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Precision of implant positioning in computer guided surgery designed on data acquired with digital methods in totally edentulous patients

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Background: Several publications focus on the accuracy of guided surgery (GS). In order to be able to perform GS in a total edentulous, it is necessary to overlap the patient's prosthesis to his CT scan. The "double scanning" technique is one of the procedures used for this purpose. Some radiopaque markers are applied on patient's prosthesis and two CT scans, one of patient wearing the prosthesis and one of the prosthesis alone, are performed. If the prosthesis was not congruent, the clinician would be forced to manufacture a new prosthesis before evaluating the case with a new TC. **Aim:** The accuracy of computer guided implant surgery designed and performed with digital methods is evaluated.
Materials and methods: 10 patients with total edentulism signed informed consent and underwent computer guided implant planning with CoDiagnostix, (Dental Wings). Patients' prosthesis was relined and some optically detectable radiopaque markers were installed on its surface. The overlap between template and CT was performed using the radiopaque features. The master cast alone was scanned and the image obtained was superimposed on the model+prosthesis scan using a series of holes created into the cast. Implant definitive position was decided on the basis of more than one project without patient excessive radiographic exposure.
Results: 54 implants were analyzed. The linear difference (mm) between in vivo implants position and surgical designed implants position in the three planes of space were calculated coronally (0.74mm [0.38; 1.1]) and apically (0.90mm [0.52; 1.28]). The difference (degrees) between the computer designed planning and the effective angle obtained was also calculated (2.66 [4.06; 1.26]).
Discussion and conclusions: A recent systematic review reports an average coronal inaccuracy of 1.3mm (1.09; 1.56), average apical inaccuracy of 1.5mm (1.29; 1.62) and an average angular imprecision of 3.3 degrees (2.71; 3.88). The present study show encouraging figures compared to the average reported in the literature. The DICOM / STL technique has a double advantage. First of all, the surgical template can be create directly on digitized master model. This could result in a more precise surgical guide could result. Secondly, the production of the diagnostic wax-up after the CT scan can reduce both the technical and chair side time required to make a classic radiographic template. The possibility to create lots of different projects reduces patients' rx exposure.

Immediate versus delayed loading of post-extraction implants in the aesthetic zone: a prospective longitudinal study with 2-year follow-up

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Aim: The aim of this study was to assess implant survival in immediate loaded post- extraction implants in the

aesthetic zone. Each single rehabilitation was carried out through a new conical connection implant.
Methods: The study was conducted at the Department of Dentistry at San Raffaele Hospital, Milan, Italy from July 2015 to January 2016. Healthy patients requiring single tooth rehabilitation in aesthetic zone of upper or lower jaw, were included in the present study and randomly divided in two groups, each one contains 16 female and 9 male with a mean age of 42 +/- 1.5. In the first group patients underwent immediate loading procedures, in the second they underwent delayed placement (3 months after extraction) of dental implants. The implants used in the present study (CSR, Sweden and Martin, Due Carrare, Padova, Italy) have a rough surface (ZirTi surface) and an internal connection with double taper. The first taper is an internal cone that supports and closes the prosthesis combined with an internal hexagon. This is used for implant screwing and prosthesis positioning. The second taper is an interaction surface between the prosthetic abutment and the head of the tightening screw, which is conical. In immediate loading implants insertion torque was at least 35 N/cm to obtain a suitable primary stability and within 24 hours the definitive abutments were screwed at 23 N/cm. In delayed implants the provisional crowns were placed after 3 months and the definitive prosthetic restoration was performed with a single unit metal-ceramic crown 3 months later. Periapical radiographs with parallel long-cone technique and clinical follow-up were performed at 3, 6, 12, 24 months. A statistical comparison of bone loss between immediate loading and delayed loading groups was realised.
Results: 50 patients, 32 females and 18 males, were enrolled in the present study. Adequate wound healing and soft tissue adaptation were detected. At 24-months, a survival rate of 100% was reported and the mean marginal bone loss was of 0.11± 0.09 mm for immediate loading group and of 0.13± 0.08 mm for delayed loading group. No statistically significant differences of bone loss were found between immediate and delayed loading implants (P>0.05) .
Conclusion: No significant differences about functional and aesthetics results were detected between immediate and delayed loading groups. Further studies are needed to evaluate long term follow-up.

A case series of an ultra-short sintered porous surfaced implant in patients with and without periodontitis: 11-year follow-up

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Aim: The aim of this case series is to show that, when appropriate surgical, prosthetic and hygienic protocols are followed, ultra-short sintered porous-surfaced (SPS) implants can nonetheless prove an excellent solution for the rehabilitation of severely resorbed posterior alveolar ridges in patients with and without history of periodontal disease.
Methods: Two cases were considered: the first one, a 78-years-old man, with history of periodontitis, needed implant-prosthetic rehabilitation of the upper first molar in the right posterior maxilla (1.6); the second one, a 38-years-old man, without history of periodontal disease, needed implant-prosthetic rehabilitation of the upper first molar in the left posterior maxilla (2.6). In the first patient, after a complete cycle of non-surgical periodontal therapy, the upper first molar in the right posterior maxilla was extracted because of deep furcation exposure and wide mobility as a result of generalized chronic periodontitis. In the second patient, the upper first molar in the left posterior maxilla was extracted for endodontic and restorative reasons. In both patients, periapical X-ray and cone beam computerized tomography (CBCT) in dental scan mode were used to assess bone width and height and to plan implant positioning. An ultra-short SPS implant was chosen because of the severe atrophy of the alveolar ridge and the patient's refusal of a bone graft. The implant was inserted after manual osteotomic preparation and a series of surgical drills to achieve ridge expansion, good primary stability and sinus floor elevations without any bone grafting. The whole porous-surfaced region of the implant and the 0.5 mm of the smooth coronal region were fully submerged in bone. Three months later, the prothesis were fashioned and checked in occlusion to eliminate precontacts and interferences during centric and eccentric movements. The patients were included in a well-established oral hygiene protocol that scheduled oral hygiene instructions, professional dental hygiene, probing pocket depth (PPD) measurements and check on occlusal contacts every 4 months for the periodontal patient, and every 6 months for the non-periodontal patient. Radiographic assessments with periapical X-rays were scheduled every 8 months. The clinical crown-implant ratio at the baseline was respectively 3.1 in the first patient and 2.7 in the second one.
Results: In both patients no pathological PPD, calculus or signs of periimplantitis were observed during the follow-up. The clinical crown-implant ratio after 11 years of follow-up was 3.3 in the first patient and 2.9 in the second one.
Conclusion: This case series shows that proper surgical, prosthetic and hygienic management enables the long-term survival of ultra-short SPS implants even

in patients with a history of periodontal disease. Patients must be carefully selected (no smokers with good oral hygiene and excellent compliance) and a well-established periodontal maintenance protocol must be rigorously imposed. This must be done to guarantee the long-term success of this type of rehabilitation and to avoid the risk of rapid implant failure due to periimplantitis developing in association with the short implant length, particularly in the patient with periodontal disease. In conclusion, regardless of age and the reason (periodontal or endodontic/restorative), ultra-short SPS implants can nonetheless prove an excellent solution for the rehabilitation of severely resorbed posterior alveolar ridges, guarantying excellent bone healing levels and long-term stability of these.

Surgical tratment of peri-implant medication osteonecrosis of the Jaw: a case series

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Aim: Medication-related osteonecrosis of the jaw (MRONJ) is a side effect of antiresorptive medications (IV and oral BPs, rank ligand inhibitor like denosumab) and antiangiogenic medications. Dental implants are believed to be a risk factor for developing MRONJ. Aim of the present study was to present a case series of MRONJ around dental implants.
Methods: A retrospective study was designed. All patients diagnosed with MRONJ associated with dental implants referring to the Department of Dentistry and Oral Surgery of the University Hospital of Pisa from January 2012 to December 2017 were included. Diagnosis of MRONJ was made according to the 2014 American Association of Oral and Maxillofacial Surgeons (AAOMS) classification. Data concerning demographic and medical background, type and duration of antiresorptive medication and osteonecrosis characteristics were collected. Logistic regression analysis was used to evaluate the influence of various risk factors on the MRONJ staging.
Results: Nineteen patients presenting peri-implant bone osteonecrosis were identified and included in the present study (16 females, 3 males; mean age: 65,74 years). Nine patients were receiving intravenous bisphosphonates (Zoledronic acid 4mg IV) for the treatment of oncologic pathologies: metastatic breast cancer (4 patients, 45%); multiple myeloma (3 patients, 35%) and metastatic lung cancer (2 patients, 20%). Nine patients were taking oral bisphosphonates for the management of osteoporosis (Alendronic Acid). Only one patient received denosumab 120 mg for the treatment of metastatic breast cancer. Nine patients were smokers, three patients were affected by diabetes and five patients were suffering from hypertension. Eight patients were taking steroids. Twelve patients suffered from periodontal disease.
Characteristics of MRONJ lesions: the most frequent stage of MRONJ was stage II (8 subject, 47%), whereas stage I (4 subject, 20%) and stage III (7 subject, 33%) were less common. MRONJ lesions were mainly symptomatic (14 subject, 93%) and accompanied in the vast majority of the cases by bone exposure (9 subject, 60%) and suppuration (12 subject, 91%). Lesions were prevalently located in the mandible (11 lesion 73%). The dental implants involved in the MRONJ lesions were 32; four patients had dental implants (n = 5) without osteonecrosis.
Treatment protocols: all patients who presented with purulent or painful MRONJ associated with dental implants were initially treated with oral antibiotics (Amoxicillin with clavulanic acid 2 g/day for 14 days) and were clinically evaluated two weeks later. There were no signs of complete healing at this stage, only stabilisation of necrosis and alleviation of pain have been reported. Patients were then listed for implants remove and local debridment.
Conclusion: Peri-implant MRONJ is undoubtedly an emerging clinical reality. All patients who have dental implants and are about to start receiving antiresorptive therapy should be adequately informed about the increased risk of MRONJ around dental implants.

Work-flow beyond the guided implantology: 3D templates in oral surgery

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Background: Computer-guided technologies are adopted in various field of surgery to limit invasiveness and obtain patient benefits in terms of surgery duration and post-operative course. Surgical templates realized through computer-aided design (CAD) and computer aided manufacturing (CAM) technologies are widely diffused in implant dentistry. The aim of this work is to propose, beyond implantology, the feasibility of application of 3D printed surgical templates in oral surgery procedures requiring osteotomies like maxillary cyst enucleation and tooth disimpaction in order to obtain accurate surgeries, avoid anatomical damage of surrounding structures and decrease patient's morbidity.
Methods: A stereolithography (STL) file of maxillary structures is obtained by the use of a 3D medical

image processing software (Materialise Mimics 20.0) a segmentation toolbox acquiring RX volumes by cone-beam computed tomography (CBCT). Digital models of the teeth, acquired as STL files directly by the use of an intra-oral scanner or indirectly by the using the desktop scanners, are imported in the same 3D medical image processing software (Materialise Mimics 20.0) to merge STL files of maxillary structures and teeth. Data are transported into Blue sky plan 4.0 (Blue Sky Bio, LLC) a software for 3D implant guides fabrication, togheter with the DICOM images package of maxillary volumes to carry out the pre-surgical treatment planning. Anatomical structures (nerves, dental roots, etc..) at risks are identified; a countour of ideal incision shape and bone osteotomy extent is drawn. Once the settings are confirmed, file of the three-dimensional guide is generated and the document created is used to fabricate the surgical guide either through additive methods (3D printing) or subtractive methods (milling machines). The resulting 3D template is fabricated with the following major features: teeth support, flap management and bone osteotomy design.

Results: The proposed work-flow assists the surgeon in both pre-operative and intra-operative work phases through accurate virtual planning and the fabrication of precise surgical guides to be used in oral surgery practice. The use of CAD-CAM technologies in 3D oral surgery planning allows a better control of the osteotomy planes and flap management. 3D templates in oral surgery could be employed in order to safeguard adjacent healthy tissues and guarantee minimum tissue damage and good coverage.

Conclusion: Objective of the study was to present a specific workflow to be applied by Oral Surgery Units when planning surgical oral treatment. In oral surgery the preparation of the osteotomy window is crucial, size, design and position may affect the intra- and post- surgical complication rates. To apply the concept of computer guided surgery could decrease the risk of surgical complication related to incision size and extent of the osteotomy. The use of 3D system techniques in oral surgery can provide useful intra-operative guidance and may help to further increase accuracy of the surgery and patient safety. Clinical trials are needed to evaluate the efficacy of the proposed protocol.

Tilted implant: therapeutic alternative to maxillary sinus augmentation

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Purpose: Nowadays partial or total edentulous patient require implant-prosthetic rehabilitation, researching the highest requirements in terms of aesthetic and function. Resorption of the alveolar ridge mainly begins with the loss of dental elements, complicating the conventional implant placement. Solving the problem of bone atrophy, it's necessary subject patients to invasive procedures such as maxillary sinus augmentation and bone grafts tecniques. For this reason tilted implants are increasingly used for the rehabilitation of edentulous jaws, not only as an alternative treatment option to hard tissue augmentation procedures but also to increase primary stability in immediate loading procedures. The goal of placing implants in an angled position is to use patient's autologous bone as much as possible. The following work illustrates the use of tilted implant for the rehabilitation of a patient not candidate to large maxillary sinus augmentation surgery.

Materials and methods: A 55-years-old male patient was referred to the Department of Dentistry of the Vita-Salute San Raffaele University. Surgery was planned by clinical and radiographic examination of the atrophic sites. Pneumatization of the maxillary sinus had considerably reduced the bone height in the first molars region. The history of a chronic sinusitis and the bad habit of a heavy smoker have excluded the intervention of sinus membrane elevation. In local anesthesia, extraction of 2.3 and 2.6 and preparation of implant sites were carried out. The distal osteotomy was performed with a tangential course to the anterior wall of the maxillary sinus: this inclination allows to obtain an emergency of the implant platform at the level of the first molar. Extreme abutment have been screwed on tilted implant in order to correct disparallelism up to 45°. Patient was discharged with a temporary prosthesis that will maintain until successful osseointegration. After 6 months from the surgical phase, reached tissues stability, the design of the final prosthetic device was carried out.

Results: This technique allowed the insertion of longer implant, thus increasing the bone-implant contact area and the primary stability. Anchoring in the dense bone adjacent the anterior wall of the sinus also help to increase stability of the implant. The analysis of the finite elements on individual tilted implants show stress on the surrounding bone; however splinting implants with fixed prosthetic structures reduce stress on peri-implant bone at a similar level on axial implants.

Conclusions: The therapeutic option adopted using tilted implant allows the rehabilitation of the atrophic jaw of a patient who was difficult to apply to a sinus lift and bone graft intervention, also reducing the biological and economic costs. Tilted implants placed in the basal bone therefore represent an alternative

minimally invasive surgical solution for a better response to treatment.

