

**Topic:** peri-implantitis

**Authors:** Englezos E, Cosyn J, Koole S, Jacquet W, De Bruyn H

**Title:** Resective Treatment of Peri-implantitis: Clinical and Radiographic Outcomes After 2 Years.

**Source:** Int J Periodontics Restorative Dent. 2018 Sep/Oct;38(5):729-735.

**DOI:** 10.11607/prd.3386.

**Type:** case series

**Reviewer:** Afarin Arghami

**Keywords:** peri-implantitis, osseous resective surgery, implantoplasty

**Purpose:** to examine the clinical and radiographic changes to peri-implant tissues 2 years after resective treatment of peri-implantitis, including an apically positioned flap, osteoplasty, and implantoplasty.

**Methods:** In total, 25 patients with 40 titanium implants of multiple brands and advanced peri-implantitis (peri-implant PD  $\geq$  6 mm, BOP, and radiographic bone loss  $\geq$  3mm) were included in the study. The implants were treated surgically: Full thickness flaps elevated, trying to preserve existing band of KG, to provide access to the implant surface and bone margin. A horizontal bone architecture was then achieved with osteoplasty. Implantoplasty was used to polish the implant surface. Flap is sutured in an apical position. Apical repositioning of the flap is possible due to removal of the angular components.

**Results:** After 2 years, all implants survived, mean probing pocket depth was reduced from 8.7 to 3.3 mm, and bone level remained stable in 92.5% of the implants.

**Conclusion:** Findings suggest the approach of an apically positioned flap combined with osteoplasty and implantoplasty as an effective and reliable strategy against peri-implantitis, although increased gingival recessions may limit its application in esthetic areas.

**Topic:** peri-implant soft tissue

**Authors:** Levin BP, Chu SJ.

**Title:** Changes in Peri-implant Soft Tissue Thickness with Bone Grafting and Dermis Allograft: A Case Series of 15 Consecutive Patients.

**Source:** Int J Periodontics Restorative Dent. 2018 Sep/Oct;38(5):719-727.

**DOI:** 10.11607/prd.3561.

**Type:** Case series

**Reviewer:** Afarin Arghami

**Keywords:** immediate implant placement, soft tissue augmentation, alloderm, provisional restoration.

**Purpose:** To demonstrate a technique combining immediate implant placement and provisional restoration with hard and soft tissue augmentation using nonautogenous materials with comparisons to nongrafted, temporized historical controls.

**Methods:** 15 patients were treated in a private periodontal practice. All teeth were extracted without a flap. Sockets debrided with ultrasonic and manual instruments to remove any remaining soft tissue. Implants were placed slightly palatal. Implant brand: Astra TiO blasted surface. Implant demonstrating rotational stability were provisionalized. A composite of mineralized, cortical allograft and deproteinized bovine bone mineral (DBBM, Geistlich) or porous carbonate apatite of porcine origin (Symbios, Dentsply) were placed in the gap between the implant and socket walls. A dermal allograft (PerioDerm, Symbios) with a pre-hydrated thickness of 0.4-0.8 mm was

adapted around the sub mucosal portion of an under contoured screw-retained temporary crown. It was inserted into a 0.5-0.7 mm sub periosteal pouch created immediately prior to insertion. The purpose of this step was soft tissue thickening, particulate graft containment, and membrane function. The measurements for the 15 cases in this study were compared to the 13 cases of non-grafted implants with provisional restoration, reported in a separate study, which served as historical controls.

**Results:** The average soft tissue thickness at 1mm apical to the facial margin was 1.89 mm, at 2 mm was 2.79 mm and at 3 mm was 3.25 mm. 13 non-grafted cases in a study by Chu et al in 2015 showed thickness values of 1.4 mm, 2.1 mm, and 2.6 mm at 1, 2, and 3 mm apical to the facial gingival margin. The increase in soft tissue thickness with this current method was statistically significant. The soft tissue thickness values achieved in this study also compared favorably with studies where autogenous connective tissue grafts were used.

**Conclusion:** The use of a dermis allograft in conjunction with bone grafting resulted in an increase in soft tissue thickness especially in the incisal third. This can potentially have an effect on long term stability of the free gingival margin and resistance to midfacial recession. By reducing postoperative morbidity and eliminating donor site, this procedure is less invasive and may be as efficacious in achieving a satisfactory increase in soft tissue thickness.

**Topic:** Regeneration

**Author:** Sivolella S, Perin C, Capecchi M, Buongiorno V, Valente M.

**Title:** Guided Bone Regeneration in the Treatment of a Lateral Periodontal Cyst: 2-Year Clinical and Radiologic Follow-up

**Source:** Int J Periodontics Restorative Dent. 2018 September/October;38(5):747-754

**DOI:** 10.11607/prd.2767

**Type:** Case Report

**Reviewer:** Phillip Crum

**Keywords:** Guided bone regeneration; lateral periodontal cyst; case report

**Purpose:** The aim of this case report was to describe the outcome of a tissue regeneration approach based on guided bone regeneration (GBR) principles of a mandibular lateral periodontal cyst (LPC), comparing the pre- and post-operative clinical radiologic findings, with a 2-year follow-up

**Methods:**

- 52-year old man, a smoker, was referred for an asymptomatic gingival swelling approximately 1cm in diameter, elastic in consistency, with well-circumscribed margins, located in the vestibular region between the mandibular left canine and first premolar.
- CBCT showed the radiolucent lesion between the roots of the two teeth, with loss of the lamina dura surrounding the roots of both teeth. The vestibular bone wall was also missing.
- Mandibular lesion was enucleated following FTF reflection.
- Autogenous bone (harvested with Micros bone scraper) was mixed at a 1:1 ratio with Bio-Oss and covered with Bio-Gide following grafting of the defect.
- Periosteal release performed and primary closure was achieved.

