

## HISTOLOGICAL EVALUATION OF FRESH FROZEN AND CRYOPRESERVED HOMOLOGUE ILIAC CREST GRAFTS USED IN SINUS LIFTING: A COMPARATIVE STUDY

S. FANALI<sup>1\*</sup>, M. DANZA<sup>1\*</sup>, P. TRISI<sup>1</sup>, A. VISCIONI<sup>2</sup>,  
L. RIGO<sup>2</sup>, V. SOLLAZZO<sup>3</sup>, G. BRUNELLI<sup>4,5</sup>, F. CARINCI<sup>4</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy*

<sup>3</sup>*Orthopaedic Clinic, University of Ferrara, Ferrara, Italy*

<sup>4</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

<sup>5</sup>*Don Orione Hospital, Bergamo, Italy*

\*These two authors equally contributed to this paper

In the last decade, several investigators have reported that autologous and homologous fresh frozen (FFB) and cryopreserved homologue bones (CFFB) are effective materials to restore alveolar ridges previous to insert dental implants. Here we reported a histological comparative study between FFB and CFFB. Patients were treated with a split mouth scheme for sinus lifting and bone grafting with FFB and CFFB. Eleven patients were enrolled, 9 males and 2 females, median age 51 years. They were treated at the Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy in the period January 2008 – December 2008. The study was approved by the Local Ethical Committee. Histological evaluation was performed on bone specimens at the time of grafting and after 4, 6, 10 and 18 months. Statistical test demonstrated that no difference exists between FFB and CFFB over time. Vital Bone Volume increase during the follow-up demonstrating that both FFB and CFF are good scaffold for bone regeneration. In conclusion, iliac crest FFB and CFFB are valuable materials for alveolar ridge augmentation: they are cheap, available in programmed amounts, safe and avoid a second operation field.

## COMPARISON BETWEEN IMPLANTS INSERTED IN FRESH FROZEN AND CRYOPRESERVED GRAFTS: AN HISTOLOGICAL STUDY

M. DANZA<sup>1\*</sup>, S. FANALI<sup>1\*</sup>, P. TRISI<sup>1</sup>, A. VISCIONI<sup>2</sup>,  
B. DE SANCTIS<sup>2</sup>, V. SOLLAZZO<sup>3</sup>, G. BRUNELLI<sup>4,5</sup>, F. CARINCI<sup>4</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy*

<sup>3</sup>*Orthopaedic Clinic, University of Ferrara, Ferrara, Italy*

<sup>4</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

<sup>5</sup>*Don Orione Hospital, Bergamo, Italy*

\*These two authors equally contributed to this paper

In the last decade, several investigators have reported that autologous and homologous fresh frozen (FFB) and cryopreserved homologue bones (CFFB) are effective materials to restore alveolar ridges previous to insert dental implants. Here we reported a histological comparative study on implants inserted in FFB and CFFB to detect the osteogenic potential of the two types of grafts. Patients were treated with a split mouth scheme for sinus lift with FFB and CFFB bone grafting and immediate implant insertion to evaluate the bone implant contact after 6 months. Three patients were enrolled, 2 males and 1 female, median age 52 years. They were treated at the Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy in the period January 2008 – December 2008. The study was approved by the Local Ethical Committee. Histological evaluation was performed on bone specimens containing spiral implants (Alpha Bio LTD, Petah-Tikva, Israel) after 6 months. Statistical test demonstrated that no difference exists between dental implants inserted in FFB and CFFB. However, FFB has a higher values of Vital Bone Volume Percentage suggesting it has higher potential in bone regeneration. In conclusion, iliac crest FFB and CFFB are valuable materials for alveolar ridge augmentation and implant insertion. Spiral implants can be immediately inserted in grafted bone.

## COMPARISON BETWEEN IMPLANT RETRIEVED FROM HUMAN MANDIBLE AND MAXILLA: AN HISTOMORPHIC-METRIC EVALUATION

T. TRAINI<sup>1\*</sup>, M. DANZA<sup>2\*</sup>, I. ZOLLINO<sup>3</sup>, L. MARINUCCI<sup>4</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>*EIS-international educational society and private practice, San Benedetto del Tronto, Italy*

<sup>2</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>3</sup>*Department of D.M.C.C.C., Maxillofacial Surgery Section, University of Ferrara, Ferrara, Italy*

<sup>4</sup>*Department of Experimental Medicine and Biochemical Sciences, University of Perugia, Perugia, Italy*

\* These two authors equally contributed to this paper

The aim of the present study was to compare the course of osseointegration speculating the bone-to-implant contact (BIC) rate, the osteocytes density (OD) and the collagen fiber orientation (CFO) in one implant retrieved from mandible and in one retrieved from maxilla. A SLA (Sand-blasted, Large grit, Acid-etched) surface implant of 3.3 mm x 15 mm was placed in a male 53 years old in the anterior region of the mandible bone (4.1) and an implant Dental Implant Line (sand blasted surface) of 3.75 x 16 mm was placed in the anterior region of the maxillary bone (2.1) in a female of 50 years old after a bone augmentation procedure. These implants were processed for histology. The specimens were analyzed under the confocal scanning laser microscope (CSLM) and brightfield light microscope (LM) equipped with circularly polarized light (CPL). The BIC rate of the implant retrieved after 23 months was  $76.7 \pm 4.9$  (mean  $\pm$ SD) while for the implant retrieved after 13 years it was  $68.7 \pm 3.7$ . The histomorphometric evaluation showed a predominantly woven bone around the 23 months implant, while around the 13 years implant the bone was mainly lamellar. The transverse CFO (mean  $\pm$ SD) under the lower flank of the thread near the tread tip was  $55.2 \pm 4.8 \times 10^4$  pixel for the 23 months specimen and  $20.4 \pm 3.5 \times 10^4$  for the 13 years specimen ( $P < .05$ ). The longitudinal CFO (mean  $\pm$ SD) in the inter-threads region was  $65.6 \pm 6.5 \times 10^4$  pixel for the 23 months specimen and  $21.4 \pm 3.0 \times 10^4$  for the 13 years specimen ( $P < .05$ ). In the 23 months specimen much more longitudinal CFO were present in the inter-threads area, while under the lower flank of the thread there were much more transverse CFO. In the 13 years specimens the difference in transverse and longitudinal CFO appeared to be not statistically significant due to the lamellar nature of the peri-implant bone which presents alternating CFO in adjacent bone lamellae. The OD (mean  $\pm$ SD) was  $205 \pm 45$  in the specimen after 23 months and  $130 \pm 34$  in the specimen after 13 years ( $P < .001$ ).

