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Title:	Immediate post-extraction single-tooth implants and temporary crowns in the aesthetic area: 2-year results of a cohort prospective multi-center study. Patient-centered outcomes.
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INTRODUCTION

Single implants in the aesthetic zone may be placed immediately after tooth extraction in conjunction with an immediate (within 48 hours) placement of a provisional crown.[1-9] The success of immediate implants is influenced by patient and site characteristics as well as operator training.[10,11] No conclusive evidence is available on peri-implant marginal soft tissues stability, aesthetic and patient-centered outcomes.[9,12,13] Most studies adopt stringent entry criteria to exclude putative risk factors (e.g. smoking habit or bone dehiscences) thus reducing failure rates.[1,3,4,9,14,15] Several systemic conditions and local risk factors are suspected to affect post-extractive implant survival.[2,16-19] Currently, the most proposed technique consists of flapless extraction, immediate post extractive implant insertion, and immediate provisional crown within 48 hours.[2,4,5,7,8,20-22] The aim of this study was to assess the role of putative risk factors (smoking, systemic conditions and therapies, inability to assume amoxicillin, periodontitis, unfavourable anatomic conditions, dental habits) on implant survival, complications, and patient-centered outcomes following single-tooth immediate (post-extractive) implant placement and loading in aesthetic areas.

MATERIALS AND METHODS

The study design was a multi-center cohort prospective clinical trial and was reported according to the STROBE guidelines.[23.] The followed procedures were in accordance with the ethical standards of the national committee on human experimentation and with Helsinki Declaration of 1965, as revised in 2000.[24] Patients were informed that their data would have been used for statistical analysis and gave their informed consent to the treatment. No ethical committee approval was sought, since it was not required by any authority when the patient recruitment was initiated (June 2007).

The study involved 15 centers, consisting of private practices in Italy.

Patient Selection

All the consecutive patients treated with a single immediate implant placement in the period comprised between June 2007 and July 2009 were enrolled into the study. Putative risk factors were categorized as systemic or local.

Systemic risk factors included smoking habit, diabetes, other systemic conditions, ongoing therapy with anticoagulants or calcium antagonists, previous assumption of bisphosphonates, inability to assume preoperative amoxicillin, assumption of antibiotics and/or steroids in the preoperative week.

Local risk factors included inadequate oral hygiene, history of past or adjacent endodontic care, treated periodontitis, thin phenotype, parafunctional and other bad dental habits, suppuration, bone dehiscences, fracture of the facial plate during implant insertion. Periodontitis was defined by the presence of proximal clinical attachment loss ≥ 3mm (not ascribed to non-periodontitis related causes) in at least two non-adjacent teeth and clinical pocket depth ≥ 3mm associated with local bleeding on probing.[25]

Refusal of the patient to undergo the treatment of periodontitis, when indicated, was an exclusion criterium. Implants with insertion torque lower than 35 Ncm were treated with a standard healing abutment to allow for a secondary stability.[26]

Surgical and prosthetic protocol

The extractions were performed trying to preserve the facial cortex. Fracture of the facial cortex was considered a local risk factor and not an exclusion criterion. The implants were inserted immediately after tooth extraction without flap elevation. The facial and lingual bone surface were located by palpation. A needle was used to locate the palatal bone surface after anaesthesia. The Gelb probe was used after extraction to assess the contour of the socket and the presence of fenestrations or dehiscences.

Tapered implants (NanoTite Certain Tapered Implants Biomet 3i Inc™, Palm Beach FL) were selected in order to increase primary stability after undersized osteotomy.

The site was prepared with the following objectives: place the facial surface of the implant at least one millimetre from the facial wall of the socket; place the implant platform 3-4 mm apical to the level of the facial gingival margin; achieve primary stability (insertion torque ≥35 Ncm). Spongious granules of bovine demineralized denatured bone (Bio-Oss® Geistlich, Wolhusen, Switzerland) or bone chips harvested from the surgical site were inserted between implant and residual alveolar wall when the gap exceeded 1 mm.