**Results:**

- CBCT at 1 year showed complete filling of the bone defect, coverage of the roots of adjacent teeth, and a reformed vestibular bone wall. These results were also confirmed at 2 years.

- Histology showed a cystic cavity lined with a thin non-keratinized squamous epi that sometime penetrated the non-inflammatory fibrous tissue of the wall forming invaginated plaques.

**Discussion:** The standard treatment of choice for LPC is enucleation followed by primary closure with no grafting. The decision to use a grafting material can be based off the morphology, including the number of walls, as well as the exposure of adjacent root surfaces. In this case, there were one or two residual bony walls, with exposure of the roots of the adjacent teeth and loss of periodontal tissues. The mixture of autogenous and xenograft materials allows us to take advantage of the properties of both materials. The use of a slow resorbable graft as a filler may be contraindicated in case of bony lesions of unknown entity. LPCs are usually nor more than 10mm in diameter. The multi-locular variant (botryoid cyst) is generally larger and consequently requires bone grafts more often.

**Bottom Line:** The outcomes from this study at 1 and 2 years show that grafting of a LPC defect resulted in no signs of recurrence and complete alveolar bone and periodontal ligament regeneration.

**Topic:** Ridge Augmentation

**Author:** Yamauchi K, Nogami S, Kataoka Y, Koyama S, Lethaus B, Takahashi T

**Title:** Cortical Bone Repositioning Technique for Horizontal Alveolar Bone Augmentation: A Case Series

**Source:** Int J Periodontics Restorative Dent. 2018 September/October;38(5):691–697

**DOI:** 10.11607/prd.2839

**Type:** Case Series

**Reviewer:** Phillip Crum

**Keywords:** Cortical bone repositioning technique; ridge augmentation, horizontal; case series

**Purpose:** To describe the novel procedure of cortical bone repositioning (CBR) technique.

**Methods:**

- 7 patients (1m, 6m, avg. age 45.1)
- A horizontal alveolar bone defect was observed in the cases: the vertical height was adequate for implant insertion, and the buccal and lingual/palatal cortices were clearly observed.
- Peri-operatively, all patients received Amoxicillin 750mg/day for at least 3 days.

Cortical Bone Repositioning Technique

1. Midcrestal incisions were made, followed by sulcular incision with or without vertical releasing incisions, FTF reflected.
2. An ultrasonic bone-cutting device was used to cut the lateral cortex only
3. Prior to block mobilization, a pilot hole for a screw was drilled, only in the lateral cortex.
4. A self-tapping mini-screw was inserted and advanced until it touched the lingual/palatal cortex
5. After confirming block was completely mobile, the screw was removed and the lingual cortex was drilled out to a diameter identical to that of the lateral hole.
6. Screw was reinserted into the lateral cortical bone block and block placed laterally to allow fixation
7. Small amount of particulate autogenous bone used at the step between the block and the original surface
8. Flap was closed after periosteal releasing incisions to ensure tension-free closure.

**Results:**

- Pre-operative bone width in the defect area was  $3.28 \pm 0.39$ mm; the post-operative 4-month bone width in the same area was  $6.46 \pm 1.10$ mm. **The gain in bone width was  $3.15 \pm 3.15$ mm**
- In total, 16 implants (all 2 stage) were placed in augmented sites (4 simultaneously with CBR procedure, 12 after 4 months). Mean ISQ values taken at the time of placement was  $68 \pm 8.2$  for all implants. The mean value was  $72 \pm 5.8$  at the second operation

**Discussion:** CBR is a static procedure: A secure space is created under the periosteum via lateral replacement of a buccal cortical bone block. CBR is a one-stage procedure, allows full defect coverage with soft tissue, requires minimal materials, can be performed in a single surgical field, lacks donor site morbidity, and is rapid. The interbone gap can be maintained and the length of the gap can be controlled during the screw procedure. The intercortical bone gap may induce bone healing not only inside but surrounding the bone gap between the bone block and original bone surface. Secure fixation is essential to achieve stability. Regeneration after CBR is similar to bone healing after a fracture. An extremely narrow alveolar bone with a small marrow space is at higher risk of cracking or fracturing.

**Bottom Line:** An advantage of CBR technique versus autogenous grafts is the lack of a donor site. The technique could induce the patient's regenerative ability for bone healing. Further clinical and experimental studies are needed.

**Topic:** Peri-implant soft tissues

**Author:** Bonino F, Steffensen B, Natto Z, Hur Y, Holtzman LP, Weber HP

**Title:** Prospective study of the impact of peri-implant soft tissue properties on patient-reported and clinically assessed outcomes

**Source:** J Periodontol. 2018;89:1025–1032

**DOI:** 10.1002/JPER.18-0031

**Type:** Prospective study

**Reviewer:** Jenny Herman

**Keywords:** Dental implants, esthetics, dental, gingiva, pain measurement, patient reported outcome measures

**Purpose:** To evaluate patient experiences with performing oral hygiene procedures around implants with and without keratinized mucosa (KM), to assess patient satisfaction with the esthetics of peri-implant soft tissue and to monitor additional clinical parameters 3 and 6 months after the restoration of implants.

**Methods:** 12 patients were included in 2 groups, one with KM and one without KM (identified using Lugol's solution). All implants were placed in a 2-stage manner. All patients denied smoking. KM was measured at 2<sup>nd</sup> stage surgery, time of implant placement, and at 3 and 6 months. Other parameters measured at 3 and 6 months included full-mouth plaque score, probing depth, plaque index, bleeding on probing, and recession. Visual analog scale (VAS) was used to evaluate esthetics and discomfort. Statistical analysis was performed.

