

STANZOLOL: A NEW APPROACH TO BONE REGENERATION WITH ANDROGENIC STEROIDS

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Introduction/Aim: androgens play an important role in positive regulation of bone homeostasis. Stanozolol (ST) is a synthetic steroid derived from dihydrotestosterone which combines high anabolic and low androgenic action. Previous studies showed that ST may promote osteoblast growth and activity (Vaishnav et al, 1988), accelerate wound healing (Kornending et al, 2012), increase bone mineral density (Liao et al, 2003) and improve bone mechanical properties (Chesnut et al, 1983). Local administration of ST has recently given encouraging results in the treatment of osteoarticular diseases (Spadari 2013). The aim of this in vitro study was to assess the effects of ST on osteoblast growth and differentiation. To the best of our knowledge, this is the first investigation on the effects of local administration of androgens to improve bone regeneration. *Materials and Methods:* osteoblasts were cultured in alphaMEM 10% FBS for 3 weeks. Different concentrations of ST were tested: 0, 10, 100, 500, 1000 nM. AlamarBlue test was performed every 2 days for 2 weeks to examine cell growth and metabolic activity. At 3 weeks, cells were stained with DAPI and Alizarin red to study cell density and bone mineral apposition. mRNA and protein profiles (alkaline phosphatase, osteocalcin, osteopontin, collagen-type I) were measured to analyze cell differentiation. *Results/Conclusions:* Boltzmann analysis of cellular growth revealed superposable data with different ST concentrations. Ten and 100 nM ST were associated with higher mineral bone apposition. One μ M ST however inhibited mineralization, suggesting that its action is not linearly dose-dependent. Our findings show that ST may directly promote osteoblasts differentiation and bone-formation. Our further in vivo experiments will elucidate the effects of ST, in view of clinical applications.

SPAZIO RICERCA – sessione STUDI PRE-CLINICI

BIOLOGICAL STUDY OF HUMAN STEM CELLS ACTION IN CONTACT WITH DIFFERENT IMPLANT SURFACES

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Introduction/Aim: stem cells, which now constitute a new frontier in the field of regenerative medicine, occur as a promising and suitable means for a more rapid and effective healing of the tissues. The aim of this study was to evaluate the effect of micro implant geometry in the induction of adipose stem cells differentiation into osteogenic cells. The observed parameters are the adhesion, proliferation and cell differentiation. *Materials and methods:* adipose stem cells were cultured on four different implant surfaces classified according to the type of surface, implant's data, code and imaging with SEM in: G1: Plasma-spray (Biomicron); G2: Sand blasted with hydroxyapatite (P1H); G3: Double etching (3i); G4: New (P1H).

The following analysis have been performed:

- Cell counting, made by a Burkner chamber in triple for any removing cells.
- Gene expression by PCR (collagen type 1, osteonectin, alkaline phosphatase, osteocalcin).

These parameters were analyzed in three different times: at 24 hours, at 3 days and at 7 days. Data were statistically analyzed with SPSS software and the method used was ANOVA with Tukey's post-hoc test. *Results:* the cell-counting at 24 hours showed an increased cell adhesion in G3. Growth curves showed a behavior amenable to a osteogenic differentiation in different implant surfaces, in particular in G2 and G3. The results of PCR analysis have shown Indifferent cell behavior on the different implant surfaces. In particular in G3 at 7 days an expression of osteocalcin was found, typical marker of osteogenic differentiation. *Conclusions:* The data showed that the micro implant surface topography influences the behavior of adipose stem cells.

INFLUENCE OF DIFFERENT STORAGE TIME ON CELL VIABILITY AND GENE EXPRESSION OF CELLS DERIVED FROM HUMAN INTRAORALLY HARVESTED BONE PARTICULATE

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Background: the procedure of bone harvesting is increasingly being used in regenerative therapies and ridge augmentation. Bone chips are used both as a space maintainer and as a source of bone cells that may have osteoinductive properties. Often it could take a long time between the harvesting procedure and the clinical use of bone particulate. It is therefore clinically relevant to assess whether the cells within the particulate can lose their viability and osteogenic ability over a long period of time. *Aim:* to determine if intraorally harvested bone cells viability is affected by the storage time. *Materials and Methods:* ten patients will be selected for mandibular third molar extraction. Safe scraper (C.G.M. S.P.A. Divisione Medica META) will be used for harvesting a small amount of cortical bone close to the extraction site. Each bone sample will be equally divided in three parts and stored for different amount of time (30, 60 and 180 minutes) in saline solution. Biological evaluation will be performed to test cell viability and gene expression. Three levels one-way Anova will be used to compare the three groups.

INTRABONY PIEZOELECTRIC STIMULATION ENHANCE BONE GROWTH AND DENSITY DURING HEALING AND OSSEOINTEGRATION OF DMLF SURFACES

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Introduction: Bone is piezoelectric and therefore capable of transforming mechanical forces into an electrical signal. Under the effect of a piezoelectric stimulation bone responds with a change in structural density and longer stimulation induce alveolar changes of medullary bone with an increase of the inner bone density and a better integration of dental implants.

Material and Methods: ten minipigs were treated with piezoelectric surgical device and traditional surgical device as control. Micro-CT was performed for all samples and the bone density analysed. All samples were taken for histology analysis and stained with hematoxylin-eosin. All 20 animal specimens treated with piezoelectric bone device have showed a marked faster healing and had evident change of the bone microarchitecture. *Results:* the density of the bone was enhanced in animals treated with the piezoelectric device. The bone surrounding the implants inserted with piezoelectric device was more dense radiologically than the bone surrounding implants inserted with traditional burs. In the piezoelectric group the bone showed a medullary modification with a change in the radiological alveolar pattern. *Conclusions:* this study show unambiguously that live bone behaves as a piezoelectric material and respond to internal piezoelectric stimuli. Piezoelectric stimulation modifies bone healing procedure, enhances bone density during osseointegration and lead to a more stable bone during years of functional loading.

