

LIQUID BIOPSY

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During the early formation and growth of primary tumor (e.g., breast, colon, or prostate cancer), cells are shed from the primary tumor and then circulate through the bloodstream. Many of the major recent advances in targeted therapies have relied on the acquisition of tumor tissue via biopsy before initiation of therapy or after the onset of resistance. The advantage of physical properties is that they allow circulating tumor cells separation without labelling. Methods based on physical properties include density gradient centrifugation, filtration through special filters. In addition to using somatic point mutations as markers for the detection of tumor DNA, strategies to detect tumor-derived rearrangements and chromosomal copy number changes in the plasma of patients with cancer have been developed. Several studies have shown that metastatic cells might have unique characteristics that can differ from the bulk of cancer cells in the primary tumor currently used for stratification of patients to systemic therapy. In conclusion, the molecular and functional analysis of circulating tumor cells and circulating nucleic acids can be used as companion diagnostics to improve the stratification of therapies and to obtain insights into therapy-induced selection of cancer cells.

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ANTI-TUMOR PROPERTIES OF SILVER

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The use of silver dates to the period when people used it to mint coins or forge jewels. Towards the end of the 1960s, Resenmberg reported a study on the antitumor activity of cisplatin, and after a few years, cisplatin began to be used all over the world against different types of neoplasias mainly involving testes, ovaries, tumors of the district head-neck. Laryngeal carcinoma cell line HEP2 and tongue carcinoma cell lines PE15 and PE46, were cultured. Cell lines were treated with increasing concentration Ag in order to evaluate the optimal concentration levels that did not significantly affect cell viability. Basing on these data, the concentration adopted for the treatment was 0.007%. Gene expression profile was carried out for 10 genes belong to cell cycle pathways. Significantly up-regulated genes showed ≥ 2 -fold change in expression while significantly down-regulated genes showed ≤ 0.5 -fold change in expression. Treatment appears to not significantly affect gene expression in the HEP2 cell line. In fact the only significantly down-regulated gene was CCNE1. All other genes have an expression comparable to that of untreated control. In recent years, the complexes containing gold and silver have been thoroughly studied for their electronic and chemical capabilities and their potential as a valid alternative in the development of new technologies. Further studies on the mechanisms of the biological effect discovered can become fundamental for the development of new high efficiency drugs with minimal minimum effects for the treatment of malignant neoplasia in humans and animals.

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SCREENING OF PERIODONTOPATHIC BACTERIA IN ITALIAN PATIENTS AFFECTED BY PERIODONTITIS

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Periodontal disease (PD) is among the most common infectious diseases in the world, caused by pathogenic bacteria that trigger innate, inflammatory, and adaptive immune responses, leading to the destruction of supporting periodontal tissues and, if untreated, tooth loss. This study included 3593 patients, of them 1963 had a complete dataset and thus were analysed: 1088 (55%) were from Northern Italy, 749 (38%) from Central and 126 (7%) from Southern. *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Treponema denticola*, and *Tannerella forsythia*, *Campylobacter rectus*, *Fusobacterium nucleatum*, and total bacterial load were investigated. There was a significant difference in geographic distribution as regard *A. actinomycetemcomitans* ($p < 0.001$), *C. rectus* ($p < 0.001$), *F. nucleatum* ($p < 0.001$) and total bacterial load ($p < 0.001$). No differences were detected as regard gender, whereas a significant higher *F. nucleatum* load was observed in younger patients.

DRUG-INDUCED GINGIVAL OVERGROWTH: AN IN VITRO STUDY ON CYCLOSPORINE AND HUMAN GINGIVAL FIBROBLASTS

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Gingival overgrowth is a serious side-effect that accompanies the use of cyclosporine. Up to 97% of the patients submitted to immunosuppressant drugs have been reported to suffer from this side-effect. Several conflicting theories have been proposed to explain the fibroblast's function in gingival overgrowth. To determine whether cyclosporine alter the inflammatory responses, we investigated its effects on gingival fibroblast gene expression as compared with untreated cells. Fragments of gingival tissue of healthy volunteers (11-year-old man, 68-year-old-woman and 20-year-old-man) were collected during operation. Cells were incubated with cyclosporine and gene expression of 29 was investigated in gingival fibroblasts cell culture, compared with untreated cells. The gene expression level was significantly deregulated only for 10 genes (CCL1, CCR1, CCR4, CCR5, CCR10, IL1A, IL1B, IL5, IL6R and TNFSF10) that were found to be downregulated except for TNFSF10. These results seem to demonstrate that cyclosporine has no inflammatory effect on healthy gingival fibroblast. In the future, it would be interesting understand, the possible effect of the drug on inflammation of patients affected by gingival hyperplasia.

