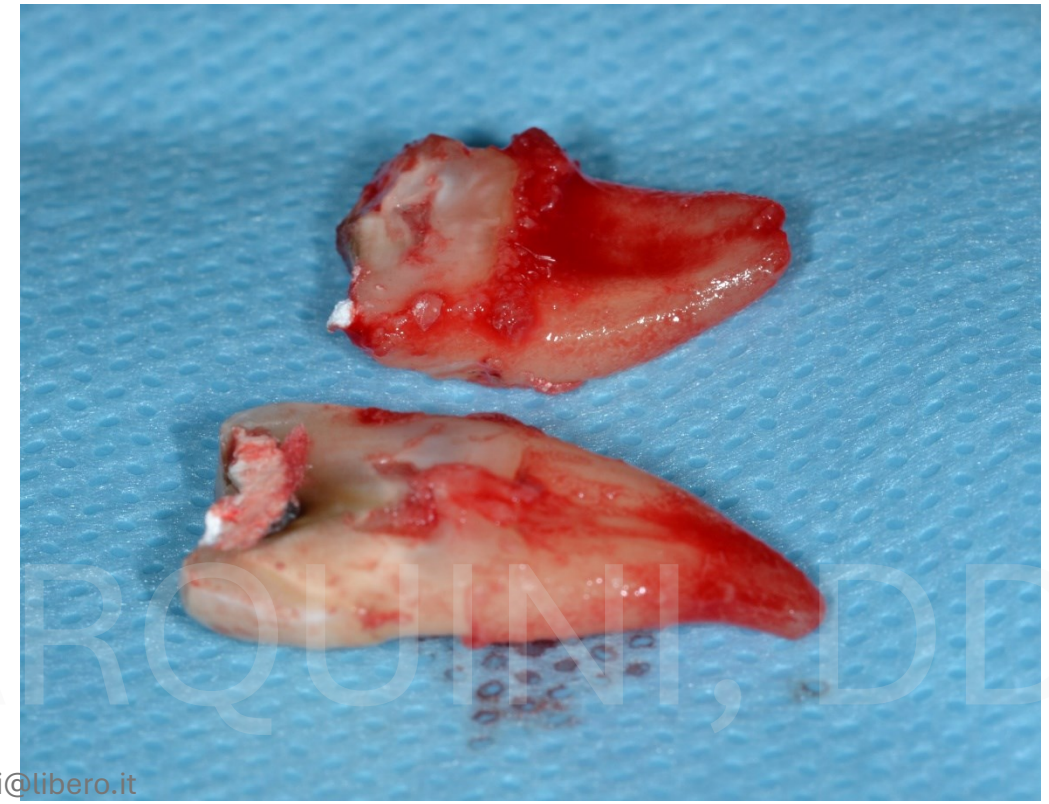
RESISTA®

- **Introduction:**
- Immediate implant placement in a post-extractive socket is a well documented procedure. In posterior sites of the jaws (either mandibular or maxillary molars) taking advantage of interradicular septum can greatly improve implant primary stability.
- Using a piezoelectric device instead of traditional drills could help to insert the implant with the right angle of inclination and to decrease the risk of destroying the interradicular septum.
- Final implant osteotomy is the carried out by means of osseodensification burs in order to expand the interradicular bony septum, just enough to place the implant
- To associate post-extractive implants with the graft of a biomaterial could reduce the risk of alveolar bone resorption.

