

# Libro de Resúmenes



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## Oral Session

### 16S rRNA gene-sequencing of sound and cariogenic dental biofilm microbioma.

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**Objectives** The objective: of the present study was to identify and compare the microbiomes of healthy and caries disease in dental surface from Chilean adults.

**Methods** Methods: A total of 56 site-specific supragingival biofilm samples were collected from 14 patients recruited, both sex (18-35 years old), of them n=5 were caries free and n=9 were caries active (ICDAS 1-3). Patients remain unbrushed during 24 hours, fast at least 8 hours, dental biofilm was collected from the four 1st molars (supragingival areas), the genetic material was extracted, maintained in buffer solution and send to Ubiome Laboratories (San Francisco, LA, USA). Biofilms were analyzed by 16S ribosomal RNA amplicon sequencing. Samples microbiotas were compared at Genus and Families levels. The caries risk assessment was made by CAMBRA.

**Results** Results: Proportion of *Streptococcus* decreased while *Veillonella* increased in caries-free patients. *Streptococcus* population decreasing was related to the increasing of *Corynebacterium*, *Neisseria*, *Leptotrichia*, *Capnocytophaga*, *Prevotella* and *Campylobacter* in healthy patients. The increasing of *Streptococcus* was associated with the rise of *Lautropia*, *Haemophilus*, *Bergeyella* and *Aggregatibacter* in caries-active patients. In general, men had significantly higher levels of *Lachnospiraceae*, *Aerococcaceae* and *Leptotrichiaceae* than female. Caries risk assessment was not associated with oral microbiome and not discriminate the presence or absence of the caries disease in adults.

**Conclusions** Conclusions: There were no typical bacteria families or genus only in healthy or only caries-active patients. Caries-free and caries-active surfaces tooth share similar microbioma but in different proportion. Greater relative abundance of bacterial families and genera were observed in caries free dental biofilms. The bacterial diversity was lower in the caries-active group, suggesting that the bacterial diversity establishes a protective environment.

### Characterization: Oral Health Of Schoolchildren From 6 To 8 Years.

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#### Objectives

The aim of the study was to determine prevalence and severity of dental caries, and describe the oral health situation in a school population aged 6 to 8 years in north area of Santiago.

**Methods** A clinical examination was performed by a group of previously calibrated dentists. The universe was school children from first to third grade, who are enrolled in municipal schools in the North area of the Region Metropolitana with registration of immigrant children. The sample was 633 children, who met the inclusion criteria and presented informed consent signed by their parents and /or guardians. The ceod / COPD, caries prevalence and Oral Hygiene were determined. The variables considered for the characterization of the sample were: sex, age, educational level of the main caregiver and immigrant status.

**Results** The prevalence of caries in the population was 64.6%, the average ceod was 2.3, COPD was 0.2 and IHO 0.68.

Prevalence, ceod / COPD and IHO rates were higher for non-immigrants

**Conclusions** There is a high prevalence and severity of caries lesions in students from first to third grade, belonging to the North area of Region Metropolitana, being higher in the group of non-immigrant schoolchildren. Furthermore, the severity of caries tends to increase with age.

### Porphyromonas gingivalis, Not P. endodontalis, Lipopolysaccharide Induces Macrophage M1 Profile

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**Objectives** The lipopolysaccharide (LPS) of *Porphyromonas gingivalis* (Pg) and *P. endodontalis* (Pe) are related to the etiopathogenesis of apical periodontitis. However, the immune response induced by LPS from *Porphyromonas spp.* specifically from Pg (Pg-LPS) and LPS from Pe (Pe-LPS), in macrophages is not fully understood. We aimed to characterize the polarization profiles of human macrophages stimulated with LPS obtained from reference strain and clinical isolates of either Pg or Pe, and a combination of both species.

**Methods** THP-1 cell line (ATCC TIB-202) was differentiated to macrophages with 10 nM of phorbol 12-myristate 13-acetate (PMA) and stimulated with *Pg*-LPS (10 µg/mL), *Pe*-LPS (10 µg/mL) or both for 24 hours. Macrophages without stimulation were used as a negative control, and macrophages stimulated with LPS from *Escherichia coli* (*Ec*-LPS) O127:B8 (10 µg/mL) were used as a positive control. Then, cells were labeled with anti-CD64, anti-CD80 (M1), anti-CD163, anti-CD206 (M2) antibodies, and analyzed by flow cytometry. Moreover, we measured TNF- $\alpha$ , IL-1 $\beta$ , IL-6, IL-12 (M1) IL-10 and IL-1Ra (M2) from culture supernatant by ELISA/Multiplex.

**Results** *Pg*-LPS decrease CD64 surface expression, increase CD80 surface expression, and increase the levels of TNF- $\alpha$ , IL-1 $\beta$ , IL-6, IL-12 (M1), and IL-10 and IL-1Ra (M2) ( $p < 0.05$ ) similar to *Ec*-LPS, but in a lower proportion. In contrast, *Pe*-LPS and the combination of *Pg*-LPS and *Pe*-LPS, did not induce changes on the levels of CD64, CD80 or cytokines levels.

**Conclusions** *Pg*-LPS would be inducing a M1 profile in macrophages, unlike *Pe*-LPS that did not show changes on surface markers and cytokines levels.

#### **Related factors with Erosive Tooth Wear in Chilean adults sample.**

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**Objectives** To explore the relationship between intrinsic and extrinsic factors and high Basic Erosive Wear Examination (BEWE) cumulative score in a Chilean adult group.

**Methods** A cross-sectional study was performed with approval by the Ethics Committee from the Faculty of Medicine, Universidad de los Andes. A consecutive adult (18 to 46 years old) sampling ( $n=533$ ) from Universidad de los Andes Health Center (CESA), in San Bernardo-Chile, from September 2016 to January 2017, was selected. Dental exams were performed by two trained and calibrated examiners, according to the BEWE index. An exhaustive hetero-applied questionnaire previously developed and evaluated questionnaire was applied for searching for potential factors related. The outcome was individuals who had BEWE cumulative score 14 or higher. Percentages and absolute frequencies described categorical variables. Logistic regression models reporting crude odds ratio (OR) and adjusted OR by age, 95% confidence interval (95% CI), and its respective  $p$ -value were estimated (Stata Software 14.2).

**Results** Variables, odds ratios and 95% CI related with  $BEWE \geq 14$  were: age (OR 1.1 [1.07-1.14]); alcohol drinking currently (OR 1.59 [1.06-2.39]); esophagitis (OR 8.22 [1.60-42.22]); difficulty to swallow (OR 2.45 [1.10-5.44]); chest pain (OR 2.07 [1.18-3.64]); anorexia (OR 3.82 [1.07-13.68]); vitamin C (OR 1.92 [1.08-3.43]); beer consumption (OR 1.68 [1.04-2.72]).

**Conclusions** Age, alcohol consumption, esophagitis self-report, history of gastric symptoms, anorexia, vitamin C intake, and beer consumption were related to high BEWE score in this sample of Chilean adults in San Bernardo, Chile.

#### **Determination of morphogeometric patterns in individuals with mandibular edentulism.**

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**Objectives** To analyze the morphogeometric coordinates of the anterior region of the mandible according to the severity of the bone resorption proposed by Wright et al. (2019), obtained based on anatomical landmarks using MorphoJ software.

**Methods** This methodological proposal is to introduce an innovation in the two-dimensional classical morphological classification (Atwood, 1963; Cawood & Howell, 1988) of the mandibular anterior region of edentulous individuals, according to severity of bone resorption, using digital analysis tools. From DICOM files (Digital Imaging and Communication in Medicine) obtained from CBCT (Cone Beam Computed Tomography) of 12 edentulous adult patients, images of interforaminal cross-sections were captured using 3DSlicer visualization software, which will be classified by PCA (Principal Component Analysis) of cross-sectional morphology (Wright, 2019) based on anatomical references of the anterior region of the mandible.

For the classification of the cross-sectional morphology of clinical cases; a work team made up of 2 evaluators participated: 1 Undergraduate Unit Teacher and 1 Medical Technologist (CIDIC member). The team had remote access to the DICOM files of the patients, with the possibility of separately classifying each clinical case, to analyze and validate the morphological variants with the highest prevalence according to Wright, 2019 (pear, ovoid, triangular, sickle, hourglass) and an expert consensus will be reached.

**Results** A novel morphological classification method is generated according to the degree of bone resorption, from the morphogeometric analysis of the mandibular anterior region.

**Conclusions** This analytical proposal will be a contribution in the resolution of cases with an atrophic mandible and its resulting morphogeometric classification, will have a potential application in rehabilitation, implantology and teledentistry.

### Effectiveness of L-PRF socket filling in three-dimensional alveolar ridge preservation

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**Objectives** To define the effectiveness of the use leukocyte and platelet-rich fibrin (L-PRF) filling versus healing of the socket naturally with a blood clot in the clinical, radiographic and volumetric alveolar ridge preservation of post-extraction socket teeth.

**Methods** A split-mouth randomized clinical trial was designed according to CONSORT statement and clinical trial register (ISRCTN34932978). Sixteen healthy patients (age  $24.62 \pm 5.61$  years, 56.25% women) who needed bilateral extraction of upper third molars participated. After the extraction, the socket was filled distributed randomly with L-PRF according to the previously published protocol of Choukroun et al., versus the contralateral socket only with the blood clot (figure 1). The dimensional change was quantified between the initial healing and the 3rd month after third molar surgery. Thus, the soft tissue healing around the sockets; the length, depth and difference of bone formation by Gray Scale Value was standardized using retroalveolar radiographs (figure 2); and the volume of the socket area with three-dimensional scanning of the dental cast were measured (figure 3) (t-test  $p < 0.05$ , STATA v.14.0).

**Results** No significant differences were found in radiographic measurements, soft tissue healing contour and volumetric changes of alveolar socket with L-PRF filling versus the use of blood clot at three months post-exodontics ( $p < 0.05$ ).

**Conclusions** L-PRF filling showed the same dimensional and volumetric behavior as normal blood clot healing in the alveolar ridge preservation of post-extraction socket teeth.

### Antimicrobial activity and adhesive properties of self-etch universal adhesive systems on caries-affected dentin: 18 months.

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**Objectives** To evaluate antimicrobial activity (AMA), as well as resin-dentine microtensile bond strength ( $\mu$ TBS), nanoleakage (NL) and *in situ* degree of conversion (DC) on sound and caries-affected dentine of six universal adhesives (UAs) applied in self-etch mode.