**Results:** 28 two-stage implants on 24 patients were evaluated in this study. 12 patients with 13 implants had KM, and 12 patients with 15 implants had no KM. Presence of KM was associated with greater patient esthetic satisfaction at the 3 and 6-month follow up visits. Esthetic satisfaction decreased over time for implants without KM. No significant differences were seen in discomfort when brushing between groups at any time points.

Presence or absence of KM did not influence clinical parameters. A wider zone of KM was significantly associated with greater patient-reported esthetics at both 3 months and 6 months. There was also a significant correlation between greater peri-implant recession and lower esthetics scores at both follow-up visits.

**Discussion:** There were no differences in discomfort during brushing or in clinical parameters at large in a population with controlled maintenance and good oral hygiene. However, patients reported greater satisfaction with the esthetics of implants with KM. Therefore, for improving patient's esthetic satisfaction, it is recommended to aim for achieving a band of keratinized mucosa around dental implants.

**Topic:** Migraine headaches

**Author:** Leira Y, Ameijeira P, Domingues C, Leira R, Blanco J

**Title:** High serum procalcitonin levels in patients with periodontitis and chronic migraine

**Source:** J Periodontol. 2018;89:1069–1074

**DOI:** 10.1002/JPER.17-0603

**Type:** Cross-sectional study

**Reviewer:** Jenny Herman

**Keywords:** Headache, inflammation, migraine, periodontitis, procalcitonin

**Purpose:** To determine whether the presence of chronic periodontitis (CP) was associated with higher procalcitonin (proCT) levels in chronic migraine (CM) sufferers.

**Methods:** 138 patients were recruited (96.4% female) for this study. Full mouth periodontal exam was performed on all subjects, which included probing depth, clinical attachment level, plaque score, and bleeding score. Patients were diagnosed with CM if they had a headache on 15 or more days per month for more than 3 months. Time of CM evolution, intensity of headache using visual analog scale (VAS), number of days with headaches per month, and type of migraine (with or without aura) was also assessed. Serum CRP and proCT levels were also assessed. Statistical analysis was performed.

**Results:** Patients with CM who had CP were older, had a higher prevalence of hypercholesterolemia, as well as increased BMI than both non-CP patients with or without CM. Participants with CM more frequently had a previous history of depression and lower education level than those without CM. Regarding hs-CRP levels, CP patients had significantly higher levels of this acute-phase protein compared to systemically and periodontally healthy individuals. The CM+CP group showed significantly higher proCT levels than the other groups. Multiple linear regression analysis carried out in the 82 patients with CM showed that mean serum proCT levels were significantly and positively associated with greater mean PPD and mean CAL.

**Discussion:** Patients with CM and CP have significantly higher serum proCT levels than patients with CM only, CP only, or systemically and periodontally healthy individuals. CP independently contributes to elevated serum proCT levels in CM patients. It could be suggested that CP via proCT may be involved in the process of migraine chronification. More studies are needed.

**Topic:** Tissue healing

**Author:** Maksoud MA, Guze KA

**Title:** Tissue expansion of dental extraction sockets using dehydrated human amnion/chorion membrane: case series

**Source:** Clin Adv Periodontol 2018; 8(3):111-114

**DOI:** 10.1002/cap.10022

**Type:** case series

**Reviewer:** Mary Elizabeth Bush

**Keywords:** soft tissue healing, dental extractions, amnion chorion membrane, bone grafts

**Purpose:** To present cases on soft tissue healing following extraction and ridge preservation with a freeze-dried bone allograft (FDBA) and dehydrated human amnion/chorion membrane (dHACM).

**Case Management:**

- 10 patients who required maxillary or mandibular posterior extractions with augmentation procedures were included.
- Surgery included: extraction, degranulation, placement of FDBA to alveolar crest, placement of dHACM membrane and suture.
- Post-op: 7 days antibiotic regimen (amoxicillin or clindamycin).
- Measurements: Flap edges at end of surgery were measured with calipers and then wound edges were measured at 2, 4, and 12 weeks.

**Clinical Outcomes:**

- dHACM showed expedited healing with no loss of underlying bone graft material.
- Good maintenance of buccal-lingual dimension.
- Formation of keratinized tissue over the socket.
- At the time of extraction, the distance from flap edges was between 5-6mm. And after 12 weeks, most sites remained retained 5-6mm of buccal-lingual dimension.

**Discussion:** Case series shows good healing and maintenance of tissue dimension with dHACM. The membrane has anti-inflammatory, wound-protecting, and scar-reducing properties and it lacks immunogenicity. The membrane possesses growth factors which help expedite healing.

**Topic:** microsurgery

**Author:** Chiantella, GC

**Title:** Tunneling coronally advanced flap for treatment of maxillary single gingival recessions: a microsurgical approach

**Source:** Clin Adv Periodontol 2018; 8(3):127-131

**DOI:** 10.1002/cap.10027

**Type:** case report

**Reviewer:** Mary Elizabeth Bush

**Keywords:** gingival recession, coronally advanced flap, tunneling, microsurgery

**Purpose:** To show the benefits of a microsurgical flap approach in order to combine the advantages of both coronally advanced flap (CAF) and tunnel techniques for the treatment of Miller class 1 and 2 localized recessions using either autogenous graft (AG) or allogeneic tridimensional matrices (ATM).