Temporary screw retained crowns, tightened at 20 Ncm, were seated within 48 hours after surgery taking care to provide the soft tissues with an adequate support. Any occlusal contact was eliminated.

Final restorations were scheduled three months after implant placement.

Data were gathered before surgery and during surgery, immediately after provisionalization, at the seventh postoperative day and at 3 months after surgery. Subsequent follow-up visits were scheduled at 1 and 2 years after implant placement.

The following variables were recorded for each patient:

- *before surgery*: gender, age, extraction site, indications for extraction and putative risk factors.

- *during surgery:* duration of the extraction, U/V-shaped bone dehiscence, bone fenestration, distance of crestal bone from the gingival margin on the facial aspect, diameter and length of the implant, insertion torque, fracture of the facial bone plate, position of the implant platform relative to the bone crest (apical, coronal, same level), facial gap between bone and implant, biomaterial inserted into the gap, suture to close the gingiva over the bone gap, duration of the implant surgery.

- *during the provisional prosthetic phase:* time elapsed between the end of surgery and provisional crown, platform switching or not, presence of contact point with adjacent teeth.

Outcome measures

Outcome measures were recorded at each follow-up visit.

Implant failure was the primary outcome: the removal of any implant for any reason.

Gingival recession: facial recession was recorded on the basis of the visual examination at the mid-facial aspect of the tooth.

Aesthetic outcomes: the Pink Esthetic Score (PES) was retrospectively evaluated on clinical pictures when available at each phase, from preoperative to follow-up.[27]

Marginal bone levels: radiographic bone levels were measured at the mesial and distal site of each implant on the available intra-oral films taken using a long-cone parallel technique with a Rinn-type film holder at each time point. The distance from the implant platform and the interproximal bone crest, and the distance from the implant platform and the most coronal bone-implant contact were measured parallel to the implant axis. The measurements were made on enlarged pictures, using the distance between the implant threads as a unit and then converting the obtained figures into millimetres. The inter-thread distance was rounded to the closest second decimal digit.

PES and radiographic measurements were carried out by two independent examiners (CC and NMS). Discordances were solved by discussion.

Mechanical complications were also recorded.

Patient-centered outcomes: Intra-operative and postoperative pain was assessed using a numeric ascending scale in 11 scores (0 to 10).[28,29] A similar scale was used to grade the satisfaction about aesthetics[30] and functional aspects where 0 meant that they could not be more dissatisfied while 10 meant that they could not be more satisfied. Patient satisfaction was investigated at each follow-up visit. The satisfaction about function was recorded only at 1 and 2 years, because the patients had been invited not to chew on the provisional crown.

Centers unable to provide the required data at the 3-month interval were excluded from the

study before statistical analysis.

Statistical analysis

Analysis unit was the patient since only one implant was placed in each patient.

Descriptive statistics with means, standard deviations and percentages were calculated for the participant characteristics at baseline, for intervention data and outcomes at different time-points of follow-up. Fisher's exact test was used to assess differences in the prevalence of outcome variables among patients exposed to different risk factors and treated by differently experienced surgeons at different time points.

Life table statistics were used to determine survival at different time points censoring data for drop-outs. Single and multiple logistic regression models were used to assess any influence on implant failure, recession, pain and satisfaction of the collected variables. Regression models were conducted considering clustering of patients by center/surgeon. All tests were two-tailed and all statistical comparisons were conducted at .05 level of significance. Analyses were performed by an independent operator (KZ) using Stata version 13 (Stata Statistical Software, release 13.0, StataCorp).

RESULTS

A total of 215 implants were inserted since June 2007 to July 2009 in 15 centers. One implant was seated with a torque < 30 Ncm and was not immediately loaded. It was successfully loaded 10 weeks after placement and was healthy 2 years later. This implant was excluded from subsequent analysis. The data on the remaining 214 implants inserted in 214 patients were gathered from 15 centers/operators. Survival rates are summarised in Table I.