SPAZIO RICERCA – sessione PATOLOGIA

AGGRESSIVE PERIODONTITIS: A SIMPLE GENETIC TEST TO PREVENT THE DISEASE. CASE CONTROL STUDY

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Objective: this study evaluates the presence of genetic mutations with two Single Nucleotide Polimorphism (SNPs) and correlates their frequencies in patients with aggressive periodontitis (AgP) compared with healthy controls. *Study design:* 81 subjects participated to this study. 21 were affected by AgP, while 60 healthy subjects formed the control group. DNA from buccal epithelial cells has been extracted, processed and sequenced. *Results:* the analysis of the IL-1 α SNP revealed the same frequency between patients and controls, while the analysis of the IL-1 β SNP showed a statistically significant difference (p=0,0319) between cases and controls. Moreover, considering two SNPs together, we found a 57,1% prevalence in the group of patients vs a 25% prevalence in the controls, with a p=0,0072. *Conclusion:* the study shows a possible correlation between the analyzed IL-1 SNPs and AgP, in our cohort of patients. Given the results, the test could be considered as a prevention system especially for the IL-1 β . So it could be useful to use this test on families that show cases of AgP to investigate the familiarity of this pathology in a direct manner and to identified young subjects at risk (without signs of illness) combining anamnestic and familiarity data with genetics in order to set up personalized and frequent "follow up" programs.

SPAZIO RICERCA – sessione PATOLOGIA

SELF-REPORTED MEASURES OF PERIODONTAL STATUS IN A DIABETIC POPULATION

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Aims: to evaluate the measures of self-perceived periodontal status in a large cohort of patients affected by diabetes mellitus (DM) and their association with the main parameters used to characterize DM status. ***Methods:*** the per protocol study population consisted of 529 diabetic patients (type I DM: 80%; type II DM: 19%; non type I, non type II: 1%) attending the Operative Unit of Diabetology, Dietology and Nutrition (University-Hospital of Ferrara, Italy). For each patient, data on type of DM, years elapsed from DM diagnosis, assumed drugs, Hb1Ac serum levels, DM complications and body mass index (BMI) were retrieved from the patient chart. A self-reported questionnaire on oral health was designed as a modification of previous, validated questionnaires (Dietrich et al. 2007, Genco et al. 2007, Gilbert & Litaker 2007, Taylor et al. 2007, Eke & Dye 2009), including specific questions on oral health status as well as self-performed and professional oral hygiene habits. The questionnaire was administered to each patient along with written instructions on questionnaire filling. ***Results and Conclusions:*** the majority of patients perceiving their periodontal status as sufficient/scarce were affected by type 2 DM and showed diabetes complications, had serum Hb1Ac levels >8%, and were overweight or obese. Patients reporting spontaneous tooth loss were frequently obese, and had uncontrolled DM and DM complications. Patients with a history of periodontal surgery were predominantly affected by uncontrolled DM.

PROTEIN SURVEY IN PERIODONTAL POCKETS USING PROTEOME ANALYSIS

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Aim: to reveal proteins associated with periodontal disease in sites where periodontopathogenic bacteria were not detectable comparing the proteomic profile of interproximal pocket tissues with interproximal healthy tissues in the same subject

Methods: 39 patients, with moderate to advanced chronic periodontitis and presenting with at least one intrabony defect next to a healthy interproximal site were enrolled. The periodontal defects were treated with osseous resective surgery, and the flap design included both the periodontal pockets and the neighboring interproximal healthy sites. Pocket-associated and healthy tissues were harvested for proteomic analyses. The results were processed using standard proteomic and statistical analyses to size and density of the spots.

Results: 15 proteins resulted differently expressed between pathological and healthy tissues. Particularly, annexin A2, actin cytoplasmic 1, carbonic anhydrase 1 & 2; Ig kappa chain C region (2 spots) and flavinreductase were overexpressed, whereas 14-3-3 protein sigma and zeta/delta, heat shock protein beta -1 (2 spots), triosphosphateisomerase, peroxiredoxin-1, fatty acid-binding protein-epidermal, and galectin-7 were underexpressed in pathological tissue.

Conclusions: the unbalanced functional network of proteins involved could hinder adequate tissue response to pathogenic noxa through different mechanisms, ranging from a lack of control of cellular stresses to an alteration of immune and apoptotic capacity. In particular it seems that it is more significant deficiency more than the over-expression of proteins to justify the pathodynamic of the periodontal disease.

The study of periodontal pocket tissue proteomic profile would be crucial to better understand the pathogenesis of and the therapeutic strategies for periodontitis.