g_tarquini@libero.it



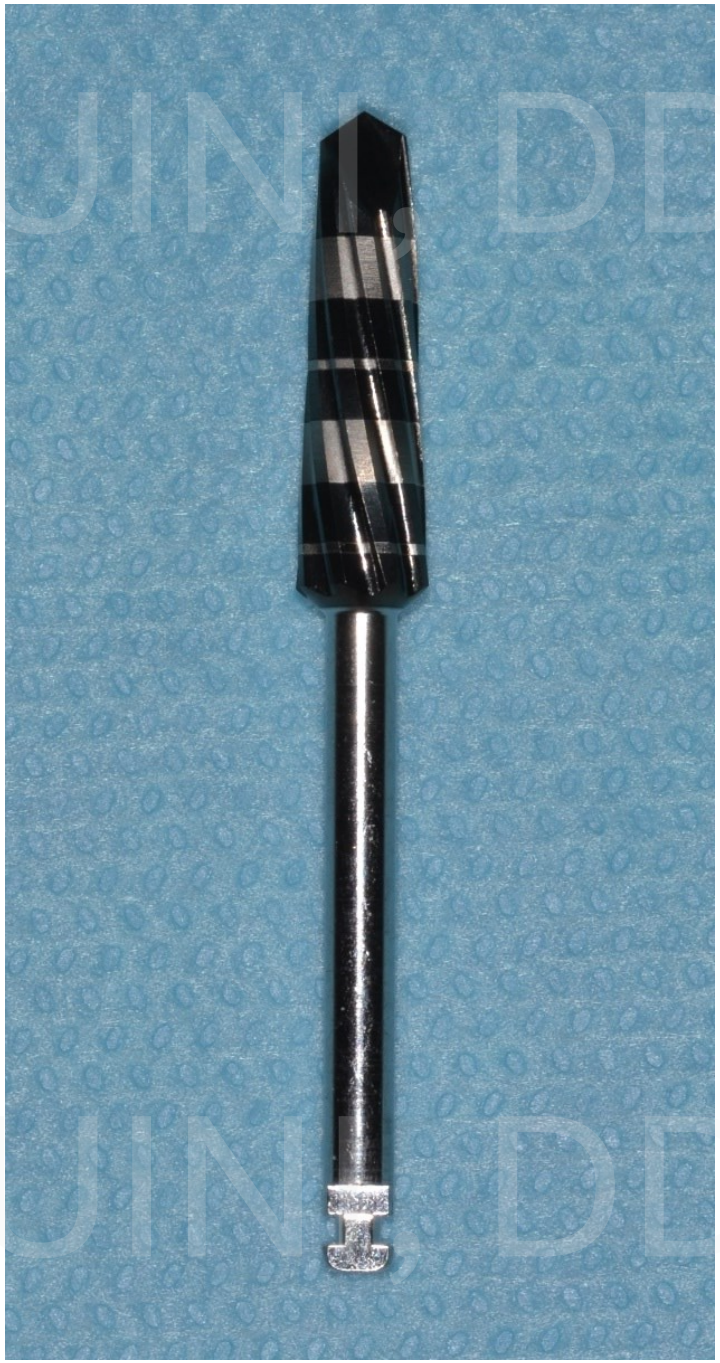
g_tarquini@libero.it

SURGICAL EXTRACTION

CONVENTIONAL EXTRACTION

g_tarquini@libero.it

GIACOMO TARQUINI, DDS
g_tarquini@libero.it



g_tarquini@libero.it

GIACOMO TARQUINI, D.D.S

CLINICAL ORAL IMPLANTS RESEARCH

*Luigi Canullo**
*David Peñarrocha**
Miguel Peñarrocha
Alonso-Gonzalez Rocio
Maria Penarrocha-Diago

Piezoelectric vs. conventional drilling in implant site preparation: pilot controlled randomized clinical trial with crossover design

Authors' affiliations:
Luigi Canullo, Private Practice, Rome, Italy
David Peñarrocha, Alonso-Gonzalez Rocio, Oral Surgery and Implantology, Valencia University Medical and Dental School, Valencia, Spain
Miguel Peñarrocha, Oral Surgery and Implantology, Valencia University Medical and Dental School, Valencia, Spain
Maria Penarrocha-Diago, Oral Surgery, Department of Stomatology, Valencia University Medical and Dental School, Valencia, Spain

Corresponding author:
Luigi Canullo
Via Nizza, 46
00198 Rome
Italy
Tel./Fax: +39 06 8411980
e-mail: luigicanullo@yahoo.com

Key words: implant stability, piezosurgery, randomized clinical trial, ultrasounds

Abstract

Objective: To compare implant stability throughout osseointegration, peri-implant marginal bone loss, and success rates of implants placed with conventional and mixed drilling/piezoelectric osteotomy.