## DOES TMJ MORPHOLOGY DETERMINE DISK INCOORDINATION?

A. BUSATO<sup>1</sup>, V. VISMARA<sup>1</sup>, L. BERTELE<sup>2</sup>, I. ZOLLINO<sup>3</sup>, S. FANALI<sup>4</sup>,  
G. TRAPPELLA<sup>3</sup>, A. AVANTAGGIATO<sup>3</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>Private practice, Milano, Italy

<sup>2</sup>Centro riabilitativo Rigamonti, Merate, Italy

<sup>3</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy

<sup>4</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy

The relation between disk incoordination and Temporo-Mandibular Joint morphology is incompletely known. To address the research purpose, the investigators designed a cohort study on 200 (TMJ). A series of morphological parameters of condyle, glenoid fossa and intra-articular space dimensions were investigated and related to disk displacement. Differences exist between normal and pathologic cases as well as between mild and severe disk incoordination. The high of condylar head, the distance between condyle from the vault of glenoid fossa as well as from the posterior wall of glenoid fossa, the angulation of tuber and the angulation of condylar head (in an horizontal plane) are the variables dividing normal from pathologic cases. The distance between condyle from vault of glenoid fossa and the angulation of condylar head (in an horizontal plane) are the variables separating mild from severe cases. Reported data shown that disk incoordination is related to condyle, glenoid fossa and intra-articular space dimensions. The distance between condyle from the upper part of the glenoid fossa and the angulation of the condylar head are the strongest variables predicting disk incoordination. Additional studies are needed to detect which therapy gives better results in mild and severe subgroups.

## RELATION BETWEEN OCCLUSION, TMJ PAIN AND IDIOPATHIC SCOLIOSIS: A RETROSPECTIVE STUDY ON 120 PATIENTS

A. BUSATO<sup>1</sup>, V. VISMARA<sup>1</sup>, L. BERTELE<sup>2</sup>, I. ZOLLINO<sup>3</sup>,  
S. FANALI<sup>4</sup>, G. TRAPPELLA<sup>3</sup>, A. AVANTAGGIATO<sup>3</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>Private practice, Milano, Italy; <sup>2</sup>Centro riabilitativo Rigamonti, Merate, Italy

<sup>3</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy

<sup>4</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy

The present study was to establish a correlation between occlusion, Temporomandibular Joint (TMJ) pain and idiopathic scoliosis. The study population was composed of 120 patients affected by idiopathic scoliosis and admitted for orthodontic evaluation and treatment between January 2008 and December 2009. Several variables were investigated: demographic (age and gender), TMJ symptoms (left and right pain) anatomic (left and right cuspid and molar tooth classes, overbite and overjet, anterior and posterior left and right enamel surface lesions, anterior and posterior left and right cross-bites) and functional (frontal and left and right lateral guides for disclosure, left and right initial, intermediate, final and reciprocal clicks) variables. By matching TMJ pain and all the other variables, only occlusal functional variables and most severe scoliosis have a significant correlation with TMJ pain. Patients affected by idiopathic scoliosis have a high incidence of malocclusion. Occlusal functional variables and degree of scoliosis have a clinical impact on TMJ symptoms.

## **CRYOPRESERVED HOMOLOGUE ILIAC CREST GRAFTS USED IN SINUS LIFTING FOR IMPLANT REHABILITATION: A CASE SERIES ANALYSIS**

M. DANZA<sup>1</sup>, S. FANALI<sup>1</sup>, L. RIGO<sup>2</sup>, M. FRANCO<sup>2</sup>,  
A. AVANTAGGIATO<sup>3</sup>, A. LUCCHESI<sup>3</sup>, I. ZOLLINO<sup>3</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy*

<sup>3</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

In the last decade, several investigators have reported that autologous and homologous fresh frozen bones (FFB) are effective materials to restore alveolar ridges previous to insert dental implants. Here we reported a comparative study between implants inserted in cryopreserved fresh frozen bones (CFFB) and native bone to evaluate their clinical outcome. Patients were grafted and spiral implants were inserted in the same surgical time. Several variables (patient, grafts, anatomic site, implant, prosthetic restoration) were investigated. Implant' failure and peri-implant bone resorption were considered as predictor of clinical outcome. 53 implants were inserted in 12 patients. Implants were inserted to replace 8 incisors, 4 cuspids, 21 premolars and 20 molars. The mean follow-up was 14 months. Three out of 53 implants were lost (i.e. survival rate SVR = 94.3%) and no differences were detected among the studied variables. Similar result was obtained by analyzing the crestal bone resorption around implant' neck (i.e. success rate). CFFB and native bone have high and comparable survival and success rate. Spiral implants can be successfully inserted in native e grafted bone to perform an oral rehabilitation.

## **IMPLANTS INSERTED IN MAXILLARY SINUS GRAFTED WITH FRESH FROZEN HOMOLOGUE ILIAC BONE: A RETROSPECTIVE STUDY**

M. DANZA<sup>1</sup>, S. FANALI<sup>1</sup>, A. VISCIONI<sup>2</sup>, M. FRANCO<sup>2</sup>,  
A. AVANTAGGIATO<sup>3</sup>, A. LUCCHESI<sup>3</sup>, I. ZOLLINO<sup>3</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy*

<sup>3</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

In the last decade, several investigators have reported that autologous and homologous fresh frozen bones (FFB) are effective materials to restore alveolar ridges previous to insert dental implants. Here we reported a comparative study between spiral implants inserted in FFB and native bone to evaluate their clinical outcome. Patients were grafted and spiral implants were inserted in the same surgical time. Several variables (patient, grafts, anatomic site, implant, prosthetic restoration) were investigated. Implant' failure and peri-implant bone resorption were considered as predictor of clinical outcome. 51 implants were inserted in 12 patients. Implants were inserted to replace 8 incisors, 4 cuspids, 18 premolars and 21 molars. The mean follow-up was 14 months. No implant was lost. Peri-implant bone resorption (i.e. success rate) was used as predictor of clinical outcome but Kaplan Meier algorithm demonstrates that no studied variable has a statistical significant impact on clinical outcome. FFB and native bone have high and comparable survival and success rate. Spiral implants can be successfully inserted in native e grafted bone to perform an oral rehabilitation.

# CUSTOM-MADE CRANIAL VALUT RECONSTRUCTION: A RETROSPECTIVE STUDY

M. LAPPARELLI<sup>1</sup>, M. A. LORENZIN<sup>1</sup>, G. TRAPPELLA<sup>2</sup>,  
I. ZOLLINO<sup>2</sup>, G. CARNEVALI<sup>2</sup>, F. CARINCI<sup>2</sup>

<sup>1</sup>Neurosurgery, University of Ferrara, Ferrara, Italy

<sup>2</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy

None of several materials used to reconstruct skull defects is fully satisfactory, due to biological and physical properties. In large defects or in defects with more complex geometries, the preoperative prefabrication of a custom polymethylmethacrylate (PMMA) implant based on a three dimensional model could be the best choice. From January 2007 to December 2010 PMMA custom made cranioplasty have been implanted in 44 patients (22M/22F; age range 17-82) at the Neurosurgery Unit of the Arcispedale S. Anna of the University Hospital of Ferrara, Italy. The causes of primary operation were 25 (56.8%) cerebral hemorrhages, 15 (34.1%) traumas, 3 (6.8%) tumors and 1 (2.3%) infection, respectively. Hypertension was a co-morbidity factor in 13 (29.5%) patients. Cranial vault reconstruction was performed after a mean period of 9 months. The variables analyzed were causes of craniotomy (hemorrhages, traumas, tumors and infections), co-morbidity factor (i.e. hypertension), sites (1 frontal, 8 fronto-temporal, 32 fronto-temporo-parietal, 2 temporo-parietal and 1 temporo-occipito-parietal) and dimension of the defect (maximum diameter smaller than 9 cm,  $9 \leq x < 12$  cm, equal or greater than 12 cm). Each patient obtained an good aesthetic result. In two cases the reconstruction was removed in the follow-up period: one case of infected reconstruction and case of mobility of the prosthesis. PMMA custom-made devices from processing of CT images can be used for produce cranial prostheses which have a low rate of infection and mobility.