Baseline and surgery (T0)

Out of 214 patients, 92 (43%) were males and 122 (57%) females, with an overall mean age of 48.3, ranging from 17 to 84 years.

Absence of potential risk factors was observed in only 46 patients (22%); 24 (9%) smoked

more than 10 cigarettes per day and 4 (2%) could be labelled as heavy smokers (more than 20 per day). Preoperative amoxicillin was administered to 196 patients (92%).

Gingival phenotype was judged as thin in 19 patients (9%), medium in 120 (56%), and thick in 75 (35%). V-shaped and U-shaped dehiscences were found in 14 sites (6.54%) and in 37 sites (17.3%), respectively. The majority of implants were inserted on the maxilla (179/214; 84%) and more than half on the site of maxillary premolars (104/214; 58%). Only 35 implants were placed in the mandible (16.3%). Implants were mostly long 13 mm (112/214, 52.3%) or 15 mm (69/214, 32.2%); the most used diameter was 5 mm (129/214, 60.3%). No filling material was used to fill the gap between implant and bone in 110/214 (51%) cases. Bone chips were inserted in 51 (24%) cases, bovine bone granules in 38 (18%) and a mixture thereof in 15 (7%). The average duration of surgery (extraction+implant surgery) was 32.9 minutes (std deviation (SD) 20.64; range: 23 to 105 minutes.

Mean intra-operative pain was only 0.79/10 (SD 1.60) with 70% of patients reporting no pain. Regression model indicated that intra-operative pain was associated with three predictive variables: younger age (OR 0.96, 95%CI 0.946 to 0.99, P=0.005), higher surgical intervention duration (OR=1.03, 95%CI 1.02 to 1.05, P=0.007), and the maxilla (mandible vs. maxilla OR=0.18, 95%CI 0.05 to 0.62, P=0.006). The provisional crown was delivered in less than 24 hours in 157/214 instances (73.5%) and the rest (57/214, 26.5%) within 48 hours.

Follow-up

1 week (T1)

Two hundred eight patients with surviving implants were seen at the end of the first postoperative week. Implant failure was observed in 5 patients.

Three implants out of 179 (1.6%) failed in the maxillary arch (a central and a lateral incisor, and a canine) and 2/35 (5.7%) in the mandibular arch (a lateral incisor and a second premo-

lar). One patient did not attend the 7-day visit, but came to a later appointment and is accounted for in a subsequent paragraph. Local risk factors (P=0.42), or systemic risk factors (P=0.06) were not correlated with failures. Overall one-week survival rate was 0.977 (95%CI = 0.945-0.990). Fisher's exact test indicated no significant difference between maxillary and mandibular implants (P= 0.611). Regression analysis indicated no important influence of experience level (1 vs. 0 P=0.209; 2 vs 0 P=0.108).

Sixteen complications were observed: one mechanical (loosening of a provisional crown) and 15 minor biological complications consisting mainly of superficial infections (mucositis) and transient disturbances of local sensitivity.

More than half of the patients (109) did not take any analgesic on the first week following the operation. Similarly, 116 patients (55%) reported 0 pain, whereas overall numeric mean score was 1.31/10 (SD 2.01). Mean score on aesthetic satisfaction with immediate provisional restoration was 8.62/10 (SD 1.82). No specific variable seemed to be associated with patients' satisfaction at this stage.

Three months (T2)

At the time scheduled for the permanent restoration (3 months) patients were recalled even if they chose to delay the substitution of the provisional crown.

Seven patients dropped out by the third month and 25 additional implants were lost, resulting in an overall survival rate of 0.878 (95%CI = 0.804-0.899). Different reasons were alleged for the 7 dropouts: one had moved to another city; one did not come to the follow-up visits, but stated that everything was going well with the implant and did not want to spend money for a permanent crown; the remaining five could no longer be contacted by the centers. Two of these patients were recorded as dropouts at 3 months, but attended the 1-year follow-up visit. One failure was observed in the patient that had missed the previous visit.