RADIOGRAPHIC OUTCOME FOLLOWING ENDOSCOPIC-ASSISTED NON-SURGICAL THERAPY IN PERIODONTAL INFRABONY DEFECT. A NON CONTROLLED RETROSPECTIVE STUDY

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Introduction/aim: the primary goal of non-surgical periodontal therapy (S+RP) is to remove subgingival deposits. The recent introduction of endoscopy to S+RP has opened new opportunities. The aim of this work is to analyse the radiographic response of infrabony defects to endoscopic-assisted S+RP. *Materials and methods:* 23 sites, belonging to 13 patients (7 females, 6 males, age =50±11) were studied. All patients were affected by chronic periodontitis presenting at least one vertical infrabony defect on a single-rooted tooth. All sites were treated with endoscopic-assisted S+RP and regularly maintained. Defects associated with perio-endo pathology were excluded. Periapical x-rays were taken before the treatment and one year after, than scanned and evaluated using an image analyser. The following measurements were registered: the distance between interproximal cement-enamel junction (CEJ) and base of the defect (BD), the distance between bone crest (BC) and BD, and the angle of the defect defined by the previous two lines. Sample size was determined hypothesizing a difference between the means of the distances not inferior to 0.8mm, with a power of 80% at an α level of 0.05. Each subject subscribed a specific informed consent. *Results:* significant mean reduction of CEJ-BD and BC-BD distances were registered: 1.13 ± 0.22 mm (95% CI:0.68-1.59) and 0.82 ± 0.19 mm (95% CI:0.42-1.22) respectively (Test t $p=0.0001$). The defect angle showed a significant mean increase of $6.29\pm 2.71^\circ$ (95% CI:0.67-11.92) (Test t $p=0.03$). Bone remodeling occurred after endoscopic-assisted S+RP leading to a partial fill and opening of the defect angle. *Conclusions:* the present work confirms the radiographic improvement of vertical bone defects after S+RP and supports the potential benefits of endoscopy. Randomized controlled trials are strongly demanded.

SPAZIO RICERCA – sessione TERAPIA PARODONTALE NON-CHIRURGICA

SUPPORTIVE PERIODONTAL THERAPY:CLINICAL AND STATISTICAL EVIDENCE IN A "WELL-MANTEINED"POPULATION AFTER 9 YEARS

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Introduction: the supportive periodontal therapy (SPT) is a primary factor in preventing the progression of periodontal diseases. The aim of this study was to investigate the survival rates and possible risk factors associated with tooth loss and progression of periodontitis in patients undergoing supportive periodontal therapy (SPT). **Materials and Methods:** 17 patients, ranging from 30 to 67 years old, were examined after supportive periodontal therapy (SPT). The maintenance protocol required a frequency of three/four recalls every year. The periodontal health reevaluation was made through the assessments of clinical and radiographic parameters, and each tooth was given a diagnostic individual score, in according to AAP criteria. Medical records, periodontal charts and radiographic examinations of each patient catalogued the number of lost teeth and their features. **Results:** Patients were subjected to supportive periodontal therapy (SPT) for an average period of nine years. At the beginning of the protocol, a total of 399 teeth was recorded. At the reevaluation, 12 teeth were lost, giving a total survival rate of 96.3%. Of these, the percentage of teeth removed due to periodontal disease recurrences was 27%, while 73% was removed due to conservative, endodontic and prosthetic complications. The main factors associated with tooth lost during SPT were: SPT duration period (OR: 24x); presence of high values of %BoP (OR: 13x); male gender (OR: 10x); beginning of SPT after 55 years old (OR: 6.7x); high risk levels registered according to PRA (OR: 6x); presence of more than nine periodontal sockets (OR: 6x);c smoking habits (OR: 3.7x). **Conclusions:** within the limits of this study, results have shown that a correctly performed SPT can be determinant for tooth preservation in periodontal compromised patients.

SPAZIO RICERCA – sessione TERAPIA PARODONTALE NON-CHIRURGICA

REMAINING ROOT SUBSTANCE COMPARING A NEW ULTRASONIC SCALING DEVICE, HAND INSTRUMENTATION AND SUBGINGIVAL AIR POLISHING WITH GLYCINE. AN IN VIVO AND IN VITRO STUDY

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Introduction: Cementum (CMT) is a component of the periodontium, and its major role is to serve as the site of attachment for principal collagen fibers. The major goal of periodontal treatment is to remove subgingival plaque and calculus. Many studies have led to the suggestion that the periodontally diseased root surface can be treated less aggressively during periodontal therapy. Aim of the study was to determine the effect of in vivo root instrumentation (inst) using a new piezoelectric ultrasonic instrument (US), manual instrument (MI) and airpolishing (AP), on the thickness and surface characteristics of CMT. *Methods:* 48 periodontally involved single rooted teeth scheduled for extraction treated in four different methods. The teeth were instrumented subgingivally at one approximal site. Upon extracting the teeth, instrumented and non-instrumented sites histologically analyzed with an optic microscope and SEM for the measurement of amount and surface characteristics of residual CMT. *Results:* In both apical and coronal sections the mean CMT thickness of noninst. surfaces was significantly greater in comparison to instrumented surfaces in all inst. groups. There was difference in loss of cementum both coronal and apical sections between the groups. MI and US+AP presented with significantly greater loss of CMT than AP in coronal sections. MI presented with significantly greater loss of CMT than AP in apical sections. SEM Findings: Large areas without remaining calculus and with a relatively smooth and intact surface occurred following use of all the inst.s, although the use of AP alone left the surface more intact than the other groups. *Discussion:* All periodontal treatment methods used in the present study remove CMT although using AP alone removed less CMT than MI and US. Results revealed that CMT was discontinuous and the dentin layer was exposed in 3 sections of the MI group. *Conclusion:* it can be concluded that all cementum can be removed by periodontal therapy from a diseased thin tissue, also dentin substance can be removed.

