



## IN THIS ISSUE

Page 1

Immediate Placement of Implants after Extraction: A Literature Review

Dr. Bertrand Bonnick, Dr. Andrew Kelly, Dr. Richard Nguyen, Dr. Alex Resnansky and Dr. Jean Woods

Page 2

Tidbits

Page 3

Improving the Precision Fit of Implant Laboratory Components

Dr. Gregori M. Kufner

CE Program Schedule

## Immediate Placement of Implants after Extraction: A Literature Review

by Drs. Bertrand Bonnick, Andrew Kelly, Richard Nguyen, Alex Resnansky, Jean Woods

There are mixed opinions on the success of immediate implant placement at the time of extraction. Immediate placement of implants brings into the success equation many variables not found in routine implant placement. Issues such as bone density, bone preservation, bone grafting, the presence of infection, trajectory of placement, types of implants, use of membranes are some of the factors considered. Various techniques, complications, and retrospective studies were used to examine the efficacy of immediate implant placement. Immediate placement shortens the time that it takes before a patient can have a restored dentition; it also lessens the amount of surgical exposure for the patient. The practitioner should be careful because the choice of cases and technique influences the overall success rate of the implant.

Traditional implant placement and predictable outcomes first came to us through the work of Adell, Lekholm, Rockler, and Branemark <sup>1</sup>. In 1988-1992 a study done by Mensdorff-Pouilly et al. comprising 190 immediate implantation (93 primary immediate implantations and 97 secondary immediate implantations performed 6



to 8 weeks postextraction) showed that the group of primary immediate implants showed a tendency towards deeper pocket formation and an increased frequency of membrane dehiscences that may be due to the poorer quality of the soft tissue covering <sup>2</sup>.

In 1993 Barzilay presented a paper on Immediate Implants: Their Current Status. He refers to the change of prosthodontic treatment in North America after the introduction of "osseointegration technology" at the 1982 Toronto Conference. In theory the concept provided many advantages including fewer surgical sessions, reduced overall costs, and preservation of alveolar bone height. He refers to the poor success rates with soft tissue noted at the interface in earlier studies; however he hinted that short-term research using animals and humans has shown that immediate implants are comparable to implants placed using the conventional technique. He concluded that long-term studies were needed <sup>3</sup>.

As knowledge of immediate implant surgery and tissue management increased reported success was more encouraging for this modality. Covani et al. in his 2004 study was able to achieve a 4 year cumulative success rate of 97% and moreover, no statistically significant differences were observed in terms of clinical attachment level between those implants treated with GBR and those without

*continued on p. 9*

### Attention Subscribers!

E-mail us your Web Site  
URL Address and Receive a  
FREE Hyperlink from us

[dentpub@optonline.net](mailto:dentpub@optonline.net)

## Immediate Placement of Implants after Extraction: A Literature Review

*continued from p. 1*

GBR. Covani adhered to strict guidelines that included patients were placed on a strict oral hygiene, the use of GBR procedures were reduced, implant surfaces were acid etched/sandblasted, and all prosthetic restorations were single crowns<sup>4</sup>.

Current implant systems with reliable internal connection ensure predictable success of restorations if guidelines are followed. Castellon et al. summarized guidelines for single tooth immediate provisionalization so we can go one step further after immediate placement of the implant. Hard tissue, soft tissue, and space available were the criteria used. Bone height greater than 10mm and width buccal-lingually of 2mm, soft tissue with papilla and keratinized gingival and interocclusal space of 1.5mm to 2mm mesiodistal 2mm buccolingual and 7mm apicocoronal were the best criteria<sup>5</sup> [figs. 1-2].

Garber and Salama and Salama documented the technique for immediate implant placement in a site where external resorption was taking place [figs 3-4]. Use of peritomes is contraindicated because osteoclastic activity is indiscriminate in its destruction of the periodontal ligament space and lamina dura of the bone. The coronal part of the tooth is removed and osteotomy is performed through the remaining tooth structure into underlying bone. Tooth remnants can then be removed and socket cleared of any left over debris. Immediate temporization can be accomplished so the patient does not have to wear a removable appliance in the esthetic zone. The temporary is kept out of occlusion to allow time for bone fill and osteointegration<sup>6</sup>.