No significant association of local risk factors (P=0.10) was observed with implant failure,

whereas presence of more than one systemic risk factor as compared to no risk factor seemed to increase implant failure (OR=3.14; 95%CI: 1.10 to 8.96; P=0.032).

The regression model showed some evidence that implant failure might be associated with shallower gingiva (moderate vs. thin OR=0.32; 95% CI: 0.11 to 0.98; P=0.047; thick vs. thin OR=0.25; 95%CI 0.07 to 0.84; P=0.025).

Nevertheless, bone grafting (P=0.90) and type of bone grafting (P=0.471) did not seem to have any influence on implant survival. Similarly, other factors such as implant length, insertion torque, jaw, distance between platform and gingival margin, platform switching and contact point were not associated to implant failure. The logistic regression model suggested a potential weak association between the narrowest implant diameter and implant failure (4mm vs. 3.25mm OR=0.22; 95%CI: 0.42 to 1.13; P=0.06; 5mm vs. 3.25mm OR=0.21; 95%CI 0.42 to 1.00; P=0.05). Five failures occurred in the 18 patients unable to take amoxicillin and 20 in the 196 who had assumed amoxicillin. The difference was statistically significant (Fisher exact test: P<0.05). Finally, 30 failures were recorded 3 months after surgery: 20/156 (12.8%) occurred when provisional crowns had been seated within 24 hours from implant surgery while 10/58 (17,2%) in cases with more than 24 hours of delay. Regression analysis indicated no association between implant failure and time of provisional prosthetic loading (more than 6h vs. less than 6h, P=0.314: more than 24h vs. less than 6h, P=0.507).

The individual failure rate varied from 0 to 6/22 (27%) among individual centers, but no association was observed between implant failure and surgeon’s experience.

No gingival recession was observed at this stage in any patient.

Mechanical complications were observed in 10 patients (8 provisional crowns fractured and 2 loosened).

Overall mean aesthetic satisfaction score was 9.5 (SD 0.83).

One year (T3)

No additional implants were lost. Six patients dropped out in the period between T2 and T3, whereas two patients that had been recorded as dropouts at 3 months, presented at 1 year. One patient did not show up at the 1-year follow-up visit because of a car accident, but came regularly to the following 2 years visit. The other 5 dropouts included a death, a myocardial infarction, two movings and a patient that could not be contacted any longer. The overall survival rate was 0.858 (95%CI = 0.804-0.899).

Recessions were noticed in three cases only. No recession occurred among patients without any risk indicator. Two crown fractures and two mucositis were observed. Both aesthetic and functional satisfaction recorded a mean score of 9.5/10 (SD 0.74 and 0.77 respectively).

Two years (T4)

The number of dropouts reached 37 at the end of second year of follow-up. One of the centers did not provide follow-up data at this stage (15 patients). Some of the other 22 can be accounted for: these included two deaths, one severe systemic disease, two movings.

One additional implant was lost, resulting in an overall survival rate of 0.849 (95%CI = 0.804-0.899).

Complications occurred in 4/146 visited patients (6.85%): 3 cases of mucositis, one of perimplantitis. No mechanical complication was observed.

Three new recessions (2.10%) occurred during the second year of follow-up. No recession occurred in the no-risk group.

Satisfaction scores: a score of 10 was assigned to the aesthetics of the permanent rehabilitation by 97/146 patients (66.44%; 95%CI = 58.16÷74.03%). The mean score was 9.49.

A satisfaction score of 10 was assigned to the functional performance of the permanent rehabilitation by 102/146 patients (69.86%; 95%CI = 61.72÷77.17%). The mean score was 9.57.

Most patients were satisfied (rating ≥7) with both aesthetics and function of their permanent crowns (95%CI = 97.50÷100%).

Pink Esthetic Score (PES)[27] was used to evaluate the aesthetic results in terms of marginal soft tissue on clinical pictures when available. The average score at 2 years was 13.16 (95%CI = 12.9÷13.5). No significant difference was observed in PES from T1 to T4.

