

Clinical case letter**"M" flap design for promoting implant esthetics: technique and cases series****Guerino Paolantoni,¹ Andrea Cioffi,¹ Jolanda Mignogna,¹
Francesco Riccitiello,² and Gilberto Sammartino.^{1,*}**¹ Department of Oral Surgery, Faculty of Medicine, University of Naples Federico II, Naples, Italy² Department of Endodontics, Faculty of Medicine, University of Naples Federico II, Naples, Italy*Corresponding author: Gilberto Sammartino, gilberto.sammartino@unina.it*Submitted March 12th, 2013; accepted after minor corrections on April 20th, 2013.***1. Introduction**

The objectives of modern implant dentistry are no more to reach only a stable osseointegration, but are now focusing on the quality of the final esthetic result. In the anterior maxillary area, the reconstructions have to be indistinguishable from the natural teeth. Factors such as a thin gingival biotype, a high lip line, triangular shaped teeth, and high patient esthetic demand may affect the final outcome of the treatment in the maxillary anterior region, and many techniques are developed to improve this final esthetic outcome [1,2].

The management of soft tissues during the second-stage of implant surgery (implant uncovering surgery) is an important parameter to improve the final esthetic aspect around the implant-supported restoration. Traditionally, a tissue-punch or a full thickness flap opening prior to abutment connection have been used at this stage. This may lead to bone loss resulting in soft tissue recession, and causes unesthetic implant restorations [3]. Many different flap designs have been advocated to reduce these negative consequences. This includes, but is not limited to: split finger technique [4], by splitting the soft tissue flap in two halves and place them respectively on the mesial and distal sides; roll technique, by moving tissue from palatal side to the buccal area; palatal roll technique, by rotating the palatal tissue after removing the epithelium layer to the buccal side [5] and inlay connective tissue graft [6].

In this article, a simple surgical approach, called "M" flap design, is described and evaluated in a series of 58 cases, to prevent buccal marginal recession and to achieve an esthetic peri-implant soft tissue remodeling and predictable implant-supported gingiva-prosthetic integration, particularly during the single tooth rehabilitations.

2. Materials/methods and results

In this article, we illustrate this technique with 2 clinical cases among a series of 58 patients. A.N (Case 1, **Figure 1**) and P.M (Case 2, **Figures 2 and 3**) were referred to the Department of Oral Surgery, Faculty of Medicine, University of Naples Federico II, and were expecting a fixed rehabilitation of their missing upper lateral incisor. An implant-supported prosthesis was planned (**Figures 1A, 2A**). Three months after the placement of a sand-

blasted acid-etched implant (Thommen Medical AG, Waldenburg, Switzerland), the fixtures exposures were performed following the “M” flap surgical technique.

Briefly, an intrasulcular inner beveled incision (Micro-blade M6900, Advanced Surgical Technologies, Sacramento CA, USA) was performed around the distal aspect of the adjacent teeth, rounding buccally and palatally (**Figures 1B, 1C, 2B**). A horizontal slightly palatal M-shaped incision connected the vertical incisions (**Figures 1B, 1C, 2B**). A full thickness flap was then raised in order to visualize the implant head (**Figure 1D**). A healing cap was placed, and a monofilament mattress suture at the gingival papillae stabilized the flap around the healing cap. Furthermore, single suture knots assured a tension free wound closure (**Figures 1E, 1F, 2C**). Ten days after surgery soft tissue was almost completely healed (**Figure 2D**). After 6 weeks, soft tissue modeling was apparently complete (**Figures 1G, 2E-2H**). A Zirconia abutment was placed and soft tissue integration was controlled (**Figures 3A, 3B**). A metal-free crown rehabilitation was finally achieved (**Figures 1H, 3C, 3D**).

The same technique was applied successfully in a series of 58 cases of lateral maxillary incisors, using the exact same protocol, and showed the same outcomes during a two-year period. The accurate evaluation and scoring of the benefit of this approach is difficult, as all cases are different and difficult to standardize. However the experience on this case series confirmed that this simple incision line has no notable side-effects or unexpected negative consequences.