Addition of LED light to the piezoelectric instrument during the osteotomy of impacted third mandibular molars: clinical evaluation of postoperative pain

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Introduction: Phototherapy, at the wavelength of the red spectrum, has been used to stimulate cellular metabolism and tissue repair in different clinical areas, including dentistry. Although the specific literature is still limited, the available data suggest that the red LED light has a positive biostimulation effect on cell viability. Moreover it has been widely demonstrated that the effect of piezoelectric technology compared to the rotating instrument, given its lower invasiveness in the removal of third impacted molars, is a valuable aid in reducing intra- and postoperative complications. The following study clinically evaluates if the association between piezoelectric instrument and LED light, compared to the piezoelectric instrument without the light, during the osteotomy of an impacted mandibular third molar, leads to a further reduction of postoperative pain.
Materials and methods: According to the inclusion and exclusion criteria, 40 patients were included and 16 were excluded. Patients were divided as follow: 20 patients underwent the removal with the piezoelectric tool (Control Group/CG) and 20 with the piezoelectric tool added with a LED light (experimental Group/EG). For the surgery, performed by the same surgeon, was used the same anesthesia, incision and extension of the flap. The osteotomy was carried out in the CG totally with the piezoelectric method and in EG totally with piezoelectric instrument added with red LED light (wavelength 668 nm). An odontotomy was performed where necessary. In order not to influence the parameters analysed, a maximum intervention time of 40 minutes was inserted and all surgeries with a higher duration were excluded from the study. To all patients were prescribed the same post-operative precautions to follow. Then, a module to fill at home was given to all patients, of both groups, where to indicate the pain perceived, through a self-assessment with the VAS scale and through an evaluation of painkiller tablets (ibuprofen 600 mg) taken during the 5 days after the surgery.
Results: The analysis of the results showed that the patients of the CG perceived an average pain of 2.12 ± 0.8, taking an average of 1.42 ± 0.68 painkillers tablets, while in the EG patients perceived an average pain of 1.83 ± 0.65, taking an average of 1.26 ± 0.79 tablets. In the parameters analysed no statistically significant differences were found between the CG and the EG ($p > 0.05$).
Conclusions: There wasn't a statistically significant difference neither in terms of pain reduction perceived by the patient nor in terms of reduction of painkiller tablets taken in the postoperative. These clinical results are not in agreement with in vitro experiments present in the literature, and in fact, despite the lack of statistical significance of the results, there is a slight reduction in the averages of the parameters analysed in favour of the addition of LED light to the piezoelectric instrument. This suggests that the lack of statistical significance is not attributable to the non-efficacy of LED light but it could be associated to the limited sample of patients included in this study.

Antibiotic prophylaxis in oral surgery and implantology: survey among dentists from the Turin area

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Introduction: The issue of antibiotic prophylaxis in oral surgery and implantology is still subject to numerous controversies, even more when considering the evidence of growing bacterial resistances which claims a rationale use of antibiotics. Dental practitioners are responsible of a large part of antibiotics prescriptions, which often have prophylactic purpose. In absence of validated guidelines antibiotic prophylaxis is often prescribed aiming to reduce as much as possible infective complications potentially arising after oral surgery interventions. Within such a frame, we lack data reporting the attitude of the Italian Dentists in the management of antibiotic prophylaxis. The present pilot study aims at describing the attitude of dental practitioners in prescribing antibiotic prophylaxis. Data from the survey will clarify the burden of prescriptions and identify which clinical situations make dentists prescribe antibiotic before and/or after surgical procedures.
Materials and methods: A survey made up of 16 questions investigating attitudes in antibiotic prophylaxis was created. It deals with the use of antibiotic prophylaxis

related to oral surgery and oral implant procedures, it also includes questions about the prevention of bacterial endocarditis. The questionnaire, accessible on the online platform "Survey Monkey" was validated on a group of 15 dentists and was subsequently disseminated to 770 dentist from the Turin area (north-western Italy) thanks to the collaboration with the local section of the Italian Association of Dentists (ANDI Turin). The participation was optional and completely anonymous.

Results and Discussion: 101 responses were collected, corresponding to a response rate of 13%. Half of responders (49%) had at least 10-30% of their clinical activity dealing with oral surgery and/or dental extraction, such procedures represent most of the clinical activity (more than 50%) in 10% of responders. Only 3% of responders correctly recognized all the conditions requiring antibiotic prophylaxis for infective endocarditis as indicated by the American Heart Association guidelines (unchanged from 2007 to date). Dental practitioners are used to prescribe antibiotic prophylaxis also in clinical settings not requiring it: wearing pacemaker (8%), previous myocardial infarction (17%), patients with coronary stent (26%), mitral prolapse with regurgitation (64%). Following routine dental extraction procedures, in absence of infection, almost 80% of colleagues prescribe antibiotics. In the case of dental extraction for which long procedures or soft tissue trauma are expected, even in the absence of flap access, almost half of responders prescribes a prophylaxis to be started before surgery. Almost 60% of the responders deals with implantology; among these, 68% always prescribe antibiotic prophylaxis to be started before placing 1-2 implant fixtures. Only a minority (8-10%) do not prescribe antibiotics before or after surgery.

Conclusions: The present study shows that lacking validated and comprehensive guidelines, dental practitioners often rely on antibiotics for prophylactic purposes in absence of infection. When considering a frame as infective endocarditis, where guidelines are available, a lack of knowledge can be observed. In fact, the reported attitudes are not consistent with the guidelines and highlight the fact that dental practitioners usually prescribe antibiotic prophylaxis even when it is not required. In order to gain a more conscious prescribing practice, comprehensive guidelines considering oral surgery procedures would be needed; but other than this, dental practitioners should have a better knowledge of the current guidelines when available.

A prospective longitudinal study on impacted wisdom tooth extraction in HIV-positive patients

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Aim: The aim of this prospective study was to evaluate the post-operatory complication's incidence in HIV-positive patients with different levels of lymphocytes CD4+ after the third molar extraction.

Methods: A prospective monocentric analysis of selected patients referred to the Dentistry Unit of San Luigi Center at San Raffaele Turro (IRCCS San Raffaele, Milan) was performed. In this study were included HIV infected patients under anti-retroviral therapy (CD4+ lymphocyte count > 200 cell/uL) with a good oral hygiene who required impacted third molar extraction due to recurrent pericoronitis (at least 2 episodes in a week). The first group included HIV positive patients with lymphocyte count level CD4+ < 350 cell/µL, the second group included HIV positive patients with lymphocyte count level CD4+ > 350 cell/µL. Data were recorded immediately after the surgical procedure (t0) and at the follow up visits settled 7 days (T1), and 28 days (T3) after surgery. The following post-operative complications were scheduled and analyzed : delayed wound healing, local wound infection, localized alveolitis (dry socket), persistent bleeding, persistent pain and alveolar nerve hypoesthesia.

Results. A total of 40 patients enrolled in this study following the inclusion criteria were divided into two groups: 20 HIV- positive patients with CD4 + lymphocyte count < 350 cell/ uL (immunologically non-responders to therapy for CD4+ level) (first group) and 20 HIV infected patients with CD4+ count > 350 cell/uL (immunocompetent) (second group). Student t test was performed for statistical analysis. The group of HIV positive patients with CD4 + lymphocyte count <350 cell/uL who required surgical extraction didn't show a statistically significant increased risk (p value > 0.05) for post-op complications compared to HIV affected patients with CD4 + count >350 cell/ uL. The rate of complications that occurred was similar in both groups.

Conclusions. This prospective study showed no statistically significant differences in post-extraction complication rate between the two groups: patients with a lower level of CD4+ seemed not to have an increased risk for post- operative complications compared to patients with an higher level of CD4+.
This result is probably due to the minor role of lymphocyte CD4+ in the inflammation and wound healing process. However more studies are needed to clear the importance of other serological markers

such as CD4/CD8 ratio in the infection process.

Conservative surgical treatment of Medical Related Osteonecrosis of the Jaw: evaluation of surgical outcome and influencing risk factor

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Aim: Medication-related osteonecrosis of the jaw (MRONJ) is a side effect of antiresorptive medications (IV and oral BPs, rank ligand inhibitor like denosumab) and antiangiogenetic medications. The management of medical related osteonecrosis of the jaw has not been completely elucidated, and its treatment can vary from no or limited surgery to more extensive surgery. Aim of the present study was to evaluate the efficacy of localized surgical treatment of MRONJ lesions and to identify the risk factors associated with relapse or treatment failure.
Methods: We performed a retrospective cohort study of MRONJ in patients who undergone localized surgery in the Department of Dentistry and Oral Surgery of the University Hospital of Pisa from January 2004 to December 2017. Diagnosis of MRONJ was made according to the criteria of the American Association of Oral and Maxillofacial Surgeons. The predictor variables were a set of heterogeneous variables, including demographic (age, gender), anatomic (maxilla or mandible, or both, affected location), clinical (disease stage, aetiology, comorbidities, history of intravenous bisphosphonate intake), time (conservative treatment before surgery, bisphosphonate treatment before the development of MRONJ, discontinuation of the drug before surgery, interval to final follow-up, interval to reoperation in the case of relapse or treatment failure), and perioperative variables (type of anaesthesia, type of surgical procedures). The primary outcome variable was relapse after surgery that required reoperation.
Results: Two hundred and forty three patients, with 256 MRONJ lesions, were identified and included in the present study (174 females; mean age 68,85 years; SD 10.7 years). 176 patients (72,4%) received intravenous bisphosphonates (zoledronic acid 4mg IV) for the treatment of oncologic pathologies: metastatic breast cancer (72 patients, 29,6%), multiple myeloma (44 patients, 18,1%), kidney cancer (5 patients, 2,1%) and metastatic lung cancer (17 patients, 7%). Sixty-four patients (26,3%) received bisphosphonates for the treatment of osteoporosis. Three patients (1,2%) received Denosumab for the treatment of metastatic breast cancer. The MRONJ lesions were mainly symptomatic (241 lesions, 94,1%) and bone exposure was detectable in the vast majority of cases (203 lesions, 79,3%); pus was detected in 93% of cases (237 lesions). 173 lesions were located in the mandible. The main event leading to MRONJ was dental extraction (142 lesions, 55,5%), periodontal/perimplant disease (24 lesions, 9,4%), prosthetic trauma (42 lesions, 16,4%), odontogenic infection (21 lesions, 8,2%) and dysodontiasis of third molar (2 lesions, 0,8%). The most frequent stage of MRONJ was stage II (137 subjects, 53,5%), whereas stage I (37 subject, 14,5%), and stage III (82 subject, 32%) were less common. 175 patients show complete healing after surgical treatment. However, sixty-eight (22,7%) did not completely recuperate and required further surgical management to treat the relapsed lesion. Stratification indicated 94.3% total disease resolution for all stage I lesions, 78.9% of improvement for stage II and 51.7% for stage III.
Conclusion: Our data suggest that patients with MRONJ lesions may benefit from local surgical treatment. Patients with severe MRONJ stage seem to present an increased risk of surgical treatment failure.

Treatment of the esophitic lesions of the oral cavity using diode laser: possibilities and limits

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Introduction The esophitic lesions of the oral cavity can be divided into reactive lesions and into neoplastic lesions. The therapy of these lesions consists of surgical excision, which can be performed either by traditional surgery or laser surgery.
Methods Among the various laser devices used in odontostomatology, the diode laser is one of the most widely used, both for its functions and for its manageability and ergonomics. The diode laser is characterized by a solid semiconductor with two usable wavelengths, one between 808 nm and 980 nm and one of 445 nm. These wavelenghts give an absorption affinity for hemoglobin and melanin, therefore diode laser is specifically indicated in the treatment of soft and more pigmented tissues. The treatment of esophitic lesions consists of surgical excision. The diode laser can be used in the excision of these lesions through two different techniques depending on the type of lesion: the mucosal preservation technique and circumferential incision. It is not always appropriate to use laser surgery. It is important to know how to discriminate the various clinical conditions, such as histology, extension of the lesion and the involvement of the bone component to choose for the most appropriate surgical approach, which can also consist of traditional surgery.

Results The mucosal preservation technique can be used only for those benign capsule lesions that can be enucleated by the surrounding tissue, as well as the lipoma, mucocele and ranula. A linear incision is made at the tense point of the mucosa overlying the lesion, then it is enucleated with the aid of a Metzembaum scraper or scissors. The phototermocoagulative capacity of laser can be used to promote haemostasis. The circumferential incision technique is used for all lesions characterized by corrugated surface, such as squamous papilloma, condyloma acuminate and Heck's disease, and for those non-capsule benign lesions, such as fibroma, pleomorphic adenoma, inflammatory hyperplasia and pyogenic granuloma. This technique reduces operative time and bleeding, it also allows a second intention healing and better cicatrization thanks to the activation of fibroblasts. Using a laser surgery there is no need of suture and it guarantees a postoperative course without edema and pain compared to traditional surgery. These considerations make the intervention more comfortable for the patient. In cases of malignant lesions, instead, it is more appropriate to use cold-blade surgery to promote a better histological reading of the surgical margins, which would otherwise be altered by the photothermal effect. In the case of involvement of the bone component, as in the ossifying fibroma, it is not convenient to use a diode laser, which has no affinity for the bone tissue. Rather than using two different laser devices (the Erbium laser, in fact, would be the most suitable for an intervention on the bone tissue), the use of traditional surgery is more ergonomic for the operator and more comfortable for the patient.
Conclusions A correct clinical and histological diagnosis allows to discriminate in which cases laser treatment is possible from those that need a different approach. In fact it is important to remember that laser treatment represents an innovative method that requires experience and specialized training.

Effect of implant-supported full-mouth prosthetic rehabilitation on the aesthetics of perioral tissues

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Backgound: The importance of aesthetics has grown year over year in the last decades. This is clear also in the clinical experience where patients ask clinicians new solutions to solve their aesthetics problems coming from the natural skin aging, like the onset of wrinkles. The objective is to improve the aesthetics compatibility thanks to a correct oral rehabilitation. The skin aging is a result of dynamic processes characterized by the degeneration of both soft tissues and bone structure. We observed how perioral wrinkles can be mitigated with an implant-supported full-mouth prosthetics. Skin aging is a gradual, natural process classified as intrinsic or extrinsic, and it involves genetic, hormonal, and environmental mechanisms. Degenerative processes involving teeth (tooth loss, poorly executed prosthetic rehabilitation, neglecof oral hygiene, etc) contribute to a more aged facial appearence. In fact, a smiling face without a complete denture appears more aged than one with a complete set of teeth, both subjectively and objectively regarding the facial structures. In addition, the condition of edentulism is associated with a well-known progressive centripetal resorption of the alveolar process of the maxillary bones, with reduced support and stretching of the perioral tissues exerted by the teeth and underlying bone, and consequent worsening of wrinkles and lip volume.
Objective: To compare the entity of perioral wrinkles before and after the prosthetic rehabilitation, qualitatively and quantitatively
Material and methods: This prospective cohort, single-center trial involved subjects who underwent rehabilitation of the upper and lower jaws with implant-retained dentures. Two full-face photographs for each patient were obtained: one with and one without the dentures. The pictures were obtained in frontal face position, with mouth in rest position. For each case examined, perioral wrinkles and lip volume were evaluated by comparing photos at the beginning and at the end of the study. The evaluation of perioral wrinkles was based on the scale proposed by Lamperle et al., in which a score from 0 to 5 is assigned according to the increasing severity of the wrinkles. Lip volume was graded according to the lip fullness scale, in which a score from 0 (very thin) to 4 (full) is assigned. The patients were photographed before and after the rehabilitation program to compare the aesthetics of the perioral soft tissues with and without the final prosthesis in place. In this study, the following parameters were analyzed: upper and lower radial lip lines, marionette lines, upper and lower lip fullness, naso-labial folds, corner of the mouth lines, and labiomental crease. Statistical analysis was performed using Wilcoxon test, with $P < 0,05$ considered significant.
Results: 31 patients were rehabilitated with implant-retained dentures (15 male, mean ± standard deviation 62,13 ± 8,69 anni, range 47-77 anni). By comparing pictures, the difference in quality and number of perioral wrinkles was evident for upper lip wrinkles, lower lip wrinkles and marionette lines. Statistically significant results were recorded also for lower lip fullness and upper lip fullness. No statistically significant results were recorded for nasolabial fold,

oral commissure and labiomental
Conclusions: Mandibular e maxillar rehabilitation with implant-retained dentures in complete edentulous patients improves the perioral aesthetics.