**Case Management:**

- 5 single miller class 1 and class 2 gingival recessions in maxillary canines were treated in 3 patients. (Healthy, periodontally stable, non-smokers, plaque score <15%, BOP <20%)
- 3 sites were treated with ATM and 2 were treated with AG from the palate.
- Root prep: scaling, EDTA 24% for 2min, treatment with gauze and 0.5% chlorhexidine gel for 3min

- Flap Design
  - Intrasulcular incision of recession margin up to adjacent papilla with micro single edge scalpel blade
  - Vertical incision starting at the base of the papilla 2mm apical from the sulcus of the adjacent teeth and up to and beyond the mucogingival junction
  - Tunnel elevators used to elevate a mucoperiosteal full thickness flap, buccal portion of papilla were elevated as well
  - Periosteal release with 15 blade for flap mobility
- Graft was sutured in place and the flap was advanced over the CEJ and sutured with sling
- Post op management
  - Amoxicillin 2g, 2hrs before surgery and 1g, 12hrs after surgery
  - Naproxen bid for pain
  - Sutures removed at 2-3weeks

**Results:** No complications noted in any patients. After 30 days the appearance of tissues was considered stable. The recession depth varied from 3-6mm in depth prior to surgery and after 6 months all sites had 0 mm recession. Complete root coverage was achieved in 100% of cases after 6 months.

**Conclusion:** This microsurgical approach avoids some of the challenges associated with either the CAF or tunnel procedure alone. Minimal vertical incisions that leave the papilla intact improve vasculature and microsurgical approach minimizes scar formation. The use of vertical incisions and release of the papilla improve flap mobility compared to tunneling alone for a single recession defect. More research is needed to compare in a controlled clinical trial with traditional CAF.

**Topic:** Implants

**Author:** Ravidà A, Barootchi S, Tattan M, Saleh MHA, Gargallo Albiol J, Wang HL.

**Title:** Clinical outcomes and cost effectiveness of computer-guided versus conventional implant retained hybrid prostheses: A long-term retrospective analysis of treatment protocols.

**Source:** J Periodontol. 2018;89:1015-1024.

**DOI:** 10.1002/JPER.18-0015

**Type:** Retrospective

**Reviewer:** Hector Carmona

**Keywords:** computer assisted surgery, cone beam computed tomography, dental implants, implant supported dental prosthesis, prosthesis and implants

**Purpose:** To evaluate survival rates and complications associated with computer-guided versus conventional implant placement in implant-retained hybrid prosthesis.

**Methods:**

Retrospective investigation enrolled all patients treated with implant-retained hybrids between January 1990 and September 2017 at The University of Michigan school of Dentistry.

Inclusion criteria:

- Edentulous patients treated with hybrid prosthesis and a documented follow up of more than 5 years and
- Cases where all implant fixtures associated with the prosthesis were placed within the same surgical procedure

Patients who received an implant-retained hybrid and returned for regular maintenance.

45 patients were included in the study, and separated into 2 groups the computer-guided group (CGIP 26 patients) and the non-guided group (19 patients)

**Results:**

- A total of 260 implants were included: 26 patients (80%) received five or six implants (40%), five patients (11.1%) received eight implants and four patients (8.8%) received seven or four implants (4.4% each)
- No statistically significant difference was observed with age
- Although not statistically significant the follow-up period was markedly longer in the control group with a more than 2 year difference on average.
- Clinical parameters such as implant loading (immediate versus delayed), the presence of a flap versus lack thereof and bone regeneration as a consequence of surgical planning also demonstrated significant differences where guided surgery was normally associated with flapless surgery, immediate loading, and no bone grafting.
- Differences between smoking, diabetes, periodontitis, and both arches were NSSD.
- For each of the investigated parameters, no statistically significant difference was found between test and control. In both groups, tooth replacement was the most common problem, affecting 55.6% of the total sample. Denture removal, due to bulk fracture, was the second most detected complication (35.6%), followed by partial acrylic fracture (24.4%).
- Regarding the time of complication occurrence, 24.4% and 68.9% of patients presented with early and delayed complications, respectively. However, no statistically significant difference was found between test and control groups
- A generalized estimation equation, adjusted according to sex, age, and follow-up time, demonstrated a lower incidence of peri-implantitis within the CGIP group compared to the non-CGIP group; both per patient (34.6% vs. 52.6%) and per implant (13.4% vs. 24.3%). However, this was not statistically significant
- A statistically significant difference in implant survival rate was found between the control (80.2%) and test group (96.7%)
- The analysis concluded that, when differences in both implant number and follow-up period were adjusted, neither mean total cost of CGIP versus non-CGIP nor the cost of the associated complications was significant

**Conclusion:** computer-guided implant placement for implant-supported hybrids is a valid, reliable alternative to the traditional approach of implant placement and immediate loading. Implants placed via guided surgery demonstrated higher survival rates and comparable long-term cost when compared with non-guided implant placement.

**Topic:** Peri-Implant disease

**Author:** Pimentel SP, Shiota R, Cirano FR, et al.

**Title:** Occurrence of peri-implant diseases and risk indicators at the patient and implant levels: A multilevel cross-sectional study

**Source:** J Periodontol. 2018;89:1091-1100.

**DOI:**10.1002/JPER.17-0599

**Type:** Cross Sectional

**Reviewer:** Hector Carmona

**Keywords:** cross sectional studies, dental implants, mucositis, peri-implantitis, risk factors

**Purpose:** To determine the prevalence of peri-implant diseases and their risk indicators at the patient and implant levels.

**Methods:**

- 147 patients with 490 implants were included
- Implants must have been in place for a minimum of one year with the final restoration. Patients, who had received administration of anti-inflammatory, bisphosphonates, and immunosuppressive medications, or antibiotic therapies in the previous 6 months, were excluded.
- Patients were interviewed regarding systemic and oral conditions, medical history, implant maintenance, oral hygiene, and educational level.
- Full mouth periodontal exam including PD, CAL, plaque score, and keratinized tissue (KT)
- Peri-implant mucositis was defined by the presence of bleeding on probing and/or suppuration and radiographic bone loss <2 mm.
- Peri-implantitis was defined as the presence of bleeding on probing and/or suppuration, probing depth >4 mm and radiographic bone loss  $\geq 2$  mm.