## TEMPORO-MANDIBULAR JOINT DISORDERS TREATMENT: REVIEW OF A CASE SERIES AND EVALUATION OF CLINICAL FACTORS ACTING ON OUTCOME

L. CLAUSER<sup>1</sup>, S. MANDRIOLI<sup>1</sup>, S. FANALI<sup>2</sup>, A. AVANTAGGIATTO<sup>3</sup>,  
A. LUCCHESI<sup>3</sup>, I. ZOLLINO<sup>3</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>Cranio-Maxillofacial Surgery Unit, Arcispedale S. Anna, Ferrara, Italy

<sup>2</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy

<sup>3</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy

Temporo-Mandibular Disorders (TMD) is a constellation of diseases characterized by pain of TMJ or its surrounding tissues, functional limitation of the mandible, or clicking the TMJ during motion. TMD etiology and pathogenesis are not completely understood and therefore a precise diagnoses and management is difficult. There is a wide range of medical or/and surgical treatment options. The majority of TMD can be greatly advantaged by the treatment with gnathologic and physiokinesic techniques. Because of no general agreement is reached on treatment protocols, data from 35 patients with TMD are reported. Our data demonstrated that oral appliance and physiotherapy are associated with a better clinical outcome. However, both oral appliance and physiotherapy are not strong enough to determine the effectiveness of the clinical outcome by themselves. Surgery must be reserved only to severe cases when conservative methods failed.



# **TRICALCIUM PHOSPHATE STIMULATES ADIPOSE TISSUE-DERIVED STEM CELLS TOWARDS OSTEOBLASTS DIFFERENTIATION**

V. SOLLAZZO<sup>1</sup>, S. FANALI<sup>2</sup>, E. MASIERO<sup>3</sup>, A. GIRARDI<sup>3</sup>, F. FARINELLA<sup>4</sup>,  
E. MELLONI<sup>5</sup>, F. PEZZETTI<sup>3</sup>, C. IACCARINO<sup>6</sup>, G. ZAULI<sup>7</sup>, F. CARINCI<sup>3</sup>

*<sup>1</sup>Orthopedic Clinic, University of Ferrara, Ferrara, Italy*

*<sup>2</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

*<sup>3</sup>Department of Histology, Embryology and Applied Biology, Centre of Molecular Genetics, CARISBO Foundation, University of Bologna, Bologna, Italy*

*<sup>4</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

*<sup>5</sup>Department of Morphology and Embryology, University of Ferrara, Ferrara, Italy*

*<sup>6</sup>"Hub & Spoke" Neurosurgery Unit-Emergency Department, University Hospital of Parma, Parma, Italy*

*<sup>7</sup>Institute for Maternal and Child Health, IRCCS "Burlo Garofolo", Trieste, Italy*

Tricalcium Phosphate (TCP) is used successfully as bone substitutes and scaffolds for tissue engineering and implantology to its capacity to enhance bone formation in vivo. To study how TCP can induce osteoblast differentiation and proliferation in mesenchymal stem cells, the expression levels of bone related genes were measured in adipose derived stem cells (ADSCs) and normal osteoblast (NO) cultivated on TCP scaffolds after 15 and 30 days of treatment using real time Reverse Transcription-Polymerase Chain Reaction. Significantly, differentially expressed genes among ADSCs and NO were RUNX, COL1A1, ALPL and SPP1 in the first 15 days of treatment and SP7, FOSL1, RUNX2, COL3A1 COL1A1, SPP1 and ALPL after 30 days. The present study demonstrated that TCP influences the behavior of ADSCs in vitro by enhancing proliferation, differentiation and deposition of matrix.

## **COMPARISON BETWEEN IMPLANTS INSERTED INTO NATIVE AND GRAFTED BONE: A RETROSPECTIVE COHORT STUDY ON 2,131 IMPLANTS**

S. FANALI<sup>1</sup>, I. ZOLLINO<sup>2</sup>, A. AVANTAGGIATO<sup>2</sup>, G. BRUNELLI<sup>2</sup>, B. DE ROSSI<sup>2</sup> and F. CARINCI<sup>2</sup>

*<sup>1</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

*<sup>2</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

In the last decade, several studies have been performed to evaluate the clinical outcome of implants inserted into grafted maxillae. A retrospective cohort study on 2,131 implants was planned to verify the impact on the clinical outcome. A total of 2,131 fixtures were inserted into native and grafted bones. Multiple implant systems were used. Five surgeons were enrolled. Kaplan Meyer and Cox analyses were used to detect those variables associated with the clinical outcome. Thirty one implants were lost (survival = 98.55%). Among the studied variables, only jaw and implant length were statistically associated with different implant survival rates. Of the remaining 2,100 implants, 304 had a peri-implant bone resorption rate that was higher than the cut-off value (success = 85.5%). The mean follow-up was 33 months. Implant site, type, length and bone type were associated to success. Bone grafts do not increase the number of lost implants in comparison with those inserted into native bone although higher bone resorption around the implant neck must be expected.

## **COMPARISON BETWEEN IMPLANTS INSERTED INTO NATIVE AND GRAFTED BONE: A RETROSPECTIVE COHORT STUDY ON 2,131 IMPLANTS**

S. FANALI<sup>1</sup>, I. ZOLLINO<sup>2</sup>, A. AVANTAGGIATO<sup>2</sup>, G. BRUNELLI<sup>2</sup>, B. DE ROSSI<sup>2</sup> and F. CARINCI<sup>2</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

In the last decade, several studies have been performed to evaluate the clinical outcome of implants inserted into grafted maxillae. A retrospective cohort study on 2,131 implants was planned to verify the impact on the clinical outcome. A total of 2,131 fixtures were inserted into native and grafted bones. Multiple implant systems were used. Five surgeons were enrolled. Kaplan Meyer and Cox analyses were used to detect those variables associated with the clinical outcome. Thirty one implants were lost (survival = 98.55%). Among the studied variables, only jaw and implant length were statistically associated with different implant survival rates. Of the remaining 2,100 implants, 304 had a peri-implant bone resorption rate that was higher than the cut-off value (success = 85.5%). The mean follow-up was 33 months. Implant site, type, length and bone type were associated to success. Bone grafts do not increase the number of lost implants in comparison with those inserted into native bone although higher bone resorption around the implant neck must be expected.