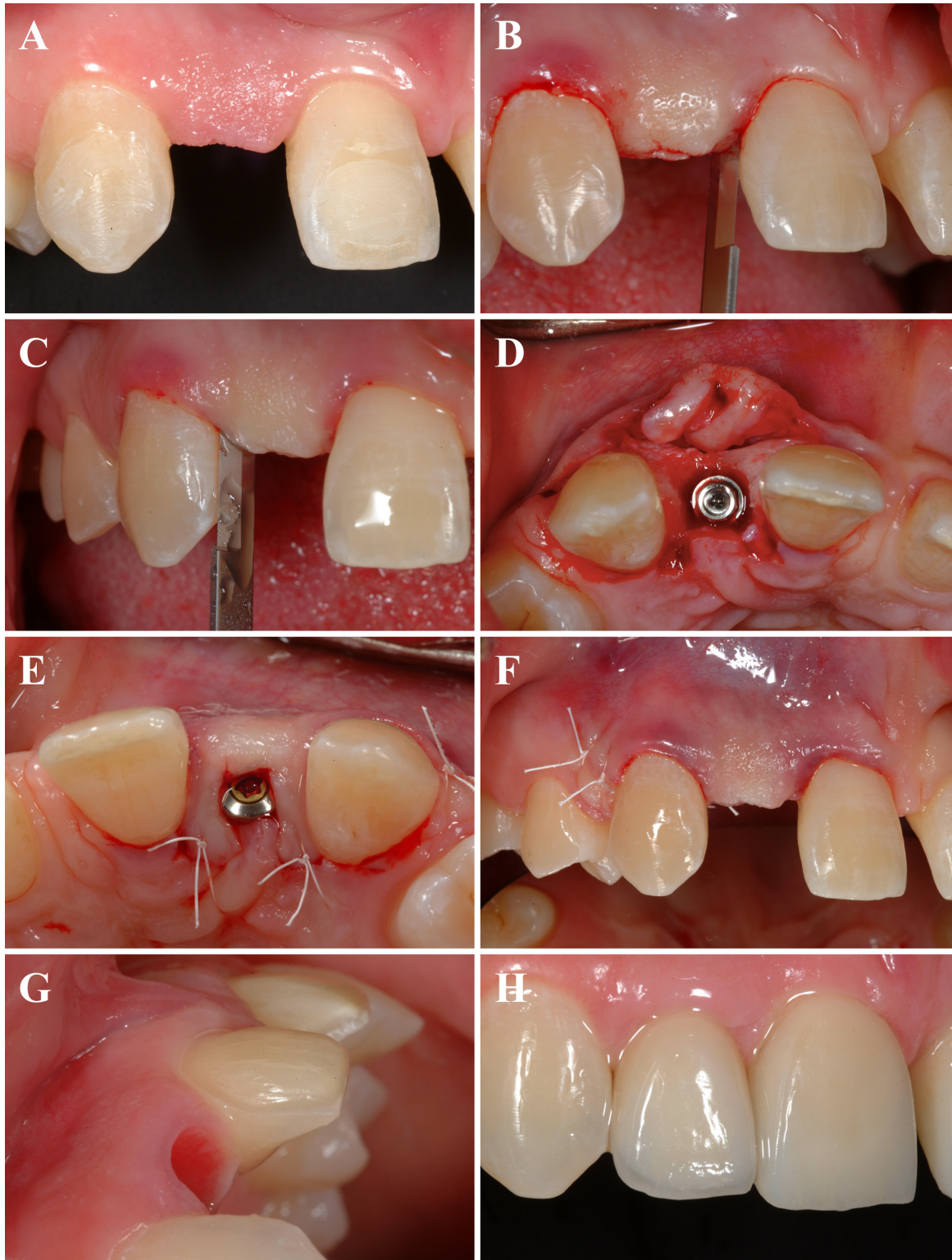


Figure 1. First case. (A) Preoperative view: the right maxillary lateral incisor was missing in a thick gingival biotype case. (B, C) An intrasulcular inner beveled incision was performed around the distal aspect of the adjacent teeth, rounding buccally and palatally and connecting with a M-shaped incision. (D) The full thickness “M” flap was raised to visualize the bone surface and connect the implant abutment. (E, F) The flap was closed and sutured with a mattress monofilament suture at the gingival papilla to stabilize the flap around the healing cap. Single knots were used to assure a tension-free wound closure. (G) After 6 weeks, a complete soft tissue healing was apparently achieved. (H) The final zirconia-based implant-supported crown offered an excellent esthetic outcome.