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**INFLAMMATORY BOWEL SYNDROME AND ORAL HEALTH:
A TWO-WAY RELATIONSHIP**

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AGING AND ORAL HEALTH: MONITORING THE DENTAL AND MUCOSAL STATUS

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ONE-PIECE IMPLANTS: AN ALTERNATIVE REHABILITATION OF EDENTULOUS JAWS

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The popularity of one-piece implants has increased considerably between patients and dentists. The advantages of one-piece immediate loading for rehabilitation of edentulous mandibles are to reduce the number of interventions and timing of prosthetic. These parameters can be better controlled with a one-piece implant. Twenty-one patients with one-piece implants inserted in totally edentulous mandibles were considered for this retrospective study. Inclusion criteria were: Good oral hygiene, absence of lesions of the oral mucosa, no smoking or smoking less than 20 cigarettes a day, drinking less than 2 glasses of wine a day, good general health no pregnancy. Twenty-one (12 female 9 males) patients were enrolled in this retrospective study. The mean follow-up was 1 year. A total of 84 one-piece implants (Biohorizon, Italy) were inserted in edentulous mandible. Implant's diameter was 3.0 mm in all fixtures. Implant's length was equal and longer than 12 mm in 44 and 40 fixtures respectively. Forty-eight were inserted in females 36 in males (range 33-67; mean age 58.3). One-piece immediate loading implants has non-difference in survival rate respect to two-piece implant and delayed loading for rehabilitation of totally edentulous mandibles. In conclusion one-piece immediate loading implant is a reliable device for mandible rehabilitation.

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BLEEDING CONTROL WITH CALCIUM SULPHATE AFTER ORAL SURGERY IN ANTICOAGULANT THERAPY PATIENTS

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Control of bleeding after oral surgery, is mandatory in patients taking anticoagulants. There are different haemostatic measure to prevent post-surgical bleeding. The aim of our study is to use a homeostatic agent, Calcium sulphate (P30, Ghimas, Bologna, Italy) for controlling post-surgical bleeding in a group of patients treated with warfarin therapy for thromboembolic states. Twenty teeth (12 mandibular molars, 8 maxillary molars) in 20 patients (14 men and 6 woman) with a mean age of 54.3 years (\pm 10.3 years) were included in the study. The patients were divided in 2 group; in 10 patients of the study group was used Calcium sulphate (P30, Ghimas, Bologna, Italy) in layers to fill the socket after extraction, while in control group was recommended to put a gauze with tranexamic acid in the extraction site immediately after extraction, and half an hour after extraction. The outcome was bleeding in subsequent days. Bleeding at post operative day 1 was significant in 5 patients of control group, otherwise in study group treated with calcium sulfate there was no bleeding in any patient (p. value 0.0055). CaS demonstrated to be a good hemostatic agent for controlling bleeding after oral surgery in patients taking anticoagulants.

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INTRA AND EXTRA ORAL CLINICAL MANIFESTATIONS OF RENDU-OSLER-WEBER SYNDROME: CASE REPORT AND LITERATURE REVIEW

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Hereditary Hemorrhagic Telangiectasia or Rendu-Osler-Weber syndrome is an incomplete penetrance dominant autosomal transmission disease which determines microcirculatory beds alterations (capillary and venules), caused by the loss of the support tissues that usually enclose blood vessels, and hemorrhage potentially in every organ. The syndrome clinical manifestations are multiple telangiectasia of small proportions on the skin or on the mucous membranes (e.g. of the gastrointestinal tract or other organs), in association with recurring bleedings of the affected areas and external and internal melena. The treatment is a supportive one so to prevent complications. This study reports a case of a patient affected by this syndrome in need of a dental implant following the fracture of a tooth. Furthermore, a bibliographical review of etiopathogenesis, clinical manifestations and therapy options has been made.