**Methods** The following universal adhesives were used: Prime&Bond Active (PBA); Scotchbond Universal (SBU); Tetric N-Bond Universal (TNU); Ambar Universal (AMU); Clearfil Universal Bond Quick (CUQ) and One Coat 7 Universal (OCU). The AMA was evaluated against *Streptococcus mutans* by agar diffusion test. After the adhesives were applied in self-etch (SE) strategy to flat sound or carious dentin surfaces, composite resin restorations were build-ups, and then, the specimens were sectioned to obtain resin-dentine sticks. It was evaluated  $\mu$ TBS, NL and *in situ* DC after 24h and  $\mu$ TBS and NL after 18-months of water storage (18M). ANOVA and Tukey's test were applied ( $\alpha = 0.05$ ).

**Results** For AMA, CUQ showed higher values than all adhesives. For *in situ*-DC, TNU present the highest value, while PBA and OCU present the lowest, regardless of dentine. For  $\mu$ TBS, OCU present the lowest values at immediate and 18-month evaluation.



For NL, significant differences were observed among adhesives, depending of time and dentine. Worst values of  $\mu$ TBS and *in situ* DC were always obtained in caries-affected dentine ( $p < 0.05$ ).

**Conclusions** Not all the UAs have the same performance in antimicrobial activity. But, most of them presented worst results in terms of adhesive properties in carious dentine, mainly after 18 months.

### Increase Handgrip Strength after Oral Rehabilitation by Removable Partial Dentures

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**Objectives** Among the elderly, maintain natural dentition or removable partial dentures (RPDs) is essential for masticatory performance (MP). MP varies according to the degree of tooth lost, and dietary intake is associated with occlusal force rather than the number of teeth. To prevent sarcopenia and frailty, occlusal force needs to be maintained through life. A reduction of occlusal force occurs when occlusal support is lost. Some indicators as age, gender and handgrip strength (HS) had been related to oral conditions as RPDs. Purpose: Determine if there is an association between HS in partially edentulous patients with no occlusal support after replacing their lost dentition with RPDs

**Methods** This was a pre-post design intervention. Inclusion criteria: octogenarians, partially edentulous, non RPDs users, classified by the Eichner Index (E) from E=B3 until E=C2 and willing to sign the informed consent form. Exclusion criteria: any other Eichner's group, auditive, cognitive impairments and unwilling to participate. HS measurements was rehearsal, final records were obtained from the dominant hand. Between October 2018 and April 2019, HS was measured at basal, 15 days after successfully using their RPDs and after six month follow up, by a manual dynamometer (Jamar<sup>TM</sup>). Data analyzed with R Studio software. For the variable grip strength, t test was used,  $p \leq 0.05$ .

**Results** The cohort, 60 octogenarian, 83.83 years average (80- 89) 38 female and 22 males. E-B3=19 (31.7%), E-B4=11 (18.3%), E-C1=13 (21.7%) E-C2=17 (28.3%). HS median at basal, RPDs and six month later were: 6.06; 8.06 and 13.0 kilograms (Kg). Median differences in Kg between RPDs-Basal; six month- RPDs and six month-basal: 2.0; 3.24 and 5.25 kg respectably, difference between six month-basal,  $p \leq 0.05$ .

**Conclusions** For the entire study group, handgrip strength progressively increased after RPDs in values of statistical significance contributing to reduce sarcopenia and frailty

### Tooth Loss And Health Related Quality of Life: ENS 2016-2017

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**Objectives** To evaluate the impact of tooth loss on health-related quality of life (HRQoL) in Chileans aged over 15 years, who participated in the 2016-2017 National Health Survey (ENS 2016-2017).

**Methods** This study included 5473 individuals who underwent an intraoral examination. The EQ-5D questionnaire was used to measure HRQoL, which evaluates five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The answers could be G1 = no problems, G2 = some problems, or G3 = problems. The dependent variables were the number of remaining teeth and anterior tooth loss. Means and proportions were calculated with their respective standard errors and 95% confidence interval (CI) using complex sampling models. Linear regressions were performed for the number of teeth and logistic regressions for anterior tooth loss. In logistic regressions, Odds Ratios (OR) were obtained with their 95% CI. We adjusted by age, sex, geographical area, and educational level.

**Results** In "self-care" dimension, the number of teeth followed a significant distribution ( $p$ -value = 0.01) with 20.59 teeth (sd 0.44) in G1, 18.53 (sd 0.85) in G2 and 17.43 (sd 1.73) in G3. Concerning mandibular anterior tooth loss, a G2 individual had an OR of 1.58 (95% CI 1.05-2.39), while a G3 had an OR of 2.04 (95% CI 0.67-6.13). For "usual activities", the number of teeth decreased significantly ( $p$ -value = 0.01) from a mean of 20.17 (sd = 0.34) in G1 to 16.85 (sd = 1.17) in G3. The mandibular anterior tooth loss increased from 1.42 (95% CI 0.96-2.10) in G2 to 3.24 (95% CI 1.34-7.81) in G3. The other EQ-5D dimensions did not show consistent gradients for anterior tooth loss.

**Conclusions** A lower number of remaining teeth was associated with lower HRQoL scores in all EQ-5D dimensions. Concerning anterior tooth loss, it was associated with lower HRQoL, especially in "self-care" and "usual activities."

### Natural Head Position in Analysis of the Soft-Tissue Facial Profile

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**Objectives** The aim of this study is to compare the results obtained in clinical photographs taken in Natural Head Position (NHP) and Natural Head Position Orientation (NHPO), to demonstrate that the latter allows a reliable diagnosis of the Analysis of the Soft-

Tissue Facial Profile and subsequent treatment plan.

Additionally, it is expected to confirm the reproducibility of the NHPO.

**Methods** The study was carried out by 2 operators and a sample of 20 patients. The inclusion criteria of the sample were 20 to 30-year-old, female and male Dentistry students at Universidad Mayor, Chile. Students who underwent or were currently undergoing orthodontic treatment were excluded from the study. Each patient was photographed 3 times using an established protocol. The first photograph was taken in NHP, without the use of a mirror; the second and the third photographs were taken in NHPO, using a mirror as a reference.

**Results** Differences were observed in the position of the pogonion soft tissue regarding to the Spradley's Vertical ( $p=0.0333$ ) between the photographs taken in NHP and those taken in NHPO. There were no significant differences between the results of the upper lip ( $p=0.1289$ ) and the lower lip ( $p=0.0526$ ) regarding the Spradley's Vertical.

Furthermore, reproducibility was confirmed because, in 75% of cases, the difference between each photograph's reference lines was between 0 and 3 °.

**Conclusions** Altogether, our results show that NHPO is the most reliable position for diagnostic Analysis of the Soft-Tissue Facial Profile because it used the True Horizontal Plane as a reference plane and is reproducible over time.

### Facial sensory alterations and PROMs in Oral and maxillofacial Surgery

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**Objectives** Objective: To assess the completeness of reporting of Patient Reported Outcomes Measures (PROMs) in studies evaluating facial sensory alterations consecutive to OMFS procedures, with a special emphasis on health related quality of life and measures of the magnitude of the sensory impairment.

**Methods** Methods: We searched MEDLINE, Embase, Web of Science, the Cochrane Library, EBSCO, Scopus, CINAHL, Lilacs, and Scielo until November 2019, to identify primary studies evaluating facial sensory alterations in OMFS, and the reporting PROMs. A pair of reviewers independently screened citations at a title and abstract, and full-text level for eligibility. Data extraction included the identification of any PROMs reported, checking for further evidence of the PROMs nature of the outcome by using the E-Provide database (<https://eprovide.mapi-trust.org/>) and any evidence reported of their measurement properties (validity, reliability, and responsiveness). In addition, we collected information regarding the nature and reason for the sensory alteration and participants' demographics.

**Results** Results: Out of 1,887 citations reviewed in Title & Abstract, 106 were selected for full-text screening, and finally 29 studies was included. The most common PROMs used were the visual analogue scale (VAS), the Hospital Anxiety and Depression Scale (HADS), the Oral Impact on Daily Performance (OIDP), the Oral Health Impact Profile (OHIP-14) and the version of that same instrument including 49 items (OHIP-49). It was important to notice that the cited instruments were used beyond the scope of their construct or intended purpose. When the magnitude of the sensory alteration was evaluated, 100% of the authors used VAS. Citations or evidence of measurement properties of the PROMs were infrequently reported.

**Conclusions** Conclusions: We identified large inconsistency as to whether PROMs were included when evaluating facial sensory alterations, and when positively included, which PROMs are expected to be used in primary studies. Such inconsistency and reporting limitations prevent systematic reviewers and other researchers from effectively assess the impact of facial sensory alteration from a patient perspective.

### Developing an Elderly People Preventive Dental Exam (EDePAM), using e-Delphi

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**Objectives** To develop the Preventive Oral Health Exam for Elderly People (EDePAM), using the e-Delphi technique.

**Methods** The e-Delphi technique was used with experts in multiple stages and a final workshop, reaching an agreement on the examination protocol to diagnose dental caries, lesions of the oral mucosa, periodontal diseases and masticatory function. An advisory group was created. Then, 51 experts from different areas were invited to participate. There were performed two or three rounds of e-Delphi. Google Forms were used.

Quantitative analyses of all the phases of the e-Delphi method were conducted. For all questions, a consensus was considered as "reached" when  $\geq 60\%$  of the experts selected the same response. Finally, a consensus workshop was held.

**Results** Forty-five experts participated (periodontology,  $n=15$ ; cariology,  $n=11$ , oral pathology,  $n=11$ , masticatory function,  $n=8$ ). Twenty-six experts participated in consensus workshop.

It was agreed to use ICDAS with modified Nyvad criteria to detect and assess caries lesions. In addition, it was considered necessary to assess different factors to determine caries risk. All the patients should have an examination of the oral mucosa describing clinically the lesion by reporting its clinical appearance, location, and its risk potential. The assessment of chewing ability and masticatory performance was agreed using the Leake index and a colour-changeable chewing-gum with a colour scale,

respectively. The number of antagonist occlusal pairs of teeth was considered as the best predictor of masticatory function. The 2018 AAP/EFPP classification was accepted as the standard to assess periodontal status.

**Conclusions** The creation of an EDePAM, using the e-Delphi methodology, enables the functional assessment of the oral health by diagnosing oral diseases.