Materials and methods: A pilot randomized-controlled trial was performed on 15 patients. Each patient received two implants in the mandibular molar region. All sites were prepared with conventionally up to the 2.8 mm wide drill. Osteotomies were randomly finalized with a 3 mm diameter drill (control group) or with two consecutive ultrasonic tips (2.8 mm and 3 mm wide, respectively) (test group). Resonance frequency analysis measurements were taken at implant placement and after 1, 3, 8, and 12 weeks. Peri-implant marginal bone loss 12 months after loading was calculated using periapical radiographs. Wilcoxon test for related samples was used to study differences in implant stability and in peri-implant marginal bone loss between the two groups.

Results: Twenty-nine of 30 implants osseointegrated successfully (one failure in the control group). Stability was significantly higher in the test group at the 8th week assessment; differences were non-significant at all other time-points. Longitudinally, differences were observed between the patterns of implant stability changes: in the test group stability increased more progressively, while in the control group an abrupt change occurred between the 8th and 12th weeks assessments. No difference was found in peri-implant marginal bone loss between the groups. All 29 implants were functionally successful at the 15-month visit.

Conclusions: Within the limit of this pilot study (small sample size, short follow-up), data suggested that implant stability might develop slightly faster when implant site osteotomy is performed with a mixed drilling/ultrasonic technique.

*First two authors claim for equal authorship.

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from mechanical engagement between the fixture and the bone walls of the implant bed. Secondary stability is the progressive increase in stability achieved through bone neo-formation and remodeling in contact with the implant surface during the healing period (Brunski 1992; Meredith 1998).

Several non-invasive diagnostic devices based on modal analysis (in other words, a

the process of osseointegration in a recently placed implant (Atsumi et al. 2007). Osstell® Mentor is an extended system to monitor implant stability based on resonance frequency analysis (RFA), which uses a transducer fixed to the implant and a resonance frequency analyzer. This method assumes that an implant and the surrounding bone function as a single unit; thus, a change in

