (bone to implant contact) is necessary (picture 9). At least 9 mm height.
6. Residual Bone Width - the implant must ideally be surrounded by at least 1.5 mm of bone over all of its surfaces (picture 8).
7. Type of Bone Density - type 1 is not recommended, type 2 with extra care. Types 3&4 - recommended.
8. The rationale for introducing wide diameter implants into the posterior areas is based on:
   - Larger bone-to-implant contact (BIC) for better primary stability (picture 1) (ref 1).
   - Increased prosthetic-base surface area (picture 2) to improve the distribution of the occlusal forces and the stability of the prostheses (ref 2).
   - Reduced risk of screw loosening and fracture was found with wide diameter implants (ref 3).
9. Between February 1999 and July 2003, 43 patients received treatment that involved 45 implants, 6mm - wide diameter.
   - The population:
     - Average age = 48y, 21 male, 22 female,
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10. All implants were tapered, Hydroxyapatite (HA coated, (Replace™ or Replace Select™, Nobel Biocare, Yorba Linda, CA) (picture 3). All implants supported a fixed prosthesis at the posterior areas only:
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   - 4 implants - posterior maxilla (picture 5),
   - 35 implants supported single tooth replacement (picture 4)
   - 10 implants supported multi-unit tooth replacement (picture 6).
11. The survival rate was 100%.