### C-Reactive Protein And Cardiovascular Risk In Women With Periodontal Diseases

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**Objectives** To assess the association between periodontal diseases (gingivitis and periodontitis) and cardiovascular risk (CVR), measured by serum high sensitivity C-reactive protein (hs-CRP); and secondarily, to determine the correlation between serum and gingival crevicular fluid (GCF) CRP concentration in Chilean adult women.

**Methods** Quantitative, analytical and cross-sectional study performed at the Faculty of Dentistry, University of Chile, between 2017 and 2020. One hundred and twelve otherwise healthy Chilean women, between 18 and 44 years old, underwent periodontal clinical examination and were classified into three groups: healthy (n=37), gingivitis (n=39) and periodontitis (n=36). Age, educational level, smoking, body mass index, blood pressure, glycosylated hemoglobin and lipid profile were recorded or either obtained from blood samples. CRP levels in serum and GCF were analyzed by turbidimetric method and Luminex technology, respectively. Cardiovascular risk was adjusted by classic CVR factors. Data were analyzed using STATA®12.0 software (p<0.05).

**Results** Periodontitis and gingivitis women did not differ significantly regarding serum hs-CRP levels (1.7 [2.9] mg/L and 1.3 [2] mg/L, respectively) from the healthy ones (1.3 [3.3] mg/L) (p>0.05). There was no significant association between periodontal status and cardiovascular risk, with a moderate CVR in all groups (p>0.05). Women with periodontal disease (gingivitis and periodontitis) had significantly higher concentrations of CRP in GCF (1178.2x10e-6 [2882.5x10e-6] and 1131.3x10e-6 [3667.6x10e-6] mg/L, respectively) than healthy women (157x10e-6 [398.1x10e-6] mg/L) (p<0.001), and there was a statistically significant association between serum and GCF CRP levels in all groups (p=0.00).

**Conclusions** All women presented moderate CVR, with no evident association between serum hs-CRP levels and periodontal disease status. Gingivitis and periodontitis participants had significantly higher CRP levels in GCF, which correlated significantly with serum CRP levels.

### Frequency And Location Of Third Molar Agenesis

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**Objectives** To determine the frequency and location of third molar agenesis, comparing between men / women, maxilla / mandible and right / left side.

**Methods** A sample of 300 digital panoramic radiographs of patients treated in the Radiology Service of the Dentistry School of Universidad Mayor was analyzed. 150 of these patients were female and 150 male. The statistical method used in this study was the Chi-square test. The inclusion criteria were: radiographs of patients between 14 and 25 years old, radiographic sign of the bone crypt, radiographic sign indicating an alveolar repair process indicative of recent tooth extraction.

Exclusion criteria were: radiographs outside the age range, poor quality radiographic records, radiographs from other radiographic centers, radiographs showing absence of at least 2 premolars per maxilla and / or mandible, evidencing signs of generalized apical root remodeling, or fixed orthodontic containment, which are indicators of previous orthodontic treatment, and patients with previous orthognathic surgery.

**Results** The frequency of agenesis was 31%, evidencing no differences between men and women. No preference for arch was observed, neither for affected tooth or right and left sides. It was found a predilection for bilateral presentation. All the results were presented in tables and graphs (p = 0.05)

**Conclusions** The third molars have been studied by several researchers, because, compared to other teeth, they present the greatest variation in morphology, anatomical position, time of development and eruption, besides presenting the highest global agenesis rate.

### Public Dental Coverage in Chile:

¿how are we doing it?

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**Objectives** Determine the coverage of current dental programs implemented in the public health system, in Chile

**Methods** A quantitative, descriptive, cross-sectional study was carried out based on the exhaustive review of the dental current programs implemented in the public health system during 2018. The sources were secondary data, requested through the state transparency law, requiring by each program, the target populations, goals scheduled for the year and the actions or discharges found in the monthly statistical registers (REMs), JUNAEB statistical information, populations assigned by FONASA and CENSUS data 2017. Percentages were calculated for the estimation and analysis of coverage, based on the comparison of the actions or discharges carried out in each program, with the total population that could be accessed and with its proposed goal for

year.

**Results** A total of 21 dental programs were identified, of which 43.5% are aimed at the population under 20 years of age. The total average coverage of the defined target populations (expected coverage) was 42.3%. The highest coverage was found in programs focused on children and adolescents population, with a percentage higher than 70% of the defined goals.

**Conclusions** The public health system carries out dental programs focused mainly on the population under 20 years of age. Altogether, these reach approximately 50% of the expected coverage, with children's programs achieving the greatest fulfillment of their goals. These coverages constitute an important improvement gap for the public health system.

#### **Micro-osteoperforations: Acceleration of Orthodontic Tooth Movement In Animal Model**

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**Objectives** Determine if the use of Micro-osteoperforations (MOPs) is effective in the acceleration of orthodontic tooth movement (OTM).

**Methods** A total of 16 32-week-old male Sprague-Dawley rats were analyzed, who were fitted with orthodontic appliances in the upper jaw and were grouped according to research day on days 7, 14, 21 and 28 (t1-t2-t3-t4). The Force was applied through a Nitinol coil located between the upper first molar and the upper central incisor, using a force of 25 grams. The left side was subjected to OTM and MOPs of 1 mm depth at an anterior distance of 5 mm from the molar to be mesialized, and was analyzed and compared with the right side, where only conventional OTM was applied. Wilcoxon non-parametric statistical tests for related samples were used to analyze the differences in the distribution of data between the two groups. The level of statistical significance used for the interpretation of results was 5%.

**Results** In the first two weeks, the left side had greater movement and speed compared to the right side, however, from day 21 there was a slowdown in movement on the experimental side, while the control side achieved greater speed and movement. None of the changes was statistically significant.

**Conclusions** The treatment with MOPs is able to increase the speed of the OTM in rats during the first three weeks after applying the stimulus, but it is not statistically significant in short periods of time. Periodic drilling is necessary to reactivate the Regional Acceleration Phenomenon.

#### **Referral criteria for pregnant women to the periodontist: qualitative exploration**

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**Objectives** Periodontal diseases are a public health problem. Though still controversial, a relationship with adverse pregnancy outcomes has been reported. The Clinical Practice Guideline of the "Comprehensive Oral Health for pregnant woman" (COHPW) program recommends a basic periodontal examination for all the beneficiaries in primary healthcare, as part of their periodontal evaluation, and a referral to the periodontist if required. In the Western Metropolitan Health Service (WMHS) in 2015, only 1.3% of pregnant women were referred to the secondary level. Objective: to qualitatively explore the referral criteria for pregnant women to the periodontist, used by dentists from primary care establishments of the WMHS.

**Methods** A grounded theory-type qualitative research design with axial open coding was conducted to explore the topic "Referral and periodontal examination concept". Transcripts of semi-structured interviews of 10 dentists, who participate in the IOHPW program in primary care in WMHS, were analyzed.

**Results** Despite the use of a referral card, there is no consensus, and pregnant women are referred according to disease severity criteria, observing late signs of periodontal destruction. Little communication is reported between primary and secondary care level. In addition, there is a need to be more decisive. The basic periodontal exam (BPE) is considered a tool to define the referral criteria to the specialist, but there is a variation of what is understood by BPE, and the appropriate instruments are not used either. The BPE is considered an easy tool to conduct, serving as screening. However, it reduces the work time to carry out curative actions, which limits its application.

**Conclusions** We did not find a unified criterion for periodontal examination and referral of pregnant women to the periodontal specialist. There may be an undervaluation and under-treatment of periodontal diseases in pregnant women in the WMHS primary care level.

#### **Variability of methods to determine postural position of the mandible**

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**Objectives** The aim of this study was to compare the variability of different methods to determine postural position of the mandible (PPM), analyzing interocclusal free space and opening angle.

**Methods** Using 3D Electromagnetic Articulography, 7 men and 6 women (19 to 28 years old), healthy, with occlusal stability, without orthodontic or prosthetic treatment, without a history of trauma or maxillofacial surgery were evaluated (Scientific Ethics Committee No. 080\_18). Three reference sensors and 3 active sensors were placed to register the position of the mandible. The position of the mandible was recorded during maximum intercuspation position and PPM. PPM carried out using different methods: No Command, Swallowing, 'Mississippi' Pronunciation and Phoneme 'm' Pronunciation. The opening angle (ang) and the Euclidean distance (d) were calculated between the coordinates of the sensors in PMI and PPM using Matlab. The Variability Coefficient (CV) was calculated for d and ang using LibreOffice Spreadsheets. SPSS Statistics was used to apply the Shapiro-Wilk



test and one-way ANOVA or Kruskal-Wallis for comparisons between the different methods ( $\alpha = 0.05$ ).

**Results** No significant differences were found between the measures (d and ang) obtained with the different methods. However, there were differences between the variabilities. The least variable method for ang was Mississippi Pronunciation (CV = 46%, ang =  $0.9 \pm 0.40$ ) and the most variable was the Phoneme 'm' (CV = 97%, ang =  $0.8 \pm 0.80$ ). The least variable method for d was No Command (CV = 39%, d =  $1.6 \pm 0.6\text{mm}$ ) and the most variable was the Phoneme 'm' Pronunciation (CV = 86%, d =  $2.8 \pm 2.4\text{mm}$ ).

**Conclusions** The variability obtained by measuring d is different from the one obtained by measuring ang. The opening angle is a more reliable parameter than the interocclusal space maybe because it does not depend on the size of the jaw.

### Protease Profile In Oral Fluid Of Individuals With Moderate/Severe Atopic Dermatitis

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**Objectives** To explore the protease profile in the gingival crevicular fluid (GCF) of individuals with moderate/severe AD compared with healthy controls.

**Methods** A case control study was conducted. AD patients (n=6) and controls (n=6) were selected at the International Center for Clinical Studies in Santiago-Chile. A complete dermatological and periodontal evaluation that involved the collection of GCF was performed at the same gender and age of both groups. The levels of 35 human proteases in GCF were analyzed using a human protease antibody array and semi-quantified by densitometric analysis.

**Results** Thirty five proteases were detected in the GCF of moderate/severe AD patients and controls. The levels of ADAM8, ADAM9, Cathepsin E, MMP8, Neprilysin/CD10, Protein convertase9 and uPA/Urokinase in GCF were lower in moderate/severe AD patients than controls ( $p < 0.05$ ). No inter-group differences in the levels of the other 28 proteases were detected.

**Conclusions** ADAM8, ADAM9, Cathepsin E, MMP8, CD10, Protein convertase9 and uPA/Urokinase proteases were down-regulated in the GCF of moderate/severe atopic dermatitis patients versus controls. The combination of these proteases may be useful biomarkers for the detection of the severity of the disease.