GIACOMO TADDEO, DDS


GIACOMO TARQUINI, DDS
GIACOMO TARQUINI, DDS
g_tarquini@libero.it

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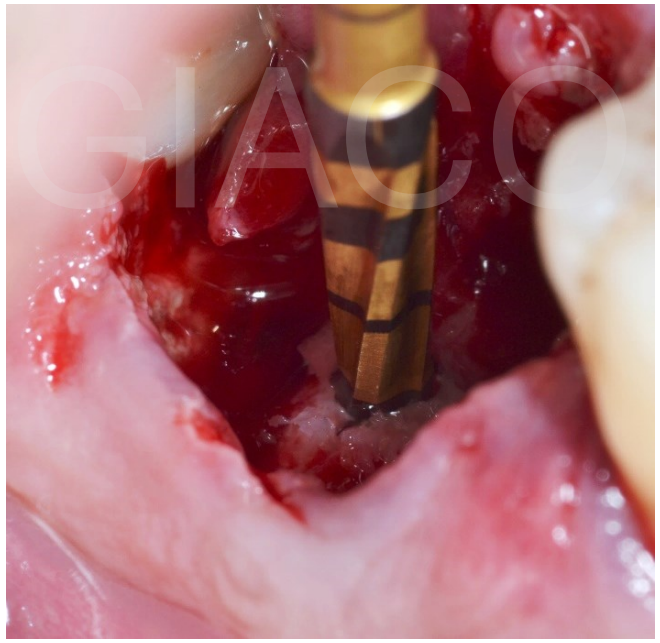
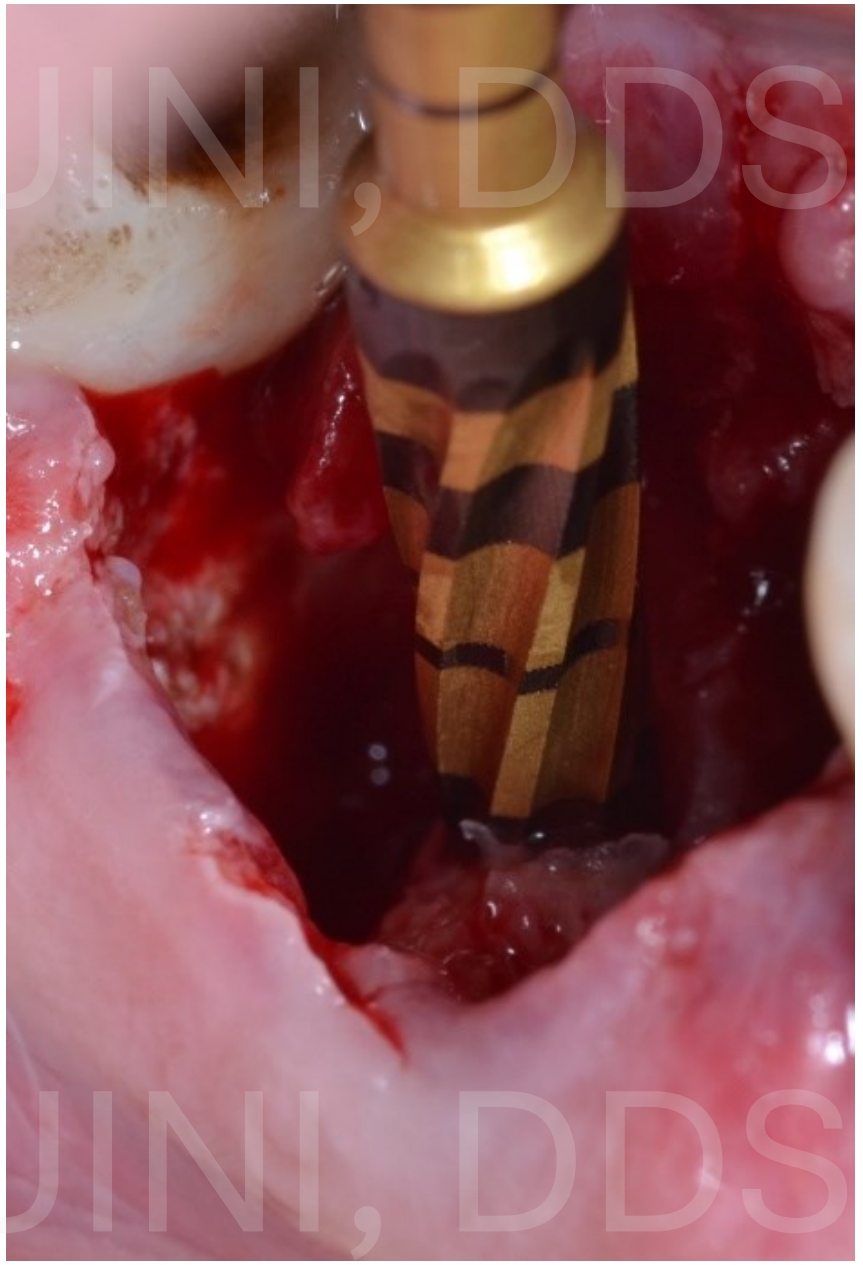
GIACOMO TARQUINI, DDS