## **OPTIMIZATION OF IMPLANT-ABUTMENT CONNECTION IN ELECTRO-WELDED IMPLANTOLOGY: STUDY AND MECHANICAL CHARACTERIZATION**

S. FANALI<sup>1</sup>, T. VILLA<sup>2</sup>, D. FANALI<sup>3</sup>, F. CARINCI<sup>4</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of Structural, IRCCS Istituto Ortopedico Galeazzi, Milan, Italy* <sup>3</sup>*Private Practice, Rome, Italy*

<sup>4</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

The aim of this study is to compare in vitro the mechanical resistance of 7 different implant-abutment connections and determine which of them has the best mechanical performances (both statically and when subjected to dynamic loads) and which of them can guarantee the best level of tenacity during the clinical use of the intraoral electro-welded implantology with the bi-phase implants. All the implants were machined by Falappa Medical Devices – Rome. Two types of tests have been performed: static tests and fatigue tests. The static tests were performed on four specimens for each typology of connection, the fatigue tests on three specimens for each typology of connection. Configuration followed ISO 14801 standard.. The static tests were performed until rupture while the fatigue tests were performed applying a 108-1080 N load until either break was detected or 5 Mcycles were reached. Results showed that good static behavior does not involve automatically that the connection has also good long-term performances. Statistically significant differences were noted among the configurations: in particular internal connectors showed better results in comparison to external ones and among internal connectors the hexagonal one turned out to be the best one even if almost all the connectors had sufficient resistance to withstand normal masticatory loads.

# RECONSTRUCTION OF SEVERELY ATROPHIC JAWS USING HOMOGRAFTS: BONE DENSITY EVALUATION OVER TIME

F. CARINCI<sup>1</sup>, I. ZOLLINO<sup>1</sup>, S. FANALI<sup>2</sup>, A. MOTRONI<sup>3</sup>,  
G. MORETTI<sup>3</sup>, A. VISCIONI<sup>4</sup>, M. FRANCO<sup>4</sup>, V. SOLLAZZO<sup>5</sup>

<sup>1</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

<sup>2</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>3</sup>*AMIRG (Applied Medical Imaging Research Group), Milan, Italy*

<sup>4</sup>*Department of Maxillofacial Surgery, Civil Hospital, Castelfranco Veneto, Italy*

<sup>5</sup>*Orthopedic Clinic, University of Ferrara, Ferrara, Italy*

Bone augmentation to reconstruct atrophic jaws provides the base for sufficient functional and aesthetic implant-supported oral rehabilitation. Although autografts are the standard procedure for bone grafting, the use of homologue bone provides a reasonable alternative. Here bone density of native and grafted bone was evaluated over time by using Computed Tomography (CT) output and a specific computer program. Five patients were grafted with Fresh Frozen Bone (i.e. FFB) and 41 implants were inserted in the same operation. Pearson's chi-square test was used to investigate difference in bone density (i.e. BD) between native and grafted immediately over time. BD of both native bone and FFB located far away from implants do not change over time. Native bone has about a double BD than FFB. Peri-implants FFB BD is growing over time: it became about  $\frac{3}{4}$  of native BD after 12 months follow-up (and after 8 months of loading). CT scan represents a valuable and accurate pre-operative method to obtain information about bone quality and quantity (i.e. volume of available bone).

# HUMAN CORD STROMA CELLS AFTER CO-CULTURE WITH HUMAN DENTAL PULP CELLS UNDERGO TO OSTEOGENIC DIFFERENTIATION THROUGH A BMP 2-MEDIATED PATHWAY

A. GRAZIANO<sup>1,2\*</sup>, R. D'AQUINO<sup>2\*</sup>, L. VISAI<sup>3</sup>, V. MALIARDI<sup>3</sup>,  
L. BENEDETTI<sup>3</sup>, M.G. CUSELLA DE ANGELIS<sup>3</sup>, M. AIMETTI<sup>1</sup>, F. CARINCI<sup>2</sup>

<sup>1</sup>*Dental School, University of Torino, Torino, Italy*

<sup>2</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

<sup>3</sup>*Department of Sperimental Medicine, Section of Human Anatomy, University of Pavia, Pavia, Italy*

\*These authors equally contributed to the study.

In the human embryonic development, the umbilical cord comes from trofoblast, the embryo part that will not originate differentiated tissues but is committed to organize the trophic system for the developing embryo. The easy collecting procedure of the cord stroma and the plasticity of the cells isolated make it a suitable source for the collection of human mesenchymal cells. At the present moment, the bone needing for clinical therapies is increasing and identification of an alternative human cellular resource, easy to collect and able to produce a well-differentiated extracellular bone matrix, acts in this way. In this paper we demonstrate that the cord stroma mesenchymal progenitors are easy to commit into osteogenic lineages after exposition to conditioned medium of Runx2<sup>+</sup>/OC<sup>+</sup> positive cells, obtained from the differentiation of human dental pulp stem cell, cells that are bone committed cells and can be used to study the bone regeneration mechanisms. The chance to obtain the osteogenic differentiation and the production of a well-differentiated bone matrix just culturing the cells with the conditioned medium of OC<sup>+</sup>/RUNX2<sup>+</sup> cells is very important in the perspective of clinical application of these MSC.



# **EFFECTIVENESS OF SURGICAL AND ORTHODONTIC TREATMENT IN ORTHOGNATHIC SURGERY: A RETROSPECTIVE STUDY**

U. BACILIERO<sup>1</sup>, I. ZOLLINO<sup>2</sup>, S. FANALI<sup>3</sup>, A. BUSATO<sup>4</sup>,  
V. VISMARA<sup>4</sup>, A. AVANTAGGIATO<sup>2</sup>, F. CARINCI<sup>1</sup>

*<sup>1</sup>Maxillofacial Surgery, Civil Hospital, Vicenza, Italy*

*<sup>2</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

*<sup>3</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

*<sup>4</sup>Private practice, Milano, Italy*

Orthognathic surgery is the surgical correction of skeletal anomalies or malformations involving the mandible or the maxilla. Therefore, an accurate objective prediction analysis of the final treatment outcome has become an important part of the consultation for any patient seeking orthognathic surgery. In the present study a case series of patients planned on tracing of cephalometric radiographs is reported in order to assess the effectiveness of planning and treatment and pertinent literature discussed. The study population was composed of 44 patients (28 females and 16 males, median age 28 years) affected by class II and III skeletal malocclusion or long face. Patients were evaluated by means of 4 telerradiographies: one at the admission, one before surgery, one after surgery and one at the end the follow-up. Slavicek cephalometric analysis was performed. A logistic analysis was performed in order to detect those variables associated to the clinical outcome. Among the skeletal variables, the mandibular trend is the only variable that has an impact on clinical outcome. None of the teeth variables has statistical significance. Orthognathic surgery involving mobilization, repositioning, and fixation of the maxilla and mandible. The jaw is corrected to improve functional difficulties in the musculoskeletal system involving the mouth, including difficulties with mastication and pronunciation, and to treat facial appearance due to abnormal growth. It not only results in functional and cosmetic recovery, but the improved appearance also benefits the patient psychologically and socially. Our data demonstrated that patients planned on tracing of cephalometric radiographs have good clinical outcome. However, mandibular correction is the most difficult challenge to be perfectly corrected.