### Human Amniotic Epithelial Cells: Mineralization Capacity and Adhesion to Dentin

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**Objectives** The aim of this study was to evaluate the mineralization capacity of human amniotic epithelial cells (hAECs) after being cultured with dentin matrix proteins (DMPs) or an osteogenic differentiation medium (StemPro). The adherence and adoption of odontoblast-like phenotype of hAECs after being seeded onto dentin disks treated with EDTA was also evaluated.

**Methods** hAECs were isolated from human placentas and the purity of the isolated cells was evaluated through flow cytometry. DMPs were extracted from third molars. Dental pulp stem cells (DPSCs) were used as control group. To evaluate mineralization capacity, the cells were cultured in DMEM with 500 pg/ml DMPs or the osteogenic differentiation medium, and calcium deposits were assessed by the alizarin red staining method (day 21). To evaluate adhesion to dentin, cells were seeded onto dentin disks previously treated with EDTA and evaluated through ESEM after 48 hours.

**Results** hAECs were able to secrete calcium deposits, although to a lesser extent compared to DPSCs.

The ESEM images of both cell types showed adhesion to and spreading onto the dentin surface. Both hAECs and DPSCs exhibit extended processes onto the dentin surface, some of them located into the dentin tubuli, and cell-cell contacts.

**Conclusions** Human amniotic epithelial cells are able to mineralize and adhere to dentin.

### Intracanal Adhesive and Morphological Modification by Sodium Ascorbate After Endodontics

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**Objectives** Describe and compare microstructural morphology of intracanal dentin and adhesive behavior to cementation of fiber post (FP) on endodontic treated teeth irrigated with sodium ascorbate (SA) as antioxidant versus physiological serum (PS).

**Methods** After Ethic's committee approval (ID181025001), endodontic was practice on 26 sound inferior premolars extracted due periodontal or surgical issues. They were prepared intracanal to receive a FP and then divided into 2 groups of 13 teeth each. Group (1) was irrigated with PS before cementation of FP, otherwise Group (2) was irrigated with 10% SA for 10 minutes. The appearance of the adherent surface was observed on 3 teeth of each group by Scanning electron Microscopy (SEM) and adhesion was measured on the rest of samples by Push out bond strength Test.

**Results** The SEM images of surfaces treated with PS seem smoother than the 10% SA surfaces that look irregular and porous. (Images 1 and 2).

In relation to push out bond strength test, mean values are 6.320 MPa for Group (1) and 15.457 MPa for Group (2). Outcomes

where compared using ANOVA ( $p < 0.05$ ) showing statistically significant differences. This is the first study about the use of 10% SA on dentine previously oxidated by conventional endodontic treatment, that shows differences in both evaluated parameters.

**Conclusions** Despite the limitations of our study we can conclude that variation exists in superficial morphology and adhesive strength between teeth treated with different irrigation protocols prior FP cementation. Intracanal irrigation with SA 10% improves bond strength and morphological surface of adhesive substrate of endodontic treated dentin.

Authors would like to thank Fondecap EQM150101 for helping with the use of SEM: FESEM, FEI, Model Quanta 250FEG, USA.

#### **Characterization of honey-derived exosomes and their oral antibiofilm effect.**

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**Objectives** Honeybee *Apis mellifera* derived products are known to be antibacterial and pro-regenerative. However, the mechanisms underlying these effects remain unknown. Recently, it has been shown that honey contains exosome-like vesicles (ELV) with strong antibacterial and biofilm inhibiting effects against *Staphylococcus aureus*. However, the effect of these ELVs on oral biofilm growth remains unknown. Thus, the aim of our study was to analyze the biofilm-inhibiting effects of honey ELVs (H-ELVs) on relevant oral streptococcal strains.

**Methods** H-ELVs were isolated by ultracentrifugation and analyzed concerning their size distribution using Nanoparticle Tracking Analysis (NTA). *Streptococcus mutans* (UA159) and *Streptococcus sanguinis* SK36 were chosen to assess antibiotic and biofilm-inhibiting effects.  $5 \times 10^4$  CFU were incubated with different concentrations of H-ELVs (0.1:1, 1:1, 10:1, 100:1 H-ELVs per CFU), in a microplate biofilm assay, and biofilm inhibition was assessed after 24hrs.

**Results** Transmission Electron Microscopy confirmed the presence of ELVs, and NTA revealed that the mean size of H-ELVs was 176.2 nm and mode 137.1 nm. It was found that for *S. mutans*, concentrations of around 1:1 H-ELV to CFU are sufficient to exert growth- and biofilm inhibition, while *S. sanguinis* growth was not inhibited at these concentrations.

**Conclusions** This is the first study reporting antibiofilm effects of H-ELVs in oral streptococci. Future work includes the characterization of relevant H-ELV cargo and potential mechanisms explaining these observations. With H-ELVs also displaying the advantages of being easily accessible and from a cost-effective source, we propose H-ELVs as a promising novel strategy for biofilm control in the oral cavity.

#### **Ionic Changes in Biofilms Treated with Polyphosphate, Polyols and Fluoride**

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**Objectives** This study assessed the effect of sodium trimetaphosphate (TMP), xylitol (X), erythritol (E) and fluoride (F), alone or in association, on F, calcium (Ca) and phosphorus (Pi) concentrations in mixed biofilms of *S. mutans* and *C. albicans* formed *in vitro*.

**Methods** Biofilms were formed in culture media containing TMP (0.025%), X (0.16%), E (0.04%), 20 ppm F (20F), alone or associated as X+E, TMP+X+E, 20F+X+E, 20F+TMP, and 20F+TMP+X+E (experimental). Culture medium containing 110 ppm F and pure culture medium were used as positive and negative controls, respectively. Biofilms (96 h) were collected both before and after exposure to 20% sucrose solution, and were analyzed regarding F (ion-specific electrode), Ca (Arsenazo III) and Pi (molybdate method) concentrations, in the solid and fluid phases of the biofilms. Data were submitted to bidirectional analysis of variance, followed by Fisher's LSD test ( $p < 0.05$ ).

**Results** F concentrations were significantly increased in the biofilm fluid of the experimental group compared with 20F. Also, the experimental group had the highest Ca concentrations in the biomass prior to exposure to sucrose, and increased the Ca concentration in the biofilm fluid after exposure to sucrose. The groups treated with TMP presented the highest values of Pi in the biofilm fluid. Overall, all inorganic components analyzed reduced after sucrose exposure, except for the Ca concentration in the fluid phase in the biofilm.

**Conclusions** It was concluded that simultaneous exposure to X, E, F and TMP (experimental group) increases the F levels in the biofilm fluid and affects Ca concentrations in the solid and fluid phases of the biofilms, before and after sucrose exposure.

#### **The Effect Of Clinical Microscope In Bioceramic Retreatment, "Experimental Study"**

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**Objectives** The aim of this study was to assess the effect of the use of a dental operating microscope on the outcome of removing a novel bioceramic filling material and gutta-percha of uniradicular treated teeth with XPENDO© system and filled by the hydraulic condensation technique.

**Methods** 40 human inferior incisors with single, curveless and medium-caliber canal were prepared by a single operator using XPENDO© System according to the manufacturer's suggested protocol (FKG): XPendo SHAPER file for mechanical preparation and XPendo FINISHER file for final irrigation activation of Sodium hypochlorite 5%, then filled by hydraulic condensation technique using gutta-percha and premix bioceramic TOTALFILL BC sealer© (FKG). Subsequently, the samples were randomly divided into 2 retreatment groups; 20 teeth with the aid of a dental operating microscope (OM) Zeiss Opmi Pico© and 20 teeth only by direct vision (DV).

A single operator removed the filling material with the same protocol, only differing in the use of a microscope: H hand files, solvent (Endosolv©), Sodium hypochlorite and XPENDO© System were used to remove filling material until clinically no residues remained.

Teeth were sectioned in two halves and photographed, the percentage of remaining obturation materials (sealer and / or guttapercha) measured by a morphometric analysis. Registered data of the intracanal surfaces of both groups were compared by a t-Welch test for two factors.

### Results

The filling remnants percentage in the (OM) group was 16.3% and in the (DV) group it was 29.4%, the difference was statistically significant ( $p=0.0198$ ). Complete removal of sealer or gutta-percha was not observed in either group.

**Conclusions** The use of a dental operating microscope improves the removal of filling materials such as bioceramic sealer and/or Gutta-percha during endodontic retreatment.

## Micro-computed Tomography Evaluation of Film Thickness of Veneers Cemented with Heated Resin Composites and a Resin Cement

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**Objectives** The purpose of this in vitro study was to evaluate the film thickness (FT) of various cementation techniques through 3-dimensional (3D) microcomputed tomography (mCT).

**Methods** Thirty 3D printed tooth maxillary central incisors specimens with standard preparations for veneers and used as testing models with 3D printed veneers. They were divided into 5 groups ( $n=6$ ): Clearfill AP-X (APX); ENA Hri (ENA); Estelite Omega (EOM); Essentia (ESS); Calibra Esthetic (CES). The cementation was performed using pre-heated composite to 55 degrees C with a commercial compule heater (Ena Heat) and resin cement at room temperature, using standard procedures by one person. Specimens were scanned after polymerization using a mCT apparatus (mCT 40; Scanco Medical AG), and the resulting files were imported and analyzed with 3D rendering software to calculate the FT. Collected data from FT were submitted to 1-way ANOVA ( $\alpha=0.05$ ).

**Results** In general, the film thickness of the light-curing resin cement (CES) was the lowest between the groups, though were not statistical difference with the pre-heated EOM and ESS resins ( $P>0.05$ ). A significant statistical difference was found in ENA and APX resins that showed high thicknesses ( $P<0.05$ ). Values ranged from 0.29mm to 0.59mm.

**Conclusions** Some pre-heated resin composites (APX and ENA) promote thicker resin cements than light-curing resin cements when cementing veneers.

ESS and EOM presented cementation thicknesses similar to resin cement.

## Salivary pH Recovery After Acidic Tea Infusions Consumption

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**Objectives** Acidic tea infusions might play a role in increasing the risk of erosive tooth wear (ETW), potentially related to their chemical properties. This study aims to assess, in vivo, the time needed for the salivary pH to return to baseline after exposure to acidic tea, compared to orange juice, the gold standard to study ETW.