### Dehiscence Coverage, Preservation of Esthetics and Histologic Studies

Wilson carried out histological analysis of immediately placed implants in 1998. 15 ITI TPS implants were placed, 6 in the maxilla and 9 in the mandible. All implants were osseointegrated at the light microscopic level with varying percentage of direct bone-implant contact. This study provides histological evidence that immediately placed implants become osseointegrated<sup>7</sup>.

In 2000 Nemcovsky discussed the clinical coverage of dehiscence defects in immediate implant placement. 61 implants were placed in 61 healthy patients with primary tissue closure. The use of barrier membrane was not mandatory provided the implant was placed within a bony envelope, even if that envelope had partially missing bone. This study showed short-term successful results with bone graft and soft tissue coverage<sup>8</sup>.

### Bone Regeneration, Horizontal Fractures Tooth Fractures, Placement Without Augmentation

Gher et al. studied the grafting and guided bone regeneration for immediate dental implants in humans. The study evaluated bone regeneration and osseointegration of hydroxyapatite (HA) and titanium plasma sprayed (TPS) implants placed in sockets immediately after extraction in 36 adults with a mean age of 55.2 years. This study showed no significant difference in the osseointegration of implants whether HA or TPS implants were used. Implants grafted with demineralized freeze-dried bone allograft (DFDBA) along with a barrier material showed a +1.32 mm in crestal bone apposition at the apical socket crest (ASC) than implants without grafting and barrier material, which showed a -0.11 mm crestal resorption. The barrier material became clinically exposed in 24 of the 36 patients during initial post-surgical healing [fig. 5]. Sites that retained the barrier material uncontaminated for the full 6 months had significantly greater bone apposition (+1.92 mm) at the ASC versus sites where the material required early removal (-0.21mm). There was no statistically significant difference in bone changes between the maxillary and mandibular arches. While the study group of 36 humans can be considered small the viability of immediate implant placement is encouraged because all 44 implants were osseointegrated at the six-month re-entry surgery<sup>9</sup>.

Krauser et al. gave a case study for immediate implantation after extraction of a horizontally fractured maxillary lateral incisor. This case is one in which fractured tooth #7 [fig. 6] needs to be extracted because of a horizontal fracture but the abutment teeth #6 and #8 do not require restoration. A full thickness flap is elevated preserving the interproximal papillae. Both sections of the tooth are removed with as little trauma as possible. Socket debridement is performed with a #8 surgical bur and hand curettes. Place as large an implant as possible so it is snug and stable [fig. 7].

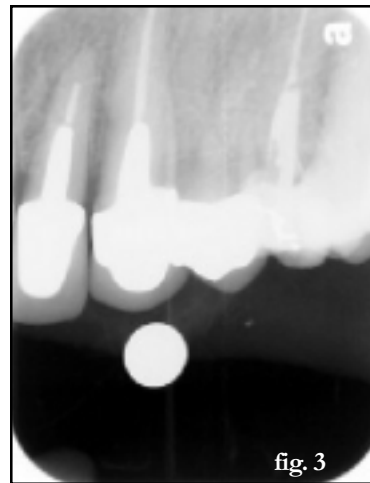


fig. 3



fig. 4

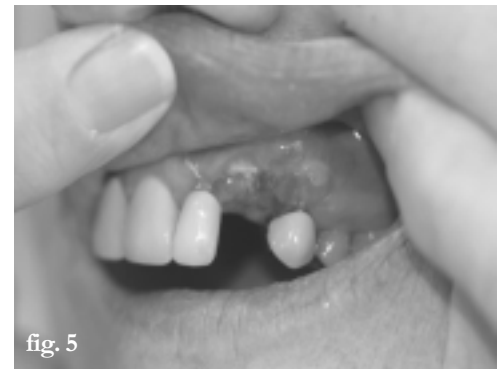


fig. 5



fig. 6

*continued on p. 10*

## Immediate Placement of Implants after Extraction: A Literature Review

*continued from p. 9*

Densely pack graft material and cover it with a membrane, then cover with an occlusive barrier. After one month insert a transitional prosthesis [figs. 8-9]. This is a disadvantage for this technique because the tooth loss is in an esthetic area and it would be hard to convince the patient to go one month without a prosthesis. The authors warn that if the site is angled or the trajectory is off close and allow the site to heal, then re-enter at another date. Another disadvantage of immediate insertion is the uncertainty of not knowing your outcome earlier in the surgery <sup>10</sup>.