Clinical-experimental and comparative study on the use of diode and CO_2 lasers in frenectomy in paediatric patients

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Introduction: The frenulums are mucosal folds located at the upper and lower vestibules and on the lingual underside. They are considered pathological when due to alterations in length, volume, consistency, insertion and/or quantity of adherent gingiva determine orthodontic, periodontal, logopaedic and functional pathological conditions. The lower median frenulum, at the level of the inferior frontal sector, with an altered insertion and / or consistency may cause gingival recessions, i.e. apical migrations of the periodontal attachment with respect to the amelo-cement junction causing a condition known as pull-syndrome. The only physiological recovery from a gingival recession is called: creeping-attachment, i.e. a coronal migration of the free gingival margin. The following study compares the healing in cases of pull-syndrome treated by CO_2 laser frenulectomy and laser diodes frenulectomy, evaluating and comparing the amount creeping attachment.
Materials and methods: 26 patients between 7 and 12 years old affected by pull-syndrome were included and randomly divided into: group A (n=13), treated with diode laser, 2.5W power, continuous mode, and group B (n=13), subjected to frenulectomy with CO_2 laser, 4.5W power, super-pulsed mode, 80HZ frequency. They were evaluated for: distance in millimetres from the incisal edge of the lower incisor involved up to the free gingiva before (T0) and at the end (T1) of the laser treatment, post-operative pain, need for medication, following diet and post-operative swelling. Clinical follow-ups were performed at 7 days, one month, three months and six months. A 0.2% chlorhexidine spray mouthwash was to be applied during the first week.
Results: The results concerning the evaluation of the six-month recession level showed a clinical efficacy of the laser treatment that has been stable over time. It can be said that the clinical variability of the degree of healing is strictly linked to the maintenance of a correct oral hygiene by the patient. The diode laser has proved to be better in controlling the bleeding in the operative phase; however, the CO_2 laser promotes faster healing of the tissues: this effect could be influenced by the "non-contact" mode with which it is used. In addition, the CO_2 laser also presents a smoother post-operative course, with less incidence of pain and swelling. The increased frequency of analgesics taken by patients treated with diode lasers can be sought in the ability to achieve a greater depth of penetration of the laser beam.
Conclusions: Between the two lasers used in the study, the differences in terms of clinical efficacy appear minimal. However, this study shows that the CO_2 laser has superior advantages: better post-operative comfort, greater healing speed, perfect visibility of the operative field. Regarding most patients whose recessions have remained unchanged, it can be concluded that laser frenulectomy may be considered a valid interceptive aid, especially in subjects with a thin periodontal biotype. However, this operation does not appear to be resolving in most cases, although a certain degree of recovery of the marginal gingiva cannot be excluded in some subjects with good or optimal hygienic conditions.

Is Computer-guided flapless implant surgery an operator dependent procedure?

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Computer-guided flapless implant surgery has many advantages for both patients and professionals and allows surgeons to adopt minimally invasive, less painful and briefer surgical interventions due to an accurate preliminary study of the surgical case. The preliminary study, in fact, allows orthodontic surgeons to answer, before beginning the intervention, a number of surgical and prosthetic issues that will need to be faced. The preliminary study adopts 3D x-ray images with the aid of radiographic templates, specific computer software and CAD-CAM surgical masks that guide the bone placement of implants without having to open a flap. Accordingly, surgeons can adopt a computer-guided flapless implant intervention with less discomfort in patients.
Once the professional has determined the best position for the implants and pins that stabilize the radiographic template during the orthodontic surgery, the intervention can be planned using a virtual elaboration and 3d print and consequent insertion of the buccal guide.
The aim of this study was to present a clinical case

study and demonstrate the precision and reliability of the surgical protocol, independently of the operator. Indeed, the study aimed to evaluate how operator dependent was the protocol and to underline the importance of the initial intervention planning.
A 64 year old adult, non-smoker, with a negative anamnesis, completely edentulous for at least six months and prostheses wearer of underwent the surgical procedure. The patient underwent CBCT with radiographic templates prepared using his own prostheses and subsequent planning of the Computer-guided implant surgery. In this manner, we were able to develop precise surgical template for each of the dental arches.
Regarding the surgical intervention, the superior dental arch was assigned to an expert surgeon, implantologist with 34 years of experience, while the inferior dental arch was assigned to a new graduate surgeon.
The patient was treated post-surgery with non-steroid anti-inflammatories for 3 days and antibiotics, without administering corticosteroid medication. The patient referred no pain or general post-operation discomfort at follow-up at 3 and 7 days.
We carried out a low dosage CBCT at 3 months to radiographically evaluate the concordance between the protocol and the effective placement of the implant
Following the necessary measures, and keeping in mind the precision error of the procedure, we found an average displacement of the implant position of 0.2 mm compared to the protocol in both dental arches (SD 0.215 for the upper dental arch and SD 0.192 for the lower dental arch). Values ranged from 0.47mm to 0.02mm. We found no significant differences between the intervention carried out by the expert hand and the intervention carried out by the new graduate.
In conclusion, computer-guided flapless implant surgery can be considered a non-operator dependent procedure, except for the planning phase, during which the presence of an expert operator is always advisable. Moreover, the possibility of carrying-out an intervention without having to open a flapless guarantees fewer complications post-intervention.

Postoperative pain and surgical time comparison using piezoelectric or conventional implant site preparation systems

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Aim: Since its introduction, piezoelectric bone surgery has established an important role in oral surgery and dental implantology. Piezoelectric surgery is efficient at preparing implant site osteotomies due to its selective cut, micro-streaming and cavitational effects, which preserve and maintain the soft tissue. Several advantages have been outlined in patient's symptoms, both in terms of improved intraoperative comfort and postoperative course. The aim of this study was to compare implant insertion procedures using piezoelectric surgery or conventional drilling. Intra- and postoperative pain, implant site preparation time and learning curve were evaluated.
Methods: A total of 13 (7 women/6 men, aged between 45 and 75 years) partially edentulous patients were rehabilitated with 40 titanium implants (n=20). Implant therapy consisted in the inclusion of at least two conical implants between 3.8 and 4.5 mm diameter with a maximum torque of 35 Ncm in randomised bilateral edentulous areas. First sites were prepared with piezodevice (test sites) and the contralateral ones with conventional drilling (control sites). Surgery was always performed by the same operator. Implant site preparation timing was measured from flap elevation until implant inclusion. Patients recorded their subjective intraoperative and postoperative pain daily for 7 days and at 15th day after surgery using a Visual Analog Scale (VAS).
Results: Patients treated with piezoelectric technique presented a lower VAS, minor swelling and less recovery time compared to the conventional technique. No operative complications were reported and the implant survival rate at 1 year was 100% for both the techniques. VAS significant differences were found for the test sites as intraoperative symptoms ($p = 0.009$), after 1 day ($p = 0.010$), 2 days ($p = 0.016$), 3 days ($p = 0.017$), 5 days ($p = 0.015$), 6 days ($p = 0.018$) and 7 days ($p = 0.039$). The average surgical times of implant sites preparation were: 10 ($\pm$ 1.4) minutes for the test sites, and 7.00 ($\pm$ 1.7) minutes for the control sites. In 69.2% of cases (9 of 13 patients) the operator has found advantages in terms of better access to the posterior sites, enhanced intraoperative visibility and insertion axis maintenance using the piezoelectric technique. The learning curve with piezodevice has seen a decrease in timing (rho = -0827, $p = 0.001$) from the first to the last intervention; whereas no significant difference was evaluated with the traditional method.
Conclusion: Compared to traditional methods, piezoelectric technique enables optimal healing because it reduces the postsurgery swelling and discomfort. The average time necessary for the piezoelectric implant site osteotomy was approximately 3 minutes more than conventional technique.

Activation and platelets degranulation in the PRP (Platelet-Rich Plasma): cytofluorimetric

evaluation and kinetic analysis of TGF-β1 release through immunotest (ELISA)

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Aim: The Platelet-Rich Plasma is a blood compound with high platelets density. By using immunotest ELISA this study evaluates the activation and degranulation of the platelets during stocking procedure of the PRP, considering the role of the TGF-β1, a growth factor of the tissues, that is found in the α-platelet granules. Finally, to gain a better understanding of the quality and the quantity activationes state these datas are compared to the ones obtained with the cytofluorimetric analysis of the activation state of the platelets in the PRP.
Methods: This study focuses on a sample of 19 patients (21-71 years-old), with no major deseases and waiting for an invasive oral-surgery. 24h before surgery each patient was sampled for 400ml of venous blood (+sodium citrate). Subsequently, the obtained blood sack was centrifugated to divided the erythrocytes from the plasma (900RPM, 13min, at 20°C). The plasma was then centrifugated (3300RPM, 15min) to respectively obtain the PRP and the PPP (Platelet-Poor Plasma). Thus, PRP was then shaked to prevent platelet aggregation. Instead, from the PPP were took the autologous-thrombin and cryoprecipitate. Finally, PRP (5ml), cryoprecipitate (2ml), calcium-gluconate (1ml) and autologous-thrombin (2ml) were mixed in 10ml syringe; after gelification the compound was placed in the chirurgic site. Through test-ELISA were calculated the pg of TGF-β1 into PRP and into compound after the gelification.
Results: The results for the TGF-β1 obtained through test-ELISA are the following:
- For the diluited solution SN (1:300) is has been extimated a release after 1 hour (h) of 22366.50 pgTGFβ/ml, after 6h of 30527.50 pgTGFβ/ml, after 24h of 19138.88 pgTGFβ/ml and in post gel of 11791.63 pgTGFβ/ml.
- For the diluited solution (1:150) is has been extimated a release after 1h of 15712.33 pgTGFβ/ml, after 6h of 26850.00 pgTGFβ/ml, after 24h of 29450.00 pgTGFβ/ml and in post gel of 15321,43 pgTGFβ/ml.

The TGF-β1 percentage released has been calculated using two formulas: (SN/SN+TOT) e (SN/TOT). The results using first formula were respectively after 1h of 7.6%, after 6h of 8.6% and after 24h of 20.5%. The results using second formula were after 1h of 8.4%, after 6h of 14.8% and after 24h of 19.9%.
These results have been matched with the ones obtained through cytofluorimetric analysis of the samples marked with monoclonal antibodies. They reveal the following datas: for CD 42 the percentage of exposure are after 1h of 79.1%, after 6h of 90.2% after 24h of 87.6% and in post gel of 11.9%; for CD 62p is after 1h of 29.1%, after 6h of 32.4%, after 24h of 52.7%; for CD 63 is after 1h of 64.5%, after 6h of 67.1%, after 24h of 80.3%.
Conclusion: From the cytofluorimetric analysis of the datas we state the procedure to produce PRP it is satisfying since the gel has demostrated a high platelets density. When the activation and degranulation of the platelets rise (cytofluorimetric), the release of the TGF-β1 increases (ELISA), but only 20% of the total present in the platelets has been effectivly released in the first 24h. This implies that a great quantity of growth factors remains in the paltelets and is available in the chirurgic-site. Untill the 24h it has been observed an increasing of release of the TGF-β1, with a drop in the quantity once the gel was formed, bringing the levels close to the first hour.

Kissing molars: literature review

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Purpose: The definition of "kissing molars (KMs)" refers a condition in which two or more permanent mandibular impacted molars are in a tight contact between the respective occlusal surfaces inside the same follicle and the roots oriented in opposite directions. It is a particular anatomical condition that may imply some surgical issues during the surgical extraction of the teeth. The present review shows the current clinical features and the treatment options.
Materials and methods: PubMed database was searched to identify studies addressing kissing molars; literature review considered paper published until August 31st 2018, with no time or language limits. Adjunctive papers were obtained from the reference of the retrieved studies.
Results: The literature overall reports 61 KM cases in 49 patients (37 unilateral, 12 bilateral), patients' age ranging from 10 to 56 years with a mean age of 27.8. The female/male ratio was 1 as we identified 24 males and 24 females. In 1 case gender was not specified. The most involved teeth were the second and third molars in 33 cases (Gulses' II class), then third and fourth molars 14 times (Gulses' III class), first and second molars 7 (Gulses' I class). In 6 cases the manuscripts did not provide enough details able to identify the

involved teeth and in 1 case all the three permanent molars were involved. Symptoms were reported in a subgroup of 20 patients: most often they reported pain (10 cases), sometimes associated to swelling (7 cases). Pericoronitis or infection were infrequently observed: 1 cases and 2 cases respectively. Conversely 19 patients had no symptoms. In almost every case diagnosis was made by panoramic radiograph and in some cases computed tomography was taken. Medical history was negative in 20 cases, in 22 not specified; 2 patients had mental retardation, 1 Down's syndrome and 4 were affected by mucopolysaccharidosis, a syndromic disease of the connective tissue that some authors linked with a variety of maxilo-facial conditions including KM. Majority of the cases were treated with surgical extraction of the teeth: 37; 9 under general anaesthesia and 19 under local anaesthesia. In cases surgery was not indicated. Orthodontic treatment was performed only in 1 case. In 4 cases only follow up was done. Two patients refused the treatment option while in 6 nothing is said about the treatment. Surgical extractions leaded to temporary paraesthesia of the inferior alveolar nerve that resolved after 3-6 months in 4 cases. Histological examination was carried out in 25 cases: the final diagnosis was 9 times dentigerous cyst, 2 hyperplastic dental follicle, 2 granulomatous degeneration of the follicle, while 12 times there was no evidence of disease.

Conclusions: The review shows that the KM condition has no connection with gender nor with age. As this condition is mostly asymptomatic, the diagnosis is mainly due to occasional findings in the context of imaging performed to plan dental treatments. Surgical extraction is the most often performed treatment. Of note in a high number of cases (22.9%) there is a fourth molar involved in this condition.

Implant-prosthetic rehabilitation in HIV-positive patients according to the "all-on-four" technique: a prospective longitudinal study

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Aim: The aim of the present study was to evaluate the survival rate of "All-on-four" rehabilitation in HIV-positive patients, treated at San Luigi Center for Infectious Diseases, I.R.C.C.S. San Raffaele Hospital, Milan, Italy.

Methods: All the patients included in the study showed a good oral hygiene and healthy clinical perio-dontal parameters. Patients were completely edentulous or with a severely compromised natural denti-tion, as a consequence of deep caries, gingivitis and periodontitis, and required implant prosthetic re-storation of one or both the jaws. Hopeless teeth were extracted and post-extraction immediate im-plants placement was performed right after. Each patient received at least one fixed full-arch maxillary rehabilitation. Four implants were placed in each jaw according to the "All on four" concept treatment (2 most anterior placed axially, 2 posterior tilted implants to minimize the cantiliver lenght). Immediate loading protocol was achieved in order to obtain immediate function and aesthetic on the same day of the surgery. Implant insertion was considered with two-year follow up; radiographic assessment of peri-implant bone level and clinical parameters were measured at 6 (T1), 12 (T2), 18 (T3) and 24 (T4) months from implant placement.