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LOW-LEVEL LASER THERAPY PROTOCOLS IN DENTAL MOVEMENT ACCELERATION AND IN PAIN MANAGEMENT DURING ORTHODONTIC TREATMENT

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In recent years various studies about the biostimulatory effects of the laser therapy in orthodontics have been carried out. This study investigates the potential advantages obtainable using the Low-level Laser Therapy during orthodontic treatment and the most efficient clinical protocols. Recently published randomized controlled trials (RCTs) have been obtained through a search on electronic databases (Cochrane Library and Pubmed). Clinical studies in humans in which Low-level Laser Therapy was applied during orthodontic treatment were included. In conclusion, 14 relevant clinical studies were identified. This study shows the possibility to obtain an increase in tooth movement between 31% and 100% depending on the laser therapy considered and the time interval for measuring the value. In addition, there is a potential impact in reducing orthodontic pain limited to the day following the application of laser therapy when orthodontic therapy includes canine retraction, and during a period not exceeding five days from the placement of fixed orthodontic appliances in the others clinical cases. Low-level Laser Therapy is considered effective both to increase the movement of the dental elements and to reduce pain during orthodontic therapy. Different clinical protocols have been identified depending on the orthodontic cases considered. Both an LED device and an AlGaAs diode device can be used. In the future paying more attention to the therapeutic possibilities offered by laser devices with greater power is recommended. A greater energy density directed to the target tissues has been proven to provoke more significant therapeutic effects.

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ROLE OF MESENCHYMAL STEM CELLS IN OSTEOTOMY SINUS GRAFT HEALING: A CASE REPORT AND A LITERATURE REVIEW

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Prosthetic rehabilitation of the edentulous posterior maxilla with implant-supported prostheses frequently presents a challenge for the oral surgeon because of the lack of bone due to alveolar ridge resorption or maxillary sinus pneumatization. To overcome these problems, different solutions were proposed over the years. Maxillary sinus membrane elevation is a common surgical technique for increasing bone height in the posterior maxilla prior to dental implant placement. However, the biological nature of bone regeneration in maxillary sinus membrane remains largely unidentified. The authors present a clinical case and literature review to understand the fundamental of bone formation in osteotomy sinus floor elevation.

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THE USE OF A NEW COLLAGEN MATRIX TO SUPPORT THE REGENERATION OF PERI-IMPLANT SOFT TISSUE LASER-ASSISTED: CASE REPORT

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Several factors compete for both the achievement and the long-term maintenance of osseointegration; among these, of importance is the width and integrity of the peri-implant soft tissue. Many authors already underlined the importance for implant-prosthesis procedures to maintain a good biological seal together with a low bacterial cell surface charge (this is also valid for a natural tooth with an undamaged periodontium). The aim of this work is to present, through a clinical case, a new technique that focuses on the regeneration of soft tissue around a post-extractive implant. For the case reported, a post-extractive implant surgery of an inferior molar of the fourth quadrant with a buccal bone resorption of 3mm in the mesial section of the root, three dimensional collagen matrices (Bioteck) and a blend of equine spongy bone granules (OX Bioteck) were used, combined with aPDT without dye (Rey Protocol). With an easy and not invasive surgery, this technique allows the recreation of new gingiva around the implant.

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EVALUATION OF THE DEGREE OF DIFFERENTIATION OF HUMAN MESENCHYMAL STEM CELLS ON DIFFERENT TITANIUM SURFACES: A PILOT STUDY

