

## Post-extractive and delayed implant placement in aesthetic areas using locking-taper implants: a 3-years comparative study

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**Background:** Implant therapy in partially edentulous patients has become a well-established treatment method even in aesthetic areas, where predictability levels comparable with those for implants placed in other jaw areas have been achieved. To shorten rehabilitation times, protocols have been constantly evolving in recent decades, with the literature focussing on the evaluation of post-extractive implant placement with or without immediate loading. Now these protocols achieve implant survival rates comparable to those of traditional biphasic techniques, thanks to continuous improvements of materials and methods. Most of the studies have focused on implant survival, however in aesthetic areas complications such abutment or implant collar exposure, or the absence of interproximal papilla, may have serious implications even if good osseointegration has been reached. There have been in literature few studies employing indices that can be objectively re-used for comparative aesthetic appraisal.

**Aim/Hypothesis:** The purpose of this study was to compare the aesthetic outcome and the stability of peri-implant hard and soft tissues of single-tooth locking-taper connection implants placed in the anterior maxilla in fresh or healed post-extractive sockets.

**Material and methods:** Twenty-one patients received 34 plateau design locking-taper implants (Bicon LLC, Boston, MA, USA) in the anterior maxilla. Fourteen implants were placed immediately after tooth extraction, whereas 20 implants were placed after the healing of alveolar socket. The presence of teeth or implants as mesial and distal adjacent was evaluated. To objectively examine the aesthetic outcome of the implants, intraoral photographs were critically analysed using the Papilla Index. Moreover, the health condition of peri-implant soft tissues such as probing depth (PD), modified bleeding index (mBI), modified plaque index (mPI) and width of keratinized mucosa (KT) were evaluated. In relation to peri-implant hard tissues, the interproximal bone peaks (crestal bone, CB) and the first bone-to-implant contact (FBIC) were measured on mesial and distal sides using a software program (Rasband, W.S., ImageJ, U. S. National Institutes of Health, Bethesda, Maryland, USA). Student T test was used to study the differences between post-extractive and delayed implants regarding the study variables, and to find any differences regarding sites with a tooth or an implant as adjacent. The significance was set to  $P < .05$ .

**Results:** The average follow-up period was  $38.6 \pm 24.1$  months. No implants or prostheses were lost (CSR = 100%). Most of the patients exhibited good oral hygiene during the follow-up period, presenting with a plaque index (mPI) of  $0.13 \pm 0.32$  and a bleeding index (mBI) of  $0.19 \pm 0.18$ . The average probing depth (PD) was  $2.64 \pm 0.57$  mm. The average amount of peri-implant keratinized tissue (TK) was  $3.84 \pm 1.35$  mm. Differences were only found regarding the width of keratinized mucosa (post-ex:  $4.57 \pm 1.64$  mm; delayed:  $3.33 \pm 0.86$  mm;  $P = 0.007$ ). The average CB level was  $2.38 \pm 1.65$  mm (post-ex:  $2.53 \pm 0.91$  mm; delayed:  $2.28 \pm 2.03$  mm;  $P = 0.67$ ). The average FBIC was  $-0.26 \pm 0.39$  mm (post-ex:  $0.21 \pm 0.06$  mm; delayed:  $0.33 \pm 0.47$  mm;  $P = 0.17$ ). The mean Papilla Index was  $1.84 \pm 0.78$  (post-ex:  $2.25 \pm 0.78$ ; delayed:  $1.55 \pm 0.65$ ;  $P = 0.01$ ). The average papilla score was  $1.98 \pm 0.71$  when there was a tooth as adjacent, and it was  $1.61 \pm 1.02$  when there was an implant as adjacent ( $P = 0.09$ ).

**Conclusions and clinical implications:** The rehabilitation of both function and aesthetics at the same time as tooth extraction, using a post-extractive immediate non-functional loading protocol, is a major challenge for the therapist but offers great benefits for the patient. Within the limits of this study, single-tooth Morse taper connection implants placed in the anterior maxilla according to an immediate non-functional loading protocol seems to be comparable to delayed implant placement for the maintenance of peri-implant hard and soft tissues, and even better from an aesthetic point of view.