**Results:**

- Of 490 implants examined 418 (85.3%) had peri-implantitis
- At the patient level 119 (80.9%) and 28 (19.1%) patients had mucositis and peri-implantitis respectively.
- Among smokers, peri-implantitis was 62.5% vs. non-smokers 16.6%
- Probing depths of higher than 6mm had 85% and 15 % of mucositis and peri-implantitis respectively. Where PD's less than 6mm had a 62.9% and 37% incidence of mucositis and peri-implantitis respectively.

**Conclusion:** In conclusion, the present study demonstrated a high prevalence of peri-implant diseases at the patient and implant level in a Brazilian population of patients rehabilitated in two reference centers. Higher probabilities of peri-implantitis were observed in patients with PPD  $\geq 6$  mm and greater number of implants, whereas smoking was the strongest factor minimizing the effect of all the others at the patient level.

**Topic:** Peri-implantitis

**Author:** Lin GH, Suárez López Del Amo F, Wang HL

**Title:** Laser therapy for treatment of peri-implant mucositis and peri-implantitis: An American Academy of Periodontology best evidence review.

**Source:** J Periodontol. 2018 Jul;89(7):766-782

**DOI:**10.1902/jop.2017.160483.

**Type:** review

**Reviewer:** Hillary Wright

**Keywords:** decontamination; dental implants; lasers; meta-analyses; peri-implantitis

**Purpose:** Significant heterogeneity and controversy exists using lasers for implant surface decontamination. The aim of this systematic review and meta-analyses is to evaluate the potential of lasers in the detoxification and treatment of peri-implant mucositis and peri-implantitis.

**Methods:** Focused question: Do lasers used alone or as adjuncts provide better treatment and patient outcomes in the management of peri-implant mucositis or peri-implantitis? Selected outcomes to be compared included changes in PD, CAL, BOP%, plaque index (PI), recession (REC), and marginal bone level (MBL). Prospective and retrospective case studies, non-randomized controlled studies and randomized controlled trials were screened from January 1980 - June 2016.

Inclusion criteria:

- >10 patients diagnosed with peri-implant mucositis or peri-implantitis treated with lasers surgically or non-surgically.
- At least 6 month follow-up
- At Least one reported outcome of one of the clinical parameters after therapy

**Results:** 237 articles initially selected for screening of which 22 were included for this review and 11 used for meta-analyses. Currently no controlled studies are identified offering evidence of lasers used as a monotherapy in the treatment of peri-implantitis. Meta-analyses conducted only on controlled trials and only short term (6-12 months) clinical outcomes could be analyzed. Most studies reported a PD and BOP reduction with CAL gain when defects were treated surgically or non-surgically. Higher PD reduction mean generally in augmented groups (bone + membrane). Slight MBL loss was reported in some non-surgical treatment groups using lasers. When compared with mechanical debridement, antiseptics and surgical approach, the addition of laser treatment showed slight to no benefit in PD/BOP reduction and CAL gain. Non-surgical group, lasers showed significant reduction of BOP compared to non-laser treatment, but with slight and significant MBL loss.

**Discussion:** Current evidence allowed for analysis of only Er:YAG, CO<sub>2</sub>, and diode lasers. Currently the efficacy of non-surgical treatment of peri-implant mucositis with or without using lasers could not be warranted. The review and meta-analyses failed to detect significant PD reduction and CAL gain when lasers were used together with non-surgical and surgical therapies to treat peri-implantitis; however short-term the laser may reduce BOP.

**Topic:** Periodontitis and Smoking

**Author:** ALHarthi SSY, Natto ZS, Midle JB, Gyurko R, O'Neill R, Steffensen B

**Title:** Association between time since quitting smoking and periodontitis in former smokers in the National Health and Nutrition Examination Surveys (NHANES) 2009-2012.

**Source:** J Periodontol. 2018 Aug 13

**DOI:** 10.1002/JPER.18-0183

**Type:** epidemiology analysis

**Reviewer:** Hillary Wright

**Keywords:** former smokers; periodontitis; survey

**Purpose:** analyses of combined dataset from 2009-2010 and 2011-2012 NHANES surveys to 1. Characterize the periodontal condition among never smokers, former smokers and current smokers and 2. Provide updated estimates for the association between time since quitting smoking and the periodontal condition among former smokers.

**Methods:** NHANES surveys were analyzed. Classification of smokers/ nonsmokers: 100 cigarettes in their life? No - nonsmoker or yes-smoker, were sub classified as current or former smoker. For former smokers, time since quitting was classified as <10 years, 10-20 years, 20-30 years, and >30 years.

Periodontal classification used AAP classification:

- Severe: presence of 2 or more interproximal sites with  $\geq 6$  mm clinical AL (not on the same tooth) and 1 or more interproximal site(s) with  $\geq 5$  mm PD.
- Moderate periodontitis were not classified as severe, and needed to have 2 or more interproximal sites with  $\geq 4$  mm clinical AL (not on the same tooth) or have 2 or more interproximal sites with PD  $\geq 5$  mm, also not on the same tooth.

- Mild periodontitis did not fall in the preceding two groups, and had  $\geq 2$  interproximal sites with  $\geq 3$ mm clinical AL and  $\geq 2$  interproximal sites with  $\geq 4$  mm PD (not on the same tooth) or 1 site with  $\geq 5$ mm PD.

**Results:** 7,088 records total found in dataset characterized periodontal condition among never smokers, former smokers, and current smokers. 1,767 records met criteria to determine their association between time since quitting smoking and the periodontal condition among former smokers.

Among never smokers, former smokers, and current smokers, prevalence of periodontitis was 13.1%, 19.3%, and 34.5%, respectively. Current smokers accounted for 28.2% moderate periodontitis and 37.5% with severe periodontitis. Participants with periodontal disease were more likely to be men 24.9% vs 12.3%. Also, black (29.8%) and formerly married (25.9%) participants had the highest proportions of moderate or severe periodontitis. Time since quitting was on average one year longer among participants with no or mild periodontitis compared to moderate or severe periodontitis but not significant.