**Methods** Fifteen volunteers with normal salivary flow participated in this in vivo, crossing-over study. Initial pH and titratable acidity of each treatment (tea infusions prepared from commercial teas [black ( $pH=2.88\pm0.01$ ); green ( $pH=2.85\pm0.01$ ); herbal tea ( $pH=2.60\pm0.01$ )] and two control solutions [orange juice (positive-control) and 20% sucrose (negative-control)] were determined. Volunteers were asked to retain 15 mL of each beverage in the mouth for 10 s, to expectorate it (time zero), and their saliva was collected after 15, 30, 45, 60, 90, 120 and 180 s in microtubes. Salivary pH was determined using a previously calibrated mini pH electrode. Area under the curve (AUC) was calculated. Data were compared by repeated measures ANOVA/Tukey (pH overtime) and ANOVA/Tukey (AUC).

**Results** There was a significant effect of each treatment ( $p<0.05$ ). Black and green tea recovered their basal pH after 30 s; herbal tea after 45 s, same as orange juice. AUC showed that all treatments were different to the negative control ( $p<0.05$ ), but tea infusions did not differ from the positive control. Among the infusions, herbal tea presented highest titratable acidity and also the

highest AUC, similar to orange juice ( $p > 0.05$ ).

**Conclusions** Titratable acidity of the infusions explains the differences observed among tea infusions to recover the salivary pH. Furthermore, the lack of difference of tea with orange juice suggests that the frequent consumption of acidic tea might increase the risk of ETW.

### New Method to Measure Angle of Convergence in Dental Preparations

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**Objectives** Compare the Convergence Angle (CA) measurements of dental preparations (DP) between a new dental instrument that measures CA in situ versus the measurement obtained indirectly with digital angle measurement software (AutoCad®).

**Methods** A correlational experimental descriptive study was carried out in adult patients who attended the Undergraduate Dental Clinic of the Universidad de La Frontera, in the city of Temuco (Chile), with indication of crowns. The sample obtained is non-probabilistic for the convenience of consecutive cases that meets the eligibility criteria. The total collected were 108 dental preparations obtained from 66 patients.

The investigator in charge measured the dental instrument (created at the University of La Frontera) clinically on 2 different occasions, the same DP (in situ). These measurements were compared with digital measurements from AutoCad® software to measure angles using an indirect DP method (DP printing and dies). An intraclass correlation coefficient test (ICC) was applied with its conceptual evaluation to determine the reliability of the measurements.

**Results** The average CA of all the preparations obtained ( $n = 108$ ) by the instrument was  $16.9 \pm 5.9$  (1st measurement);  $17.1 \pm 5.7$  (2nd measurement) and by the AutoCad  $18.9 \pm 6.2$ . When comparing the measurements of the dental instrument versus the measurement with AutoCad®, a good ICC was observed (0.79 to 0.78, respective first and second measurement with the instrument). The comparative ICC between 1st and 2nd measurement with the dental instrument had a very good conceptual evaluation (ICC = 0.95).

**Conclusions** The study reported that the new dental instrument measures reliable values of the Convergence Angle of dental preparation, immediately (in situ); and it constitutes an advantageous tool that will allow the clinician to obtain objective values of the convergence angle for a correct dental preparation in an immediate, economic and effective way.

### *In vitro* evaluation of the association of toothpaste and mouthrinse on dental enamel demineralization

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**Objectives** The aim of this study was to evaluate *in vitro* capacity of the association of media between fluoridated toothpastes and mouthrinses supplemented or not with sodium trimetophosphate (TMP), in reducing dental enamel demineralization.

**Methods** Bovine blocks ( $n=60$ ) were selected for their initial surface hardness (SHi) and then divided into 5 experimental groups ( $n=12$ ): 1) Toothpaste without F/TMP (Placebo); 2) Toothpaste 1100 ppm F (1100F), 3) Toothpaste 1100F associated with a mouthrinse with 100 ppm F (1100F-100F), 4) Toothpaste 1100F associated with a mouthrinse with 225 ppm F (1100F-225F) and 5) 1100F toothpaste associated with a 100 ppm F mouthrinse supplemented with 0.4% TMP (1100F-100F-TMP). The blocks were treated with 2 mL of toothpaste slurry and mouthrinses 2x/day, being subjected to 5 pH cycles for 7 days. After pH cycling, the final surface hardness (SHf) was determined to calculate the percentage of loss of surface hardness (%SH). The data were submitted to a variance analysis (ANOVA-1-criterion) followed by the Student-Newman-Keuls test ( $p < 0.001$ ).

**Results** For %SH, the 1100F-100F-TMP group reduced enamel demineralization by ~ 15% compared to treatment with 1100F ( $p < 0.001$ ), being similar to the 1100F-225F ( $p > 0.001$ ). Blocks treated with 1100F only presented the highest %SH when compared to the other treatments (1100F-100F; 1100F-225F; 1100F-100F-TMP) ( $p > 0.001$ ).

**Conclusions** It was concluded that the toothpaste and mouthrinse association promoted a greater inhibitory effect against enamel demineralization when compared to toothpaste, and that the TMP supplementation in the 100F mouthrinse obtained a similar effect to a 225F mouthrinse. Clinical Significance: The combined treatments may be an alternative for patients at high risk of dental caries.

### *Helicobacter pylori* and *Porphyromonas gingivalis* Interaction Enhance Cell Migration

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**Objectives** The objective of this work is to evaluate if the interaction between *H. pylori* and *P. gingivalis* increase the ability of *P. gingivalis* to promote migration in gingival epithelial cells. We also sought to determine if the presence of *H. pylori* induced changes in the expression of *P. gingivalis* genes associated with enhanced cell migration.

**Methods** We defined conditions for the co-culture of *H. pylori* and *P. gingivalis*. For this, a liquid culture was standardized in which *H. pylori* 26695 and *P. gingivalis* W50 can grow and co-exist for 1 to 2 days (Brain-heart infusion, hemin, menadione, VITOX and equine serum, at 37 °C, in anaerobiosis and orbital agitation). After that *P. gingivalis* was isolated from the co-culture the ability to promote migration of OKF6-TERT2 cells was evaluated in transwell assays. RT-qPCR was performed to measure the mRNA levels of different gingipains of *P. gingivalis* relevant to cell migration (RgpA, RgpB and Kgp).

**Results** Our results indicate that *H. pylori* increases the ability of *P. gingivalis* to promote migration of OKF6-TERT2 gingival epithelial cells compared to *P. gingivalis* grown in monoculture. Also, co-culturing increased the expression of the *P. gingivalis*



gene *rgpB*, which is known to promote the migration of infected cells.

**Conclusions** A synergistic interaction between *H. pylori* and *P. gingivalis* was observed, in which *H. pylori* enhanced the ability of *P. gingivalis* to promote gingival epithelial cell migration, thereby contributing to alterations in gingival epithelial organization. Moreover, our results suggest that *H. pylori* enhances the ability of *P. gingivalis* to promote cell migration by increasing the expression of bacterial gingipains.

### **LPRF-plugs from smokers have the same tensile-strength properties as non-smokers**

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**Objectives** In this study we want to analyze and to compare the tensile-strength properties of LPRF plugs from smokers and non-smokers.

**Methods** 16 blood donors between 18 and 50 years old, 8 smokers and 8 non-smokers were included, after Pontificia Universidad Católica de Chile Scientific and Ethical Committee approval. All participants signed an informed consent. Briefly, venous blood samples were obtained in vacutainer tubes without anticoagulants and centrifuged 12 minutes at 406 X g. Then, LPRF clots were isolated from the middle of the tubes and compressed with a piston included in a stainless-steel device (X-expression-box) for 5 minutes to get plugs. Plugs were maintained in cell culture media until their analyses. Fresh LPRF plug samples, were evaluated in a universal Instron testing machine, using a quasi-static destructive tensile test at controlled temperature. Plugs were fixed using clamps at both while loading was applied. The Maximum load at sample failure were registered as a Stress-strain curve was established.

**Results** In our in vitro study, the comparative mechanical parameters analyzed, evidenced that LPRF plugs from smokers have the same stiffness, elastic modulus, stretch length (non-smokers =  $2,84 \pm 0,28$  [mm/mm], smokers =  $2,69 \pm 0,20$  [mm/mm]) and the same resistance against tensile stress (non-smokers =  $60,22 \pm 14,64$  [kPa], smokers =  $46,17 \pm 12,87$  [kPa]).

**Conclusions** With the limitations of our in vitro study, we can suggest that tensile-strength properties are not altered in LPRF plugs from smokers. More studies are necessary to characterize the effect of smoking habit in this plasmatic fraction as an alternative to promote wound healing in smokers.

### **Cytotoxicity and adhesive properties of etch-and-rinse universal adhesive systems on caries-affected dentin: 18 months**

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**Objectives** To evaluate cytotoxicity (CTX), as well as resin-dentine microtensile bond strength ( $\mu$ TBS), nanoleakage (NL) and in situ degree of conversion (DC) on sound and caries-affected dentine of six universal adhesives (UAs) applied in etch-and-rinse mode.

**Methods** The following universal adhesives were used: Prime&Bond Active (PBA); Scotchbond Universal (SBU); Tetric N-Bond Universal (TNU); Ambar Universal (AMU); Clearfil Universal Bond Quick (CUQ) and One Coat 7 Universal (OCU). For CTX, Saos-2 cell-line was used. After, the adhesives were applied in etch-and-rinse strategy to flat sound or carious dentine surfaces, composite resin restorations were build-ups. Then, the specimens were sectioned to obtain sticks to be evaluated in  $\mu$ TBS, NL and DC after 24h and  $\mu$ TBS and NL after 18 months of water storage (18M). ANOVA and Tukey's test were applied ( $\alpha = 0.05$ ).

**Results** For CTX, PBA, AMU, CUQ and OCU present cytotoxicity in different dilutions. For  $\mu$ TBS, OCU present the lowest values, regardless of time, dentine or strategy. For NL, PBA present the highest values, on sound dentine, regardless the time. TNU present the highest DC, while PBA and OCU present the lowest DC. Worst values of  $\mu$ TBS, NL and DC were always obtained in caries-affected dentine ( $p < 0.05$ ).

**Conclusions** Not all UAs have the same performance in terms of cytotoxicity. However, the majority showed worst results in terms of bonding when applied in carious dentine, mainly after 18M.

### **Morphological Characterization of Tumor Spheroids for Cell Viability Assays**

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**Objectives** The objective of this assay was to characterize the size and morphology of head and neck carcinoma spheroids for cell viability assays.