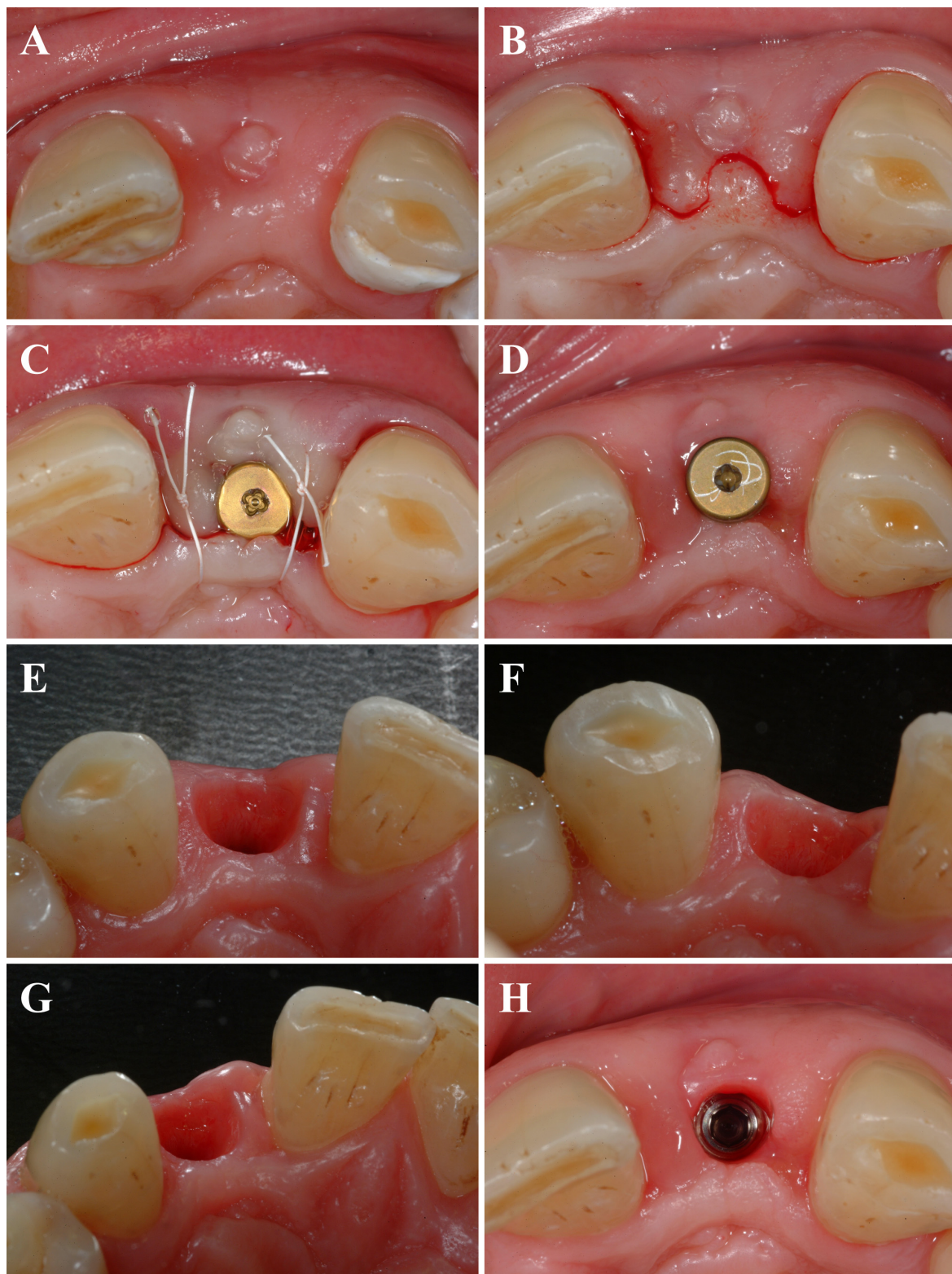


Figure 2. Second case, surgical step. (A) Preoperative view: the left maxillary lateral incisor was missing. (B) A M-shaped flap was performed. (C) A mattress monofilament suture was used at the gingival papilla to stabilize the flap around the healing cap. (D) After ten days, the healing was good and uneventful. (E, F, G, H) After six weeks, the healing was almost complete with a stable contour around the temporary crown.



Figure 3. Second case, prosthetic step. (A, B) A zirconia abutment was placed and presented a correct peri-implant soft tissue integration. (C, D) The final zirconia implant-supported crown was placed and showed a proper esthetic aspect and contour.

3. Discussion

The incisions are critical parameters in all periodontal and implant surgeries [7,8], particularly for the wound closure after a bone reconstruction and for the management of a natural soft-tissue contour in complex rehabilitations [1,2,9].

The second implant surgical stage could be a challenging procedure, especially in the anterior maxilla where the esthetic expectations are always very high. Gingival recession and implant shoulder exposure can seriously compromise the final esthetic outcome of incisor rehabilitations, especially in immediate postextractive cases [10] and when an adequate architecture of the surrounding papilla is still present. High lip line smile, thin gingival biotype, triangular tooth shape, high patient expectation represent risk factors for the proper management of the prosthetic implant-supported rehabilitation in the esthetic anterior area [11].

In immediate postextractive cases, the buccal bone resorption can affect the esthetic outcome. The thin buccal bone plate resorption, related to the tooth loss and past infections, may cause a wide marginal recession, with the implant shoulder exposure [10,12] and sometimes the beginning