Results: A total amount of 148 implants were placed in 28 patients and 37 full arch rehabilitations were performed. 9 patients received rehabilitation of both jaws, 3 patients were rehabilitated only in the mandible and 16 patients were rehabilitated in the upper jaw. Implant survival rate was 92,57%. Survival criteria for implant were presence of implant stability, ab-sence of radiolucent zone around the implants, suggesting perimplantites, no mucosal suppuration, and no pain. Implants failure occurred in five patients, 6 months after the immediate loading. Two patients lost all four implants while the other three patients lost only one implant, with a total amount of 11 implants failed. All implants were re-placed at a later time. Mean marginal bone levels (MBL) were recorded at 6, 12, 18 and 24 months. The mean MBL in axial implants was 1.01 +/- 0.81 mm at 6 months, 1.17 +/- 0.43 at 12 months, 1.12 +/- 0.54 at 18 months and 1.22 +/- 0.47 at 24 months; the mean MBL in tilted implants was 1.23 +/- 0.32 at 6 months, 1.31 +/- 0.21 mm at 12 months, 1.27 +/- 0.33 mm at 18 months and 1.35 +/- 0.25 at 24 months. Not statistically significant differences were found between axial and titled implants over time.

Conclusion: Within its limitations, this report shows as the "All on four" treatment concept represents a predictable procedure for the rehabilitation of completely edentulous jaws, in immunocompromised but immunologically stable patients, showing the advantages of both the immediate loading, which al-lows immediate function and aesthetic, and the full arch fixed prosthetic restoration, with a higher de-gree of patient satisfaction compared to removal prostheses. However there is a lack of long-term data

in the literature and there is no doubt that more studies are needed to reach definitive results and clinical based evidence.

Comparison between two different implant surfaces in HIV positive patients: a monocentric randomized clinical trial

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Aim: The aim of this study is to compare the clinical and radiological outcomes of implants with different surface roughness in HIV controlled patients.
Materials and Methods: Partially or completely edentulous HIV patients showing adherence to antiretroviral drug regimen and good oral hygiene that could benefit from implant prosthetic restorations were enrolled in the present study. Each patient received at least one dental implant and two different types of implant surfaces were compared: one group of implants had a higher surface roughness (Microrough surface MRS) and the other one was electrochemically treated, with a lower surface roughness (Full Contact Covering Surface FCC). The surgeon was blinded to the type of implant surface used. Depending on patient requirements, single implants or full arch rehabilitations, immediately loaded according to the All on four protocol, were performed. Marginal bone loss (MBLC), implant and prosthetic failure, biological and mechanical complications, serological levels (CD4 cell count, CD4/CD8 ratio and HIV-RNA) were recorded at 6 (T2) and 12 (T3) months after implant insertion. Survival criteria for implant were presence of implant stability, absence of radiolucent zone around the implants, no mucosal suppuration, and no pain. One year follow-up after implant insertion was considered.
Results: Implants were placed in 62 patients and the overall number of fixture was 207. Twenty-six "All on four" complete-arch rehabilitations (104 fixtures) and 103 single implants were achieved. Low incidence of complications and high survival rates with good Marginal Bone Level (MBL) outcome were recorded after one year follow up. Mean marginal bone levels measured at T2 were 0.53 ± 0.29 mm for FCC implant surface and 0.48 ± 0.24 mm for MRS implant surface and at T3 were 0.90 ± 0.33 mm for FCC implant surface and 0.85 ± 0.28 mm for MRS implant surface. Not statistically significant differences were found between the two different implant surfaces (P>0.05). Implant failure occurred in 6 patients (9 fixtures out of 207): four patients developed early implant failure due to primary infection and failure in the osseointegration process; the other two lost their implants due to perimplantitis. The implant survival rate was 97,8% for FCC implants and 93,7% for MRS implants. In all cases an absence of fractures of the acrylic resin superstructure was found.
Conclusion: Within the limitations of the present study, due to the short follow-up and the number of implants, low roughness implant surface seems to be less susceptible to primary infection and perimplantitis, in immunocompromised but immunologically stable patients, compared to microrough surface.

Cryosurgery: a minimally invasive approach for the treatment of low-risk oral leukoplakia

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The cryosurgery technique is used for removing mucosal lesions obtaining tissue necrosis by rapid freezing. Its use in medicine has been widely cited since the 1960s and, even in oral surgery, is well documented. In fact, the oral cavity allows easy access and is an ideal site for the temperature and humidity of this anatomic region.
This technique is based on the ability of nitrogen to reach temperatures of -196° during evaporation. Thanks to the use of this gas, the probes placed in contact with the mucosa can reach a temperature of -90°; this mechanism causes the freezing of the tissue and its consequent necrosis. From a histological point of view, we observe the formation of intra and extra-cellular ice crystals, followed by an electrolyte imbalance, enzymatic inhibition, and damage to the cell membrane with the final outcome of cell death.
This technique is characterized by a minimal invasiveness associated with a reduced operating time. The procedure permits a bloodless surgical field with good patient compliance. Moreover, even with a secondary intention healing, a reduced incidence of superinfections is observed, a substantial absence of scar retraction and a limited post-operative pain.
On the other hand, cryosurgery shows an important post-operative edema and a secondary intention healing process with longer times when compared to interventions performed with other techniques traditional blade or laser devices. Moreover, especially

when dealing with potentially malignant disorders, the main disadvantage is represented by the lack of the specimen to be submitted to pathological assessment. Furthermore, the surgeon is not able to directly control the depth of the obtained necrosis, neither a pathological assessment of the deep margins can be acquired.
With such premises, cryosurgery represents a potential surgical approach in presence of superficial mucosal lesions where a definitive pathological assessment is not strictly required. For this reason, it is used mainly for the removal of benign lesions. In addition, cryosurgery can be indicated in the management of potentially malignant lesions in some specific clinical conditions, eg in low-risk lesions as defined by previous incisional biopsy.
When compared to other ablative techniques like laser technologies (Erbium or CO_2), cryosurgery is a valid therapeutic option for both ease of use and cost reduction.

Keratoacanthoma of the vermilion. A minimally invasive approach allowed by a correct diagnosis

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Introduction: Keratoacanthoma (KA) is a benign epithelial tumor, characterized by a higher incidence in fair complexion people and it is commonly found on sun-exposed skin. It may affect the vermilion, entering into a differential diagnosis with squamous cell carcinoma (SCC). The defining clinical aspect characteristic of a KA is that it is dome-shaped, surrounded by inflamed skin, and presenting a central crusted and ulcerated surface. A correct diagnosis of KA can be impaired because of its rapidly growing, a clinical aspect resembling SCC and because of pathological features similar to SCC.
Case report: A 56-year-old man came to our observation for the rapid onset, in the previous month, of an exophytic lesion of the right lower vermilion. The local objective examination showed the presence of a 10 x 5 mm mass, with a crusted and partially ulcerated surface in its central part. There was, therefore, an indication to complete the diagnosis by incisional biopsy. The histological examination showed the presence of keratosis with lichenoid infiltrate and verrucous hyperplasia, thus excluding a form of SCC. Therefore, a minimally invasive removal of the mass was planned.
Approximately 3 weeks later, the lesion showed an important increase in volume, with a markedly exophytic growth, with no apparent involvement of the deep tissues.
The histological examination was indicative for the diagnosis of keratoacanthoma, showing an exophytic lesion, with hyperkeratotic and hyperplastic epithelium.
Discussion and conclusions: The clinical provisional diagnosis of KA is based on the clinical features of the lesion, including rapid growth, and must be confirmed by histological examination. In particular, 3 clinical phases have been described in the natural history of KA: growth phase, stationary phase, and involving phase. Such a process, from the onset to spontaneous resolution usually takes 4-6 months and can lead to an atrophic hypopigmented scar.
Given the potential spontaneous regression, some authors prefer monitoring the lesion in order to avoid surgical treatment. However, this approach can be questionable, for both the long time needed to gain the complete resolution with consequent discomfort for the Patient and the potential malignant transformation of KA, although minimum. Therefore, the surgical excision with free margins is considered the gold standard treatment; however, a correct differential diagnosis with SCC is mandatory in order to avoid over-treatment.

Platelet-rich fibrin (prf): applications in dentistry and description of a clinical experience

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Introduction: There are three formulations of plasma rich in growth factors to be used in surgical practice:
Platelet rich plasma (PRP): used as a source of growth factors, with intact platelets to be activated within the injection site;
Platelet-rich fibrin (PRF): essentially used as an adjunctive therapyfor wound healing and as "fibrin glue", where platelets are activated during centrifugation and therefore the fibrin clot is already formed before its positioning. The PRF consists of a complex fibrin matrix polymerized in a structure that incorporates cytokines, totipotent cells and growth factors.
Cryoprecipitate: for topical use or as local adhesive support.
The present study describes the short and long-term biological/clinical effects obtained in oral surgery

thanks to the use of growth factors. It describes benefits on the different tissues in order to improve the healing of the socket, aiming to obtain a complete restitutio ad integrum.

Materials and methods: 14 patients were evaluated, ranging in age from 15 to 86 years (without coagulopathies), who underwent oral surgery procedures using PRF(sagittal corticotomies, palatal expansion, cystectomies, sinus lift and dental extractions). Peripheral venous blood sampling (glass tubes of class 2a or higher, 9ml) was performed at the time of the surgical procedure.

The samples were subjected to centrifugation at different speeds in order to observe any variations in the final product. Centrifugations were performed at 2700 rpm x 12 'and at 1500 rpm x 14'. A part of the blood taken was used for:

- haemochromocytometric evaluation of the supernatant to evaluate the residual cellularity
- histological evaluation of the obtained clot

For the evaluation of healing, each case was observed after 7-10 or 15 days, 2 and 6 months after surgery. In addition, a histological evaluation was performed on tissue taken from the surgical site 6 months after surgery.

Results: The haemochromocytometric evaluations revealed:

1) Increased recruitment of platelets in the blood clot set at 2700rpm x 12 '(+ 3%).
2) Greater recruitment of mononuclear cells in the clot prepared at 1500rpm x 14 '(+ 3%).

The histological measurements of the coagulation show that the two centrifugation protocols lead to obtain a structure of superimposable fibrin filaments. From a clinical point of view, the coagulum obtained at 2700 rpm showed greater compactness with better intraoperative management. No post-surgical complications of haemorrhagic or infectious type were recorded. At the first clinical check, the wound was completely closed in all cases (except one), with slight or absent signs of inflammation. Histological evaluations of the biopsy sampling reveal the presence of residual bone surrounded by newly formed bone and connective tissue. No bone resorption or inflammatory reaction was found.

Conclusion PRF belongs to a new generation of platelet concentrates; its ability to promote healing derives from the biological activity of fibrin. Its slow polymerization gives a physiological architecture particularly favorable to promote cell migration and to support the healing process. A correct selection of the centrifugation protocol is important as it can influence both the properties of the clot and an adequate clinical handling.

Implants placed in fresh versus healed sockets in molar site: a prospective longitudinal study with 1-year follow-up

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Aim: The aim of this prospective longitudinal study was to compare survival of implants placed in post-extraction molar site with implants placed in healed molar site. Over the past 20 years, the use of dental implants has become an established method to support and retain fixed posterior prostheses. Stable and predictable aesthetic and functional results can be achieved with different surgical and prosthetic management techniques of the hard and soft tissue around implant restorations. In both rehabilitations was used a new conical connection implant with tapered morphology and a double cone shaped innovative prosthetic abutment connection (CSR-DAT implant system, Sweden e Martina, Padova, Italy).

Methods: The study was conducted at the Department of Dentistry at San Raffaele Hospital, Milan, Italy from April 2016 to June 2017. All patients needed rehabilitation of single molar site were recruited into the study and randomly divided into two groups. In the first group all implants were placed in post-extraction site and in second group in healed site. All implants were loaded after 3 months from surgery. A new conical connection implant was used for this study. Macromorphology present three apical flute shapes that increase primary stability. Radiographic bone level change was measured on the periapical radiographs. A blinded examiner made the bone height measurements. Image analysis software (Digora for Windows 2.1; Soredex, Milwaukee, WI) was used to measure the distance between the implant platform and the most coronal level of the bone deemed to be in contact with the implant surface. Periodical radiographical and clinical follow-up were performed at 3, 6, 12 months. Statistical analysis evaluated: keratinized mucosa (KM), bleeding index (mBI), plaque index (mPI) and marginal bone loss (MBL).

Results: 50 implants were placed in 50 patients. Overall at 12-month, a survival rate of 96.0% was reported. Only one implant failed in both groups. Adequate wound healing and soft tissue adaptation were detected. At 12-month follow-up a mean marginal bone loss of 0.62 ± 0.19 mm for post-extractive group, for healed site group a value of 0.38 ± 0.20 mm was found. Not statistically significant differences between groups were measured (P>0.05).

Conclusions: This new implant with innovative macro e micro morphology showed successfully functional and aesthetics results in both groups. Nonetheless,

not-significant differences were detected between groups.

Medication Related Osteonecrosis of the Jaw: a new mini-invasive approach performed with Erbium YAG laser and Auto-Fluorescence guided

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Background: Medication-related osteonecrosis of the jaws (MRONJ) is a well-known adverse side effect of several drug therapy, including bisphosponates (BPs). Success rates following surgical removal of necrotic bone are the highest. Particularly, results obtained with Er:YAG laser-assisted surgical approaches are significantly better than those obtained through traditional surgery. The precise identification of necrotic bone margins during osteonecrosis removal can be very difficult and it is usually based on subjective parameters such as bleeding, colour and texture of the bone. Recently, the use of endogenous Auto-Fluorescence (AF) of the bone as a guide to visualize necrotic bone during surgical debridement/resection has been proposed. The aim of this study is to investigate the correlation between AF degree and histopathological features of 56 specimens of bone tissue.
Materials and Methods: Twenty-two patients (16 females; 6 males) affected by MRONJ were treated with a surgical technique guided by AF and supported by the use of Er:YAG laser. Diagnosis of MRONJ was performed on the basis of clinical evaluation and radiographical examinations. Antibiotic therapy with amoxicillin (2 grams per day) and metronidazole (1 gram per day) was administrated starting 3 days before up to 3 weeks after intervention. No preoperative tetracycline labelling was performed in any patients. After bone exposure through mucoperiosteal flap, the VELscopeTM (LED Medical Diagnostics Inc., Barnaby, Canada) system was used to induce and visualize bone AF. Complete resection of hypo-fluorescent bone was performed through Lindemann bur. After removal of necrotic bone block, AF visualization was used to guide the removal of further possibly present necrotic bone. According to the AF status obtained after osteotomy, Er:YAG laser (Fidelis Plus®, Fotona - Slovenia) (Parameters: 300 mJ , 30 Hz, Fluence: 60 J/cm2) was used for the vaporization of further necrotic bone, up to the detection of strongly hyper-fluorescent bone. Small samples of hyper-fluorescent bone were collected in the surrounding area. The histological pattern of each bone samples was analyzed and correlated with the degree of fluorescence. Categorical variables were analyzed with the Pearson square chi test or, when indicated, with the exact Fischer method. An alpha-type error of less than 5% was considered significant. Statistical analysis was performed with the OpenEpi software (Open Source Epidemiologic Statistics for Public Health, 3.01 Version).
Results: Fifty-six samples of bone tissue were collected and analyzed from the 22 patients. Thirty-five out of 56 samples (62.5%) resulted hypo-fluorescent, whereas 21 out of 56 samples (37.5%) resulted hyper-fluorescent. Histopathological analysis of the 35 hypo-fluorescent samples revealed in 100% of cases presence of necrotic bone tissue. Out of 21 hyper-fluorescent specimens, the 86% (18) resulted in normo-structured and vital bone, whereas in 14% (3) medullary bone tissue with an area of chronic osteomyelitis was detected.
Conclusion: The association of the Er:YAG laser and the AF is highly useful in removing additional minimal necrotic bone after osteoplasty. It is possible to act through laser evaporation in the areas where non- or hypo-fluorescence has been displayed.