SPAZIO RICERCA – sessione TERAPIA PARODONTALE NON-CHIRURGICA

LOCALLY DELIVERED TOPICAL DESICCANT AGENT (HYBENX®) AS AN ADJUNCT TO ULTRASONIC DEBRIDEMENT IN THE RETREATMENT OF PERSISTENT PERIODONTAL POCKETS: CLINICAL AND MICROBIOLOGICAL PRELIMINARY RESULTS IN HUMANS

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Objectives: to evaluate the adjunctive effect of a topical desiccant agent on the ultrasonic re-instrumentation of pockets persisting after initial periodontal therapy. **Materials and methods:** 20 chronic periodontitis patients underwent initial full-mouth ultrasonic debridement. At the three months reevaluation two different treatments were randomly applied to persisting pockets, following a split-mouth study design: control quadrants were subjected to ultrasonic debridement alone; test quadrants were subjected to supra and subgingival application of a topical desiccant agent (HYBENX®) before ultrasonic instrumentation. Periodontal charts were obtained at baseline and 45 days after. Subgingival microbiological samples were obtained before, immediately and 6 weeks after the re-treatment. Analysis of variance/covariance was used to compare changes in clinical parameters and aerobic and anaerobic bacterial counts. **Results:** baseline examination revealed no significant differences between study groups. At 6-weeks reevaluation test group showed a statistically significant ($P < 0.05$) greater reduction in plaque index and bleeding on probing (VPI and BOP reduction: 6% and 20% in the control group and 35% and 48% in the test group respectively). No statistically significant differences were found in the mean PPD reduction and mean gingival margin (GM) recession. The count of anaerobic subgingival microbiota showed only in the test group a significantly greater decrease in the number of anaerobic UFC, both immediately and 45 days after retreatment. The only detected side effects in test group was a transitory hypersensitivity. **Conclusion:** the adjunctive subadministration of a desiccant agent before ultrasonic debridement has shown to improve at 6 weeks the clinical and microbiological outcomes of the ultrasonic instrumentation.

SINGLE FLAP APPROACH AND ENAMEL MATRIX DERIVATIVE: EFFECTIVENESS IN INTRABONY DEFECTS

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Aims: the present study was performed to evaluate the clinical effectiveness of enamel matrix derivative (EMD) either alone or in association with deproteinized bovine bone mineral (DBBM) in the treatment of intrabony defects accessed with the Single Flap Approach (SFA). Also, an attempt was made at identifying patient and defect/site characteristics that may inform the clinician's decision on whether or not use the combined EMD+DBBM approach.

Methods: twenty-four periodontal intrabony defects were accessed with a buccal SFA. At operator's discretion, EMD or EMD+DBBM were used. *Results:* Twelve defects were treated with EMD, whereas 12 defects were treated with EMD+DBBM. EMD group showed a higher prevalence of incisors and canines, while EMD+DBBM group showed a higher prevalence of premolars and molars. The interaction between the morphology of the intrabony defect (as assessed in terms of bony wall composition) and the surgical treatment was statistically significant, with the proportion of the 1-wall component and 3-wall component being more prevalent in EMD+DBBM and EMD groups, respectively. At 6 months, both EMD and EMD+DBBM groups showed a statistically significant CAL gain and PPD reduction, as well as a significant 6-month increase in REC. No significant difference in CAL, PPD, and REC 6-month changes was observed between groups. *Conclusions:* both EMD and EMD+DBBM were clinically effective in the treatment of periodontal intrabony defects accessed with a buccal SFA. The adjunctive use of DBBM in predominantly 1-wall defects located at posterior teeth seems to compensate, at least in part, the unfavorable osseous characteristics on the outcomes of the procedure.

CLINICAL PERFORMANCE OF ACCESS FLAP IN THE TREATMENT OF THE FURCATION DEFECTS. A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CLINICAL TRIALS

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Objectives: to systematically review the performance of access flap (OFD) in the treatment of furcation defects (FD). **Methods:** Randomized Clinical Trials evaluating surgical treatment of FD with OFD and at least 6 months follow-up were identified through electronic databases and hand searching. Screening, data extraction and quality assessment were conducted independently by two reviewers. The primary outcomes were tooth survival and change in horizontal clinical attachment level (HCAL). Changes in vertical clinical attachment level (VCAL), reduction of pocket probing depth (PPD), increase of recession (REC), horizontal bone level (HBL) and vertical bone level (VBL) were also collected. **Results:** the search identified 1529 studies out of which 12 articles met the inclusion criteria. Data analysis was performed on a sample of 209 patients and 256 furcation defects. The weighted mean difference was 0.96 mm (CI: [0.60, 1.32], $p < 0.001$, $I^2 = 76\%$) for HCAL gain and 0.55 mm (CI: [0.00, 1.10], $p = 0.05$, $I^2 = 95\%$) for VCAL gain. PPD reduction over 6 months was 1.72 mm (CI: [1.05, 2.40], $p < 0.01$, $I^2 = 94\%$). HBL gain and VBL gain were negligible. No teeth were lost during follow-ups (6-24 months). Potential risk of bias was identified. **Conclusions:** teeth affected by class II and III furcation defects treated with OFD show a high survival 6 months after surgery. Nevertheless, and despite the important heterogeneity between studies, clinical changes were modest. Prospective long term trials on conservative surgical treatment of FD are still lacking.

**AUTOGENOUS BONE HARVESTED WITH PIEZOSURGERY IN
ASSOCIATION WITH ENAMEL MATRIX DERIVATIVE IN
TREATMENT OF NON CONTAINING INTRABONY OSSEOUS
DEFECTS. 24 MONTHS CLINICAL-RADIOLOGICAL FOLLOW-UP**

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Aim: the aim of this study is to investigate the effectiveness of enamel matrix protein derivative (EMD) used in association with Autogenous Bone (AB), grafted by a piezo-electric device for the treatment of non-containing intrabony defects.