Bone levels were measured at the same sites mesial and distal to 78 implants at surgery and at the final visit: the measurements at surgery and 2 years later document a substantial stability, with a mean gain of supporting bone of 0.47mm on the mesial aspect (95%CI = 0.208 to 0.732) and 0.75mm on the distal aspect (95%CI = 0.541 to 0.959), and a correspondent mean loss of crestal bone (mesial -0.40mm; 95%CI = -0.598 to -0.202; distal -0.60mm; 95%CI = -0.769 to -0.431). The average distance between the crest and the bone-implant most coronal contact decreased accordingly, leading to a flattening of the bone profile (Table II).

DISCUSSION

A multi-center prospective cohort study was considered adequate for a pragmatic research on the frequency of implant, prosthetic and aesthetic failures of immediate prostheses on single tooth post-extractive implants. The explorative nature of the study guided the choice of the experimental design: possible sources of bias were accepted if it was the price to gain an insight about the mechanisms of failures. Broad inclusion criteria permitted the evaluation of several putative risk factors. Systemic and local conditions are usually employed as exclusion criteria in the current literature, thus preventing to obtain information about their actual role in determining failures. As a result, many of the commonly excluded cases were included in this work.[1,9,11,31] The main purpose was the identification of possible risk factors and not the definition of clinical recommendations.[32] Moreover, the subjective evaluation of the indication for immediate tooth replacement imposes caution in the interpretation of the present results.

The association between individual risk factors and failures did not reach the threshold of statistical significance. The failure rate was significantly higher only in patients unable to take

amoxicillin. This observation is in agreement with the conclusions of other studies: the inability to assume preoperative amoxicillin was recently identified as a risk factor[10] and might be even more harmful in challenging situations such as post-extractive implants, as suggested by the study of Wagenberg & Froum (2006).[16]

The time distribution of implant failures (most of them in the first 3 months) suggests an overwhelming role of the initial conditions in determining the success or the failure, even if a strong correlation with any of the investigated putative risk factors could not be substantiated by the data. Postponing the seating of provisional crowns after 24 hours did not appear to jeopardise the success of implants.

Based on the data of this study, 15% of early failures may be expected, but only prior to the permanent restoration. On the other hand, some months of patient discomfort and significant chair-time were saved in the other 85% of cases while improving the quality of life remarkably. Only one implant was lost among the 176 survived at 3 months and controlled up to 2 years. Less than 0.6% of failures in the two first years after permanent restoration and full occlusal loading is an encouraging figure.

Immediate implant placement in the anterior maxilla is an attractive option, but several articles warn against the risk of unpredictable tissue healing after immediate post-extractive implants, reporting mean retraction of the soft tissues of 0.5÷1 mm.[2,3,18,33]. Experimental studies suggest that a flapless approach to tooth extractions and immediate implant placement results in a better preservation of the soft tissue contour.[34,35] Nevertheless, the flapless approach entails some inconveniences, including the difficulties in appraising the size and shape of the crest and the soft tissue thickness: the clinician must rely on indirect evaluation by means of probing and palpation. Flapless atraumatic extraction, immediate implant insertion in the fresh socket, and immediate incorporation of a provisional crown are associated with minimal facial recessions (0.45 mm +-0.25) one year after implant insertion.[5] A significant association

was found between U-shaped dehiscences and higher incidence of facial recessions in a previous study.[36] The exclusion of sites fenestrations and dehiscences is consistent through the clinical literature on immediate implants. The present multi-center study did not exclude such bone defects and showed a minimal incidence of facial recession in the two postoperative years (6/176). These data do not confirm nor disprove the hypothesis of a correlation between recessions and phenotype or dehiscences, mainly due to the low frequency of recessions. It is however remarkable the fact that no recession was observed in the patients without any risk factor and only one recession occurred in the 37 sites with U-shaped bone dehiscences. Recessions were minimal also in other clinical studies employing immediate provisional crowns,[11,37] even in a randomised clinical trial.[4] The outcomes of this approach appear to be better than alternative techniques involving elevation of flap and even GBR.[15,38]