## **SINUS LIFT AUGMENTATION USING PULP STEM CELLS: A CASE REPORT AND HISTOLOGICAL EVALUATION**

A. GRAZIANO<sup>1</sup>, R. D'AQUINO<sup>1</sup>, G. BRUNELLI<sup>2</sup>, S. FANALI<sup>3</sup>, F. CARINCI<sup>1</sup>

*<sup>1</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

*<sup>2</sup>Don Orione Hospital, Bergamo, Italy*

*<sup>3</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

Bone augmentation to reconstruct atrophic jaws provides the base for sufficient functional and aesthetic implant-supported oral rehabilitation. Although autografts are the standard procedure for bone grafting, the use of bone regeneration by using dental pulp stem cell is an alternative that open a new era in this field. One patient undergoes to sinus lift elevation by means pulp stem cells gently poured onto collagen sponge. Histological sampling was performed after 6 months. Results clearly demonstrated new bone formation after dental pulp stem cells grafting after sinus lift. This report demonstrated that stem cells derived from dental pulp poured onto collagen sponge is a useful method for bone regeneration in atrophic maxilla.

# EARLY EFFECTS OF PULSED ELECTROMAGNETIC FIELDS ON HUMAN OSTEOBLASTS AND MESENCHYMAL STEM CELLS

V. SOLLAZZO<sup>1</sup>, L. SCAPOLI<sup>2</sup>, A. PALMIERI<sup>3</sup>, S. FANALI<sup>4</sup>,  
A. GIRARDI<sup>2</sup>, F. FARINELLA<sup>3</sup>, F. PEZZETTI<sup>2</sup>, F. CARINCI<sup>3</sup>

*<sup>1</sup>Orthopedic Clinic, University of Ferrara, Ferrara, Italy*

*<sup>2</sup>Department of Histology, Embryology and Applied Biology, University of Bologna, Bologna, Italy*

*<sup>3</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

*<sup>4</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

Pulsed Electromagnetic Fields (PEMFs) are commonly used in the clinical practice to treat several pathologies like osteotomies, avascular necrosis of the femoral head and bone grafts. The sequences of events by which electromagnetic stimulation can lead its effects on bone healing are not completely understood. In order to get more information on the mechanism of action of PEMFs, we asked whether a) PEMFs are able to induce changes in the production of growth factors in human osteoblasts and in human mesenchymal stem cells b) the production of growth factors induced by PEMFs vary at different time points (12 and 24 hrs) c) PEMFs induce a different production of growth factors in cells at different stages of differentiation like human Mesenchymal Stem cells and human osteoblasts. Twenty seven genes out of the 84 studied were significantly over and down expressed and fourteen of those genes up or down regulated are related to bone formation or inflammation. Our data demonstrate that PEMFs exert their effects by activating or suppressing a large number of growth factors simultaneously with different functions and that this variation of expression varies depending on time and depending on the different stage of differentiation of the cell.

# MANDIBLE BROWN TUMOR CAUSED BY PRIMARY HYPERPARATHYROIDISM

A. SCARANO<sup>1</sup>, B. SINJARI<sup>1</sup>, L. ARTESE<sup>1</sup>, S. FANALI<sup>1</sup>, F. CARINCI<sup>2</sup>

*<sup>1</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

*<sup>2</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

Brown tumor is a uni or multi-focal bone lesion, which represents the terminal stage of the hyperparathyroidism-dependent bone pathology. It often appears as an expansive osteolytic lesion of the bone, commonly in the mandible, ribs, pelvis and femur. A 56 year-old male patient presented with an asymptomatic unilocular radiolucent lesion of the right mandible without teeth. The lesion had a diameter of about 3 cm, had sharply delimited margins and was surrounded by an osteosclerotic rim. Under local anesthesia, the lesion was extracted surgically. The microscopic diagnosis was brown tumor of the mandible. The following report describes a patient with secondary hyperparathyroidism who developed a brown tumor of the mandible, discuss the differential diagnosis, and review the literature.

## **POSTURE-STABILOMETRIC VALUATION IN RUGBY PLAYERS AFTER MANDIBULAR REPOSITIONING**

M. D'ATTILIO<sup>1</sup>, D. RODOLFINO<sup>1</sup>, C. CHIMENTI<sup>2</sup>,  
A. SCARANO<sup>1</sup>, F. FESTA<sup>1</sup>, S. FANALI<sup>1</sup>, F. CARINCI<sup>3</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of Surgical Sciences, Università degli Studi di L'Aquila, Italy*

<sup>3</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

The aim of the present study was to investigate the effect of the mandibular repositioning on the sport performance of rugby players, after posture-stabilometric screening. Twenty healthy rugby players (25 years on the average), with Temporomandibular Disorders (TMD), were included in the study. Posture-stabilometric valuation was performed with a combination of different visual conditions (eyes open/closed) and mandibular positions (Rest Position (RP) /Maximum Intercuspidation /mandibular repositioning with a wax non centric, centric and with an increase of the vertical dimension). Twelve players, which improved their posture-stabilometric arrangement after mandibular repositioning, were treated with Positioner, and underwent strength and speed testing before (T0) and after (T1) the use of the Positioner. For all tests there was a statistically significant improvement of the performance ( $P<0.05$ ). The mandibular repositioning can produce an increase of the levels of strength, postural stability, resistance to fatigue, and a reduction of the muscular trauma.

## **POSTUROSTABILOMETRIC EVALUATION OF PLANTAR VARIATIONS IN PATIENTS WITH TEMPORO-MANDIBULAR DYSFUNCTION: A CASE-CONTROL STUDY**

M. D'ATTILIO<sup>1</sup>, D. RODOLFINO<sup>1</sup>, B. SINJARI<sup>1</sup>, S. CAPUTI<sup>1</sup>,  
R. GERXHANI<sup>1</sup>, A. SCARANO<sup>1</sup>, F. FESTA<sup>1</sup>, S. FANALI<sup>1</sup>, F. CARINCI<sup>2</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

The aim of this experimental study was to find out if temporo-mandibular dysfunctions (TMD) can influence two of the parameters defining body posture, intersolar distance and plantar lay. Test group (TG) was made of 52 subjects (14 males and 38 females aging from 12 to 64 years, average  $34.25 \pm 12.96$  ) all affected by temporo-mandibular dysfunctions. Control Group (CG) was made of 52 subjects (21 males and 31 females aging from 16 to 56 years average  $34.19 \pm 13.40$  ) completely negative for temporo-mandibular or occlusal dysfunctions. The posturo-stabilometric measurements were made using a stabilometric platform and the following conditions were investigated: mandibular rest position (rest) and intercuspidal position (icp) with both eyes open/closed. For both conditions the following parameters were recorded: sway area, sway velocity, sway length, sway velocity variation, weight distribution, right foot angle, left foot angle, the sum of feet angles, bar torsion angle and intersolar distance. The results of our study show that there is a detectable difference between Test and Control group in intercuspal position.

