

Immediate implant placement in focus

Better now than later

For patients there is usually no doubt: implants placed directly after an extraction, requiring no separate surgical procedure, are an attractive option. But how does the peri-implant tissue react to immediate implant placement? And how does this technique compare to delayed or late implant placement protocols? We are taking a look at a selection of studies to answer this question.

In their cross-sectional analysis, Parvini et al. investigated the prevalence of peri-implant disease following immediate implant placement and immediate loading. A total of 47 partially edentulous patients with 64 implants were included in the study. Standardized surgical and prosthetic protocols were used for all patients (including flapless atraumatic extraction, bone-level implants with platform switching, immediate provisional restoration with screw-retained abutments and bisacrylate composite resin crowns). Following surgical procedures performed between 2008 and 2017, the inserted implants studied had been in situ for two to ten (4.23 ± 1.7) years.

The clinical evaluation included probing depths, soft-tissue recession, suppuration, implant mobility and the width of the keratinized mucosa, in addition to the plaque index and bleeding on probing. Where clinical signs of peri-implant inflammation were present, panoramic radiographs were also taken to detect any changes in marginal bone levels.

Peri-implantitis is rare

At the patient level, healthy peri-implant conditions prevailed in 38.3% of individuals. In the remaining 61.7%, researchers found peri-implant disease. The majority of these cases (57.5%) were diagnosed as peri-implant mucositis, with only 4.2% of subjects showing peri-implantitis. At the implant level, healthy peri-implant conditions prevailed around

48.5% of fixtures. Another 48.5% of implants were affected by peri-implant mucositis, and 3% by peri-implantitis.

Based on these findings and given the limitations of this study, the authors conclude that immediate implant placement and immediate loading are associated with a high success rate after two to ten years.

Immediate implant placement in compromised extraction sockets

A 2021 systematic review examined treatment outcomes after immediate implant placement in compromised extraction sockets. The authors looked at implant survival rates and other success parameters, such as marginal bone levels or soft-tissue conditions.

Their literature search, which included reports published to January 2021, identified 43 studies to include in their analysis. In total, data covering 3,436 subjects and 5,148 implants over a period of 8 to 120 months were considered. Of these implants, 4,804 were immediate implants, with 3,305 of the latter placed in compromised extraction sockets. A flapless approach was used in 18 of the studies included, while a mucoperiosteal flap was reflected in 25 studies. Only 2 studies used both techniques.

An option for pre-damaged extraction sockets

While all 43 studies reported the incidence of implant loss, 22 publications

additionally addressed marginal bone loss, 9 addressed instances of soft-tissue recession, and only 3 studies zoomed in on aesthetic parameters. A total of 106 implants placed immediately in compromised extraction sockets were lost, compared to 19 lost implants in intact extraction sockets. The resulting survival rates were 96.79% and 98.73%, respectively, so the review's discussion section stated that there had been no significant differences in survival rates. The conclusion was that immediate implant placement in compromised extraction sockets does not appear to adversely affect survival and success rates compared to non-compromised sockets.

High survival rates regardless of timing

Aiquel et al investigated the extent to which the timing of implant placement and loading affects implant survival and biological success parameters in a systematic review. They analyzed 14 studies with at least 10 patients rehabilitated with multi-unit restorations supported by at least two implants and followed for at least three years. Implant survival rates and at least one biological parameter were reported in all studies included.

Based on the definitions of different times of implant placement and loading proposed by Gallucci et al. and Siebers et al., the authors assigned all studies to one relevant category. In this system, implant placement and implant loading can

Minimally invasive immediate implant placement



The MIMI procedure is a flapless implant insertion protocol that also provides for immediate implant placement, developed by Dr. Armin Nedjat between 1994 and 2006. In the MIMI nomenclature, immediate placement is designated a MIMI 0. A characteristic feature of MIMI 0 is that a new implant bed is created rather than inserting the implant into the extraction socket. Scan the QR code on the left to view an immediate implant placement procedure using the MIMI 0 protocol.

For teeth with a single root, such as the incisor shown on the upper left, a new implant bed is created by drilling at an angle different from that of the extraction socket. The empty extraction socket can then be filled with, for example, autologous bone replacement material obtained from the patient's extracted tooth using the Smart Grinder procedure.

For molars with two or three roots, drilling is performed into the bifurcation or trifurcation. This requires the pilot hole and, if necessary, its first extension hole to be drilled with conical triangular drills at low speed. The cavity is then prepared with condensers of ascending diameter until a torque of approximately 20 Ncm is achieved, which also indicates what the diameter of the implant should be. For example, if a torque of 20 Ncm was achieved with the condenser with a diameter of 4.3 mm, an implant with a diameter of 4.5 mm should be selected. Scan the QR code on the right to view an immediate implant placement procedure using the MIMI 0 protocol.



be immediate, early or delayed, resulting in nine possible combinations (e.g., immediate placement with early loading or delayed placement with immediate loading).