Cohen and Shenoy gave a similar case report involving a maxillary central incisor with similar success yet they had immediate use of a provisional maxillary removable partial denture. They obtained primary coverage by sliding the full-thickness buccal mucogingival flap to the palatal flap without the use of grafting materials <sup>11</sup>.

Becker et al. did an extensive study with 134 implants in 81 patients without augmentation or barrier membrane. Forty-seven implants were followed over 4 to 5 years with a 93.3% success rate. This indicates that implants placed at the time of extraction without augmentation or grafting have excellent long-term cumulative success rates <sup>12</sup>.

Cosci and Cosci reported on 423 hydroxyapatite coated implants over 7 years (1989-1995). During the one year follow-up one implant was lost, and an additional implant failed during the 7 year follow-up, with a final success rate of 99.53% <sup>13</sup>.

In the early 1990's Mason discusses his technique of immediate placement using HA coated implants. He found that at the uncovering stage he would find bone growing over the implant. On the other hand Wallace prefers to use titanium implants because of their long-term success record and less possibility of periodontal problems due to HA degradation <sup>14</sup>.

Werbitt and Goldberg demonstrate with several cases that an intact extraction site is not necessary for successful integration of a titanium fixture. Guided tissue regeneration and bone grafting can be used successfully in compromised sites <sup>15</sup>.

Parel and Triplett described immediate placement of fixtures beneath the apices of extracted teeth in the anterior mandible. This procedure was described as a radical departure from conventional mandibular protocol <sup>16</sup>.

Krump and Barnett compared results of placing endosseous implants into the anterior mandible at the time of extractions with appropriate radical alveolectomies versus a control group <sup>17</sup>. The success of the immediate group was 92.7% while the control group was 98.1%.

Landsberg describes a novel approach called the "socket seal surgery." A 3 to 4mm thick soft tissue graft that contains part of submucosa is obtained from the palate, the implant is placed in the socket and the soft tissue sutured around the socket. A space screw can also be used when the implant head is almost level with the labial crestal bone <sup>18</sup>.

In 1995 Evian and Cutler present cases where a failed screw type pure titanium implants were replaced immediately with a HA coated Ti-6Al-4V implants. This negated the common protocol at the time where the failing implant was extracted, socket curetted and a one year healing period was observed. Success was enhanced when the sockets were prepared to remove grooves and soft tissue, the replacement implant was larger in diameter than the original implant, and sufficient available bone remained for the procedure <sup>19</sup>.

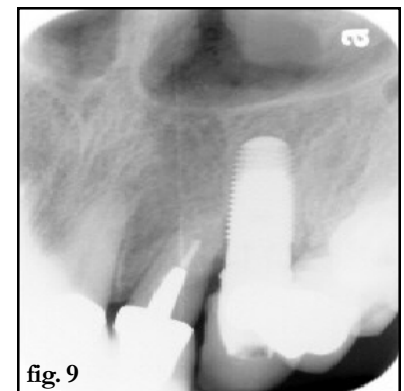
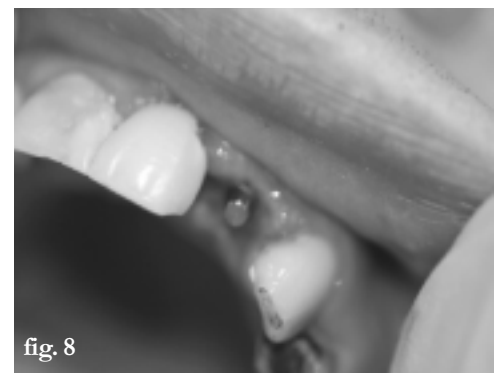
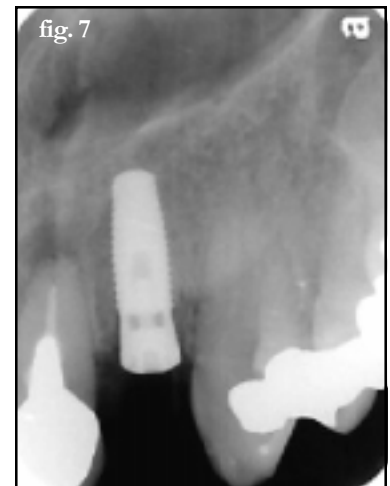
### Enhancing Placement, Alveoloplasty and Resorbable Membranes

In 1991 Tolman and Keller reported their results from immediate placement of 301 implants in 61 patients over a six-year period. They concluded that placement of implants were contraindicated in the presence of acute periodontal or periapical infections. However if these areas can be eliminated with alveoloplasty, drilling, or tapping procedures then success can be expected. All 301 implants were osseointegrated and prosthetically loaded <sup>20</sup>.