# **MAXILLARY SINUS MEMBRANE PERFORATION FROM NASAL SUCTION TECHNIQUE AND ULTRASONIC APPROACH vs. CONVENTIONAL ROTATIVE INSTRUMENTS**

A. SCARANO<sup>1</sup>, C. MANCINO<sup>1</sup>, G. MURMURA<sup>1</sup>, S. FRISONE<sup>1</sup>, S. FANALI<sup>1</sup>, F. CARINCI<sup>2</sup>

<sup>1</sup>*Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

<sup>2</sup>*Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy;*

To compare the efficacy of two different techniques for sinus membrane elevation for maxillary lining lifted using a lateral window approach: nasal suction technique and ultrasonic surgery approach vs. traditional approach. Twelve partially edentulous patients having bilaterally 1 to 5 mm of residual bone height and at least 5 mm bone width below the maxillary sinuses as measured on Computed Tomography (CT) scans were randomized to receive two 2-stage sinus lift procedures using the lateral window approach. In one side the sinus lining the membrane was elevation with nasal suction technique and ultrasonic surgery approach whereas the contralateral side the membrane was elevation after osteotomy prepared using a round oral surgery bur. No patient dropped out. In the group 1 (control), a four small perforation of membrane (< 5 mm) was observed. In the group 2 (test) no perforation of membranes was observed. A statistically significant difference was present between the incidence of sinus membrane perforation in group I vs. II (control vs. test) p-value = 0.08. In conclusion the sinus lift with ultrasonic surgery and nasal suction technique is useful to prevent a perforation of sinus membrane.

# **EVALUATION OF A MIR-146A POLYMORPHISM IN ORAL SQUAMOUS CELL CARCINOMA ORIGIN AND PROGRESSION**

A. PALMIERI<sup>1</sup>, F. CARINCI<sup>1</sup>, M. MARTINELLI<sup>2</sup>, F. PEZZETTI<sup>2</sup>,  
A. GIRARDI<sup>2</sup>, F. FARINELLA<sup>1</sup>, C. RUBINI<sup>3</sup>, P. BONELLI<sup>4</sup> and L. SCAPOLI<sup>2</sup>

<sup>1</sup>*Department of D.M.C.C.C, Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

<sup>2</sup>*Department of Histology, Embryology and applied Biology University of Bologna, Bologna, Italy*

<sup>3</sup>*Anatomical Pathology Unit, Polytechnic University of the Marche Region, Ancona, Italy*

<sup>4</sup>*Experimental Pharmacology, Department of Research, National Cancer Institute G Pascale, Naples, Italy*

Recent evidence indicates that microRNAs affect cell growth, differentiation, apoptosis, and play a role in tumorigenesis. Large scale screening suggested that mir-146a was related to oral squamous cell carcinoma development and progression. The common polymorphism rs2910164, able to modulate mir-146a expression appeared related to the onset of different cancers, including carcinoma. A sample set of 360 oral squamous cell carcinoma was genotyped to test association between rs2910164 and cancer occurrence as well as cancer progression. No significant levels of association with any allele or genotype was found, however a slight increase of the variant allele was observed in stage II tumors. Further studies could help to understand if rs2910164 may considered a risk factor for oral carcinoma.

## PEPTIDE-15 STIMULATES PULP STEM CELLS TOWARDS OSTEOBLASTS DIFFERENTIATION

V. SOLLAZZO<sup>1</sup>, S. FANALI<sup>2</sup>, E. MASIERO<sup>3</sup>, A. GIRARDI<sup>3</sup>, F. FARINELLA<sup>4</sup>,  
E. MELLONI<sup>5</sup>, F. PEZZETTI<sup>3</sup>, C. IACCARINO<sup>6</sup>, G. ZAULI<sup>7</sup>, F. CARINCI<sup>3</sup>

*<sup>1</sup>Orthopedic Clinic, University of Ferrara, Ferrara, Italy*

*<sup>2</sup>Department of Oral Science, Nano and Biotechnology, University "G. D'Annunzio", Chieti, Italy*

*<sup>3</sup>Department of Histology, Embryology and Applied Biology, Centre of Molecular Genetics, CARISBO Foundation, University of Bologna, Bologna, Italy*

*<sup>4</sup>Department of D.M.C.C.C., Section of Maxillofacial Surgery, University of Ferrara, Ferrara, Italy*

*<sup>5</sup>Department of Morphology and Embryology, University of Ferrara, Ferrara, Italy*

*<sup>6</sup>"Hub & Spoke" Neurosurgery Unit-Emergency Department, University Hospital of Parma, Parma, Italy*

*<sup>7</sup>Institute for Maternal and Child Health, IRCCS "Burlo Garofolo", Trieste, Italy*

**Peptide-15 (P-15) is a bone augmentation material analog to the cell binding domain of collagen. P-15 competes for cell surface sites for attachment of collagen and, when immobilized on surfaces, it promotes adhesion of cells and facilitates physiological process like binding, migration and differentiation of cells. To study how P15 can induce osteoblast differentiation and proliferation in mesenchymal stem cells, the expression levels of bone related genes (RUNX2, SP7, ALPL, SPP1, COL1A1, COL3A1 and FOSL1) and mesenchymal stem cells marker (ENG) were measured in Dental Pulp Stem Cells (DPSCs) and Normal Osteoblast (NO), after 15 and 30 days of treatment. Significantly, differentially expressed genes among DPSCs and NO were SP7, ENG, RUNX2, COL3A1, COL1A1, ALPL and SPP1 in the first 15 days of treatment and ENG, RUNX2, COL31A, COL1A1, SPP1 and ALPL after 30 days. The present study demonstrated that P15 influences the behavior of DPSCs in vitro by enhancing proliferation, differentiation and deposition of matrix.**



# RECIPROCAL ALTERED EXPRESSION OF E-CADHERIN AND P-CADHERIN IN MUCOUS MEMBRANE PEMPHIGOID

A. SANTARELLI<sup>1,2</sup>, O. DI FEDE<sup>3</sup>, F. CARINCI<sup>4</sup>, C. RUBINI<sup>5</sup>,  
G. GANZETTI<sup>6</sup>, D. PERRONE<sup>1</sup>, O. SIMONETTI<sup>6</sup>, A. OFFIDANI<sup>6</sup>, M. RE<sup>2</sup>, D. PERRONE<sup>1</sup>,  
G. PANNONE<sup>1</sup>, L. LO MUZIO<sup>1,3</sup>

*<sup>1</sup>Department of Surgery, University of Foggia, Foggia, Italy*

*<sup>2</sup>Department of Specialistic Clinic and Odontostomatological Sciences,  
Polytechnic University of Marche, Ancona, Italy*

*<sup>3</sup>Department of Oral Sciences, Sector of Oral Medicine "V. Margiotta", University of Palermo,  
Palermo, Italy*

*<sup>4</sup>Department of D.M.C.C.C., Section of Maxillofacial and Plastic Surgery, University of Ferrara, Ferrara, Italy*

*<sup>5</sup>Institute of Pathology, Polytechnic University of Marche, Ancona, Italy*

*<sup>6</sup>Clinic of Dermatology, Polytechnic University of Marche, Ancona, Italy*