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The aim of our study was to evaluate the properties of a laser-modified titanium surface, specifically the promotion of a faster differentiation of human Mesenchymal Stem Cells (hMSCs) into osteoblasts and a more stable connection between differentiated cells and titanium, compared to machined and sand-blasted surfaces. Furthermore, we wanted to assess if the titanium alone could be a sufficient factor in the induction of the differentiation towards the osteogenic lineage. Materials and methods: we harvested stem cells from an individual (under his consensus) and cultivated them into dishes containing titanium disks presenting three different surfaces: machined (M), sand-blasted (S) and laser-modified (L). In the test group, cells were cultivated in an osteogenic medium, while in the control group, cells were seeded in a standard DMEM. Evaluations of the degree of differentiation were made with Alizarin coloration after 28, 38, 42, 49, 56 and 63 days from induction. Results: no signs of differentiation were evident in the control group, while in the test group there was a statistically significant differentiation, evident since the fourth week. Laser-modified and sand-blasted surfaces showed similar values, higher than the machined surface. Discussion: on the laser-modified surface the differentiation reached its peak on the sixth week, while on the seventh week for the other two surfaces. After the peak, the differentiation showed a slow decrease for the laser-modified surface and a rapid decrease for the other two. Conclusions: titanium alone can't be considered enough to induce differentiation of human Mesenchymal Stem Cells into osteoblasts. Still, the laser-modified once induced a faster differentiation of stem cells and a more stable connection between osteoblasts and titanium.

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A NEW CHEMICAL DEVICE FOR THE TREATMENT OF CHRONIC PERIODONTITIS: A CASE CONTROL STUDY

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The objective of this study was to compare the efficacy of supportive periodontal therapy (i.e. scaling and root planning, SRP) alone, versus a chemical device silica dioxide (SiO₂) colloidal solutions (SDCS) used in association with SRP in the treatment of chronic periodontitis in adult patients. A total of 20 patients with a diagnosis of chronic periodontitis (40 localized chronic periodontitis sites) in the age group of 35 to 55 were selected. None of these patients have previously received any surgical or non-surgical periodontal therapy and demonstrated radiographic evidence of moderate bone loss. Two non-adjacent sites in separate quadrants were selected in each patient to monitor treatment efficacy (split mouth design). Clinical pocket depth (PD) and microbial analysis (MA) were analyzed at baseline day 15. SPSS program and paired simple statistic T-test were used to detect significant differences. Total bacteria loading, *Tannerella forsitia* and *Treponema denticola* loading were statistically reduced when SiO₂ is locally delivered. SDCS gel is an adjuvant therapy which should be added to SRP in the management of moderate to severe chronic periodontitis.

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IMPLANT POSITION FOR SUPPORTING MAXILLARY OVER-DENTURE: A CLINICAL STUDY

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Using implant-supported overdentures can solve the main problems of a complete removable denture. This retrospective study aimed to identify the most predictable implant position for maxillary overdentures and encountered mechanical complications, as well as the marginal bone loss. A total of 26 subjects were treated with maxillary overdentures supported by two to three implants on each side, either in the molar (Group PS) or the premolar area (Group ANT). The implants were connected by a casted bar with a soldered Locator®. Mechanical complications and bone loss were recorded. The average bone loss was 2.02 mm, with no statistical differences between Group PS and Group ANT. Mechanical complications were observed in 75,0% of the cases in Group PS, whereas only 21,4% subjects from Group ANT needed maintenance. There is a statistically significant association between groups and the occurrence of mechanical complications ($p=0,016$). The maxillary overdenture supported by implants inserted in the premaxilla is more predictable and suffers fewer mechanical complications than the one retained by posterior implants.

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BONE STRAIN MEASUREMENTS AND IMPLANT MICRO-SURFACE ANALYSIS OF DRILL-LESS SELF-THREADING DENTAL IMPLANTS- PRELIMINARY IN-VITRO RESULTS