### Delayed Immediate, Posterior maxilla, and Retrospective Analyses

Grunder et al report compared the Immediate Placement and Delayed-Immediate placement over a 3-year loading period. It was found that there was no difference in survival rate between Immediate and Delayed-immediate placements. The success rate was 92.4% for the 264 units placed. There was some clinical correlation of higher failure rate when periodontitis was the reason for tooth loss <sup>21</sup>.

Rosenquist and Grenthe studied the survival rate of Immediate Placed implants into extraction sockets. Of the 109 nobelpharma implants placed there was a 93.6% survival rate, 92% for periodontally involved extracted teeth and 95.8% for teeth extracted for other reasons. It was found that bone preservation and less treatment time was the greatest advantage for placing implants in extraction sockets. The main disadvantage was more complicated tissue handling technique to gain satisfactory esthetics <sup>22</sup>.



*continued on p. 11*

## Conclusion

Immediate placement of implant after extraction is a procedure that will become the standard of care in the circumstances outlined. Careful use of adjunctive procedures and consideration of the variations in technique will greatly enhance our success using this modality.

Recent success can be attributed to the improvements in the texture of implant surfaces and its ability to cause fibrin to stick encouraging the migration of osteoblasts.

The bone growth around HA coated implants is one of its advantages and the current method of plasma spraying as well as the use of HA below the first few titanium threads have helped to make HA coated implants more desirable for immediate placement.

From the entire information available immediate implant placement after extraction is most successful in the anterior maxilla and anterior mandible after alveoloplasty to remove infected sockets. The presence of vital structures in the posterior maxilla and posterior mandible contraindicates immediate placement except under extreme circumstances. Most guidelines recommend preparation of the osteotomy 4mm apical to the apex of the tooth socket to achieve primary stability. Presence of bony septums after extractions in these areas serves to deflect osteotomy drills and make it difficult to obtain proper implant trajectory.

## Footnotes and Bibliography

1. Int J Oral Surg. 1981 Dec;10(6):387-416. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. Adell R, Lekholm U, Rockler B, Branemark PI.
2. Int. J Oral Maxillofacial Implants. 1995 Sep-Oct;10(5):561-7. Immediate and delayed implantation for complete restoration of the jaw following extraction of all residual teeth: a retrospective study comparing different types of serial immediate implantation. Watzek G, Haider R, Mensdorff-Pouilly N, Haas R.
3. Int J Prosthodont. 1993 Mar-Apr;6(2):169-75. Immediate implants: their current status. Barzilay I.
4. J Periodontol. 2004 Jul;75(7):982-8. Immediate implants supporting single crown restoration: a 4-year prospective study. Covani U, Crespi R, Cornellini R, Barone A.
5. Pract Proced Aesthet Dent. 2004 Jan-Feb;16(1):35-43. Immediate implant placement and provisionalization using implants with an internal connection. Castellon P, Block MS, Smith M, Finger IM.
6. World Dentistry. 2000 1(1) Immediate Implant Placement in the External Root Resorption Case, David A. Garber, DMD, Maurice A. Salama, DMD Henry Salama, DMD
7. International Journal of Oral & Maxillofacial Implants; 1998 May/June 13(3): 333-341, Implants Placed in Immediate Extraction Sites: A Report of Histologic and Histometric Analyses of Human Biopsies. Thomas G. Wilson, Jr, DDS, Robert Schenk, MD, Prof Dr Med, Daniel Buser, DMD, Prof Dr Med Dent, David Cochran, DDS, PhD, MS, MMSci
8. Int J Oral Maxillofac Implants. 2000 Nov-Dec;15(6):843-52. Clinical coverage of dehiscence defects in immediate implant procedures: three surgical modalities to achieve primary soft tissue closure. Nemcovsky CE, Moses O, Artzi Z, Gelernter.
9. J Periodontol. 1994 Sep;65(9):881-91. Bone grafting and guided bone regeneration for immediate dental implants in humans. Gher ME, Quintero G, Assad D, Monaco E, Richardson AC.
10. Practical Periodontics and Aesthetic Dentistry. 3(5):33-40 Immediate Implantation After Extraction of a Horizontally Fractured Lateral Incisor Krauser J, Boner C, Boner N.
11. Periodontal Insights 6:7-11, 1999. Immediate Placement of a Dental Implant in an Extraction Socket Following Tooth Fracture. Cohen R. E. and Shenoy L.
12. Int J Oral Maxillofacial Impl 1997; 12(4):454-462. One-step surgical placement of Brånemark implants: A prospective multicenter clinical study. Becker W, Becker BE, Israelson H, et al.
13. Compend Contin Educ Dent. 1997 Sep;18(9):940-2, 944, 946 passim. A 7-year retrospective study of 423 immediate implants. Cosci F, Cosci B.
14. Implant Society 1991 2(1):1-3 Immediate Placement of Dental Implants After Extraction. Mark L. Mason DMD.
15. Int J Periodontics Restorative Dent. 1992;12(3):206-17. The immediate implant: bone preservation and bone regeneration. Werbitt MJ, Goldberg PV.
16. Int J Oral Maxillofacial Implants. 1990 Winter;5(4):337-45. Immediate fixture placement: a treatment planning alternative. Parel SM, Triplett RG.
17. Int J Oral Maxillofacial Implants. 1991 Spring;6(1):19-23. The immediate implant: a treatment alternative. Krump JL, Barnett BG.
18. Int J Periodontics Restorative Dent. 1997 Apr;17(2):140-9. Socket seal surgery combined with immediate implant placement: a novel approach for single-tooth replacement. Landsberg CJ.
19. Int J Oral Maxillofacial Implants. 1995 Nov-Dec;10(6):736-43. Direct replacement of failed CP titanium implants with larger-diameter, HA-coated Ti-6Al-4V