E- and P- cadherins are involved in the selective adhesion of epidermal cells. To gain insight into the role of cadherins on the acantholysis of keratinocytes and further investigate the pathogenesis of Mucous Membrane Pemphigoid, we examined the expression of P-cadherin and E-cadherin, in normal human oral mucosa, lesional and peri-lesional mucosa in MMP. Twenty-nine samples from paraffin-embedded specimens of MMP were used for the study. Five specimens of healthy oral mucosa were evaluated as control group. To evaluate the E- and P-Cadherin expression, a mean percentage of positive cells was determined from the percentage of positive cells derived from the analysis of 100 cells in ten random areas at x400 magnification. It was observed that E-cadherin was weakly and discontinuously expressed on the epithelial layers of pemphigoid mucosa, while it was intensively expressed on all keratinocytes in normal human skin. In contrast, P-cadherin was strongly expressed throughout the entire epidermal layer in MMP samples, although its expression is restricted to the basal cell layer in normal human skin. Statistical analyses showed that the percentage of E-cadherin positive cells in the epithelium of pemphigoid cases was significantly decreased compared with that in normal human mucosa. There was a significant increase in the percentage of P-cadherin positive cells in the epithelial layers of MMP compared with normal human mucosa. The present study showed that there is downregulation of E-cadherin expression and upregulation of P-cadherin expression in MMP mucosa, which may be involved in the pathogenesis of MMP.

# EXPRESSION OF $\beta$ -CATENIN AND $\gamma$ -CATENIN IN MAXILLARY BONE REGENERATION

A. SANTARELLI<sup>1,2</sup>, G. COLELLA<sup>3</sup>, F. CARINCI<sup>4</sup>, G. PANNONE<sup>1</sup>,  
R. RUBINI<sup>5</sup>, L. LO RUSSO<sup>1</sup>, A. POLIMENI<sup>6</sup>, N. SGARAMELLA<sup>1</sup>, S. ANNIBALI<sup>6</sup>, G. SPINELLI<sup>7</sup>,  
L. LO MUZIO<sup>1,3</sup>

<sup>1</sup>*Department of Surgical Sciences, University of Foggia, Foggia, Italy*

<sup>2</sup>*Department of Specialistic Clinic and Odontostomatological Sciences,  
Polytechnic University of Marche, Ancona, Italy*

<sup>3</sup>*Department of Head and Neck Surgery, Second University of Naples, Naples, Italy*

<sup>4</sup>*Department of D.M.C.C.C., Section of Maxillofacial and Plastic Surgery, University of Ferrara, Ferrara, Italy*

<sup>5</sup>*Department of Neurosciences, Pathologic Anatomy and Histology,  
Polytechnic University of Marche, Ancona, Italy*

<sup>6</sup>*Institute of Dentistry, University of Rome "La Sapienza", Rome, Italy*

<sup>7</sup>*Section of Maxillo-Facial Surgery, Careggi Hospital, Firenze, Italy*

$\beta$ - and  $\gamma$ -catenin are components of catenin family involved in cadherin adhesion function. Recently it has been shown that this family is involved in other functions such as signaling and activation of transcription factors. The final goal of this study was to evaluate the role of  $\beta$ - and  $\gamma$ -catenin in bone cell physiology and bone regeneration. Formalin-fixed-paraffin embedded specimens of 15 human bone specimens after sinus lift were collected and examined by immunohistochemistry using primary antibodies against  $\beta$ - and  $\gamma$ -catenin. Staining intensity and cellular localization were evaluated.  $\beta$  and  $\gamma$ -catenin showed a very high level of expression in human bone tissues. In particular catenins were expressed in cells with morphological findings of osteoblasts in the areas of new bone formation at the junction between mineralized and unmineralized tissue, between osteoid matrix and bone. Osteoclasts showed also positivity for catenins. Osteocytes, cells located in lacunae of mature mineralized bone with function of bone vitality maintenance, showed no expression for catenins. Specimens characterized by high amount of catenins in osteoblasts at 1<sup>o</sup> month showed high grade of bone maturation at 3<sup>o</sup> month. Data demonstrated an overall involvement of catenins in human bone tissues and in particular during bone regeneration process. The presence of staining for  $\beta$ - and  $\gamma$ -catenin particularly in osteoblasts demonstrates a significant role of catenins in functions, other than in cadherin interaction, such as signaling and activation of transcription factors during differentiation of bone tissues.

**PERI-TUMORAL INFLAMMATORY CELL INFILTRATION IN OSCC:  
A RELIABLE MARKER OF LOCAL RECURRENCE AND PROGNOSIS?  
AN INVESTIGATION USING ARTIFICIAL NEURAL NETWORKS**

G. CAMPISI<sup>1</sup>, F. CALVINO<sup>1</sup>, F. CARINCI<sup>2</sup>, D. MATRANGA<sup>3</sup>,  
M. CARELLA<sup>4</sup>, M. MAZZOTTA<sup>5</sup>, C. RUBINI<sup>6</sup>, V. PANZARELLA<sup>1</sup>,  
A. SANTARELLI<sup>4</sup>, S. FEDELE<sup>7</sup>, L. LO MUZIO<sup>4,5</sup>

<sup>1</sup>*Section of Oral Medicine “V. Margiotta”, Department of Surgical and Oncological Sciences,  
University of Palermo, Palermo, Italy*

<sup>2</sup>*Department of D.M.C.C.C., Section of Maxillofacial and Plastic Surgery, University of Ferrara, Ferrara, Italy*

<sup>3</sup>*Department of Biopathology and Medical and Forensic Biotechnologies, University of Palermo, Italy*

<sup>4</sup>*Department of Surgical Sciences, University of Foggia, Foggia, Italy*

<sup>5</sup>*IRCCS CROB, Centro di Riferimento Oncologico di Basilicata, Rionero in Vulture, Potenza, Italy*

<sup>6</sup>*Department of Neuroscience, Politecnica University of Marche, Ancona, Italy*