A very interesting point is the incidence and amount of marginal tissue recessions after conventional implant insertion in healed sites: the average values are quite comparable to the recession after immediate post-extractive implants inserted according to the principles of the trimodal approach.[8,39-43] The observed stability of the peri-implant soft tissues irrespective of phenotype and bone defects might be explained by the role of the immediate insertion of a provisional crown, according to the hypothesis of Restorative Tissue Inhibition (RTI).[44,45]

It is interesting to note that despite the dentists recorded recessions, patients scored 10 for the aesthetic satisfaction in 3/6 cases and 8 and 7 in one and two cases, respectively. The discrepancy between dentists and laymen in appreciating aesthetic defects is well documented.[46] The upper lip covered the gingival margin in 3 cases and left it exposed in the other 3 when patients smiled. The analysis of patient-centered outcome (aesthetics and function) demonstrates that this treatment option is really welcome by the patients even when the dentist may observe minor defects. It is noteworthy that the average PES score improved over time.

Radiographic measurements of bone levels mesial and distal to implants at surgery and 2

years later document a substantial stability. The distance between the crest and the bone-implant most coronal contact remained almost unchanged.

CONCLUSIONS

Immediate provisionalization with non-functional loading is a viable option for immediate implants. Early failures (before the final restoration) were more frequent than those reported in the conventional approach and loss of implants after occlusal loading was a rare event in the first 2 postoperative years, even in cases with putative risk factors.

The implant failure rate varied greatly among operators, independently from surgeon's experience.

Little or no discomfort and few trivial complications have to be expected: in particular, very few and shallow recessions may be observed by the dentists, but they appeared negligible to the patients. Good levels of patient satisfaction may be expected in association with the surviving implants.

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Table I

Life table statistics used to determine survival at different time points, censoring data for dropouts. Each patient had received only one implant.

Interval	Total	Failures	Dropouts	Survival	95% CI
T0-T1	214	5	1	0.977	0.945-0.990
T1-T2	209	25	7	0.878	0.804-0.899
T2-T3	179	0	6	0.858	0.804-0.899
T3-T4	173	1	26	0.849	0.792-0.889

T0 = baseline

T1 = 1 week after surgery

T2 = 3 months after surgery

T3 = 1 year after surgery

T4 = 2 years after surgery

Table II

Bone levels changes on the mesial/distal aspects of implants between T0 (surgery) and T4 (2-year follow-up): most coronal bone-implant (or bone to abutment) contact levels relative to the implant platform (BIC), crestal bone levels (crest), and vertical distance between BIC and crest (distance).

Mesial bone level differences	BIC (gain)	crest (loss)	distance (reduction)
Mean	0.47*	-0.40*	-0.87*
S Dev	1.18	0.89	1.33
95%CI	0.208 to 0.732	-0.598 to -0.202	-1.23 to -0.515
Distal bone level differences	**BIC (gain)**	**crest (loss)**	**distance**
Mean	0.75*	-0.60*	-1.35*
S Dev	0.94	0.76	1.64
95%CI	0.541 to 0.959	-0.769 to -0.431	-1.64 to -1.06

N = 78 (sites with available Xr at the time points of interest)

* significant difference ($P<0.05$)

BIC measurements led to record a significant net gain.

Crest peaks heights decreased significantly.

Mean vertical distance between crestal bone levels and BIC decreased significantly as a consequence.

Comments and answers

We thank the editor and the referee for having suggested changes of the text to improve clarity and accuracy. We have changed the text accordingly.
The corrections are in red in the text to facilitate the checking.

The suggested corrections are reported in red in the text without reporting in this document.
The term “buccal” has been substituted with “facial” through the text.
The comments are addressed below.