Time since quitting was found to be significantly protective for the odds of having periodontal disease (OR 0.961, 95% CI: 0.948-0.975). Each additional year of having quit was associated with an additional 2.5-5.2% reduction in the odds of having periodontitis. The longer time since quitting smoking, the less likelihood of developing periodontal disease.

**Discussion:** These results are consistent with established evidence of negative effects of smoking on periodontal disease in an expanded and new dataset. The study provides cross-sectional evidence that cessation of smoking may reduce the odds of having periodontal disease.

**Topic:** Peri-implantitis

**Author:** Ramos UD, Suaid F, Wikesjö UME, et al.

**Title:** Microbiologic effect of two topical anti-infective treatments on ligature-induced peri-implantitis: A pilot study in dogs.

**Source:** J Periodontol. 2018;89:995-1002

**DOI:** 10.1002/JPER. 17-0630

**Type:** Animal study

**Reviewer:** Thao Nguyen

**Keywords:** antimicrobial photodynamic therapy, checkerboard, peri-implantitis, tetracycline

**Purpose:**

The aim of this split-mouth design pilot study in dogs was to assess the microbiologic effects of two topical anti-infective treatments on dental implants subjected to ligature-induced peri-implantitis, without use of systemic antibiotics.

**Methods:**

8 male Beagle dogs, aged 18-24 months, were selected for this study. The study was divided into 2 phases: 1) preparation for and induction of ligature-induced peri-implantitis and 2) treatment of induced peri-implantitis defects using different anti-infective therapies.

Phase I: Following bilateral atraumatic surgical extractions of the mandibular premolars and first molars, 4 implants were placed in each mandibular quadrant. Non-resorbable sutures placed and removed after 2 weeks; and surgical sites were allowed to heal in a total of 8 weeks. For peri-implantitis induction, silk ligatures were placed around the

healing abutments over 8 weeks. Ligatures were then removed, and peri-implant lesions were allowed to progress undisturbed for an additional 6 weeks.

**Phase II:** Mucoperiosteal flap elevated without releasing incisions. Peri-implantitis defects were debrided of granulation tissue and dental implants instrumented using plastic curette. Exposed dental implants were divided into 2 groups for either Topical Tetracycline (TTC) or antimicrobial photodynamic therapy (aPDT). In TTC group, implant surfaces were rubbed with cotton pellets loaded with a tetracycline hydrochloride solution for 3 minutes then thoroughly rinse with sterile saline. In aPDT group, defects were filled with photosensitizer solution for 5 minutes, then thoroughly rinsed with sterile saline. Implant surface was then divided into 6 areas, over which laser was applied for 30 seconds, for a total dose of 44J/cm<sup>2</sup>. Biofilm samples were collected from the deepest proximal site for each dental implant before and after TTC or aPDT treatments and submitted for microbiologic analysis. The samples were analyzed using DNA-DNA hybridization checkerboard technique and statistical tests performed.

### **Results:**

Peri-implantitis induction successfully produced lesions with microbiologic characteristics similar to those found in humans. Overall results showed effective bacterial count reductions for both protocols. aPDT demonstrated major reductions of the red complex, but no statistical differences between groups were observed when adjusted for multiple comparisons.

### **Discussion:**

In this study, aPDT and TTC successfully decontaminated infected implant surfaces. Implant decontamination with aPDT appears to be a viable substitute for TTC in the management of peri-implantitis defects.

**Topic:** Tunnel technique

**Author:** Tavelli L, Barootchi S, Nguyen TV, Tattan M, Ravidà A, Wang HL

**Title:** Efficacy of tunnel technique in the treatment of localized and multiple gingival recessions: A systematic review and meta-analysis.

**Source:** J Periodontol. 2018;89:1075–1090.

**DOI:** 10.1002/JPER.18-0066

**Type:** Systematic review

**Reviewer:** Thao Nguyen

**Keywords:** evidence-based dentistry, gingival recession, meta-analysis, surgical flaps, tooth root

### **Purpose:**

Evidence regarding the efficacy of the tunnel technique (TUN) is still inconclusive, despite its increasing popularity among clinicians as a clinically and esthetically promising procedure to treat gingival recession (GR). The main purpose of the present systematic review and meta-analysis was to investigate the predictability of TUN and its comparison to the coronally advanced flap (CAF) procedure. Additionally, this review also investigated factors that may have affected mean root coverage (mRC), complete root coverage (CRC), and keratinized tissue (KT) gain.

### **Methods:**

This systematic review utilized the Preferred Reporting Items Systematic review and Meta-Analyses (PRISMA) statement and checklist, as well as the patient, intervention, comparison, outcomes (PICO) method. The PICO question used in this systematic review is:

**P:** Patients with localized or multiple GR defects classified as Miller I, II, or III or RT1 or RT2

**I:** All the recessions treated with TUN, without vertical incisions and without the incision of the papillae

**C:** In the meta-analysis TUN was compared to CAF

**O:** mRC and CRC of TUN in the maxilla versus mandible, in localized versus multiple GR defects and in Miller Class III versus Classes I and II

Two independent reviewers conducted electronic and manual literature searches on PubMed, Cochrane libraries, EMBASE through November 2017 to identify clinical studies investigating TUN for root coverage procedures. Inclusion criteria: surgical treatment of GR defects with TUN and randomized controlled trial (RCT), cohort study, case-control study, case series with  $\geq 10$  patients. Exclusion criteria: TUN included  $\geq 1$  vertical incisions and/or incisions of the papillae, sample size  $< 10$  patients, case reports, and studies with envelope flaps that were not coronally advanced.

**Results:** Twenty articles (11 RCTs and 9 case series) reporting on 1181 recessions in 439 patients treated with TUN, with a mean follow-up of 11 months, were included in the present systematic review. Among these, six RCTs comparing CAF to TUN were considered for the meta-analysis.