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Innovative implant thread design enables timesaving one-stage insertion, with no need for prior osteotomy. This technique may impair bone and implant surface. The aim of this study was to investigate the strain levels produced in surrounding bone by this new treatment approach during and after implant placement and the effect of high insertion torque on the surface microstructure of the implants. Fresh bovine bone was collected and prepared to receive 2 types of drill-less self-threading dental implants differing in their thread design. Prior to implant insertion, two strain-gauges were cemented onto the bovine bone at each of the implant's neck recipient sites, one horizontally and one vertically. 5 Type 1 and 5 Type 2 implants were inserted into the bone with insertion torque of 80 Ncm. Strain was measured during implant insertion, and residual strain was recorded for 1 hour after implant placement. Implants micro-structure were analyzed by SEM. These results were compared to osteotomy and implant insertion strain data of conventional dental implants. A clear pattern of higher vertical compared to horizontal strain levels can be seen in the drill-less implants, compared to the opposite in drilling and insertion of conventional implants. Type 2 drill-less implant showed the lowest strain levels of all groups. Highest horizontal strain levels were measured for insertion of standard implants. Strain recovery was least prominent in the insertion stage of standard implants. Significant more cervical compression zones were detected in type 1 implant. However, SA and Rx. Surface roughness measurements didn't show any differences. Favorable horizontal stress distribution was noted in the 2 types of the novel drill-less implants, and comparable or lower vertical strains compared to regular protocol was also noted. Residual strain was low within all dimensions of bone. Conventional implant insertion protocol delivers strain to the frequently vulnerable bone around the implant neck. Horizontal residual strain, both in drilling and inserting conventional implants, was higher than the insertion strain of the drill-less implants. Implant surface roughness was not impaired by high insertion torque. High torque implant insertion may induce positive strain distribution within coronal part of the supporting bone. Implant surface were not impaired by high torque insertion methods.

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HEALING OF THE POST EXTRACTIVE SOCKET: TECHNIQUE FOR CONSERVATION OF ALVEOLAR CREST BY A CORONAL SEAL

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The first aim of the following experimental study was to assess bone changes in the horizontal and vertical dimension when using different socket preservation procedures. The second objective of our work was also to compare two clinical methods of coronal seal's management: an experimental group was treated using the natural extracted tooth; another experimental group saw the use of a provisional resin preformed as a seal technique. In twelve patients a premolar tooth was extracted without elevation of a mucoperiosteal flap and the patients were randomly distributed into four groups. The first and second group was considered as a control groups: in the first, the extraction socket was left with its blood clot and interrupted sutures were applied; In the second, the extraction socket was filled with BioOss Collagen (Geistlich Biomaterials, Wolhusen, Switzerland) and a free gingival graft was sutured to cover the socket. The third and fourth groups was considered as a test group. In the third group, after tooth extraction, for aesthetic reasons, the root of the natural dental element is cut to allow immediate temporary prosthesis. In the fourth group, as in group 3, the patient is discharged through a temporary restoration performed or by the dental technician or directly to the chair. Standardized photographs were taken eight months after tooth extraction. Five competent observers analyzed the esthetic outcome according to the PES. To assess the level of bone healing at the extraction site, the following parameters were evaluated: 1) changes in soft tissue and 2) changes in bone level. As for soft tissues, they were assessed using the PES score by two assessments, four weeks apart. The overall scores of the four treatment groups revealed PES values of 8.47 (SD 2.08, group 3), 6.62 (SD 3.24, group 4). The differences between groups 1 and 2 and were statistically significant ($P=0.015$ and $P=0.047$). The single parameter analysis displayed a certain range of fluctuation and heterogeneity. As regards hard tissue, during the 6-month period, bone remodeling occurred in all four experimental groups with different percentages. The mean vertical loss of the buccal bone plate for the Tx 1 group was -2 ± 0.2 mm. The Tx 2 group showed vertical loss of -0.34 ± 0.2 mm. The Tx 3 group demonstrated -0.3 mm of mean vertical loss and the 4 groups demonstrated -0.46 of mean vertical loss. The horizontal dimension of the alveolar process was 13.5 ± 0.1 mm, 7.6 ± 0.1 mm e 6.7 ± 0.1 mm at the three different levels for the Tx 1 group. The Tx 2 group depicted bone dimensions of 14.4 ± 0.2 mm, 13.7 ± 0.3 mm e 13.4 ± 0.1 mm. The horizontal dimension of the Tx 3 - Tx 4 group was 13.7 ± 0.3 mm, 13.1 ± 0.1 mm e 13 ± 0.1 mm and 13.5 ± 0.1 mm, 13.2 ± 0.1 mm e 12.9 ± 0.1 mm. The findings from the present study disclose that incorporation of coronal seals define a particular respect to the buccal bone plate.

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