**Methods** To make low-adhesion plates, 60  $\mu$ L of a 5 mg/mL solution of poly-HEMA in 95% ethanol was added to each well of untreated 96-well plates. They were dried for 24 hr, sterilized 40 min under ultraviolet light, and stored sealed at 4 °C. The characterization was performed for the Cal-27 and HEp-2 line. For each line between 500 and 8,000 cells per well were seeded in a 96-well plate. The plate was centrifuged at 2730 rpm for 5 min and incubated for 24 hr at 37 °C. The spheroids were photographed and the average diameter was calculated according to the number of cells seeded. The test was repeated at 48 h.

**Results** Cal-27 forms homogeneous and regular spheroids. HEp-2 forms irregular spheroids. For both lines the average diameter increased according to the initial number of cells seeded. The difference between size at 24 and 48 h was not statistically significant for the same number of cells. HEp-2 spheroids are larger in diameter than CAL-27. For Cal-27 the percentage of diameter variation for the same number of cells is 5% at 24 h and 10% at 48 h, for HEp-2 it was from 1 to 8% for both times.

**Conclusions** Both lines formed multicellular spheroids, but the morphology and size differ. The ideal diameter of the spheroid for cytotoxicity assays is reported between 300 to 500  $\mu$ m, which is achieved by seeding 4500 cells for the Cal-27 line and 500 for the HEp-2 line. It is recommended to start the tests on spheroids later of 24 h of formation due to the smallest size variation.

## Periodontitis and Alzheimer's Disease Biomarkers, Common Pathways in Down Syndrome

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**Objectives** The aim of this study was to determine the presence of molecular and microbiological biomarkers associated with periodontitis and Alzheimer's Disease (AD) in individuals with Down Syndrome (DS)

**Methods** Patients with DS (cases) and without DS (controls) were studied. Periodontal screening and recording were determined for each individual. Subgingival microbiota and gingival crevicular fluid samples were taken to quantify the presence of *P. gingivalis*, and cytokine profiles, and ApoE- $\epsilon$ 4.

**Results** A correlation between *P. gingivalis* and early stages of periodontal disease was established in the DS population, especially related to probing depth. Cytokine analysis revealed no differences amongst DS individuals and their periodontal status, except IL-1 $\beta$ , a pro-inflammatory cytokine, relevant in both AD and periodontitis. ApoE- $\epsilon$ 4—a known risk factor for AD—in DS individuals was found to be in a higher concentration in individuals with stage III and IV periodontitis.

**Conclusions** This is the first clinical study to inquire about the relationship between AD and PD biomarkers in DS individuals. Associations between periodontal stages, bacterial load, and ApoE- $\epsilon$ 4 were established. Bidirectional relationships (AD-DS, DS-periodontitis, periodontitis-AD) have been studied and discussed, but the current study brings to light the need to further study the pathways that exist amongst the three conditions.

## Histological characterization of STAT3 activation in periodontitis

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**Objectives** The transcription factor signal transducer and activator of transcription 3 (STAT3) integrates and transduces signaling of multiple pro-inflammatory cytokines associated with periodontitis. STAT3 is also crucial for Th17 cell differentiation, a critical CD4<sup>+</sup> T cell subset in periodontitis immunopathogenesis. Despite the importance of this protein, there is a gap in our knowledge regarding the distribution of STAT3 in human periodontal tissues. Hence, our goal was to characterize the localization of activated STAT3 in gingival tissues from subjects with periodontitis.

**Methods** After clinical evaluation, diagnosis, selection, and consent, a standardized gingival tissue sample was obtained from each volunteer. Gingival tissues were fixed, included in paraffin, and activation of STAT3 was evaluated via immunohistochemical staining using an anti-pSTAT3 (Tyr705) antibody. Immuno-positive cells were counted in 10 representative tissue areas per sample, using the Image J software. Data are shown in mean  $\pm$  SEM. P-values of <0.05 were considered statistically significant.

**Results** Eighteen volunteers were initially screened, all of them diagnosed with periodontitis. Nine subjects met our inclusion criteria and were enrolled in our study. We found that 61.79  $\pm$  2.13% of the total cells were positive for pSTAT3. Total numbers and percentages of immune-positive cells were higher in the stroma compared with the epithelium in periodontitis gingival tissues (p=0.0001 and p=0.0032, respectively). Within the epithelium, the mean expression of pSTAT3 was 55.60  $\pm$  2.86%, located mainly in the nucleus of the basal layer cells. In the connective tissue, pSTAT3 was detected in 67.98  $\pm$  2.90% of the cells, and the staining was homogeneously located in the nucleus and cytoplasm.

**Conclusions** STAT3 transcription factor is activated on tyrosine 705 in gingival tissues obtained from subjects with periodontitis. Furthermore, STAT3 activation was higher and more widely distributed in connective tissue cells compared to epithelial cells.

## Translocation of Endodontic Pathogens through Mononuclear Blood Cells

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**Objectives** We aimed to first explore overall extra-radicular infection as well as by specific *Porphyromonas (P).* spp; and their potential to translocate from infected root canals to blood through peripheral blood mononuclear cells (PBMCs).

**Methods** In this cross-sectional study, healthy individuals with and without apical periodontitis (AP) diagnosis with an associated apical lesion of endodontic origin (ALEO) were included. ALEOs (n=64) were obtained from volunteers with asymptomatic apical periodontitis (AAP; n=29) and symptomatic apical periodontitis (SAP; n=35). Intracanal samples (n=39; AAP=29, SAP=10), their respective PBMCs and controls (n=14/per group) were included. Total bacteria load, as well as *P. endodontalis* and *P. gingivalis* were measured by qPCR.

**Results** In ALEOs, the detection frequency of total bacteria, *P. endodontalis* and *P. gingivalis* (bacterial load [median DNA copy number/mg]) were 70.8% (4521.6), 21.5% (1789.7), 18.4% (1493.9), respectively (p>0.05). In intracanal exudates, the total bacterial detection (load [median DNA copy number/μL]) was 100% (21089.2); *P. endodontalis* and *P. gingivalis* were detected in 41% (8263.9) and 20.5% (12538.9) of the samples, respectively. In PBMCs, total bacteria was detected in all samples; the bacterial load (median DNA copy number/μL) was significantly higher in AP (953.6) compared to controls (300.7; p<0.05). *P. endodontalis* detection was equal for both groups (50%), but bacterial load tended to be higher in AP (262.3) than controls (158.8; p>0.05); *P. gingivalis* was not detected.

**Conclusions** DNA from the specific endodontic pathogen *P. endodontalis* was detected in endodontic canals, ALEOs and in PMBC. Higher bacterial loads can be identified in PMBC from AP compared to healthy individuals. PMBC might carry endodontic bacteria/DNA to distant tissue/sites.

### **Oxidative Stress Induces Senescence In Gingival Fibroblasts.**

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**Objectives** Oxidative damage is a frequent event that may occur in inflammatory conditions like periodontal disease. However, the precise effect of oxidative stress in gingival connective tissue cells is still not well defined. In the present study we evaluated the effect of oxidative stress, induced by hydrogen peroxide, on cell proliferation, DNA damage and cell size in human gingival fibroblasts (HGF).

**Methods** HGF were obtained from two young donors and cells were exposed to an acute exposures of 500 uM hydrogen peroxide. Changes in cell size, cell proliferation and DNA damage were evaluated by immunofluorescence for actin, Ki67 and H2A.x respectively. Paired student's "t" test was used to compare between conditions under study.

**Results** Oxidative stress induced a significant increase in cell size, phosphorylated H2A.x and a reduction in cell proliferation. Both cell strains equally responded to the oxidative stimulus.

**Conclusions** These changes are compatible with the induction of senescence in gingival connective tissue cells. Oxidative damage, a frequent event in inflammatory conditions, may induce senescence in fibroblasts. Further studies are needed to determine the magnitude of this senescence response in vivo.

### **Smoking Status in size and inflammation of apical lesions**

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**Objectives** To assess whether smoking was associated to lesion size and inflammation of apical lesions in individuals with clinical diagnosis of asymptomatic apical periodontitis (AAP).

**Methods** Cross-sectional analytical observational study. Patients with diagnosis of AAP and at least one apical lesion consulting at the clinic of surgery in the Faculty of Dentistry Universidad de Chile, and Public assistance hospital (HUAP), Santiago, Chile were included. Exclusion criteria were co-existence of any systemic disease or NSAIDs or antibiotics consumption during the last 3 months. Patients were examined; demographics, clinical and current smoking status were registered on clinical records. Apical lesion size was measured as weight (mg) and with MMP-8 levels (ng/mL) were measured across Milliplex Assay. The results were analyzed with Chi squared or Mann-Whitney tests in STATA® V12 program.

**Results** A total of 38 patients; 18 smokers and 20 non-smokers were included. The demographic variables age, sex and socioeconomic level were similarly distributed among the groups (p>0.05). Lesion size (mg) and MMP-8 levels tended to be higher in smokers compared to nonsmokers, but differences did not reach statistical significance (p>0.05).

**Conclusions** No association was evidenced between smoking and apical lesion size and inflammation in individuals with AAP.

### **Association between Alzheimers Disease and Periodontitis: Pilot study**

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**Objectives** The bacteria in the disbiotic microbiome of periodontitis (PE) exacerbate the production of proinflammatory mediators having the potential to spread to the systemic circulation and trigger neuroinflammation which plays a fundamental role in the onset and progression of Alzheimer's Disease (AD). The aim of this study was to quantify the levels of Th1, Th17, Th2 and T-reg cytokines, load of *P. gingivalis* (*P.g*) and ApoE-ε4 in Gingival Crevicular Fluid (GCF) of controls, PE and PE and AD subjects and correlate them with the cognitive status.

**Methods** A cross sectional study was carried out. Each of the subjects included were classified according to their periodontal (AAP 2017) and their cognitive (MoCa Test). Biological samples of GCF and subgingival microbiota were taken to quantify cytokine profiles (Multiplex immunoassay, Invitrogen™ Cytokine 25-Plex Human Panel), ApoE-ε4 (Invitrogen™ Apolipoprotein ε4 Human ELISA Kit) and bacterial load of *P. g* (*qPCR*, FavorPrep™ Tissue Genomic DNA extraction Mini Kit).