INTRODUCTION

TEXT:
No conclusive evidence is available on peri-implant marginal soft tissues stability, aesthetic and patient-centered outcomes
COMMENT::
will this be addressed in this article?
ANSWER:
Patient-centered outcomes and stability of the marginal tissues are addressed in the text

TEXT:
to exclude putative risk factors
COMMENT:
like what?
ANSWER:
Added: (e.g. smoking habit or bone dehiscences)

TEXT:
Systemic conditions and local risk factors may affect post-extractive implant survival; however evidence is still inconclusive.
COMMENT:
Still not clear what you are talkign about
ANSWER:
The text has been changed to “Several systemic conditions and local risk factors are suspected to affect post-extractive implant survival”. The examples are now in the last sentence of the preceding paragraph.
“; however evidence is still inconclusive” has been eliminated.

TEXT:
Currently, the most proposed technique is conventionally defined “trimodal approach” and consists of flapless extraction, immediate post extractive implant insertion, and immediate provisional crown
COMMENT:
Where and who defined this? it is not in the glossary of oral and maxillofacial implants
ANSWER:
The definition is in the quoted articles by Cabello (2013 and 2015).
However, we have canceled the term from the text.

COMMENT:
within 48 hours.
ANSWER:

Added

COMMENT:
Might be better to describe these risks
ANSWER: a shortened list of grouped risk factors has been added: (smoking, systemic conditions and therapies, inability to assume amoxicillin, periodontitis, unfavourable anatomic conditions, dental habits)

MATERIALS AND METHODS

TEXT:
Putative risk factors were categorised as systemic or local.
COMMENT:
So this study looked at all; presumed risk factors, this could be a huge risk, certainly more than could be described in one study
ANSWER:
In fact, this is an explorative study on the field. The risk factors are a reality: we can record them and see if any has an overwhelming influence on the outcomes. Patients refusing treatment of periodontitis and implants without sufficient primary stability were excluded. The rest was included to gain information about the possible role of any factor. Of course, the number of factors limits the power of statistics.

COMMENT: smoking is voluntary, the others are not. you might also consider bruxing and other parafunctional activities
ANSWER:
bruxing and other parafunctional activities are considered among local factors in the next paragraph

TEXT:
Local risk factors included periodontitis (treated or already scheduled for timely treatment)
COMMENT:
already scheduled for timely treatment??
inadequate oral hygiene, history of past or adjacent endodontic care
ANSWER:
The sentence has been changed and the changes are highlighted

TEXT:
Implants with insertion torque lower than 35 Ncm were treated with a standard healing abutment to allow for a secondary stability.(26)
COMMENT:
This is an arbitrary factor
ANSWER:
This exclusion criterion was introduced to avoid failures caused by unscrewing the implants during the prosthetic manipulations: the threshold of 32 Ncm was set by the quoted study by Ottoni (IJOMI 2005). We have chosen 35 Ncm to avoid accidents due to minor inaccuracy in the measurements of the torque.

TEXT:
Fracture of the buccal cortex was considered a local risk factor
COMMENT:
you have either systematically removed risk factors or have ignored them
ANSWER:
These cases were included in the study. “and not an exclusion criterion” has been added.

TEXT:
Tapered implants (NanoTite Certain Tapered Implants Biomet 3i Inc™, Palm Beach FL) were selected in order to increase primary stability
COMMENT:
undersized osteotomy
ANSWER:
“after undersized osteotomy” has been added.

COMMENT:
should you record insertion torque?
ANSWER:
insertion torque was measured and recorded, as reported in the subsection “Data gathering-during surgery”

Data gathering

COMMENT:
The relevant data were gathered prior to and during surgery????
ANSWER:
The circulating assistant took notes during surgery. The variables are reported in the next lines.
The text was changed to: “Data were gathered before surgery and during surgery”

TEXT:
1 and 2 years after implant placement
COMMENT:
Or was it after the definitive crown was inserted?
ANSWER:
It was after the implant placement.