The studies included covered five of the nine defined categories, including immediate and early loading after immediate placement and all three loading times following delayed placement. With the exception of one prospective

cohort study, in which immediate placement and loading were performed (survival rate: 90%), all groups exhibited survival rates of more than 90% over study periods of 3 to 15 years after surgery. Based on these findings, and given the prevailing limiting factors, the authors concluded that all timing combinations for placement and loading produced high survival rates.

Positive results following immediate placement

Arora et al took a closer view at immediately placed and provisionalized implants. Their prospective study covered 30 patients with single-tooth implants in the anterior maxilla and documented hard- and soft-tissue changes as well as aesthetic outcomes using the Pink Es-

thetic Score (PES). In their study, the surgical procedure was flapless following augmentation of the bony gap between implants and buccal bone walls.

The average increases in bone height over a follow-up period of two to five years were 0.18 ± 1.38 mm ($p = 0.85$) in the mesial region and 0.34 ± 1.40 mm ($p = 0.22$) in the distal region. The average soft-tissue loss was 0.05 ± 0.64 mm in the mesial papillary region and 0.16 ± 0.63 mm in the distal papillary region, and the midfacial recessions was 0.29 ± 0.74 mm, deemed to be beneficial by the study authors as none of these values turned out to be statistically significant.

The authors concluded that by using a flapless technique, immediately placed and restored implants in the anterior maxilla yielded positive results in terms of osseointegration and of hard- and soft-tissue outcomes and aesthetics.

Reduced incidence of soft-tissue recession

The retrospective analysis by Noelken et al found evidence for an improvement of the facial soft-tissue level after immediate implant placement. They provided 26 patients with recession of the marginal gingiva on a non-salvageable anterior maxillary tooth (13 to 23) with an immediate implant. Extraction and implant placement were performed using a flapless technique, and facial bone defects were augmented with autologous bone. Exactly half of the patients also received connective-tissue grafts.

After an average 45 months, the authors found a significant reduction in soft-tissue recession from 1.8 to 0.9 mm in the group of patients without a connective-tissue graft. In the group of patients treated with a connective-tissue graft, this reduction was even more pronounced – from 2.3 to 0.5 mm. Additionally, a significant improvement in PES values was evident in both groups. None of the implants investigated were lost, although a marginal bone loss > 1 mm was observed around 5 implants without a soft-tissue graft.

The authors considered the clinical results as evidence that immediate implant placement could improve facial soft-tissue levels and aesthetics patients with initial gingival recessions of 1 to 3 mm. This effect was more evident in cases with more pronounced recession and additional connective-tissue grafts.

Conclusion

Some practitioners still consider immediate implant placement too risky, but the studies discussed here take a much more promising view of this technique. While the authors of the cited reviews uniformly express a desire for a broader data base, their conclusions suggest that immediate implant placement is far more reliable than the still relatively small number of immediate procedures would suggest. Given the smaller number of treatment sessions that eases the psychological and financial burden on patients in particular, immediate implant placement should be considered as a treatment option more frequently.

Literature

- 1 Parvini P, Obreja K, Becker K, Galarraga ME, Schwarz F, Ramanauskaite A. The prevalence of peri-implant disease following immediate implant placement and loading: A cross-sectional analysis after 2 to 10 years. *Int J Implant Dent.* 2020; 6(1), 1–10. <https://doi.org/10.1186/s40729-020-00259-x>.
- 2 Amid R, Kadkhodazadeh M, Moscovichi A. Immediate implant placement in compromised sockets: A systematic review and meta-analysis. *J Prosthet Dent.* 2021 Nov 9;S0022-3913(21)00525-4. (Online ahead of print)
- 3 Aiquel LL, Pitta J, Antonoglou GN, Mischak I, Sailer I, Payer M. Does the timing of implant placement and loading influence biological outcomes of implant-supported multiple-unit fixed dental prosthesis – A systematic review with meta-analyses. *Clin Oral Implants Res.* 2021;32(Suppl. 21):5–27. DOI: 10.1111/clr.13860.
- 4 Gallucci, G. O., Hamilton, A., Zhou, W., Buser, D. & Chen, S. (2018). Implant placement and loading protocols in partially edentulous patients: A systematic review. *Clin Oral Implants Res,* 29 (Suppl. 16), 106–134. <https://doi.org/10.1111/clr.13276>.
- 5 Siebers, D., Gehrke, P. & Schliephake, H. (2010). Delayed function of dental implants: A 1- to 7-year follow-up study of 222 implants. *Int J Oral Maxillofac Implants,* 25, 1195–1202.

6 Arora H, Khzam N, Roberts D, Bruce WL, Ivanovski S. Immediate implant placement and restoration in the anterior maxilla: Tissue dimensional changes after 2–5 year follow-up. *Clin Implant Dent Relat Res.* 2017 Aug; 19(4):694–702. doi: 10.1111/cid.12487. Epub 2017 Apr 21. PMID: 28429394.

7 Noelken R, Moergel M, Pausch T, Kunkel M, Wagner W: Clinical and esthetic outcome with immediate insertion and provisionalization with or without connective tissue grafting in presence of mucogingival recessions: A retrospective analysis with follow-up between 1 and 8 years. *Clin Implant Dent Relat Res.* 2018; 20 (3):285–293.



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