Leukoplakia and Lichen Planus as oral mucosal lesions potentially evolutive in neoplastic sense

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Background: Oral tumors are one of the ten most common cancers, with an incidence of 4% of all cancers in man and 2% in women, with an increasing number of cases per year. Early treatment is the key of clinical treatment for this condition. Because of this reason, it is important to identify and to know how to recognize clinical situations that more than others can evolve in a neoplastic sense. We have considered leukoplakia and lichen planus. Oral Lichen Planus and Leukoplakia are two precancerous lesions of great relevance in oral pathology.
Aim: To know epidemiology, risk factors, clinical presentation and probability of neoplastic evolution of leukoplakia and lichen planus is essential for the clinician who is dealing with one of these two conditions. It is also essential to know how to treat these clinical conditions.
Materials and methods: A meta-analysis was performed

on 50 patients diagnosed with leukoplakia, lichen planus or oral cancer treated at the UO of Odontostomatology E.O Ospedali Galliera, Genoa from 2008 to 2018.
Results: Leukoplakia is one of the most common white lesions of the oral mucosa and it is observed in about 3% of adult patients with a clear preference for male patients. The risk of neoplastic transformation is around 4-5% for ulcerated verrucous leukoplakia and 1-2% generally for all leukoplakias considering the progression in 10 years; the lesion frequently tends to recur. Another potentially malignant lesion with oral manifestation is lichen planus (OLP). The prevalence in the general population is between 1% and 2%. A semi-annual follow-up program is considered reasonable to monitor the potential malignant development of the OLP. The risk of neoplastic transformation is around 1% in 10 years.
Discussion and conclusions: Oral leukoplakia and oral lichen planus are conditions that have the potential to transform into squamous cell carcinoma, so it is important to recognize clinical conditions such as those object of our work, to know therefore the epidemiology, the risk factors and the possible malignant evolution to treat them at best and above all as early as possible. Treatment of oral leukoplakia, with or without dysplasia, is traditionally represented by surgical excision. Currently, in particular for leukoplakia, the type of surgery preferable is radical surgery (performed as early as possible), traditional or laser, involving healthy tissue (histological certainty) to prevent recurrences; although some authors have effectively tested immunomodulatory therapy (metisoprinol), even after surgical treatment.

Comparison of the main autoimmune bullous diseases affecting the oral cavity: pemphigus and pemphigoid

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Background: Pemphigus and pemphigoid are two distinct types of autoimmune bullous diseases characterized by the presence of antibodies that target adhesion molecules specific to both the epidermis and the oral mucosa. These two diseases are autoantibody-mediated blistering skin diseases. In pemphigus, keratinocytes in epidermis and mucous membranes lose cell-cell adhesion, and in pemphigoid, the basal keratinocytes lose adhesion to the basement membrane. Pemphigus lesions are mediated directly by the autoantibodies, whereas the autoantibodies in pemphigoid fix complement and mediate inflammation. In both diseases, the autoantigens have been cloned and characterized; pemphigus antigens are desmogleins (cell adhesion molecules in desmosomes), and pemphigoid antigens are found in hemidesmosomes (which mediate adhesion to the basement membrane). This knowledge has enabled diagnostic testing for these diseases by enzyme-linked immunosorbent assays and dissection of various pathophysiological mechanisms, including direct inhibition of cell adhesion, antibody-induced internalization of antigen, and cell signaling. Understanding these mechanisms of disease has led to rational targeted therapeutic strategies. Bullous pemphigoid (BP) is the most common type of subepidermal autoimmune bullous diseases. BP characteristically affects the elderly and is seen mainly in patients older than 70 years. While the annual incidence of BP has been estimated to be between 2.4 and 23 cases per million in the general population, it rises exponentially to 190–312 cases per million in individuals older than 80 years. In addition, a growing body of evidence reports a remarkable trend of increased incidence of BP, showing a 1.9- to 4.3-fold rise over the past two decades. This demonstrable increase warrants a higher awareness of the increased risk to develop BP.
Purpose: The aim of our study was to compare two of the main autoimmune bullous diseases affecting the oral cavity: pemphigus and pemphigoid.
Materials and methods: Several biopsies were performed with direct immuno-fluorescence to point out complement C3 on patients with suspected pemphigus and pemphigoid.
Results: Images were produced to point out the differences between the two forms of these autoimmune diseases.
Conclusions: We have succeeded in characterizing the structural differences of the two pathologies in an unequivocal way. This aim was particularly important for us because the treatment of oral mucosal disorders must be based on an early and correct diagnosis. Pemphigus vulgaris (PV) and mucous membrane pemphigoid (MMP) are among the diseases that pose the greatest diagnostic difficulties for dentists, with scores of 7.35 and 8.03, respectively, on a scale from 0-10.

Oral surgery in patient undergoing antithrombotic therapy

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Antithrombotic therapy discontinuation, in patients

undergoing dental surgery, triples the risk of serious adverse cardiovascular events. On the other hand, in such patients, the risk of post-extraction haemorrhagic complications, is significantly greater than in healthy people. The recent introduction of direct oral anticoagulants has led to new clinical scenarios, as the need of drug discontinuation in relation to surgical treatments and clinical characteristics of patients. The aim of the present work is to provide guidelines for the management of patients on anti-aggregating and anticoagulant treatment, as regards both pharmacological and surgical aspects, based on the minimum invasiveness which is the necessary condition to guarantee an extremely low incidence of complications. In order to unchange patient antithrombotic treatment and to balance the thrombo-embolic risk with the hemorrhagic risk, the most appropriate strategy is to divide the therapeutic plan into several operative sessions. If multiple extractions are needed, few appointments allow less extensive vascular bed exposure and guarantee shorter surgical duration in each sessionsince such patients often present co-morbidities, which reduce tollerability to surgery. Is also possible a similar approach as preliminary or alternative treatment for more complex intervention, for exaple the marsupialization of large cystis. As to surgical management few simple precautions allow to minimize bleeding risk. It is important to avoid any flap incision. However, if the flap is really necessary, whenever possible a minimally invasive surgical access allows an appropriate management of local hemostasis. When a buccal flap is essential can be appropriate not to raise it beyond the mucogingival line and to avoid any incision on the lingual side of the jaw, especially in the molar region, to avoid blood diffusion in deep anatomical regions, where the possible extravasation of blood has greater risk of diffusion and where the surgeon has greater difficulties in inspection and access. It is also important the use of local haemostatic materials, suitable for extension and morphology to the surgical wound. In masticatory areas, clot preservation can be ensured by minimal plastic intervention on crestal bone and soft tissues. Protective resin plates or immediate prosthesis made in the pre-operative phase, allow to avoid post-operative traumatism on surgical wound caused by theet on oppisite arch.

Distortion of third molar tilting in panoramic reconstruction: analisis of the geometric component

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Introduction: Removal of the mandibular third molars is the most commonly performed oral surgery, but may have numerous complications. Among those that occur more frequently are pain, root apex fracture, alveolar osteitis but some are particulary serious, like transitory or permanent inferior alveolar nerve injury, lingual nerve injury, temporomandibular joint discomfort, and mandibular fracture. Accurate surgical planning is therefore crucial to reduce the risk of onset of those complications. Panoramic x-rays rapresents the first-level imaging to evaluate third molars prior to their surgical removal, whereas, in more complex cases, evaluation using cone-beam CT (CBCT) can provide additional information. Panoramic x-rays presents some limits, like angular and linear measurements distortion. Distortion has been ascribed to the tomographic movement and to patient malposition as well as to projection geometry, i.e. the distortion caused by flattening of 3D objects to 2D images. While distortion due to tomographic movement theorically can be avoided, geometric distortion can not be avoided and its magnitude is particulary high when the third molar axis presents a substantial bucco-lingual inclination.

Aims: To evaluate the geometric distortion of tilting of mandibular third molars with respect to second molars on panoramic reconstruction.

Material and Methods: Mandibular third molar tilting respect to second molar has been evaluated two-dimensionally on panoramic reconstruction obtained from the patient CBCT scan, and three-dimensionally on the same CBCT scan. All of the CBCT radiographs were taken by the same operator with a Soredex SCANORATM 3D device (Soredex, Helsinki, Finland; Receptor type: CMOS flat panel 124 × 124 mm; fixed anode tube; focal spot 0.5 mm IEC 60336; 85 kV; 4.0–12.5 mA; voxel sizes 0.25 mm; scan time 13 s). CBCT DICOM files were analyzed with Simplant® 17 Pro software (DENTSPLY SIRONA Inc., York, PA). A total of 104 scans were evaluated obtained from patients requiring 3D imaging for surgical planning in presence of risk of lesion to inferior alveolar nerve injury. Panoramic reconstruction obtained from CBCT scan were used instead of panoramic x-rays to avoid bias from tomographic movement and patient malposition. To test the null-hypotesis of absence of difference between two- and three-dimensional angle the Student's t-test were used.

Results: A significative difference was found between two- and three-dimensional angle (mean: -2.3° ± 6.3°), with an absolute error of 3.6° ± 5.7° and a relative error of 10%. Moreover, the difference between two- and three-dimensional angles was higher when the bucco-lingual tilting of the third molar was pronounced.

Conclusions: Although panoramic x-rays represents the most used diagnostic exam and is very useful in the

pre-surgical evaluation of mandibular third molars, oral surgeon must consider that the inclination of the third molar is biased by a not avoidable distortion, and that this distortion can give rise to a wrong assessment of the degree of difficulty of the surgery.

Histological analysis of bone healing following alveolar preservation technique by deproteinised bovine bone covered by a xenogenic collagen matrix

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Introduction: The aim of the present study was to histologically evaluate the new bone formation and the dimensional changes in tissues following two different healing protocols (16 weeks and 32 weeks) using deproteinized bovine bone mineral (DBBM) covered with a collagen matrix (CM) for alveolar ridge preservation in the aesthetic area frontal before implant placement.
Materials and methods: Sixteen patients (mean age 48.2 years), requiring the extraction of a single mono-radiculated tooth in the frontal area were recruited for the study. The surgical protocol was performed with great care to preserve the buccal plate and surrounding soft tissues. Each selected tooth was extracted using a minimally invasive technique. Subsequently, in each patient, the alveolus was filled with DBBM with 10% collagen (Bio-Oss® Collagen; Geistlich Pharma AG, Switzerland). A xenogenic reabsorbable CM (Mucograft®, Geistlich Pharma AG, Switzerland) was subsequently adapted to marginal soft tissues and positioned to cover the DBBM in order to promote primary tissue healing. A resorbable suture was placed on the wound to stabilize the CM and to allow a flap closure without tension. Following the tooth extraction, the vertical distance from the center of the buccal and palatal/lingual alveolar crest (AC) and the cemento-enamel junction (CEJ) of the adjacent teeth that was recorded using a periodontal probe. The buccal-palatal/lingual alveolar width and thickness was measured at the center of both buccal and lingual walls using a caliper. After the surgical procedure was completed, each patient was randomized for evaluation of short-term (16 weeks) or long-term (32 weeks) healing group protocol for subsequent implant placement. Moreover, after the elevation of the flap, a biopsy was obtained useful for histological analysis; therefore, a 4.0 mm diameter implant was placed into the surgical site. A Student t-test was performed for the analysis of dimensional ridge changes and in changes of the histological parameters between the two groups. A value of $p<0.05$ was set as statistically significant.
Results: Regarding the dimensional alveolar ridge variations, no significant difference were found, between groups, in the thickness of the buccal plate (short term 1.09 ± 0.26 mm vs long term 1.15 ± 0 , 31 mm) and in the CEJ-AC buccal distance change (short term 2.38 ± 0.22 mm vs long term 2.49 ± 0.26 mm) and in the palatal/lingual CEJ-AC distance (short term 2, 41 ± 0.31 mm vs long term 2.37 ± 0.24 mm), respectively. Furthermore, there was no significant difference between groups in the buccolingual alveolar thickness ($P = 0.12$). However, the 32-week protocol resulted in a better new bone formation and fewer tissue dimensional changes ($P = 0.01$) compared to the 16-week protocol. The 16-week group presented a vital bone percentage of 35.58% compared to 47.76% of the 32-week group. Regarding the percentage of residual graft, there was no significant difference between groups (short-term= 34.23%, long-term= 25.43%).
Conclusions: This study indicates that there was significantly greater new vital bone formation by a xenograft protocol for the alveolar socket preservation with DBBM plus CM at 32 weeks compared to 16 weeks before dental implant placement.

Conservative surgical treatment of medication-related osteonecrosis of the jaws with Leukocyte-Platelet Rich Fibrin: preliminary results at nine months

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Background: The optimal treatment of Medication related osteonecrosis of the jaw (MRONJ) remains controversial; leading goals of the surgical treatments are to control the infection and the pain and to slow the progression of the disease and, when it is achievable, to remove all the necrotic bone promoting the complete tissues healing. In the latest years, conservative surgical treatments of MRONJ have been proposed and applied also in advanced stage of the disease. Recently, autologous platelet concentrates, such as Leukocyte-Platelet Rich Fibrin (L-PRF), are increasingly applied as a new approach to regenerate tissues in oral surgery as they release high quantities of growth factors, promoting angiogenesis and bone

and mucosal healing, improving the post-surgical wound healing. These properties of L-PRF appear particularly useful in MRONJ surgical therapy, as the lack of vascularization represents one of the major factors on pathogenesis of MRONJ. The aim of this study was to evaluate efficacy and safety of L-PRF in conservative surgical approaches of ONJ in osteometabolic patients.
Methods: Two osteometabolic women were referred to our Sector of Oral Medicine (AUOP "P. Giaccone" of Palermo) for facial swelling; severe pain and lip paresthesia. Both patients were already treated with drugs related to MRONJ; subsequently, a computed tomography scan (CT) was requested to confirm the suspect of MRONJ. Applying the PROMaF protocol (http://www.policlinico.pa.it/portal/index.php?option=displaypage&Itemid=264&top=page&SubMenu=), pre- and post-operative antibiotic systemic treatment was given (ampicillin/sulbactam im and metronidazole per os) as well as the use of chlorexidine mouthwashes and sodium-hyaluronate gel topically. The surgical PROMaF protocol expected: 1) anesthesia without adrenaline; 2) full-thickness mucoperiosteal flap (when needed); 3) curettage of the necrotic bone, by mean of a piezo-surgery device; 4) irrigation with rifamycin sodium; 5) L-PRF application; 6) tension-free suture. Post-operative instructions were given. Follow-up visits were scheduled 10 days after to remove the suture, then at 1,3,6 and 9 months.
Results: Two ostemetabolic patients were 64 and 59 years old respectively. One patient was treated with alendronic acid and was diabetic; the second one was treated with ibandronic acid. The mean cumulative dose of BPs therapy was 15075± 4425mg. The intraoral examinations showed a suppurating mucosal fistula in the left side of the mandible in both patients, associated with swelling, lip paresthesia and pain. The CT scan showed sequestration of necrotic bone and involvement of the inferior alveolar nerve; both lesions were classified as Stage III (SICMF-SIPMO staging system). Ten days after the surgery, the wound showed a central depression covered by granulation tissues; still, the complete mucosal healing was achieved before the next control in both patients. Nine months after surgery, at the last follow-up visit, there were no clinical signs related to ONJ and a slow recovery of nerve function.
Conclusions: The combination of conservative surgical procedures and L-PRF application in MRONJ treatments in osteometabolic patients could offer a practical and useful protocol, avoiding more complex procedures for the clinicians and demanding surgery for the patients. Although with the great limitation of this report, these preliminary results suggest that L-PRF can act as local regulators of wound healing, improving mucosal healing and reducing the surgical time during bone sequestrectomy. More prospective studies are needed to confirm this statement with a larger patients' sample.