Material and methods: twelve consecutively treated patients, five females and seven males, aged 31-65 years, four light smokers, were included. A total of 13 deep, mainly one- to two wall intraosseous defects, were selected. Probing pocket depth (PPD), clinical attachment level (CAL), gingival recession (REC) and periapical x-rays were recorded at baseline and then at 12 and 24 months after surgery. The defect was accessed with the Minimally Invasive Surgical Technique, the root surface was scaled, carefully planed and conditioned with EMD. Then AB graft, harvested from the retromolar mandibular area by means of piezosurgery, was positioned to fill the defect. Flaps were repositioned at pre-surgery level.

Results: PPD amounted to $7,85 \pm 1,82$ mm before surgery and decreased to $3,77 \pm 1,01$ mm at 2 year follow-up ($p < 0,0005$). CAL varied from $9,92 \pm 2,69$ mm pre-surgery to $5,62 \pm 2,06$ mm at 2 year follow-up ($p < 0,0005$), with CAL gain averaging $4,31 \pm 1,75$ mm. REC increase was $-0,23 \pm 0,69$ mm. *Conclusion:* the results of this study pointed out that autogenous bone, grafted with piezo-electric device, can be considered a good scaffold to support soft tissues following EMD application in non-containing intrabony defects. Soft tissue recession was stable. X-ray showed a stable bone filling of the defects.

THE CORONALLY ADVANCED FLAP PLUS CONNECTIVE TISSUE GRAFT IN THE TREATMENT OF MULTIPLE GINGIVAL RECESSIONS: A RANDOMIZED LONGITUDINAL STUDY

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Aim: it is to evaluate the clinical significance of thickness and position level of CTG in relation to the clinical outcomes obtained in multiple recessions on three contiguous teeth over 6-month follow up. *Materials and Methods:* ten patients were enrolled. At baseline were recorded the FMPS, FMBS, PSR score, PI and BoP in relation to the treated areas. The indexes selected were the PD, keratinized tissue width (KTW-mesial, buccal and distal), recession depth (RD-mesial, buccal and distal) and the recession width (RW). The flap and graft thickness were always recorded and the CTG was randomly placed at the CEJ or 1 mm coronally. The measurements were in duplicate, on the patient and on a plaster model through an acrylic mock-up in a special copolymer mask at baseline and at 6 months.

Results: A total of 30 Miller class I, II and III gingival recessions were treated. Four patients were the test group (TG) with regard to the positioning of the CTG while the control group (CG - 6 patients) was assessed in relation to the thickness of the CTG placed at the CEJ. At baseline there was no significant difference between the two groups. At 6 months, buccal RD, RW outcomes appeared to be more favorable in the TG VS CG. In multivariate analysis 1mm increase of CTG thickness, increased 36.3 mm distal RD and 7.5 KTW mm recovery while buccal RD 6-month defect decreased of 3.2%. However, a 1mm increase of baseline thickness defect increased of 0.33mm the 6-month thickness defect.

Conclusions: a positive correlation is observed between the CTG thickness and outcomes, independently from the baseline thickness defect that, conversely, worsens the recovery trend. A positive correlation between the baseline thickness defect and the CTG thickness is observed. The coronal positioning of CTG induce better outcomes by CAF+CTG technique.

CLINICAL AND BIOMOLECULAR OUTCOMES OF OSSEOUS RESECTIVE SURGERY USING PIEZOELECTRIC DEVICE VERSUS CONVENTIONAL ROTATING INSTRUMENTS: A PILOT STUDY

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Aim: the aim of the study was to compare clinical and biomolecular outcomes of osseous resective surgery (ORS) using traditional rotating technique versus piezoelectric bone surgery.

Material and methods: A prospective, randomized, split mouth study was performed using a consecutive series of 8 chronic periodontitis patients with bilateral osseous defects at posterior sextants requiring ORS. Each patient was surgically treated using a piezoelectric device on one random side of the lower jaw (test sites) and rotating instruments on the controlateral side (control sites). Probing depth (PD) and gingival recession (REC) were recorded at baseline and at 1, 6, 12 months postoperatively. A gingival biopsy specimen was harvested just before the surgery and 7 days later to analyze the change in the interleukin(IL)-1 β expression by using the polymerase chain reaction technique.

Results: both techniques led to statistically significant PD reduction and REC increase compared to baseline ($p < 0.001$). At the test sites the average PD amounted to 3.96 ± 0.60 mm and the mean REC to 0.71 ± 0.54 mm before the piezoelectric surgery. At 1-year they were 2.08 ± 0.27 mm and 1.95 ± 0.59 mm, respectively. At the control sites the mean baseline PD was 3.77 ± 0.82 mm and the mean REC was 1.0 ± 0.94 mm. At 12 months PD amounted to 2.19 ± 0.18 mm and REC to 2.05 ± 0.4 mm. The IL-1 β expression in the drilled sites was 2.7 times greater than in the piezoelectric bone surgery sites at 7 days ($p < 0.001$). *Conclusions:* the results showed that piezoelectric and rotary bone surgery resulted in similar clinical outcomes, whereas the rotating technique promoted a greater IL-1 β production in the early wound healing. These findings could address the use of the piezoelectric device in critical anatomical sites in order to reduce osteoclastic activation by IL-1 β .