of an implant contamination [13]. In such cases, a slightly palatal implant placement via a flapless approach allows an adequate primary fixture stability and reduces the buccal plate stress [11,14]. The reported “M” flap technique represents a low risk approach to the implant shoulder, especially when natural adjacent teeth are present. As the

case 2 shows, a more palatal incision allows to get a thicker buccal soft tissue, reducing the risk of gingival recession even in thin biotype cases. The M-shaped flap technique needs microsurgical devices in order to minimize soft tissue inflammation. By this way, it assures a better flap vascularization with a tension-free flap healing, and thus reduces the risk of buccal gingival recession [15]. The internal vertical mattress suture at the papilla level (each suture for each papilla) assures a better soft tissue modeling around the implant healing cap and the adjacent teeth. By this way, the esthetic results are more predictable, especially in more demanding cases.

The M-shaped incision offers good results, but this approach could also be combined with some healing biomaterials such as platelet concentrates for surgical use, in order to promote a supplementary stimulation of the periosteum and gingival maturation [7-9].

As a conclusion, in anterior implant rehabilitation, the M-shaped flap offers excellent esthetic outcomes, especially in single tooth restorations and in immediate postextractive cases. With the “M” flap design, the gingival architecture is preserved, peri-implant soft tissue healing during the immediate postoperative period is more predictable (particularly around temporary crowns) and consequently soft tissue-crown integration is improved. The reported technique allowed to achieve these results in all of the 58 surgical cases performed.

Disclosure of interests

The authors have no conflict of interest to report.