Dental autotransplantation for the replacement of lost teeth

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Introduction: The replacement of an irremediably compromised tooth requires an implant rehabilitation or a traditional fixed partial denture. In well-selected cases, a further therapeutic possibility is represented by tooth autotransplantation. Although dental transplants are poorly understood and practiced, the international literature agrees that it is considered the first choice therapy when applicable. The main indication is represented by the cases in which a "sacrificable" donor tooth is available and is compatible with the receiving site. For sacrificable we mean an element whose extraction does not determine a significant biological cost. The advantages of the technique are numerous: use of an autologous element, maintenance of tissue trophism, aesthetic and functional restoration, cost reduction.
Purpose: The aim of the present work was to rertrospectively analyze 20 cases performed from 2003 to 2008 in 19 patients to evaluate their survival rate and success rate with an average follow-up of 10 years. Elements that have not been extracted after transplantation are considered survivors. The elements, even survivors, that have developed any problem in the root have been considered among the failures; the total of the surviving elements that have not developed root pathologies determines the success rate.
Materials and methods: All the re-evaluated patients received a transplant using a third molar as a donor tooth repositioning it in place of a first or a second compromised molar. The donor teeth were impacted or without antagonist; for these reasons they were perfect candidates because their extraction had a reduced biological cost. The procedure was highly recorded according to the dictates of the literature and provided for: avulsion of the lost tooth, avulsion of the donor tooth, adaptation of the receiving alveolus and flexible splinting for 2 weeks. After 15 days the endodontic treatment of the transplanted tooth and the composite restotation of the access cavity were performed.nNo teeth received a prosthetic restorations.
Results: The 19 patients were aged between 25 and 47 years, with an average of 37 years. The cases have a

follow up between 8 and 13 years, with an average of 10.4 years. During follow up, only one element has been lost, setting a success rate of 95%. The failed transplant was due to the alveolitis of the receiving site. One element developed an inflammatory related root resorption that stopped after the endodontic treatment; the tooth is currently functional. The success rate is therefore 90%.
Conclusions: Dental transplantation is an alternative to implant rehabilitation or traditional prosthesis for the replacement of compromised teeth. The results of survival and success are in complete agreement with the most modern literature and confirm that the technique of autotransplantation is reliable when indications and protocols are rigidly followed The values obtained can be overlapped with those of the other therapeutic alternatives, therefore it is possible to conclude that dental transplantation can be contemplated as valid option in the selected cases.

Oral Squamous Cell Carcinoma and potential diagnostic pitfalls: a case report

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Introduction: Oral squamous cell carcinoma (OSCC) is characterized by poor survival with a 5-year survival rate of 55-65%. Early diagnosis remains a fundamental element in order to improve survival and quality of life due to less invasive therapeutic approaches. The first clinical diagnosis is based on oral examination and it must be confirmed by the histopathological diagnosis thanks to one or more incisional biopsy samples. Both these two diagnostic steps may harbor pitfalls which the clinician has to be aware of, in order to successfully manage the diagnostic process.
Case description: A 56-year-old male was referred to the Oral Medicine and Oral Oncology Clinic of the University of Turin by his dentist, because of the onset of an ulcerated lesion on posterior part of the left border of the tongue. Even in absence of potential local causes, the lesion was persistent for more than 10 days and on palpation a significantly firm mass was perceived. Such clinical features lead to a clinical diagnosis suggestive for OSCC, a biopsy was performed for histological examination. The histological report was non-specific because of technical problems occurred in embedding of the tissue samples. For this reason the sample had to be considered inadequate for diagnosis. Therefore, a second biopsy was performed. The pathological report revealed the presence of chronically inflamed papillary and verrucous hyperplasia associated with focal low-grade dysplasia. Considering the clear discrepancy with the clinical suspicion of malignancy, a third biopsy was performed, finally supporting the diagnosis of squamous cell carcinoma. The subsequent clinical staging defined a cT3cN1c OSCC. Surgical treatment was performed including marginal glossectomy and pull-through ipsilateral therapeutic neck dissection (levels I-IV), followed by reconstruction with a free radial flap. On the base of the pathological staging (pT2pN0) no adjuvant therapies were performed and the patient entered a follow-up protocol.
Discussion and conclusion: Potential pitfalls in the diagnostic process of OSCC may arise during the clinical examination, in the surgical sampling of adequate tissue to be submitted for pathological assessment, during technical procedures of embedding and preparation of slides and finally in the pathological assessment. Problems associated with clinical interpretation of oral mucosa lesions are the best known, with many efforts from researchers in order to identify diagnostic aids able to improve the clinical detection and interpretation of oral mucosal lesions. Conversely, Clinicians are usually less aware of potential pitfalls related to the pathological diagnosis. Even if in the literature there are many studies showing that the pathological reports are not free from potential pitfalls leading to false negatives.
This may occur due to problems related to the choice of the biopsy site, to incorrect management of the biopsy sample or finally to the pathological assessment. Clinicians must be aware of all the potential sources of false negatives that can impair the diagnostic process, in order to be able to manage them correctly. Particularly the pathological report must always be critically evaluated on the base of clinical evidences.

Clinical management of malpositioned implant fixtures: a case report and evidence from literature

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Introduction: Complications related to implant surgery may occur in the surgical, post-surgical or prosthetic rehabilitation phases. In the context of surgical complications, these can be caused by implant fixture malposition resulting in iatrogenic damage to adjacent structures such as the maxillary sinus or the inferior alveolar nerve. Moreover, especially in presence of severe bone atrophy, malpositioned fixtures can entail a risk of fracture, with the consequent need

for invasive salvage interventions (ie positioning of osteosynthesis plaques).
Case report: An 81 year-old patient was sent by her physician to our clinic for the presence of an ulcerative lesion with raised margins, not painful, located along the midline of the anterior floor of the mouth. The patient wore complete dentures: the mandibular denture was retained by two fixtures positioned in 3.1 and 4.1 site. The ulcer was standing from about 7-10 days, no healing was observed irrespective of the removal of the lower denture. A biopsy was performed in order to clarify the nature of the lesion. At the same time an orthopantomography was acquired, revealing both a severe mandibular atrophy and malposition for the fixture on the left side. The apex of the fixture passed beyond the cortical bone of the lower margin of the mandible. A CBCT was performed in order to obtain a precise three-dimensional evaluation of the position of the fixture within the bone volumes. The clinical and radiological evaluation showed absence of infection or perimplantitis and the fixture was found to have a good osseointegration. Due to severe mandibular athropy and to a sound osseointegration, the removal of the fixture would have implied a not negligible risk of iatrogenic fracture, therefore no indication was given to the removal of the fixture.
Discussion and conclusion: The risk of mandibular fracture following the positioning of implant fixtures in atrophic mandible is very low when interventions are planned according to previous evaluations of the bone volumes; data from the literature show an incidence not exceeding 0.05% in patients with at least two implants supporting an overdenture. Fractures may occur when the mandibular height is lower than 10 mm (measured at the symphysis level); moreover an incorrect osseointegration can seriously increase the risk of fracture. Perimplantitis, trauma, or removal of the fixture itself (including atraumatic maneuvers) may lead to fractures as long as 1 year after implant positioning; therefore the risk of fracture cannot be neglected when assessing the indication to fixture removal; mainly in presence of marked atrophy. The indication to removal of malpositioned fixtures must be based on a comprehensive assessment of the risk-benefit ratio. The intraoperative occurrence of a mandibular fracture would dramatically change the intervention, requiring an access to the operating room in order to position internal fixation devices with further potential complications. Implant malposition can be a source of complications, but it can certainly be avoided thanks to a correct preoperative evaluation based on clinical and image data assessing the bone volumes.

Implant prosthetic rehabilitation in patients undergoing anticoagulation therapy: a prospective longitudinal study

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Aim: The purpose of this study was to evaluate the frequency and threat of bleeding episodes following dental implant surgery in patients where oral anticoagulant therapy was not temporary altered. The importance of not discontinuing the anticoagulation therapy is essential to minimize morbidity risk for the patient. In fact, there is scientific evidence that embolic complications may occur in case of suspension, change or reduction of the anticoagulant therapy.
Methods: Patients included in this study had to be under oral anticoagulant therapy (WARFARIN) and with international normalized ratio (INR) between 2.5 and 3.5. At least one tooth had to be extracted and replaced through an implant-prosthetic rehabilitation. All patients suffered from controlled cardiovascular disease and were evaluated by the cardiac care unit of San Raffaele Hospital which gave consent to the surgery. Hemorrhagic events were reported for each patient according to a classification that ranged from mild, moderate and severe. A total of 190 teeth were extracted and 112 dental implants (CSR, Sweden & Martina, Due Carrare, Padova, Italy) were positioned in fresh sockets. Immediate prosthetic loading was applied after the surgery. Patients were enrolled in a post-operative care program which included at home instructions and professional oral hygiene sessions. Implant osseointegration was assessed through clinical examinations and crestal bone levels were evaluated with digital intraoral x-rays at 6, 12 and 24 months over time.
Results: Forty-seven patients were enrolled in the study. Intra-operative moderate bleeding occurred in 12 patients. Mild post-operative bleeding reported were 6: four of them within 12 hours and two within 24 hours from the intervention. Nor bleeding required patient hospitalization neither a secondary surgical intervention. Local agents use such as bone wax and collagen sponge application, sterile gauze compression, tranexamic acid mouthwash accomplished to stop all hemorrhagic complications. Follow-up at 2 years revealed a survival rate of 96,43% (four implants lost). Bone levels were stable over time with a mean value 0,78 ± 0,62 mm crestal resorption at 2 years.
Conclusion: At present, there is no evidence in literature about the risk of hemorrhagic events related to dental implants surgery. According to this study, implant surgery can be performed under safety conditions

in anticoagulated patients if a minimally invasive approach, specific implant design, anti-hemorrhagic agents and strict post-operative recommendations are set in place.

Implant survival in diabetic patients: a preliminary study with 1-year follow up

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Aim: Diabetes mellitus is a medical disorder often accompained with wound healing alterations, which may affect osseointegration of dental implants. The use of dental implants in patients with type-1 diabetes mellitus (DM1) remains controversial due to the fact that impairment of bone healing around implants has been reported in literature. This study attempted to determine if DM1 can represent a significant risk factor to the clinical performance of dental implants.
Methods: Adult patients affected by DM1 with a duration greater than 20 years, suffering from partial edentulism (one tooth per arch) and requesting implant treatment were enrolled in this study. Dental implants were placed into single edentulous sites according to manufacturer instructions and a delayed loading protocol was set in place. (Winsix Implant System, Biosafin, Ancona, Italy). Antibiotic prophylaxis was administered to DM1 patients 1 hour prior to the surgery and than continued for 6 days. Implant osseointegration was evaluated through digital intra-oral x-rays and clinical follow-ups at 6 and 12 months from surgery. Professional oral hygiene sessions were planned at 4, 8, and 12 months from surgery. At the same appointment, patients were motivated for at home oral hygiene habits. Single fixed implant-prosthetic rehabilitations were delivered to all patients. Data were analyzed using GraphPad Prism software version 5.00 for windows.
Results: A total of 28 DM1 patients and 28 non-diabetic patients met the inclusion criteria and were selected for the study. At 12 months , a survival rate of 100% was reported for DM1 group, and 100% for non-diabetic control group, showing no statistical differences ($p > 0,05$). At 12 months follow-up, radiographic results showed a mean marginal bone loss of $0,84 \pm 0,45$ mm for DM1 group, while $0,78 \pm 0,33$ mm was recorded in control group, showing no statistical differences ($p > 0,05$). Wound healing was reported without complications in all 28 DM1 patients. Soft tissues around the implant sites developed mild inflammation due to surgical trauma and no infections occurred over time. No prosthetic complications were reported at 12-month follow-up.
Conclusion: The absence of statistical differences between the two groups suggested that the use of a minimally invasive implant system, the antibiotic administration before and after the surgery and a strict post-operative oral hygiene protocol are effective in controlling implant survival in DM1 patients. These findings need to be confirmed by a longer follow-up and with a larger sample size.

Evaluation and predicability of two different techniques: Split-Crest using surgical steel wedges and Split-Crest with immediate implant insertion

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Aim: Various treatment strategies and techniques have been proposed to perform alveolar bone augmentation; the most common of all is the Split-Crest. In order to plane an intervention with crestal expansion technique it is essential to obtain as much information as possible regarding the actual structural characteristics of the bone residue, both qualitatively and quantitatively. It becomes necessary a presurgical study for three-dimensional evaluating regarding the amount and morphology of the residual ridge, the bone quality, and the relationship with the opposing arch and the prosthesis elements programmed. Objective examination and palpation of the edentulous areas, as well as the radiological study represent the most suitable a diagnostic tools for obtaining a complete diagnosis of the bone segment to be expanded. The aim was to investigate the marginal bone stability around dental implants inserted with two different techniques: split crest and Immediate implant Insertion (Group A) and split crest using surgical steel wedges and implant insertion after three months from the first operation (Group B).
Materials and methods: Twenty patients were enrolled in this study. Each patient had an oral edentulous area with Class IV atrophy according to Cawood & Howell. Each patient included in the study was assigned to one of the two intervention protocols by opening a closed envelope containing the intervention group during the surgery, after having separated the two cortices.
Results: They underwent placement of 53 dental implants in edentulous region. Twenty-five dental implants (Group A) were placed after split-crest ridge expansion procedure and immediate loading and twenty-eight dental implants (Group B) were placed after split-crest ridge expansion procedure and the

loading after three months. Crestal bone levels were measured at baseline and at 6 months after the implant placement. For each implant, vertical bone loss was measured: group A recorded 1,871 ± 0.201 mm; the group B 2,026 ± 0,218 mm.
Conclusions: The collected data show encouraging results for the use of the split crest technique associated with implant placement. However, more extensive follow-up studies are needed and other parameters should be evaluated, comparing them, such as for example with the horizontal bone resorption scheme or changes in esthetic outcomes.

Complications of peri-implant mucogingival surgery: a challenging case-report

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Aim: The main goal of the implant rehabilitation in the aesthetic area is patient satisfaction and function. A major concern is the appearance of soft tissue dehiscence in the facial aspect, common finding following implant restorations. To date, international literature shows that periodontal plastic procedures like Coronal Advanced Flap (CAF) with Connective Tissue Grafts (CTG) technique present high predicibility in terms of exposed implant surface coverage. Periodontal plastic procedures are complex, technique-sensitive interventions that require advanced skills and expertise. The aim of the following case is to report a complication after a bilaminar technique in the aesthetic buccal area of an upper central implant.
Materials and methods: A female patient (36 yo) in general health condition came to our attention with a complex history on an implant placed in position #11. After a trauma, she lost her central incisor and received a bone block graft harvested from the mandibular branch. After 6 months, an implant was placed and the prosthetic treatment was completed after 6 months more, without any complication or suppuration. Due to a gingival recession on the facial aspect of the implant, a Coronally Advanced Flap (CAF) with a connective tissue graft (CTG) was executed in Brazil. After 4 weeks, the patient finally came to our attention with bleeding on probing and suppuration on the buccal aspect of the implant. The implant was removed and a post-extractive immediate-loading implant was then placed. After an observational period of 1 month, the buccal suppuration continued. An explorative access flap was then elevated to observe the peri-implant submucosal environment and find the cause of the suppuration. Primary horizontal crestal incision was performed after removing the provisional crown from the implant, extended mesially and distally intrasulcularly in the adjacent teeth, with a papilla preservation flap technique. A vertical incision was then carried out distally to increase the visibility of the operatory field, keeping the incision area away from the highly aesthetic area. A total thickness flap was elevated in order to manage properly the periostium and to significantly improve patient's post-operative course. The presence of sub-connective epithelial tissue was noted within the raised flap. The presence of this tissue highlights the importance of the management of the grafted tissue and the receiving vascular bed. In particular, the grafted connective tissue was not carefully de-epithelialized and so the epithelium proliferated below the submucosal layer. The epithelial pearls were then surgically removed with 15C blade and the flap was repositioned and sutured with 3/0 silk sutures.
Results: After 15 days of follow-up and soft tissue maturation, there was the complete absence of suppuration. Due to the previous surgeries, a soft tissue deficiency was observed.
Conclusion: Periodontal plastic procedure are great solutions to enhance aesthetic outcome and increase ketarinized tissue improving the peri-implant emergency profile. By the way they must be performed in the best way: the management of the connective tissue graft and the preparation of the vascular bed with the de-epithelialization is crucial in order to avoid complications.