**Results** Cognitive status was dependent on the study group, significant difference ( $p < 0.05$ ) was found in the clinical parameters of PE between groups. A correlation was found between cognitive impairment and higher levels of Th1 and Th17 cytokines ( $r = -0.919$ ,  $p < 0.05$ ) while Th2 and Treg cytokines increase as the cognitive status improves ( $r = 0.97$ ,  $p < 0.05$ ). The bacterial load of *P. gingivalis* increased as the cognitive status declines ( $r = -0.996$ ,  $p < 0.05$ ). ApoE-ε4, a known risk factor of AD, secretion was detectable in GCF of all subjects and higher in impaired cognitive status ( $r = -0.939$ ,  $p < 0.05$ ).

**Conclusions** Association between periodontal cytokine, bacterial load, ApoE-ε4 and cognitive status were established. This data supports recent studies about the relationship between these two diseases. This is the first clinical study to quantify the secretion of ApoE-ε4 in GCF. With this it is suggested that a greater control of periodontal status could modify the cognitive status in AD.

### Role of tumor cell-secreted TGF-β on macrophage phenotype in HNSCC

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**Objectives** Macrophages are the most abundant immune cell type in the tumor microenvironment (TME) of head and neck squamous cell carcinomas (HNSCC), representing up to 50% of the tumor mass. In the TME, macrophages are called tumor-associated macrophages (TAM) and their phenotype is determined by external cues, including neoplastic cell-secreted products. In HNSCC, increased M2-like macrophage infiltration is associated with worse prognosis and poor survival. The goal of this study is to determine, in vitro, the relative contribution of HNSCC cell-secreted transforming growth factor beta (TGF-β) on macrophage phenotype.

**Methods** We used macrophages derived from a human monocytic cell line (THP-1), which were exposed to the secreted products (conditioned medium, CM) from two HNSCC cell lines for 24 h: H314 (SCC floor of mouth, high TGF-β) and SCC9 (SCC tongue, low TGF-β). Phenotype of macrophages were studied by expression of TGF-β, IL-12, IL-10, TNF, M-CSF, MMP-2 and MMP-9 by RT-qPCR. One-way ANOVA and Kruskal-Wallis tests were used for data analysis. The significance level adopted was 95% ( $p \leq 0.05$ ) and 'GraphPad Prism 6' software were used for the statistical analyses.

**Results** In comparison to unstimulated control (mock CM), expression of M-CSF, TGF-β and IL10 was increased in macrophages exposed to CM from H314 cells ( $p < 0.05$ ). On the other hand, macrophages exposed to CM from SCC9 cells had increased expression of MMP-2 expression, but no significant differences were observed for M-CSF, TNF, TGF-β and IL-10 in comparison to negative control.

**Conclusions** In conclusion, high expression of TGF-β in cell-secreted products from HNSCC induces an M2-like phenotype in macrophages.

### Single Crowns: Digital versus Conventional Workflow. Systematic Review and Meta-Analysis.

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**Objectives** The aim of this systematic review and meta-analysis was to evaluate the manufacturing of fixed dental prosthesis (single crowns) about digital workflow compared to conventional workflow techniques in terms of accuracy, time effectiveness and patient satisfaction.

**Methods** The search was performed in the Pubmed / MEDLINE, Embase and The Cochrane Library databases with articles published until January 2020. This review followed the PRISMA criteria and is registered in the PROSPERO platform. The PICO question was: "Does the use of digital workflow technique compared to conventional workflow for manufacturing fixed dental prostheses (single crowns) improve accuracy, time effectiveness and patient satisfaction?"

**Results** Thirteen studies were selected for qualitative analysis and 06 studies for quantitative analysis. All included studies are Randomized Controlled Trials (RCT). The included studies present a total of 259 patients, with a mean age of 49.35 years. Following the design of each study, a total of 465 crowns were made, distributed in two groups (conventional workflow or digital workflow). Regarding the accuracy of the crowns, the meta-analysis showed a significant difference between the groups for the digital workflow group ( $P = 0.003$ ; MD: -23.82, 95% CI: -43.05 to -4.59), presenting higher accuracy. For clinical time analysis at each impression, an average of 484.4 seconds was verified for the digital workflow and 731.75 seconds for the conventional workflow. Patient satisfaction was assessed using the Visual Analog Scale (VAS), and was influenced by the type of scanner and the clinician's experience.



**Conclusions** Within the limitations of this systematic review and meta-analysis, it can be concluded that the digital workflow technique presents greater precision in the accuracy of the single crowns, as well as shorter clinical time to perform the technique. Patient satisfaction will be influenced by the type of scanner system used and the clinician's experience.

### Expression of Angiogenic Factors in Symptomatic and Asymptomatic Apical Periodontitis

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**Objectives** To profile the angiogenesis related proteins in symptomatic apical periodontitis (SAP), asymptomatic apical periodontitis (AAP) and healthy controls.

**Methods** Patients consulting at the dental clinic of the Faculty of Dentistry with diagnosis of SAP, AAP and healthy control were included (N=5). Samples of apical lesions and healthy periodontal ligament as control were collected. The specimens were homogenized and angiogenic factors were measured using a commercial profiler with semi-quantitative assessing of 55 proteins on nitrocellulose membranes and densitometric scanning.

**Results** Seven proteins showed evidenced variations among studied groups. A decrease in Serpin-1 was observed in AAP and SAP compared to the control group. MMP-9 and MMP-8 levels increased in AAP. PTX3, ET-1, Ang-2, DPP-IV were lower in SAP, higher in AAP and the highest in control group.

**Conclusions** Differential angiogenesis related protein profiles were observed in SAP, AAP and controls, supporting a role of angiogenesis in AP evolution /exacerbation.

### Cardiovascular Risk And Endodontic Treatment In Adults With Apical Periodontitis

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**Objectives** To determine whether root canal treatment can reduce cardiovascular risk (CVR) based on serum hsCRP and lipid profile in individuals with apical periodontitis during 12 months follow-up.

**Methods** Quasi-experimental study, 22 otherwise healthy young adults between 18 and 40 years old with apical lesions of endodontic origin (ALEOs) were included. Exclusion criteria were periodontal diseases, obesity, anti-inflammatory/antibiotic treatment in the previous 3m and pregnancy. Patient's medical history, sociodemographic characteristics and classic cardiovascular

risk factors were recorded. Oral clinical-radiographic examinations and blood samples to determine hsCRP and lipid profile at University Hospital clinical laboratory were performed at baseline (BL) and after root canal treatment at 1, 6 and 12 months. Data were analyzed with Wilcoxon or T-Student paired test.

**Results** Twenty one patients between 18 and 40 years old, 76.19% female and 23.81% male, smokers (42.86%), most patients had one apical lesion (90.5%) and 47.6% showed an altered lipid profile with no medical diagnosis of dyslipidemia. HsCRP levels at baseline and up to 12 months were within moderate CVR level (median 1.1 and 1.4 mg/L, respectively; Total cholesterol and low density lipoprotein significantly increased during the follow up period (Mean diff. -17 and -16.5 mg/dL, respectively;  $p<0.05$ ) whereas high density lipoprotein and triglycerides showed no change (Mean diff. +0.125 mg/dL and -3.5 mg/dL,  $p>0.05$ ).

**Conclusions** CVR remained moderate based on serum hsCRP risk stratification during 12 months follow-up after endodontic treatment in young adults. Lipid profile showed increasing of total cholesterol and LDL, but remained within normal range.

## Poster Session

### Inflammatory biomarkers of intra-articular disorders of temporomandibular joint. Systemic Review

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**Objectives** To determine the qualitative and quantitative evidence of inflammatory biomarkers present in the synovial fluid (SF) of adult patients with intra-articular disorders (ID) of the temporomandibular joint (TMJ) and their diagnostic ability.

**Methods** Electronic (*Pubmed, Cochrane Library, Epistemonikos, EBSCO y Scopus*) and manual search of articles (2010-2019) were performed. Data were extracted in duplicate (agreement between evaluators  $k=0.82$ ). The methodological quality of the studies was determined by CONSORT, STROBE and Cochrane RoB 2. The population studied was adult patients with TMJ ID and with studies of biomarkers in SF. Descriptive statistical analysis of data was performed.

**Results** Out of 264 articles, 6 met the inclusion-exclusion criteria, including 323 SF samples analyzed in 262 patients, [153 with OA (media=37.3 years old, 88% women), 93 with disc displacements (DD) (media=33.3 years, 67.7% women) and 16 with OA+DD (media=36.7 years, 93.7% women)]. The diagnostic criteria RDC/TMD were used in three studies, MRI in 4 studies and CBCT in 2. All samples were obtained by arthrocentesis and detected by ELISA. Nineteen biomarkers were evaluated in patients with OA, 9 in patients with DD and 2 inflammatory biomarkers in those diagnosed with OA+DD. Increased inflammatory biomarkers in the synovial fluid of ATM were associated with ID. The level of evidence of the articles and their degree of recommendation was 2B (Oxford) and the risk of bias varied between 81.08-62.16% (Rob2).

**Conclusions** The most frequently evaluated biomarkers in SF of patients with ID of the TMJ were IL-1 $\beta$ , IL-6 and TNF- $\alpha$  and in secondly TGF- $\beta$ 1, MMP-3 and IFN- $\gamma$ . Their increases were associated with ID. Low quality evidence was found, given the inconsistency of the biomarkers evaluated and the protocols used, and it was not possible to associate of any of them to a given intra-articular disorder, nor to perform statistical data analysis.

### Omega-3 effect on osteoarthritis symptoms of synovial joints. Review-Meta Analysis.

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**Objectives** To evaluate evidence, establish effectiveness and determine methodological quality of randomized clinical trials (RCTs) on the effect of omega-3 long chain polyunsaturated fatty acid (PUFA  $\omega$ -3) on the painful symptomatology of osteoarthritis (OA) in synovial joints.

**Methods** Electronic and manual search of articles (2004-2019) was performed. Using pain as the main outcome and rigidity/function and swelling as secondary outcomes, based on PRISMA criteria, CONSORT reporting quality and Cochrane/RoB-2 risk of bias assessment. Data were processed statistically (RevMan v.5.2).

**Results** 409 studies were identified. Seven RCTs were included for qualitative assessment and six for meta-analysis ( $n=454$  patients with OA; 234 intervention/intake  $\omega$ -3 and 220 control, media=57.8 years, range 28-80 years, 68% women). Pain in the intervention group presented significantly favorable results versus control, expressed as mean difference =22.89, at 95% (CI=between 3.37-42.42;  $p=0.02$ ;  $I^2=98\%$ ) in 4 studies however, 2 RCTs were atypical. The RCTs showed high clinical and methodological variability expressed as a lack of homogeneity in the combined effect of the studies. The effective anti-inflammatory dose was not established. The most frequent adverse effects were gastrointestinal without affecting the intervention. For rigidity, function and inflammation the number of studies was low ( $n=2$ ).