g_tarquini@libero.it





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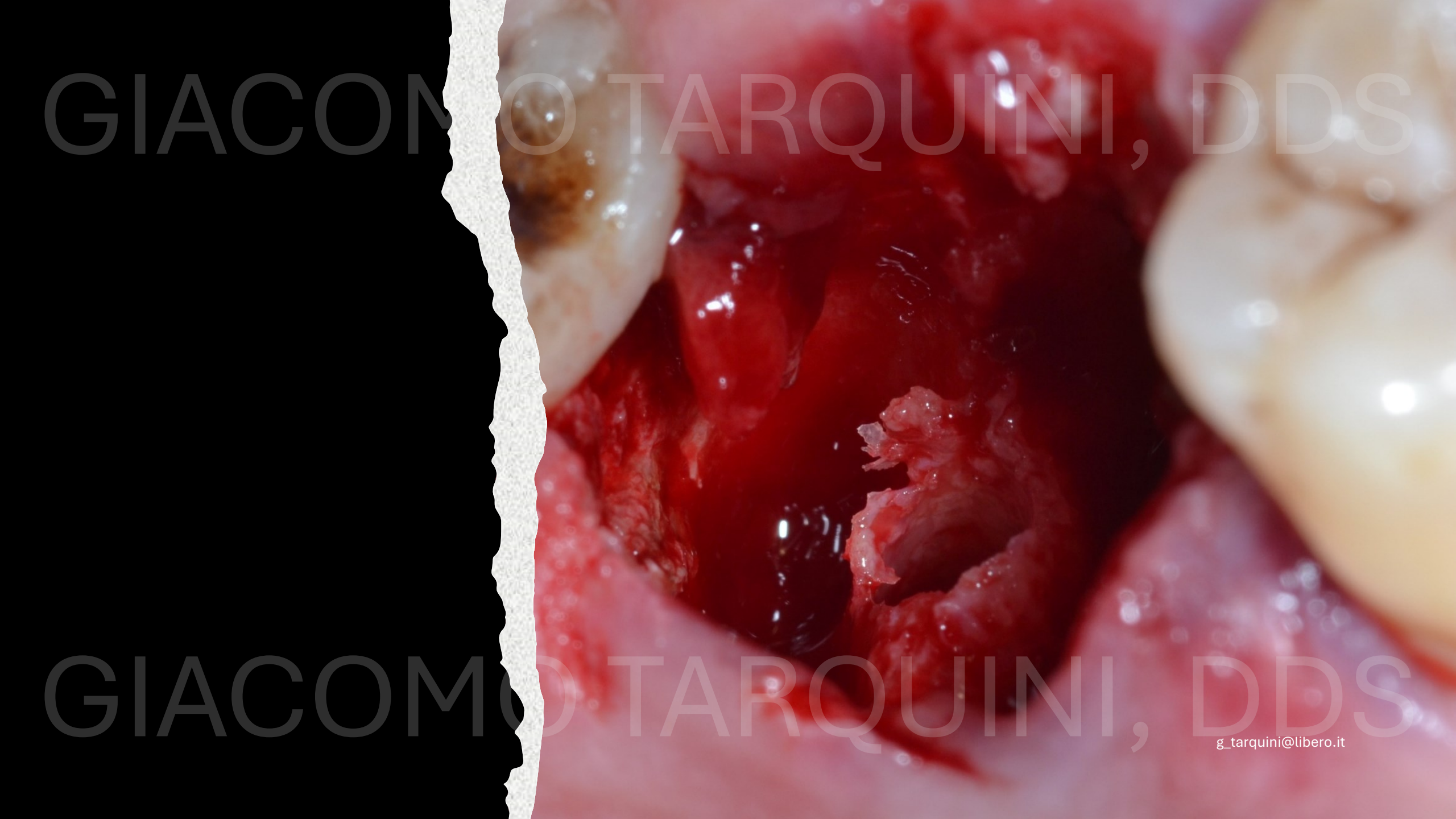
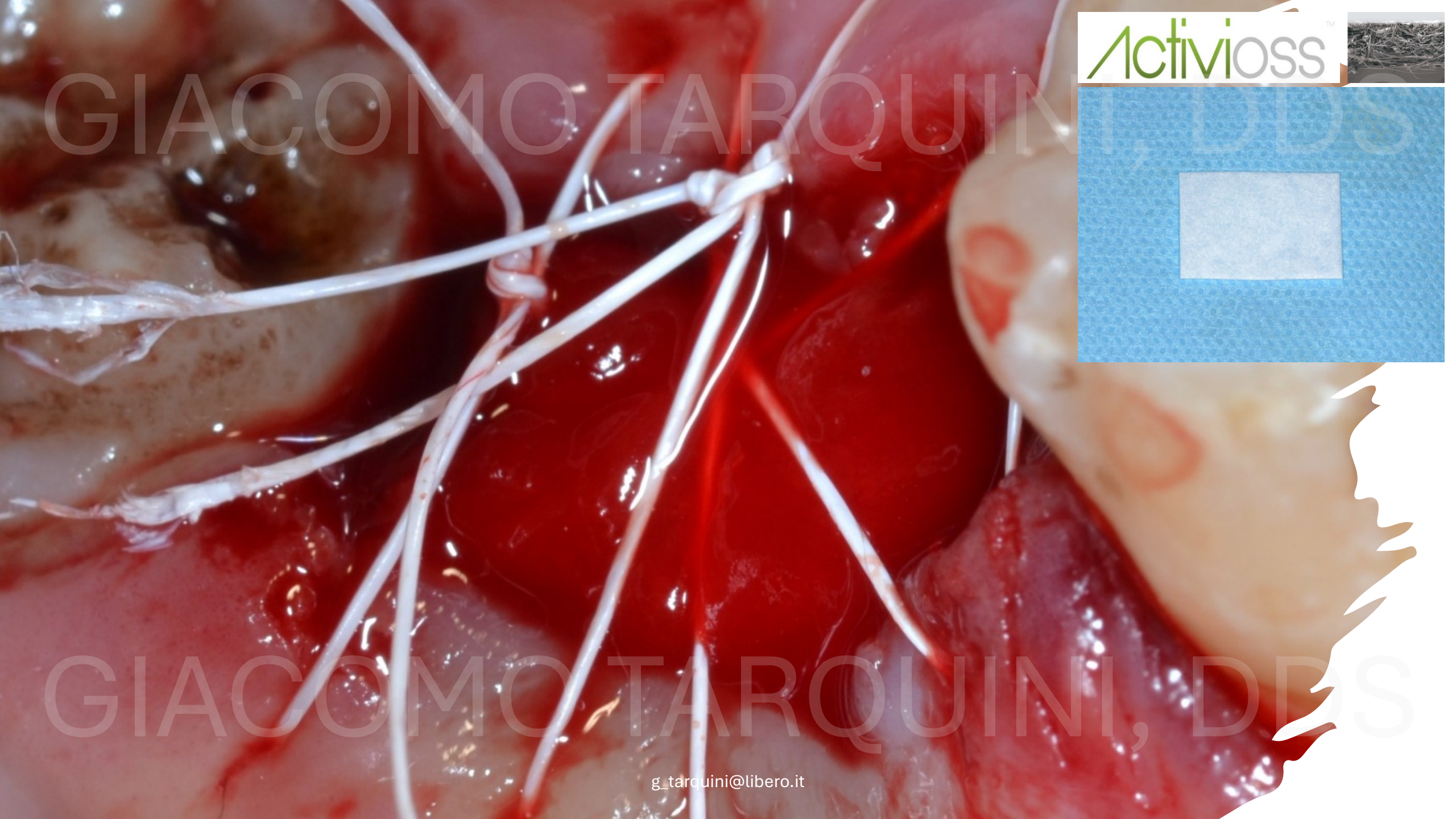