Immediate versus delayed loading of post-extraction implants in molar sites: a prospective longitudinal study with 1-year follow-up

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Aim: The aim of this study was to compare the survival rate of immediate loaded post extraction implants versus delayed loaded implants in first molar sites. Each single rehabilitation was carried out through a new conical connection implant.
Methods: The study was conducted at the Department of Dentistry at San Raffaele Hospital, Milan, Italy from February 2016 to January 2017. The present study was based on healthy patients requiring single tooth

rehabilitation in the molar region. They were enrolled and randomly divided in two groups. In the first group patients underwent immediate loading procedures, in the second they underwent delayed placement (3 months after extraction) of dental implants. While, in the second group, a delayed submerged-healing implants protocol was adopted. The implant (CSR, Sweden & Martina, Due Carrare, Padova, Italy) had an internal connection with double taper: the first taper is an internal cone that supports and closes the prosthesis combined with an internal hexagon. This is used for implant screwing and prosthesis repositioning. The second taper is an interaction surface between the prosthetic abutment and the head of the tightening screw, which is conical itself. In immediate loading implants insertion torque was at least 35 N/cm to obtain a suitable primary stability and within 24 hours the definitive abutments were screwed at 23 N/cm. Implants were placed 0.5 mm below the crest. In delayed implants the temporary crowns were placed after 3 months and in each case the definitive prosthetic restoration was performed with a single unit metal-ceramic crown 3 months later. Periapical digital radiographs with parallel long-cone technique and clinical follow-up were performed at 3, 6, 12 months. A statistical analysis was performed to compare outcome measures between immediate and delayed loading groups.

Results: 50 patients received 50 implants (one implant each patient). At 12 months after implants placement, a survival rate of 98.0% was reported (an implant was lost in immediate loading group one month after placement). Adequate wound healing and soft tissue adaptation were detected. At 12-month follow-up a mean marginal bone loss was of 0.53 $\pm$ 0.12 mm for immediate loading group thus a value of 0.42 $\pm$ 0.18 mm was measured for delayed loading group. Indeed, the bone levels remained stable; similar values were reported over time, with no significant differences ($P>0.05$).

Conclusion: When used in immediate extraction and immediate loading, the new conical connection implant showed successfully functional results and satisfied healing of soft and peri-implants tissues. Nonetheless similar patterns of sequential osseointegration were observed in immediate and delayed loading groups. Further studies are needed to evaluate long term follow-up.

Corticotomies as aid to the orthodontic treatment: biological basics, actual applications and possible developments

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Aim: The purpose of this work is to present a literature review about corticotomies/osteotomies associated with orthodontics, including the evolution of corticotomy techniques and current techniques used, with related indications, contraindications and complications.

Discussion: The need for a method that would accelerate the duration of orthodontic treatment was born above all because of the increasing portion of adults who requires to undergo orthodontic treatment for aesthetic purposes, as one of the major disadvantages of traditional orthodontics is precisely the duration of it (on average over one year). Currently there are numerous options in the literature that allow the acceleration of orthodontic timing: the local subministration of chemicals, the "physical" stimulation based on the currents generated by magnets or vibration, photostimulation and surgical association to orthodontic treatment intended as corticotomy or bone distraction. Over the past few decades, the association between orthodontics and surgery has been widely used, known as corticotomy assisted orthodontics (CAO). Several clinical trials have shown a reduction of one-third in treatment time by compared to conventional treatments. To validate these results, numerous histological and clinical studies have been conducted and have shown not only a reduction in time, but also a bone and tissue preservation, as well as a stability of the result. In the surgical world community, from the end of the 1800s to the end of the 1900s there was a predominance of the "mechanistic concept". According to this theory the orthodontic movement was compromised by the physical presence of the alveolar cortex; to speed it up it was therefore necessary to eliminate the cortical by surgical intervention. In this way, very invasive interventions were carried out to perform decortication and "block" movements. Thanks to the evolution of studies in the biological field and to the observations of the Wilcko brothers, the theory of RAP (Regional Accelerating Phenomena) was taken into consideration, which had already been formulated in the orthopedic field twenty years earlier. We have therefore moved on to a "biological concept", centered on bone physiology and on cellular modifications in response to external stimuli. Since then, less and less invasive techniques have been developed, thanks to: the use of instruments other than rotating ones, such as the Piezoelectric handpiece or Erbium laser, the association of corticotomies with orthodontic methods with aligners and the virtual design of templates Surgeries realized with CAD-CAM technique to obtain a computer-guided execution of the techniques.

Conclusions: The research in the dental field of

minimally invasive techniques and the development of new technologies has allowed a rapid evolution of the corticotomic techniques, with increasingly efficient, controlled and predictable methods, involving a global multidisciplinary approach in respect of the patient's physiology and suitable for an optimal aesthetic result.

A basal cell ameloblastoma: conservative surgical approach with the Bichat bulla flap

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Aim: The aim of the present work is to report a rare case of basal cell ameloblastoma treated surgically by setting up a Bichat bulla adipose flap. Furthermore, a systematic review of the literature concerning all cases of basal cell ameloblastoma with the relative relapse rate is reported.
Materials and methods: In 2016, in the Department of Oral and Maxillofacial Surgery of the Vita-Salute San Raffaele University, a female patient, aged 52, presented with an osteolytic lesion in the right maxillary area visible in orthopantomography. Despite the extensive size of the lesion, the patient does not report any symptoms. Once the Cone Beam CT is performed, a large intra - sinus neoformation of about 5 cm of diameter is found. After the signing of the informed consent, the exeresis of the lesion was performed under local anesthesia. A full-thickness mucosal flap from element 1.5 until the tuberos was perfprmed, exposing the neoformation on the anterior wall of the sinus. Exploiting the cleavage plane we proceed to careful enucleaction of the lesion in toto, without including the neighboring implant in position 1.6. Then a pedunculate Bichat bulla flap is placed dislocating it from the space between the masseter muscle and the buccinator up to the element 1.5 and suturing it to the bone and mucosa component, allowing the perfect closure of the oro-antral communication and stabilizing the necessary clot for healing. Then the mucoperiosteal flap covered all was sutured with Vycril 3/0 without tensions. He resigned in antibiotic therapy, FANS and postoperative recommendations. The outcome of the histological examination was found to be basal cell ameloblastoma. A systematic review of the literature of this particular histotype of ameloblastoma was therefore conducted.
Results: Despite the extensive dimensions of the cystic lesion, surgical therapy has maintained a conservative chest, preserving the dental elements and implants, for example contiguous. The patient had a post-operative course in the standard, did not report complications such as infections , gold-antral communications , hemorrhages or sinusitis . It was checked in the clinic after 7 days, 21 days, 3 months, 6 months and 12 months after surgery and no signs or symptoms of recurrence were evident. Regarding the literature review of ten cases of basal cell ameloblastoma reported, nine describe non-conservative interventions of maxillary resection in block or mandibulectomy. Being very poor literature regarding this rare histological type of ameloblastoma was not possible to calculate a rate of recurrence or metastasis reliable.
Conclusions: The clinical and radiographic data of the present clinical case suggest that even very extensive cystic lesions can be successfully treated based on an adequate clinical, radiographic and histopathological diagnosis. The sacrifice of the dental elements or of the adjoining implants must be appropriately avoided. The incidence of recurrence of ameloblastoma after 5 years is 50% so, with regard to the patient treated above, she will be followed for a follow-up protocol every 6 months for at least 10 years in order to intercept any eventual sign of relapse. Therefore, controlled clinical trials with a sufficient number of basal cell ameloblastoma cases will be needed to better understand both the type of surgical approach and the exact way to follow up to be undertaken.

The post-operatory course of the third molars' extraction: the influence of the surgery instruments

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Introduction: Molar extraction is one of the most executed performance in oral surgery and requires a careful evaluation of the cost benefit ratio and a careful planning of the extraction surgery, both for the presence of noble structures adjacent to the third molars and for the problematic post-operative course. Not only the surgeon's skills, but also the anatomical knowledge, the access flap's choice and the correct surgical instruments are essential prerequisites for the therapeutic success. From the patient's point of view one of the most important aspects is the intra and post-operative pain and the relative fear of pain, which, in some cases, can negatively condition the outcome of the intervention.
Aims: The objective of this study is to compare the operative course according to the different surgical techniques that can be performed for the exeresis

of the included third molars. In particular, we have assessed the results of the extractions performed with the classic rotating instruments compared to those made with the latest generation piezoelectric instruments.
Materials and methods: For the purposes of the study, patients with third molars in total bone inclusion who did not have acute or chronic lesions were recruited. Patients were randomly assigned to the two treatment groups. The same operator carried out the all interventions. The duration of the intervention was recorded and, subsequently, the patients were asked to complete a questionnaire with the scale of perceived pain (VAS) both at 12 and 24 hours after surgery, the degree of perceived swelling and the number of painkiller tablets (Ibuprofen 600mg) taken on the following days. After 48 hours, an operator blinded to treatment performed measured the degree of facial swelling starting from 4 points of repere (labial, cheekbone, orbit and the outer corner) and the frame or the degree of mandibular post-operative trismus.
Results: From the analysis of the collected data, it emerged that the surgical exeresis of the third molars in bone inclusion through piezoelectric instruments requires a greater use of time in the operative phase with respect to the rotating instruments. However, it is possible to infer from the processing of data that the use of piezoelectric instruments allows to obtain a reduced use of pain medication, an inferior facial swelling and a lower degree of mandibular tightening when compared to classical rotating instruments. This may be due to the fact that the piezoelectric instrument causes less heating of the patient's hard tissues and is able to selectively cut the bone and / or the enamel without damaging the surrounding soft tissues such as the periosteum or the mandibular vascular-nervous bundle.
Conclusions: The osteotomy performed with piezoelectric instrument, respect of the use of rotating instruments at high speed, makes the intervention of third molars extraction more safety, preserving the adjacent noble structures and improves the post-operative course in terms of pain perceived by the patient, edema and mandibular trismus.

Post-operative pain evaluation using thermal infrared imaging in lateral sinus augmentation performed with trapezoidal and modified triangular flap design

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Purpose: Post-operative pain and swelling are frequently observed after sinus floor elevation procedures. The aim of this randomized pilot study was the clinical evaluation of swelling and pain of two different sinus flap lift techniques through the use of a visual analogue scale (VAS), verbal rating scale (VRS), and infrared thermal imaging (i.e. thermography).
Materials and Methods: A controlled trial was conducted with 15 patients (30 surgical sites in total) randomly allocated into two groups. For the sinuses of Group I a trapezoidal flap was used, while for Group II a modified triangular flap without anterior release and with a non-sutured distal release incision as passive drains, was utilized. Postoperative pain was scored by means of a 100 - mm VAS ranging from 0 (no pain) to 100 (worst pain imaginable), and was recorded at 2, 4, 6 and 14 days after surgery. Swelling was recorded by a verbal rating scale (VRS) and was classified into four categories: a score of 1 referred the absence of swelling, patients with intra-oral swelling in the surgical zone scored 2, any extra-oral swelling in the surgical zone scored 3, and intense swelling exhibited by extra-oral swelling extending beyond the surgical zone scored 4. The facial temperature was recorded before and after sinus lift, and at 2, 4, 6, and 14 days post-surgery to check the course of healing.
Results: In Group I the peak of pain has been recorded at 2 days after surgery with a mean score of 38.67α 6.4 mm. Swelling was greater at 2 and 4 days, and was almost absent at day 6. The facial temperature difference before and immediately after the procedure was 1.55 °C. In Group II the peak of pain was recorded at 2 post-operative days with a mean score of 29.33 α7.0 and the main pain score were always lower than in Group I at 2, 4 and 6 day ($p < 0.05$). The swelling score was 2 on the first and second days, and was reduced on day 4. In Group II the swelling score 4 has never been assigned and the mean score were always lower than in Group I at 2, 4, and 6 day ($p < 0.05$) . The average temperature difference before and after surgery was 0.77 °C ($p < 0.05$); at the second and fourth day the mean temperature value recorded with the modified triangular flap was significantly reduced as compared to the values recorded in Group I; at 6 and 14 days no significant difference in temperature was registered between the two groups.
Conclusion: The results of this clinical study show the significant effectiveness of the modified triangular flap in the sinus augmentation procedure for reducing pain and swelling.

Reduced surgical impact in a case of atrophic edentulous maxilla reconstruction with horizontal block grafts

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Objective: Presentation of a case of edentulous maxilla (class IV according to Cawood and Howell classification) reconstructed with deproteinized bovine bone block, manufactured with CAD / CAM technology.
Material and methods: A 50-year-old female patient referred to the Oral Surgery Unit of the Policlinico Umberto I Hospital– Sapienza University of Rome with chief complains of replacement her upper and lower dentures with "full arch" fixed prosthesis.
Cone Beam CT (CBCT) scans showed the upper edentulous jaw with a thickness of less than 3 mm and a vertical dimension of 10 mm. The Digital Imaging and Communication in Medicine (DICOM) data on the anatomical structures and the ideal teeth prosthetic position were loaded in the software planning program. On the three-dimensional computer images, the surgeon virtually planned the horizontal ridge augmentation, using apposition grafts with deproteinized bovine bone blocks manufactured with CAD / CAM technology, and the delayed insertion of six implants to support the "full arch" fixed prosthesis. Surgery was performed under local anesthesia. After elevation of the mucoperiostal trapezoidal flap, cortical bone was perforated to expose the marrow spaces and accelerate revascularization of the graft, four blocks of deproteinized bovine bone were grafted on the buccal surface of the maxilla and stabilized with titanium screws. The blocks were covered with autogenous particulate bone, previously collected with bone-scraper, and resorbable membranes. Before flap repositioning, six immediate provisional implants were inserted to support the pre-existing removal denture, fittingly modified, so as not to interfere with the regenerative process. The flap was coronally advanced by periosteal releasing incision, adapted and sutured to allow a tension-free primary closure. Healing was uneventful. After 6 months, at the time of implant insertion, the bone biopsy was performed to evaluate the quality and quantity of the regeneration tissue. Histological analysis revealed areas of biomaterial affected by remodeling process , with osteocyte lacunae and osteocytes, areas of new bone formation and the presence of numerous vessels.
Discussion: To increase horizontal alveolar bone dimension in atrophic edentulous maxillae, three reconstruction procedures have been proposed: guided bone regeneration (GBR), sagittal osteotomy, and bone block grafts. In the presented case the use of block grafts was chosen due to the defect morphology, which contraindicated both GBR and sagittal osteotomy. In the GBR the large defect surface could expose to the risk of wound dehiscence and membrane exposure. Instead, the sagittal osteotomy requires a the residual bone thickness at least 3 mm in order to avoid cortical fractures. The choice not to use the autologous bone was motivated by the significant amount of material needed for grafting and the impossibility to use intraoral donor sites. The biomaterial made it possible to avoid the second surgical site, which less traumatism, operative time, and postoperative patient morbidity. CBCT-scans and three dimensional surgical planning software allowed the clinician to analyze the patient's anatomical and prosthetic parameters and to virtually plan graft blocks perfectly adapted to the residual bone structure. In addition the rapid prototyping allowed to produce graft blocks, which need a less amount of material, were easy to handle, and have good stability.
Conclusion: The present clinical case reports a therapeutic option at reduced surgical impact to reconstruct an horizontal atrophic edentulous maxilla.