implants: report of five cases. Evian CI, Cutler SA.

20. Int J Oral Maxillofacial Implants. 1991 Spring;6(1):24-8. Endosseous implant placement immediately following dental extraction and alveoloplasty: preliminary report with 6-year follow-up. Tolman DE, Keller EE.

21. Int J Oral Maxillofacial Implants. 1999 Mar-Apr;14(2):210-6. A 3-year prospective multicenter follow-up report on the immediate and delayed-immediate placement of implants. Grunder U, Polizzi G, Goene R, Hatano N, Henry P, Jackson WJ, Kawamura K, Kohler S, Renouard F, Rosenberg R, Triplett G, Werbitt M, Lithner B.

22. Int J Oral Maxillofacial Implants. 1996 Mar-Apr;11(2):205-9. Immediate placement of implants into extraction sockets: implant survival. Rosenquist B, Grenthe.

**Dr. Bertrand A. A. Bonnick D.D.S, F.A.G.D.** maintains a general practice in Geensboro, NC with an emphasis on implants, cosmetic dentistry and laser treatment. He has been an instructor in national institutional and continuing education programs. He can be reached at [babonnick@triadbiz.rr.com](mailto:babonnick@triadbiz.rr.com).

**Dr. Andrew Kelly** maintains a private practice in North Carolina, is a graduate of the Core Vent Institute in Encino, California and The Implant Maxi Course at the Medical College of Georgia and has been placing and restoring implants since 1988. Dr. Kelly is an active member The Academy of General Dentistry, The American Academy of Implant Dentistry, and International Congress of Oral Implantology. He has served as a Deputy Examiner for the North Carolina State Board of Dental Examiners. He can be reached at 336-766-7966 or [dctr2th@msn.com](mailto:dctr2th@msn.com).

**Richard Ngyuen** maintains a private practice in Houston, TX and has completed a post-doctoral program in Advanced Education in General Dentistry.

**Dr. Jean Woods** maintains a general practice in Chapel Hill, NC. She is a certified implantologist after completing the American Academy of Implant Dentistry Maxi Course at the Medical College of Georgia. Dr. Woods maintains active membership in Roy Heash Study Club, Academy of General Dentistry, American Academy of Implant Dentistry, and the National Dental Association. She has served as deputy examiner for the NC State Board of Dental Examiners.

**Alex Resnansky, DDS** maintains a general practice in Raleigh, North Carolina with an emphasis on Cosmetic Dentistry, Implant Dentistry, and Tissue Regeneration procedures. He taught briefly in the Department of Restorative Dentistry SUNY at Stony Brook School of Dental Medicine. He can be reached at [alexresnansky1736@earthlink.net](mailto:alexresnansky1736@earthlink.net).