GIACOMO TARQUINI, DDS
GIACOMO TARQUINI, DDS
g_tarquini@libero.it

g_tarquini@libero.it


GIACOMO TARQUINI, DDS
GIACOMO TARQUINI, DDS
g_tarquini@libero.it

g_tarquini@libero.it

g_tarquini@libero.it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GIACOMO TARQUINI, DDS
g_tarquini@libero.it

3 MONTHS POSTOP HEALING

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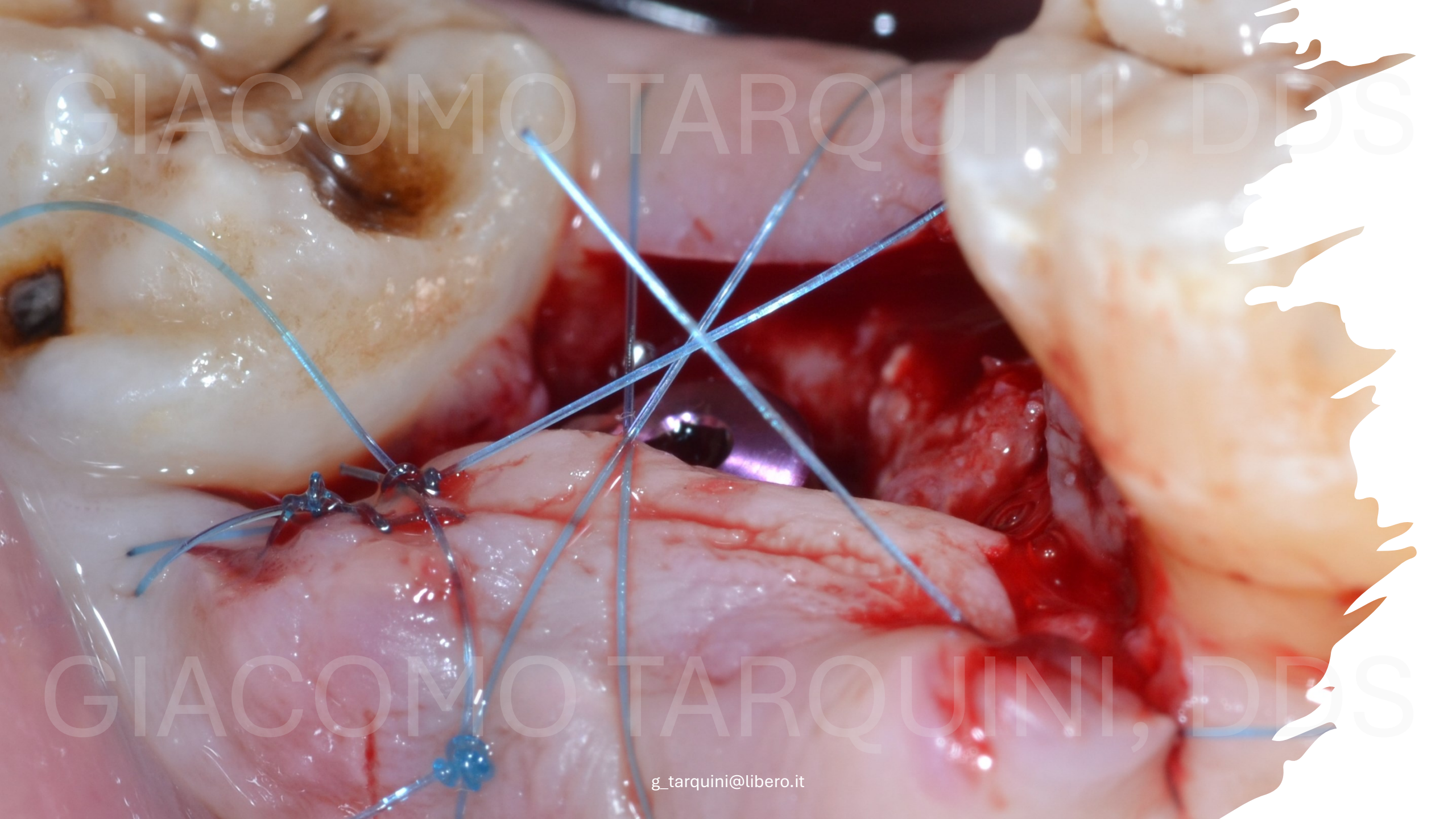
3 MONTHS POSTOP HEALING



g_tarquini@libero.it


GIACOMO TARQUINI, DDS
GIACOMO TARQUINI, DDS
g_tarquini@libero.it

- 2 YEARS FOLLOW-UP

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- 3 YEARS FOLLOW-UP

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- 5 YEARS FOLLOW-UP

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5 YEARS FOLLOW-UP

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- **Conclusions:**
- Immediate post-extractive implant placement offers indisputable advantages in terms of predictability of results, integration of the prosthetic restoration with soft tissues and reduced rehabilitation time.
- The combined use of dedicated piezoelectric tips and osseodensification burs is very useful to overcome the issues related to low density bone and/or limited vertical bone availability in maxillary post-extractive implants, thus avoiding the need for more invasive surgical procedures.
- The selection of an appropriately implant macrogeometry and grafting peri-implant gap significantly contribute to the maintenance of the residual alveolar bone crest.

g_tarquini@libero.it