Comparative evaluation on upper lip frenulum surgical treatment

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Introduction: The hypertrophy or the incorrect attach of the upper lip frenulum can be seen in young patients older than 9 during permanent teeth eruption. This condition can interfere with the correct infra-incisor diastema closure, leading to a clear aesthetic defect, in some cases it can imply pronunciation deficiency and it represents a risk of relapse after orthodontic treatment. Furthermore, in adult age it can be a predisposing factor for gingival recession. Due to the young age of patients, frenectomy can harbor several problems related to a low compliance during the surgery, especially in case of bleeding, and in the days following the intervention when a correct post-operative management is needed. The traditional technique with blade is predictable and reliable. Nevertheless, laser technologies are becoming more and more preferred in order to reduce disadvantages, namely intraoperative bleeding and post-operative edema and pain.
Materials and methods: Five patients, ranging in age from 8 to 51, underwent upper lip frenectomy respectively with blade, 808nm diode laser (400 αm

optical fiber), 980nm (330 αm optical fiber) and with 915nm diode laser with sapphire prismatic insert. The following data were recorded: intra-operative hemostasis, surgery timing, post-operative pain and the instrument ease of use expressed in NRS (Numeric Rating Scale).

Results: All patients had a good healing without complications. Intra-operative hemostasis was good for the 4 patients who underwent a laser-assisted surgery, while suture was needed for the patient who underwent a traditional blade surgery. The use of diode laser allowed to reduce operative timing, with a medium timing of 10 minutes, against 16 minutes with the traditional technique. Post-operative pain perception expressed in NRS was 5/10 after blade surgery, while a mean of 2.5/10 was reported for the laser-assisted surgery, regardless of wavelength and terminal used. The instrument ergonomics was valued 8/10 with the traditional technique, and a mean rate of 6.5/10 was recorded for the laser techniques. Of note, the only value similar to blade was obtained by diode 915 nm with prismatic inserts.

Discussion: Laser-assisted surgery is becoming a standard thanks to its ease of use, to the low learning curve and to the improved intraoperative visibility due to reduced bleeding. Recent studies underlined that laser-assisted surgery of oral soft tissues implies reduced bleeding, edema and post-operative pain when compared to traditional blade surgery. When diode laser is used, suture is no more needed, thus reducing both the surgical procedure time and the patient's discomfort. When comparing the 4 laser technologies, the sapphire insert allowed the surgeon a more confident operative feed-back, being similar to the one given by traditional blade. Nevertheless, the use of laser technologies implies higher costs for both purchasing and maintenance.

Conclusion: Positive results in terms of reliability and patient compliance lead clinicians to favor laser-assisted surgery when dealing with oral soft tissues. The reduced bleeding obtained with diode lasers may represent an advantage for oral surgery students.

Surgical approach of severe maxillary bone atrophies using autologous bone grafts: statistical analysis compared to minimally invasive implant rehabilitations

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Severe maxillary and mandibular defects are mainly caused by several factors such as neoplastic lesions, traumatism and finally the edentulism, especially if maintained untreated for a long period of time. All these factors strain the capabilities of the oral surgeons who need to know exactly how to repair those defects, through the deep knowledge of both the biological properties of the native bone tissues and their engineering properties, making the best use of the residual bone tissues of the patients. If treated with unsuitable prosthesis or completely untreated, edentulous maxillary and mandibular bones, tend to atrophy over time both vertically and horizontally, complicating the possibility to help the patients with an implant-based rehabilitation. These kinds of procedures are the actual gold standard to reclaim edentulous jaws, through the insertion of titanium fixtures into the patient's basal bone. There are two main possibilities in case of lack of minimal bone thickness: the first one consisting in the use of autologous bone grafts, directly withdrawn from an intraoral or extraoral site of the patient, while the second one consists in taking advantage of the residual basal bone through minimally invasive surgical techniques, mainly using a limited number of implants. Therefore, the aim of this study is to compare, through a statistical analysis, the previously mentioned surgical techniques used in the rehabilitations of maxillary and mandibular severe atrophies by studying two different groups, each one consisting of 31 non-smokers and healthy patients without systemic diseases, and treated for at least 5 years respectively with and without the use of autologous bone grafts, evaluating at T-zero, at 9 months and at 1 and 5 years, different variables such as the number of implants loss, the PPD, the BOP, the suppuration and the average bone resorption.

In the light of data collected, through the study of the actual scientific research but most of all according to our statistical analysis, it can be concluded that both the techniques used are a valid option to the rehabilitation of patients affected by severe maxillary and mandibular defects, with a good level of oral hygiene, non-smokers and without systemic diseases. Moreover, this study as further confirmation of the extensive scientific research, proves both the biological and the clinical validity of the calvarial autologous bone grafts, thanks to the statistical analysis that proved the complete absence of significant differences in 5 years with the implants positioned into the native bone tissues of the patients.

Prosthetic rehabilitation according to the All-on-4 protocol: prospective cohort-study with a new conical connection implant

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Aim: Oral rehabilitation of atrophic jaws with dental implants is limited by anatomical conditions. In atrophic patients frequently the anterior region has a sufficient alveolar crest while in the posterior area a severe bone resorption is present: this limitation is due to the reduced quantity and quality of available bone. So, the aim of this article is to test a new conical connection implant in "all-on-four" protocols with 2-year follow-up.
Methods: The study was conducted at the Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy, from June 2015 to January 2018. Healthy edentulous patients requiring rehabilitation of upper maxilla and/or mandible were scheduled for the present protocol. All of them required an implant prosthetic restoration of one or both jaws. The "all-on-four" protocol was followed: 4 implants were placed, the mesial ones were axial while the distal ones tilted from 30° to 45°. Pre-operative evaluation was both clinical and radiological. The implant used is CSR-DAT which has a rough surface (ZirTi surface, Sweden & Martina, Due Carrare, Padova, Italy) and an internal connection with double taper. The first taper is an internal cone that supports and closes the prosthesis combined with an internal hexagon. This is used for implant screwing and prosthesis repositioning. The second taper is an interaction surface between the prosthetic abutment and the head of the tightening screw, which is conical itself. Each patient underwent implant placement and immediate loading in the same day, obtaining aesthetic and function. Follow-up were both radiographical and clinical and it included evaluation of bone marginal levels and clinical parameters at 6, 12 and 24 months from implants placement.
Results: 25 patients, 17 females and 8 males, were enrolled in the present study. A total amount of 104 Implants were placed, 1 patient received rehabilitation of both jaws, 5 patients were rehabilitated only in the mandible and 19 patients were rehabilitated in the upper jaw. At 24 months, a survival rate of 99% was reported (one mesial implant in a maxillary rehabilitation was lost and replaced after three months). Adequate wound healing and soft tissue adaptation were detected. At 6 months, mean bone levels were 0.52 ± 0.13 mm, at 12 months a value of 0.83 ± 0.24 mm was measured and at 24-month follow-up a mean marginal bone loss of 0.82 ± 0.32 was reported. Not statistically significant differences were found between axial and tilted implants over time (P>0.05).
Conclusion: Within the limitations of the present study, rehabilitation according to the "all-on-four" protocol of edentulous jaws with new conical connection implants resulted in a suitable procedure.

Platform Switching versus non-Platform Switching in the rehabilitation of atrophic upper and lower jaws with ultra-short implants: a prospective, randomized clinical trial

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Introduction: The aim of this randomized prospectical clinical trial is to evaluate the effectiveness of Platform Switching in preventing perimplantar bone loss in ultra-short implants (5mm and 6mm long).
Matherials and methods: A total of 23 ultra-short implants with external hex connection and microrough surface (5 and 6 mm long, Zimmer Biomet T3® Short), were used to rehabilitate the posterior regions of atrophic upper and lower jaws of 19 patients, chosen with appropriate inclusion and exclusion criteria. The patients were randomized in the experimental (Platform Switching, PS) and control (Regular Platform, no-PS) groups with the coin flip method: 16 implants were allocated in the PS group, 7 in the no-PS group. After performing a preliminary radiographical and clinical exhamination, bone volume and prosthetic space were carefully evaluated for every patient. Then, the surgery was scheduled and a preoperatory antibiotical prophilaxis was prescripted. The surgical protocol involved a full-thickness flap elevation, then a site preparation followed by the placement of the ultra-short implants and a wound suture without tension. A biphasic protocol was adopted in order to avoid osteointegration-related problems in the healing phase: implants were left submerged for four months, then prosthetized. The provisional prosthetization proceeded according to the group of belonging (PS, no-PS), with single crowns or provisional partial fixed prostheses being placed on the implants. After two months the provisionals were replaced by the definitive metal-ceramic prostheses. Clinical, radiographic controls (endoral periapical x-rays) and professional hygiene procedures were scheduled every four months. Marginal bone levels (MBL) and Crown/Implant Ratio (C/I) were measured for every implant.
Results: In a follow-up period of 18±5,3 months, success and survival rates were as high as 100%. No implant or prosthetical failures were recorded. Mean CBL (Crestal Bone Loss) was 0,74 ±0,68 mm, the clinical C/I ratio at control was 2,72±0,63 (baseline: 2,7±0,7). No statistically relevant difference was found between mean CBL at control (compared to baseline) and Platform Swiching (pvalue = 0,65). A statistically relevant difference was found between CBL and anatomical C/I ratio (Spearman Corr. 0,57) and between CBL and clinical C/I ratio (compared to

baseline, Spearman Corr. 0,59).
Conclusions: The results still have no statistical relevance because of the fact that this is an ongoing study, and the population numbers are still growing: because of the randomness, the PS population is bigger than the no-PS one; in fact, the final sample will reach a total number of 40 implants positioned. It also seems that the PS has a greater base vibration than the Regular Platform because of the minor area of the prosthesis' base and because of the minor stiffness of the connection, important to maintain perimplantar bone leves in the long term. It's interesting to notice how the implant survival rate and outcome of this study are not dependent upon the C/I ratio. The authors will further look into these results after reaching a bigger sample and a longer follow-up; if these preliminary results will be confirmed with a bigger sample and a longer follow-up, a probable cause could be the fact that the circumferential discrepancy of 0.5 mm between the implant and the abutment used in this study are considered to be insufficient in terms of "switching amount" in other experimental clinical studies.

The coronectomy, an alternative approach in third molar surgery: contraindications, surgical techniques and follow-up

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Inferior Alveolar Nerve (IAN) injury is a serious neurological complication which can result from a number of reasons, the most common of which is by performing oral and maxillofacial surgical procedures. Extraction of an impacted mandibular third molar has the potential risk of causing temporary or permanent neurologic disturbances of the inferior alveolar nerve. The incidence of IAN injury (IANI) reported in the literature ranges from 1.3% to 5.3%. The risk of this complication depends mainly on the position of the impacted tooth in relation to the inferior alveolar canal before surgery. If there is close proximity between the IAN and the roots, the incidence may be as high as 20%. After a clear indication for extraction is defined and a complete radiographic CBCT evaluation is performed, surgical removal of an impacted third molar with the roots in close contact with the IAN should attempt to minimize the risk of irreversible neurological complications. Different surgical approaches has been described including combined techniques with orthodontic eruption. Coronectomy has been presented in the literature in 1984 as a way to reduce neurological complications avoiding the nerve canal by ensuring intentional retention of the roots when they are close to IAN. As originally conceived, the technique involved total sectioning of the crown of the tooth, removal of all enamel, and removal of enough of the coronal portion of the tooth such that the portion to be retained was at least 2 to 3 mm below the alveolar crest of bone. Avoiding roots mobility is mandatory. Nowadays, different flaps and tooth sectioning techniques, such as the use of rotating burs or piezoelectric surgery, are described. Primary closure is preferred but when socket is not completely closed, success rate seems to be similar. The infection rate is noted to be no higher than with complete third molar removal; roots migration seems to be a common finding and most migratory component would be present in the first 6 months postoperatively, with an average migration of 2–3 mm. Adequate follow-up must be performed in the first 24 months. The aim of this presentation is to report coronectomy as a treatment of choice in our experience; the approach is to be considered a minimally invasive treatment to avoid IAN injury in lower impacted third molars.

The use of piezosurgery technique in the germectomy of the third inferior molar

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Introduction: The piezo is an ultrasound instrument which replaces rotating instruments in oral surgery. The purpose of this study is to identify the advantages of this instrument in the ostectomy during the germectomy of the third inferior molars. The piezo technology provides some advantages intra and postoperative reducing the possible complications. The germectomy is a surgical extraction of third molar during the stages before its final root growth; The operation's indications are orthodontic and extra-orthodontic. The literature proposes different methods to evaluate the best time to intervene; the preferred method of evaluation is through an radiographic examination. It's possible to do the same assessments taking into consideration the child's age in which the operation is recommended. Pappalarto et al, divide the age in: very early (before 8 years), early(between 8-12 years) and late (between 13-16 years). The use of piezo offers different advantages: micrometer cutting, selective demolition, bleeding's reduction, pounding action, reduction of pressure and less detritus near working tip. The piezos' refrigerant action (with the release of 60 ml/min of saline solution

at 4C°), offers to cut the bone with more respect of the anatomy. The regenerative processes are faster thanks to the greater quantity of growth factors (BMP-4, TGFB2, IL-1B, IL-10) and the low quantity of pro inflammatory interleukins.

Materials and methods: In the study, 19 patients were included, recruited from the department of pediatric dentistry of the Policlinico Umberto I, Rome. The patients' age is between 10 and 15 years of age (11 male and 18 female). The main inclusion criterion adopted is the germectomy of the third inferior molar for orthodontic purpose. The patients with pharmacological contraindications were excluded. The legal guardians signed an informed consent for the surgical operation. The patients were divided in two group: group A (with rotary instrument) and group B (germectomy with piezosurgery technique). The assignment of the method was casual, with the use of a random algorithm. The differential criteria to evaluate the follow up, at 3 and 7 days after, were: operative time, maximum opening of the mouth, lockjaw, facial swelling and pain (with VAS scale).

Results: In all the patients the molar's odontotomy was done with rotary instruments. Comparing groups A and B, we found the same statistical data concerning the limitation of the mouth's maximum opening and regarding swelling and pain there isn't relevant or significant statistical data. The only complication was the post extraction alveolitis in the patients of the group A.

Conclusions: This study shows that piezosurgery technique reduces intraoperative complications and it improves the postoperative period. The decreased noise and vibration reduce the stress and anxiety in the little patients, allowing for a better compliance on their side. Although in literature there aren't any studies that compare the piezosurgery with the traditional technique, the piezosurgery results to be more effective.