RICRESCITA DEI TESSUTI MOLLI DOPO CHIRURGIA OSSEA-RESETTIVA CON RITENZIONE DI FIBRE VERSUS CHIRURGIA OSSEA-RESETTIVA TRADIZIONALE. ANALISI MULTILIVELLO

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Background: lo scopo dello studio è quello di analizzare la ricrescita e la stabilità nel tempo dei tessuti molli dopo chirurgia ossea-resettiva con ritenzione di fibre (FibReORS) rispetto alla chirurgia ossea-resettiva classica (ORS) nel trattamento delle tasche parodontali residue associate a difetti infraossei ≤ 3 mm nei denti posteriori. **Materiali e Metodi:** trenta pazienti con parodontite cronica e tasche residue dopo terapia non chirurgica sono stati inclusi nello studio, assegnati in modo randomizzato a FibReORS (15 pazienti-gruppo test) e a ORS (15 pazienti-gruppo controllo). La ricrescita dei tessuti molli dopo la sutura del lembo è stata monitorata controllando i cambiamenti della recessione gengivale a 1, 3, 6 e 12 mesi di follow-up. È stata eseguita un'analisi multilivello tenendo conto delle variabili a livello paziente, sito e tempo. **Risultati:** la quantità media di ricrescita dei tessuti molli dopo l'intervento chirurgico è stata di 2.48 millimetri nei siti trattati con ORS e di 2.24 mm in quelli trattati con FibReORS. Circa il 90% della ricrescita coronale avveniva 6 mesi dopo le procedure chirurgiche. L'interazione tra ORS e il tempo di osservazione ha dimostrato una ricrescita maggiore dei tessuti molli dopo 12 mesi ($p=0.0233$) con 0.24 millimetri di maggiore riduzione della recessione rispetto a FibReORS. **Conclusioni:** entrambe le procedure hanno dimostrato un simile modello di ricrescita coronale dei tessuti molli con una riduzione della recessione maggiore nei siti tratti con ORS. La stabilità clinica del margine gengivale è ottenibile 6 mesi dopo la chirurgia.

CLINICAL PERFORMANCE OF PAPILLA PRESERVATION FLAP IN THE ESTHETIC AREA: A PRELIMINARY RANDOMIZED CLINICAL TRIAL

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Introduction/Aim: Periodontal therapy for the maxillary anterior area requires careful consideration, as esthetic outcomes are just as important as eradication of disease. Papilla preservation flaps are supposed to determine higher clinical performance than open flap debridement. The aim of the study is to compare clinical performance of the papilla preservation flap technique (PPF) vs. open flap debridement (OFD) in the esthetic areas in patients affected by aggressive periodontitis. **Materials and Methods:** twenty-three patients (18-70 years old), affected by aggressive periodontitis and presenting at least one site between teeth 1.5-2.5 with residual PPD>3mm and a mean < 5.5mm after non-surgical periodontal therapy, were surgically treated. Subjects were randomly assigned to two groups: a group was surgically accessed with the PPF, whereas the other group with the OFD. Clinical outcomes probing pocket depth (PPD), bleeding on probing (BoP), recession (REC), # sites with PPD>3mm were collected at baseline and at 3 months. Data were imported in SPSS; statistical analysis was evaluated with ANOVA test and Student's t-test. **Results:** wound healing was free of complications in all cases. There were no significant differences in BoP and REC between groups throughout the study. Probing pocket depth (PPD) and # sites with PPD>3mm improved significantly from baseline to 3 months in both groups: PPF group showed significantly more reduction in mean PPD and # sites with PPD>3mm compared with OFD group (PPD 1,99 mm versus 2,56 mm, # sites 0,87 versus 3,46, respectively, p <0,05).

Conclusions: clinical performance of PPF appears superior compared with OFD in terms of periodontal pocket reduction in esthetic areas. Nevertheless no differences are noted in terms of gingival recession.

USE OF A COLLAGEN MATRIX FOR THE TREATMENT OF MULTIPLE GINGIVAL RECESSIONS: PRELIMINARY DATA

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Aim: Aim of the study was to compare the usage of a xenogeneic collagen matrix (CM) vs. autologous connective tissue graft (CTG) in combination with a coronally advanced flap (CAF) in the treatment of multiple recession defects. *Materials and Methods:* In a single-blinded, randomized, controlled, parallel group trial, 31 recessions in 14 patients were treated with either CAF+ CM or CAF + CTG. The following outcome measures were recorded at baseline and 6 months after surgery at the deepest site of recession: recession (REC), width of keratinized gingiva (WKG). Recession reduction (RECRED), complete root coverage (CRC) and percentage of root coverage (PRC) were then calculated. The main outcome measure was 6 months CRC at patient and defect level. *Results:* Baseline REC was 3.52 ± 1.09 mm and 3.56 ± 0.25 mm, WKG was 3.06 ± 0.84 mm and 2.92 ± 0.79 mm for CM and CTG respectively, these differences being insignificant. At 6 months CRC was achieved in 8/18 (44%) sites treated with CM and 10/13 (77%) with CTG ($p>0.05$). At patient level CRC was 3/8 (38%) after CM and 5/6 (83%) with CTG ($p<0.05$). RECRED was 1.80 ± 1.13 mm and 2.75 ± 0.93 mm ($p<0.05$), PRC was 60.07 ± 32.75 % and 80.66 ± 33.29 % ($p>0.05$), WKG gain was 0.64 ± 2.00 mm and 0.70 ± 1.96 mm ($p>0.05$) for CM and ACTG, respectively. Subject undergoing CTG reported various degree of complaints after surgery. *Conclusion:* These preliminary data support the usage of CTG in the treatment of multiple recession defects. Nevertheless, the magnitude of the findings and the absence of side effects/morbidity supports further trials and the usage of CM for some clinical indications.