- mRC of TUN for localized defects was 82.8%, and for multiple GR defects was 87.9%.
- CRC of TUN was lower in localized (47.2%) compared with multiple GR defects (57.45%)
- No significant difference in mRC, CRC, and KT gain between TUN and CAF
- A subgroup analysis of trials utilizing only CTG or ADM revealed results both in favor of CAF. This indicates the significantly higher number of GR defects that achieved a CRC when treated with CAF + CTG or CAF + ADM versus TUN + CTG and TUN + ADM. Therefore, CAF demonstrated better CRC than TUN when the same graft material (connective tissue or acellular dermal matrix) was used in comparisons of both techniques

#### **Discussion:**

- Evidence comparing TUN to CAF is still limited
- TUN is highly effective in treating localized/multiple GR defects, especially maxillary and Miller Class I and II GR defects
- Limitations are mainly related to surgical indications in the lower arch, areas with interproximal attachment loss (Miller Class III or RT2), localized GR defects, and operator expertise.
- Technique modifications (e.g. split-thickness flap and microsurgical approach) may enhance final outcomes for TUN
- CAF is associated with higher percentage of CRC than TUN when the same graft materials were used

**Topic:** peri-implantitis

**Author:** Sarmiento H, Norton M, Korostoff J, Ko K, Fiorellini J

**Title:** Surgical Alternatives for Treating Peri-Implantitis

**Source:** Int J Periodontics Restorative Dent 2018;38:665–671

**DOI:** 10.11607/prd.3639

**Type:** case report

**Reviewer:** Maggie Weber

**Keywords:** peri-implantitis; implant; resective; regenerative; apically repositioned flap

**Purpose:** to present distinct surgical approaches used to treat peri-implantitis

**Materials/Methods:**

- 32 patients with 45 implants treated surgically for peri-implantitis
  - Nonsmokers and systemically healthy
  - Pocket depth  $\geq$  5mm and BOP with progressive bone loss
- comprehensive evaluation and x-rays taken at baseline and 180 day follow-up
- patients had nonsurgical therapy first (subgingival debridement and Arestin delivery)
- surgical protocol
  - partial thickness flaps laid initially, then transition to full thickness at sound bone
  - debridement of implants using cavitron and curettes
  - implant site decontaminated with 5% hydrogen peroxide and .9% sodium chloride
  - implant site treated with laser
  - for implants with mostly horizontal bone loss, treated with apically repositioned flap
- after basic surgical protocol, if well contained infrabony defect, regenerative therapy completed
  - bioOss + platelet rich growth factor + membrane
- after basic surgical protocol, if not well contained defect, treated with osseous resection
- statistical analysis performed to evaluate efficacy by comparing probing depths and BOP at baseline to 6month reeval.

**Results**

- all surgical procedures yielded reduction in probing depths
  - regenerative approach: mean baseline 7.21mm versus 4.09mm at 6 month postop and percent sites BOP (100% at baseline to 10.6% at 6 month postop). improvement seen regardless of material used
  - resective approach: decrease in pocket depth (5.86mm versus 3.63mm) and BOP absent at 6 months
  - apically positioned flap: decrease in pocket depth (6.79mm versus 4.32mm) and BOP (100% to 14.3%)
- 6 implants were removed due to mobility at the time of surgical intervention

**Conclusion:** regenerative, resective, and apically repositioned flaps all yielded reduction in probing depths and decrease in BOP; therefore, these techniques may be used to treat peri-implantitis.

**Topic:** intrabony defect

**Author:** Ferrarotti F, Quirico A, Pallotti S

**Title:** Effectiveness of Enamel Matrix Derivative in conjunction with Particulate Autologous Bone in the Treatment of Noncontained Intrabony Defects: a 2-Year Prospective Case Series

**Source:** Int J Periodontics Restorative Dent 2018;38:673-680

**DOI:** 10.11607/prd.3003

**Type:** prospective

**Reviewer:** Maggie Weber

**Rating:** good

**Keywords:** intrabony defect; one wall; two wall; EMD; piezosurgery

**Purpose:** To evaluate the clinical effectiveness of the application of Enamel Matrix Derivative (EMD) associated with autologous bone collected by piezoelectric device for the treatment of intrabony defects with a predominantly one or two wall component

**Materials/Methods:**

- 15 patients with one deep intrabony defect requiring regenerative therapy

- inclusion criteria: severe chronic periodontitis, completion of etiologic periodontal treatment at least 3 months prior, full mouth plaque score and bleeding score  $\leq$  20%, 1 intrabony defect without furcation, pocket depth  $\geq$  6mm, radiographic component  $\geq$  3mm
- clinical measurements taken at baseline, 12 months postop, 24 months postop
  - plaque index, BOP, PD, gingival recession, clinical attachment loss, PA x-ray
  - intrabony defect measured as distance between bone crest level and bottom of bony defect
- surgical procedure:
  - teeth > 1 mobility splinted
  - papilla preservation technique used under microscope
  - defects were debrided
  - measurements taken: number of residual walls, distance from CEJ to apical defect, distance from coronal bone crest to apical defect
  - graft harvested from buccal/lingual cortical plate using piezo
  - roots conditioned with EDTA gel
  - bone graft and Emdogain used to fill defect
- statistical analysis conducted

### **Results:**

- 15 defects; mostly mandibular combination defects that ranged from 5-10mm
- all sites achieved and maintained primary soft tissue closure
- surgical sites decreased with plaque index (26.67% versus 13.33%) and BOP (20% versus 6.67%)
- At 12 months and 24 months, CAL and PD improved (PD reduction 4.4mm and CAL gain of 4.2mm)
- Nine defects had complete pocket closure
- Only one defect had residual pocket >5mm
- Eight defects had CAL gain of >5mm, 4 defects had CAL gain of 3-4mm, three defects gain of 2mm
- Radiographic defect fill of 51.8%
- $\geq$  5mm intrabony defects showed increase in PD of .4mm at 24 months compared to 12 month values
- >5mm intrabony defect showed decrease in PD of .4 at 24 months compared to 12month values

### **Conclusion:**

The use of EMD + autogenous bone graft via piezo resulted in improvement in CAL, PD, and infrabony defect depth when treating noncontained intrabony defects.