COMMENT:
Did you record all 26 items for each implant???
ANSWER:
Yes: each implant was placed in a different patient. Some variables do not pertain to implants, but all of them are linked to an individual patient.
Added “a single” (implant) in the first sentence of “Patient selection” (about 2 pages above this comment). The sentence “Analysis unit was the patient/implant since each patient was provided with only on implant” was also added to the beginning of the “Statistical analysis”

Statistical analysis
At the beginning, we have added a line to make it clear that each patient has received only one implants: the patient is the unit of analysis:
“Analysis unit was the patient since only one implant was placed in each patient.”

RESULTS

TEXT:
Mean intra-operative pain was only 0.79/10 (SD 1.60)
COMMENT:

is this a discrete or a continuous variable?
ANSWER:
The variable is continuous, even if the individual measure is a score, rounded to each integer (like the millimeters of probing). The mean is not necessarily an integer.

TEXT:
One patient did not show up at the 1-year follow-up visit because of a car accident, but came regularly to the following 2 years visit. The other 5 dropouts included a death, a myocardial infarction, two movings and a patient that could not be contacted any longer. The overall survival rate was 0.858 (95%CI = 0.804-0.899).
COMMENT:
is this acceptable? It seems low
ANSWER:
Most failures occurred at the 3-month interval, before the final crown. Life tables incorporate these failures even in the following time intervals.In the text it is specified that no one implant was lost in the time interval between 3 months and one year postoperatively.

COMMENT:
were the dropouts the loss of patients or implants, would make a difference relative to censured data
ANSWER:
Each patient received only one implant: the number of patients and implants are the same. This information had disappeared from the text when we reduced the text dramatically. Now we have restored this info by adding “a single” (implant) in the first sentence of “Patient selection” (M&M). The sentence ““Analysis unit was the patient since only one implant was placed in each patient.”” was also added to the beginning of the “Statistical analysis”

COMMENT:
But these might be anticipated based upon numerous publications
ANSWER:
No mechanical complications were observed in this sample during the second year of service while they are reported in the first year and especially in the first 3 months.

TEXT:
Satisfaction scores: a score of 10 was assigned to the aesthetics of the permanent rehabilitation by 97/146 patients
COMMENT:
Continuous or discrete variables
ANSWER:
The variable is continuous, even if the individual measure is rounded to each integer (like the millimeters of probing). The mean is not necessarily an integer.

TEXT:
Pink Esthetic Score (PES) was used to evaluate the aesthetic results in terms of marginal soft tissue on clinical pictures
COMMENT:
Continuous or discrete variables??
ANSWER:
The underlying variable is continuous, but is assessed using an ordinal score (as it happens in using a Gingival Index, for example): in these cases, means and standard deviations are widely used in the dental literature to summarise data, even if the outcomes are measured on an ordinal scale. Frequency distributions would be more rigorous, but more difficult to interpret.

TEXT:
mean gain of supporting bone of about half millimetre
COMMENT:
Scientific writing should be precise
ANSWER:
The text has been changed to: “mean gain of supporting bone of 0.47mm on the mesial aspect (95%CI = 0.208 to 0.732) and 0.75mm on the distal aspect (95%CI = 0.541 to 0.959), and a correspondent mean loss of crestal bone (mesial -0.40mm; 95%CI = -0.598 to -0.202; distal -0.60mm; 95%CI = -0.769 to -0.431)”

DISCUSSION

TEXT:
Based on the data of this study, 15% of early failures may be expected, but only prior to the permanent restoration. On the other hand,…
COMMENT:
How many times have you said “on the other hand?”
ANSWER:
Too many, definitely. I have reduced the occurrences of this locution to one.

CONCLUSION

TEXT:
even if surgeon’s experience did not appear to significantly affect the failure rate.
COMMENT:
????
ANSWER:
The text has been simplified:
The implant failure rate varied greatly among operators, independently from surgeon’s experience.

Table I

COMMENT:
Were the dropouts patients or implants?
ANSWER:
We have added a short sentence to remind that each implant corresponds to one different patient.