SPAZIO RICERCA – sessione TERAPIA PARODONTALE CHIRURGICA

EFFETTO DELLA INTRA-MARROW PENETRATION SULLA RISPOSTA OSSEA NEL TRATTAMENTO RICOSTRUTTIVO DI DIFETTI INFRAOSSEI MEDIANTE AMELOGENINE

STUDIO CLINICO PROSPETTICO RANDOMIZZATO A 12 MESI

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Introduzione: l'obiettivo del presente studio randomizzato controllato multicentrico è stato valutare l'effetto della rigenerazione indotta mediante amelogenine con (test) o senza (controllo) penetrazione intramidollare nel trattamento di difetti infraossei profondi in pazienti affetti da parodontite da moderata ad avanzata. **Materiali e metodi:** 50 pazienti, ciascuno con un difetto infraosseo con PPD (Probing Pocket Depth) e CAL (Clinical Attachment Level) > 5 mm e rxDD (radiographic Defect Depth) ≥ 3mm, sono stati trattati chirurgicamente in maniera randomizzata con una delle due procedure (test o controllo) e inseriti in un protocollo di mantenimento con follow up a 12 mesi. **Risultati:** i dati presentati sono relativi a 32 difetti di pazienti che hanno completato il periodo di osservazione previsto. Dall'analisi statistica condotta entrambe le procedure hanno prodotto guadagno di attacco clinico e riduzione di PPD, BS (Bone Sounding) e rxDD. Non sono emerse differenze significative fra i due gruppi di trattamento in termine di CAL, PPD, Rec (gingival Recession), BS, rxDD e rxDW (radiographic Defec Width). I siti controllo hanno mostrato maggior prevalenza di completa chiusura dell'angolo radiografico dei difetti. **Conclusioni:** entrambi i trattamenti si sono dimostrati efficaci nell'indurre guadagno di attacco clinico e riempimento radiografico dei difetti. Non si è riscontrata evidenza clinica di alterata efficacia clinica di EMD riconducibile all'aumento del sanguinamento locale indotto dalla IMP.

**CLINICAL, RADIOGRAPHIC AND MICROBIOLOGICAL
EVALUATION OF IMPLANTS WITH DIFFERENT COLLAR
TREATMENTS**

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Aim: the aim of the present study was to compare the clinical, radiographic and microbiological parameters of Laserlok® (test) to RBT® (control) dental implants restored with straight or angled abutments. *Materials and Methods:* twenty patients were enrolled and a total of 40 implants inserted. All the implants were placed with a non submerged, one stage surgical approach. Three months after the implant placement, pick-up impressions were performed and the fixtures were restored with Laserlok® on test sites and fully machined abutments on control sites. The peri-implant status was assessed by PD, mPI and mGI and standard periapical radiographs were taken on the baseline, on the implant placement and six months after the implant placement. Student's t-test statistical analysis was adopted. 6 months following the surgical placement of the dental implants, subgingival sampling with -paper points for microbiological analysis (Real Time Polymerase Chain Reaction) of the microbiota at the implant sites were performed. *Results:* all the peri-implant parameters were within the regular ranges and all the implant sites healed uneventful. The radiographic evaluation showed a minimal physiological bone remodeling. Bone remodeling was minimal on test implants compared to control ones with slight significant differences ($p = 0.013$). *Conclusions:* within the limits of this study the use of dental implants with laser configured microchannels on the collar and abutment surface may help maintaining excellent peri-implant hard and soft tissues conditions.

PREVALENCE OF BIOLOGICAL COMPLICATIONS IN IMPLANTOLOGY

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Introduction: the aim of the study was to evaluate the prevalence of biological complications associated to implant-supported prostheses, in light of different risk factors such as the “compliance” and the periodontal disease (PD). **Materials and Methods:** the sample consisted of 194 patients with a mean age of 61.6 ± 12.3 years (age range 28-89 years), for a total of 467 osseointegrated implants. The medical history was collected and a full clinical and radiological examination was performed for each patient. **Results:** 40% of patients (38% of implants) were affected by peri-implant mucositis (M) while 32% of patients (27% of implants) presented peri-implantitis (P). The major part of healthy patients (n=32) showed a plaque index (PI) < 25%, 19 patients showed a PI in a range of 25-75%, only one healthy patient presented a PI>75%. Patients with a previous history of PD had a prevalence of P of 36% in respect with a prevalence of 8% for patients without PD. It was observed an increase of P over the time, with a prevalence of 27% in the first five years after the implant insertion, 34% between six and ten years after positioning and 39% after ten years. After ten years from implant insertion, 80% of patients showed M or P. This percentage was superimposable to that observed in patients with a PI > 75% but treated in a period of less than five years. **Conclusions:** results agree with data of the literature showing an high percentage of biological complications associated to implant treatment. The prevalence of complications is influenced by numerous risk factors such as a previous PD or an inadequate oral hygiene. Furthermore, data shows that the “compliance” decreases over the time and for this reason a strict recall programme with a reinforcement of motivation, is essential to prevent biological long-time complications.