References

- [1] Simonpieri A, Del Corso M, Sammartino G, Dohan Ehrenfest DM. *The relevance of Choukroun's platelet-rich fibrin and metronidazole during complex maxillary rehabilitations using bone allograft. Part I: a new grafting protocol.* **Implant Dent.** 2009;18(2):102-11.
- [2] Simonpieri A, Del Corso M, Sammartino G, Dohan Ehrenfest DM. *The relevance of Choukroun's platelet-rich fibrin and metronidazole during complex maxillary rehabilitations using bone allograft. Part II: implant surgery, prosthodontics, and survival.* **Implant Dent.** 2009;18(3):220-9.
- [3] Belser UC, Mericske-Stern R, Bernard JP, Taylor TD. *Prosthetic management of the partially dentate patient with fixed implant restorations.* **Clin Oral Implants Res.** 2000;11 Suppl 1:126-45.
- [4] Misch CE, Al-Shammari KF, Wang HL. *Creation of interimplant papillae through a split-finger technique.* **Implant Dent.** 2004;13(1):20-7.
- [5] Adriaenssens P, Hermans M, Ingber A, Prestipino V, Daelemans P, Malevez C. *Palatal sliding strip flap: soft tissue management to restore maxillary anterior esthetics at stage 2 surgery: a clinical report.* **Int J Oral Maxillofac Implants.** 1999;14(1):30-6.
- [6] Kazor CE, Al-Shammari K, Sarment DP, Misch CE, Wang HL. *Implant plastic surgery: a review and rationale.* **J Oral Implantol.** 2004;30(4):240-54.
- [7] Del Corso M, Mazor Z, Rutkowski JL, Dohan Ehrenfest DM. *The use of leukocyte- and platelet-rich fibrin during immediate postextractive implantation and loading for the esthetic replacement of a fractured maxillary central incisor.* **J Oral Implantol.** 2012;38(2):181-7.
- [8] Del Corso M, Vervelle A, Simonpieri A, Jimbo R, Inchingolo F, Sammartino G, Dohan Ehrenfest DM. *Current knowledge and perspectives for the use of platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) in oral and maxillofacial surgery part 1: Periodontal and dentoalveolar surgery.* **Curr Pharm Biotechnol.** 2012;13(7):1207-30.
- [9] Simonpieri A, Del Corso M, Vervelle A, Jimbo R, Inchingolo F, Sammartino G, Dohan Ehrenfest DM. *Current knowledge and perspectives for the use of platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) in oral and maxillofacial surgery part 2: Bone graft, implant and reconstructive surgery.* **Curr Pharm Biotechnol.** 2012;13(7):1231-56.
- [10] Chen ST, Buser D. *Clinical and esthetic outcomes of implants placed in postextraction sites.* **Int J Oral Maxillofac Implants.** 2009;24 Suppl:186-217.
- [11] Esposito M, Maghaireh H, Grusovin MG, Ziounas I, Worthington HV. *Interventions for replacing*

missing teeth: management of soft tissues for dental implants. Cochrane Database Syst Rev. 2012;2:CD006697.

[12] Araujo MG, Wennstrom JL, Lindhe J. *Modeling of the buccal and lingual bone walls of fresh extraction sites following implant installation. Clin Oral Implants Res.* 2006;17(6):606-14.

[13] Mouhyi J, Dohan Ehrenfest DM, Albrektsson T. *The peri-implantitis: implant surfaces, microstructure, and physicochemical aspects. Clin Implant Dent Relat Res.* 2012;14(2):170-83.

[14] Quirynen M, Van Assche N, Botticelli D, Berglundh T. *How does the timing of implant placement to extraction affect outcome? Int J Oral Maxillofac Implants.* 2007;22 Suppl:203-23.

[15] Burkhardt R, Lang NP. *Role of flap tension in primary wound closure of mucoperiosteal flaps: a prospective cohort study. Clin Oral Implants Res.* 2010;21(1):50-4.

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