**Topic:** Implant Technique

**Author:** Ng P., Hu X., Wan S., Mo H., Deng F

**Title:** Clinical Outcomes of Bicortical Engagement Implants in Atrophic Posterior Maxillae: A Retrospective Study with 1-5 Years Follow-up

**Source:** Int J Periodontics Restorative Dent 2018;38:e96-e104

**DOI:** 10.11607/prd.3241

**Type:** Retrospective Study

**Reviewer:** Ronald Young

**Keywords:** bicortical engagement, short implant, survival rate, bone loss

**Purpose:** Evaluate the survival and bone stability of a 6 and 10mm implant with or without bicortical engagement in the posterior maxilla after 1-5 years of prosthetic loading

**Methods:** Inclusion criteria: healthy adult, a restorable molar implant site with greater than 3mm difference between crest and a healthy, non-grafted sinus floor. Exclusion criteria: systemic conditions, smoker, alcohol or drug addiction, periodontal disease and bruxism. Group A- single implants penetrating maxillary sinus floor; Group B- single tooth implants not penetrating sinus floor. Each group subdivided into 6mm and 10mm length groups. Average follow-ups were 22.91 and 32.14 months for the 6 and 10mm groups in Group A; 27.69 and 32.83 months in Group B. Group A surgery was performed using an osteotome to tap the sinus floor prior to placing the implant, but otherwise had the same protocol followed through surgery and into restoration phase.

**Results:** All group A implants penetrated the sinus floor by less than 3mm with the change between restoration and follow up showing a decrease in penetration by 0.21 and 0.33 mesial and distal, which was statistically significant. No significant difference found between 6 and 10mm groups in this category. Group A had 34 implants placed, 15 6mm and 19 10mm implants. Group B had 27 implants placed, 12 6mm and 15 10mm implants. Survival rate was 100% in group A, 74.68% in group B. Survival rate of 6mm implants was 100% in group A and 51.85% in group B. Survival rates of 10mm implants was 100% in group A and 93.33% in group B. Change in mesial and distal marginal bone levels between crown restoration and follow-up visits for Group A 6mm implants was 0.28 and 0.41; Group B 6mm implants was 0.34 and 0.33; which was significantly higher in group A. A similar comparison for Group A 10mm implants was 0.23 and 0.03mm and Group B 10mm implants was -0.35 and 0.06mm. There was no significant difference between mesial or distal sites in the 10mm groups between Group A and B.

**Discussion:** A survival rate of 100% over 5 years follow-up was found suggesting that 6mm implants can be placed in compromised areas with alveolar bone levels greater than or equal to 3mm, but less than 7mm. However, randomized control trials with more patients, and follow-up are necessary as well as a standardized method for survival.

**Topic:** Immediate Full Arch Loading

**Author:** Villa R., Villa G., Fabbro M.

**Title:** Immediate Post Extraction Screw-Retained Partial and Full-Arch Rehabilitation: A 3-Year Follow-up Retrospective Clinical Study

**Source:** Int J Periodontics Restorative Dent 2018; 38:627-635

**DOI:** 10.11607/prd.3417

**Type:** Retrospective Study

**Reviewer:** Ronald Young

**Keywords:**

**Purpose:** Document the medium-term performance of implants inserted in fresh post-extraction sockets and restored immediately with definitive abutments connected at surgery and not disconnected afterwards.

**Methods:** Included healthy adult patients had implants coupled to tilted (17-33 degrees) or straight abutments and provisionalized immediately with opposing dentition present. Excluded systemically unhealthy patients who smoked more than 20 cigarettes per day, and bruxism. Preload antibiotics and chlorhexidine mouthwash were used prior to surgery, implant preparation was performed by manufacturer recommendations, and after atraumatic extraction the sockets were cleaned and washed with antibiotic solution. Implants were planned prior placed at angles that maximized engagement of native bone, and a flapless protocol was used except for the palatal lingual bone in the mandible. Implants were placed beneath soft tissue to give natural emergence profile, inserted by hand and torque measured (greater than 35 Ncm used as stability),

definitive abutments connected. All sockets filled with Bio-Oss, 5 or 6 implants placed in the maxilla and 4 in the mandible and provisionalized with screw retained, metal reinforced prosthesis and healed for up to 1 year before the final zirconia prosthesis was delivered.

**Results:** 70 patients and 153 implants placed with 141 placed in the maxilla and 12 in the mandible. Opposing dentition was implant supported prosthesis in 38 cases and natural teeth in 115 cases. Implant diameter was either 4.3 or 5 and length between 8.5-18mm. 97 placed using a flap procedure and 56 flapless with all achieving stability torque and restored immediately with a screw retained provisional. 29 abutments had no angulation, 55 angulated 17 degrees and 69 angulated at 30 degrees. Follow-up was a mean of 38 months and a survival rate of 99.3% after 36 months with 1 failed implant that did not affect the provisional. Mean marginal bone loss was 0.68mm and neither mesial nor distal bone levels were affected by angulation or implant diameter. No cases had a prosthetic failure.

**Discussion:** Positioning post-extraction implants to take maximum advantage of remaining bone, using implants designed for high stability and connecting them immediately to definitive abutment offers a safe, and effective solution for immediate rehabilitation for screw retained prostheses.