SHORT AND ULTRASHORT LOCKING-TAPER IMPLANTS PLACED IN POSTERIOR AREAS OF MAXILLA AND MANDIBLE: RESULTS AT 2 YEARS OF LOADING

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Objectives: to evaluate the performance of short (8-mm-long) and ultrashort (≤ 6 -mm-long) locking-taper implants placed in posterior regions of maxilla and mandible. **Materials and methods:** a retrospective cohort study was conducted between January 2009 and December 2011. The sample was composed of patients who had received at least one 5-to-8-mm-long locking-taper implant (Bicon LLC, Boston, MA, USA). The outcome variables were implant failure and peri-implant bone loss. Clinical parameters such as the modified bleeding index, the modified plaque index, the average probing depth and the presence of an adequate volume of keratinized mucosa were recorded. Descriptive statistics and univariate models were utilized to identify predictors of implant failure. **Results:** fifty-five subject who received 143 locking-taper implants were followed for an average period of 24 months. Of these, 57 were short implants (8-mm-long) and 86 were ultrashort implants (≤ 6 -mm-long). Seventy-nine implants were placed in the posterior upper maxilla, while 64 implants were placed in the posterior mandible. Four implants failed in the posterior maxilla and two implant failed in the posterior mandible, giving a cumulative survival rate (CSR) of 95.8%. Among the failed implants, three were short and three were ultrashort. The peri-implant bone loss between prosthetic loading and last recall visit was 0.26 mm, with an average bone loss of 0.38 mm in the posterior maxilla and 0.11 mm in posterior mandible. The mean mBI was 0.25, and 58 implants showed an mBI= 0. The mean mPLI was 0.17, and the mean PPD was 2.35 mm. The average volume of keratinized mucosa was 2.16 mm. **Conclusion:** the survival of short and ultrashort implant was comparable. Moreover, the implants of this study have shown good health of peri-implant tissues after two years of loading.

IMMEDIATE FUNCTIONAL LOADING OF IMPLANTS WITH TWO DIFFERENT NECKS IN SINGLE-TOOTH REPLACEMENT: A 1-YEAR PROSPECTIVE CLINICAL STUDY

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Aim: the aim of this study was to evaluate the influence of a Laser-Lok microtexturing collar on crestal bone remodeling around immediately functionally loaded implants in single-tooth replacement. *Materials and methods:* seventy-seven patients were included in a prospective, randomized study and allocated into two groups. Group 1 (control) consisted of non-Laser-Lok type implants (n = 39), while in group 2 (test), Laser-Lok type implants were used (n = 39). Crestal bone loss (CBL) and clinical parameters including clinical attachment level (CAL), Plaque Index (PI), and bleeding on probing were recorded at baseline examinations and at 6 and 12 months after loading with the final restoration. *Results:* No statistically differences were found between test and control groups in terms of PI and BOP. A mean CAL loss of 0.99 ± 0.27 mm was observed during the first 1 years in group 1, while the mean CAL loss observed in group 2 was 0.54 ± 0.32 mm. Radiographically, group 1 implants showed a mean crestal bone loss of 1.02 ± 0.29 mm compared with 0.41 ± 0.27 mm for group 2. *Conclusion:* the Laser-Lok implants resulted in greater CAL and in shallower radiographic peri-implant CBL than non-Laser-Lok implants.

CLINICAL EVALUATION OF LOCKING-TAPER IMPLANTS PLACED IN ESTHETIC AREAS: RESULTS AT 3-YEARS

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Objectives: this study updates the esthetic results of locking-taper implants (Bicon LLC, Boston, MA,USA), placed in fresh extraction site of anterior areas of the maxilla. **Material and Methods:** the results of 21 locking-taper implants placed in highly esthetic areas of 16 patients are presented. For each implants the Pink Esthetic Score (PES), the White Esthetic Score (WES), the cumulative survival rate and peri-implant soft tissue conditions were evaluated. All implants were placed in fresh post-extraction sites and loaded with a temporary non-functional crown. After 6-month the final prosthetic crowns were inserted and all fixtures were re-evaluated after 3-years loading. **Results:** after 36.3 ± 4.9 months of loading the implant CSR was 100% and no inflammatory process was observed. The esthetic parameters PES / WES has given a total average value of 16.9 ± 1.14 (PES/WES maximum value 20). **Conclusion:** within the limits of this study, this implant-prosthetic protocol seems to give excellent results with regard to the esthetic and as for the maintenance of peri-implant soft tissues.

COMPARATIVE EVALUATION OF THE EFFECT OF IMPLANT LENGTH AND CROWN HEIGHT IN THE EDENTULOUS MAXILLA: A THREE-DIMENSIONAL FINITE ELEMENT ANALYSIS

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Aim: short dental implant placement has been proposed as an alternative to rehabilitate atrophic edentulous areas, especially in the posterior region of jaws. However longer crowns are sometimes necessary to compensate the bone resorption. The aim of this study was to evaluate the influence of implant length and crown height on the stress in the surrounding bone. *Materials and methods:* the 3D geometry of the posterior area of the edentulous maxilla was reconstructed from computerized tomography (CT) scans. The implants' meshes (Astra Tech AB OsseoSpeed™ TX) were placed in molar position. Three single implant configurations were compared: A) 4mm diameter x 6mm length implant with 8mm long crown; B) 4mm diameter x 6mm length implant with 13mm long crown; C) 4mm diameter x 11mm length implant with 8mm long crown. The implants were placed in molar position. A 200 N axial and 45° oblique load were applied. For each configuration the effect of both loading scenarios was evaluated in terms of state of stress in the bone-implant interface (Von Mises stress, maximum and minimum principal stresses). *Results:* in all experimental conditions the stress values were higher around the cervical area of the implants. Considering axial loads the values of stress were comparable among the 3 configurations. Under oblique load the peri-implant stress was higher than under axial load and the maximum values of stress were found in the B configuration. *Conclusions:* crown height seems to be a more influencing factor in the peri-implant bone stress than the implant length even if the stress values were in a physiological range. Therefore from a biomechanical point of view short implants with higher crowns can be considered a potential alternative to standard length implants, but occlusal force have to be carefully analysed in every patient.