<sup>7</sup>*UCL Eastman Dental Institute, London, United Kingdom*

The presence of inflammatory reaction in peri-tumoural connective tissue is generally considered as a defense mechanism against cancer, but inflammation tissue in malignant transformation and early steps of oncogenesis has been recently proven to play a supporting and aggravating role in some carcinomas. Aims of this retrospective study were to evaluate in OSCCs the independent association of peri-tumoral inflammatory infiltrate (PTI) with local recurrence (LR) or survival outcome, and to verify whether PTI can be considered a marker of prognosis. Data from 211 cases of OSCC, only surgically treated between 1990 and 2000, were collected and retrospectively analyzed for PTI and the event LR (5 yrs follow-up at least) by means of univariate-multivariate and neural networks analyses. Patients (mean age  $65.3 \pm 12.4$  yrs, M/F = 2.98) showed presence of PTI in 68.2% (144/211): (+) in 27.0%, (++) in 25.6%, (+++) 15.6%; PTI was found reduced in 24.7% of cases and absent in 7.1%. In overall PTI+ve group (n=144), 66 were TNM Stage I, 33 Stage II, 45 Stage III, none Stage IV. LR (mean  $6 \pm 4$  months) was present in 87/211 (41.2%) patients, of which 43/144 (29.8%) in OSCCs with PTI [23 (+), 13 (++) and 7 (+++)] vs. 44/67 (65.7%) in OSCC with PTI -/+ or PTI-ve ones. By univariate analysis, PTI+ve cases showed a significant lower risk to have LR ( $p < 0.0001$ ; OR= 0.2297; CI= 0.1277:0.4134) vs PTI -/+ or -ve ones, especially among cases with higher PTI value (+++) (OR= 0.1718; CI= 0.0749:0.3939). Multivariate analyses (Logit model and neural networks) confirmed the same datum: presence of PTI was an independent predictive variable accounting for a better tumoural outcome without LR (Logit and neural networks values: OR' 0.226; CI= 0.113:0.454; ROC Area = 0.66, respectively). In terms of prognostic significance, elevated PTI was found to have an independent association with the poorest overall survival rate ( $P = 0.056$ ). Our findings strongly suggest the importance to investigate routinely PTI in OSCCs, as useful marker of tumoral behavior and prognosis, and warrant further studies on its specific cellular nature.

# **DIRECT VISUALIZATION OF ORAL-CAVITY TISSUE FLUORESCENCE AS NOVEL AID FOR EARLY ORAL CANCER DIAGNOSIS AND POTENTIALLY MALIGNANT DISORDERS MONITORING**

C. PADERNI<sup>1</sup>, D. COMPILATO<sup>1</sup>, F. CARINCI<sup>2</sup>, G. NARDI<sup>3</sup>, V. RODOLICO<sup>4</sup>,  
L. LO MUZIO<sup>5</sup>, G. SPINELLI<sup>6</sup>, M. MAZZOTTA<sup>7</sup>, G. CAMPISI<sup>1</sup>

<sup>1</sup>*Department of Oral Sciences, Sector of Oral Medicine “V. Margiotta”, University of Palermo, Palermo, Italy*

<sup>2</sup>*Department of D.M.C.C.C., Section of Maxillofacial and Plastic Surgery, University of Ferrara, Ferrara, Italy*

<sup>3</sup>*Department of Oral Sciences, University “La Sapienza” of Rome, Rome, Italy*

<sup>4</sup>*Department of Sciences for health promotion - Sector of Human Pathology  
University of Palermo, Palermo, Italy*

<sup>5</sup>*Department of Surgical Sciences, University of Foggia, Foggia, Italy*

<sup>6</sup>*Section of Maxillo-Facial Surgery, Careggi Hospital, Firenze, Italy*

<sup>7</sup>*Istituto di Ricovero e Cura a Carattere Scientifico Centro di Riferimento Oncologico di Basilicata  
(I.R.C.C.S. C.R.O.B.), Rionero in Vulture, CROB, Italy*

**Direct visualization of the oral tissue autofluorescence has been recently reviewed in several studies as a possible adjunctive tool for early recognition and diagnosis of potentially malignant and malignant oral disorders. The aims of this study were to assess: a) the value of a simple handheld device for tissue auto-fluorescence visualization of potentially malignant oral lesions; and b) the sensitivity, specificity and diagnostic accuracy of tested device, using histological examination as the gold standard. 175 consecutive patients, with at least one clinical oral lesion, were enrolled in the study. Clinical conventional inspections were performed for each patient by two blind operators. Then, oral biopsy and histological examination were performed. Pathologist was blind with respect to the autofluorescence results. The 175 histological assessments revealed no dysplasia, mild dysplasia, moderate/severe dysplasia and OSCC, in the 67.4%, 8.6%, 8%, 16% of cases, respectively. Oral lesions diagnosed as OSCC were found as positive under fluorescent light in the 96.4% of cases. Statistically significant correlation was observed between oral dysplastic lesions and the loss of tissue fluorescence (p-value=0.001). Low sensitivity values (60% and 71%) were recorded about the ability of the device in differentiating mild dysplasia vs. lack of dysplasia and moderate/severe dysplasia vs absence of dysplasia, respectively. The device tested in our study was found to not replace the histopathology procedure. However, we assessed its usefulness for oral tissue examination, especially within an oral medicine secondary care facility, before performing a biopsy and in monitoring oral lesions.**

# EXPRESSION OF SEXUAL HORMONES RECEPTORS IN ORAL SQUAMOUS CELL CARCINOMA

G. COLELLA<sup>1</sup>, G. IZZO<sup>2</sup>, F. CARINCI<sup>3</sup>, G. CAMPISI<sup>4</sup>, L. LO MUZIO<sup>5</sup>,  
S. D'AMATO<sup>1</sup>, M. MAZZOTTA<sup>6</sup>, R. CANNAVALE<sup>1</sup>, D. FERRARA<sup>2</sup>, S. MINUCCI<sup>2</sup>

<sup>1</sup>*Department of Head and Neck Surgery, Second University of Naples, Naples, Italy*

<sup>2</sup>*Department of Experimental Medicine, Second University of Naples, Naples, Italy*

<sup>3</sup>*Department of D.M.C.C.C., Section of Maxillofacial and Plastic Surgery, University of Ferrara, Ferrara, Italy*

<sup>4</sup>*Department of Oral Medicine, University of Palermo, Palermo, Italy*

<sup>5</sup>*Department of Surgical Sciences, University of Foggia, Foggia, Italy*

<sup>6</sup>*Istituto di Ricovero e Cura a Carattere Scientifico Centro di Riferimento Oncologico di Basilicata  
(I.R.C.C.S. C.R.O.B.), Rionero in Vulture, CROB, Italy*

Sexual hormones play an important role in expression of genes involved in a wide variety of biological and neoplastic processes. The information on Estrogen Receptors (ER) expression in non-target tissues is very few and, in particular, the studies in head and neck tumors are still controversial. Recent studies analyzed the role of Tamoxifen (TAM) on Oral Squamous Cell Carcinoma (OSCC) lines in relation to the presence/absence of ER. The purpose of the present study was to evaluate the expression of sexual hormones receptors mRNAs, in particular Estrogen Receptor alpha (ER $\alpha$ ) and Androgen Receptor (AR) mRNA in OSCC tissues. The study group comprised 20 samples of OSCC, harvested from 20 otherwise healthy subjects (14 males and 6 females, mean age 58.2y, range 38-74). The control group was formed by 20 samples of normal mucosa harvested around the margins of the specimens (at least 1 cm from the lesion margins). Estrogens Receptor alpha (Era) and Androgen Receptor (AR) mRNA expressions were analyzed by RT-PCR carried out on total RNAs extracted from both cancerous and healthy tissues. Obtained data were evaluated by Shapiro-Walk normality test and compared by Student's t test. Results with  $p < 0.05$  were considered statistically significant. AR transcripts were less expressed in OSCC specimens than in healthy tissues, while levels of ER $\alpha$  transcripts significantly increased in tumor samples. These preliminary data show different expression patterns of AR and ER $\alpha$  mRNAs in malignant tissues of oral mucosa and could suggest an involvement of these sexual hormones in oral cancer.