**Conclusions** Omega-3 had significant results in pain reduction. However, the limited number of studies, the diversity of doses, sources, intervention length, baseline characteristics of the patients, asymmetry in reporting bias, along with the excessive heterogeneity of the studies, determined low quality evidence that did not allow us to offer a clinical guide that includes  $\omega$ -3 for the management of pain in patients with synovial joints affected by OA.

### Relationship Between Periapical Lesions In Antral Teeth And Sinus Mucosal Thickening

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**Objectives** To know the relationship between periapical lesions in antral teeth and maxillary sinuses basal mucosal thickening, through CBCT analysis of patients who went between 2014-2017 to the Imaging Service of the Dental Clinic at Universidad Finis Terrae.

**Methods** A descriptive, correlational, cross-sectional observational study was performed, examining CBCT of maxillary sinuses that presented mucosal thickening greater than 2mm. Sociodemographic characteristics and pathological findings were recorded in the maxillary sinuses and adjacent teeth. The data were analyzed using the statistical program SPSS 21. To evaluate the association of the presence of apical lesions, type of anatomical relationship of the affected apex and the degree of maxillary sinus mucosal thickening, chi-square hypothesis tests were used with a level of significance of 0.05.

**Results** A sample of 84 maxillary sinuses with mucosal thickening was analyzed, from patients 9 to 90 years old, where 54% were female. The frequency of detection of apical lesions in relation to mucosal thickening was 39.3%; where the first superior molar and its mesiovestibular root was the most frequent location. No significant association was observed between the degree of mucosal thickening and presence of periapical lesion or type of anatomical proximity.

**Conclusions** The presence of periapical lesions in relation to sinus mucosal thickening is a frequent finding. The CBCT is an appropriate method to assess the etiology and relationship between odontogenic pathologies and sinus involvement.

### Orthopedic correction for adolescents with retrognathic mandibular position. A systematic review and Meta-analysis.

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**Objectives** to establish whether the stepwise advancement orthopedic treatment is better than the traditional one bite jump method.

**Methods** A systematic search was conducted up to Oct. 20, 2019 in the MEDLINE, EMBASE, Scopus, Central Cochrane Library, and BBO databases. Included were preadolescent and adolescent humans with Angle class II malocclusion, without further restriction. The intervention group was composed of subjects treated with stepwise mandibular advancement; the control group received Bite jumping advancement. Search terms included prospective randomized and nonrandomized trials in English, German, Spanish, and Portuguese with the primary outcomes of skeletal and dental class II correction, effects on condylar growth, lower incisor proclination, overjet and overbite reduction. The risk of bias (ROB) was assessed using the Cochrane Collaboration's ROB2 tool. Mean differences were calculated and pooled by a meta-analysis using a random effects model.

**Results** Data from five randomized controlled trials (RCT) with 401 participants (mean age 13.84 years; SD 1.53) were included; 331 derived from four studies were included in the meta-analysis. The ROB in the selected articles was high. We detected a increased reduction of the ANB (mean difference [MD]  $-0.95^\circ$ , 95% confidence interval [CI]  $-1.80$  to  $-0.10^\circ$ ;  $I^2 = 72\%$ ) that may be attributed to a slightly more pronounced increase of the SNB angle in stepwise advanced mandibles (MD  $0.27^\circ$ ; 95% CI  $-0.47$  to  $1.00^\circ$ ;  $I^2 = 38\%$ ). Stepwise advancement tended to reduce the undesired side effect of lower incisor proclination (MD  $-1.59^\circ$ ; 95% CI  $-3.98$  to  $0.8^\circ$ ;  $I^2 = 0\%$ ), indicating more pronounced mandibular incisor changes with bite-jumping advancement.

**Conclusions** There is weak evidence indicating a slightly increased reduction of the ANB and less lower incisor proclination with Stepwise advancement compared to Bite jumping, but the clinical relevance is debatable due to the small overall magnitude and small number of high-quality papers.

### Evaluation of a new bleaching agent for professional use containing trimetaphosphate and fluoride

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**Objectives** This study evaluated the addition of sodium trimetaphosphate (TMP) and/or sodium fluoride (NaF) or calcium gluconate (CaGlu) to a 35% hydrogen peroxide ( $H_2O_2$ ) bleaching gel on the color change, enamel microhardness and transamelodentinal diffusion.

**Methods** Bovine enamel/dentin disks ( $n=216$ ) were divided according to the bleaching gel: 35%  $H_2O_2$ ; 35%  $H_2O_2$  + 0.05% NaF; 35%  $H_2O_2$  + 0.25% TMP; 35%  $H_2O_2$  + 0.05% NaF + 0.25% TMP; 35%  $H_2O_2$  + 0.1% NaF + 1% TMP and 35%  $H_2O_2$  + 2% CaGlu. The bleaching gels were applied thrice (40 min/session) at the intervals of 7 days between each application. Then, the color change, percentage of surface hardness loss (%SH), cross-sectional hardness ( $\Delta KHN$ ) and transamelodentinal diffusion of  $H_2O_2$  were determined. The data were submitted to ANOVA followed by the Student-Newman-Keuls test ( $p < 0.05$ ).

**Results** All bleaching gels showed significant color changes after treatment ( $p < 0.001$ ). Mineral loss (%SH and  $\Delta KHN$ ) and  $H_2O_2$  diffusion were lower for 35%  $H_2O_2$ /0.1% NaF/1% TMP, and 35%  $H_2O_2$ /2% CaGlu showed higher values, compared to the other groups ( $p < 0.001$ ).

**Conclusions** It was concluded that the addition of NaF/TMP in-office bleaching did not interfere in the bleaching efficacy, and reduced enamel demineralization and  $H_2O_2$  transamelodentinal diffusion.

### Relationship between Electromyographic Activity of the Musculature and Removable Prosthesis.

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**Objectives** Patients wearing removable prostheses commonly have insufficient retention, support and stability of their devices. This condition can alter the balance between the physiological components of the stomatognathic system, affecting the TMJ and muscular health.

The purpose of the study was to compare the electromyographic activity of the mandibular levator muscles in patients with removable partial dentures, before and after the stabilization of them, in the positions of maximum intercuspation, mandibular postural position and maximum voluntary tightening.

**Methods** Sixteen subjects with an average age of 59 years who met the inclusion and exclusion criteria were selected. With prior informed consent, records of the surface electrical activity were made bilaterally of the anterior temporal and superficial masseter muscles. Measurements were made before and after stabilization of removable prosthetic devices with a one-week interval. The data obtained was analyzed with STATA 14.1 software. For the distribution of data, the Shapiro-Wilk Test was used and then, the paired T Test was performed for the comparative analysis of the samples. A significance of  $P < 0.05$  was used.

#### Results

No statistically significant differences ( $p < 0.05$ ) were found in any of the three positions recorded when comparing the electromyographic activity before and after the stabilization of the removable partial dentures.

**Conclusions** Future research is needed with better standardization of the location of surface electrodes, definition of the study population and its characteristics. Likewise, the design of the prosthesis to be evaluated and the type of repair to be performed. We also believe it is important to increase the follow-up time. Thus, results with a clear trend can be obtained that allow evaluating the validity of stabilizing the removable prostheses of the patients prior to registering the maxillo-mandibular relationships in their oral rehabilitation treatments.

### Shear bond strength evaluation of experimental composite with silver nanoparticles coated with silicon dioxide for orthodontics.

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**Objectives** The purpose of this study was to investigate the shear bond strength of orthodontic brackets to bovine enamel using experimental composites with different concentrations of silver nanoparticles coated with silicon dioxide ( $\text{Ag@SiO}_2$ )

**Methods** Fifty bovine incisors were randomly divided into 5 groups according to the composite ( $n = 10$ ): G1 - Commercial Control Group (Transbond XT Resin), G2 - Experimental Composite without  $\text{Ag@SiO}_2$  nanoparticles; G3 - Experimental composite with 0.5% of  $\text{Ag@SiO}_2$ ; G4 - Composite with 1% of  $\text{Ag@SiO}_2$ ; G5 - Composite with addition 3% of  $\text{Ag@SiO}_2$ . The shear bond strength (SBS) test was performed in a universal mechanical testing machine and the analysis of the adhesive remnant index (ARI) by optical microscopy. For analysis of SBS, Analysis of Variance (ANOVA) was used, followed by Tukey test, at 5% statistical significance level. The ARI results were analyzed descriptively.

**Results** There was no statistically significant difference between the experimental groups (G2, G3, G4 and G5) and the commercial control (G1) ( $p > 0.05$ ). However, it was observed that the incorporation of 3% of  $\text{Ag@SiO}_2$  reduced the values of Ru, and this difference was statistically significant when compared to group with 1% of  $\text{Ag@SiO}_2$  ( $p < 0.05$ ).

**Conclusions** The incorporation of nanoparticles of  $\text{Ag@SiO}_2$  to composites did not negatively interfere in Ru of orthodontic brackets to bovine enamel when compared to commercial control. All the tested materials showed shear bond strength values suitable for clinical use.

### Oral hygiene in newborns and *Candida spp* colonization

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**Objectives** This is a randomized clinical trial aiming to evaluate the influence of oral hygiene in newborns before tooth eruption on *Candida spp* colonization and on oral candidiasis occurrence.



**Methods** The study included pair of mothers and their babies born in a maternity hospital in Diamantina, Minas Gerais, Brazil. The mother/baby pairs were selected in the hospital and randomly assigned to two groups: Group I (mothers instructed to clean the baby's oral cavity using gauze and filtered water once a day) and Group II (mothers instructed not to clean the baby's oral cavity before tooth eruption). In the hospital, a researcher exposed the instructions to the mothers allocated to each group. One month after the baby's birth, the newborns were evaluated in their homes, where a clinical oral examination was performed to assess the presence of candidiasis, and also saliva was collected for *Candida spp* identification and quantification. Questionnaires addressing aspects related to the baby and the family were also applied. Data analysis included the Mann Whitney and Spearman correlation tests.

**Results** Fifty-six mother/baby pairs were evaluated. Colonization by *Candida spp* was detected in 49.1% of the evaluated babies, and *Candida albicans* was the most common type (17%). There was no significant difference between colonization by *Candida spp* and intervention groups ( $p=0.947$ ). Oral candidiasis was found in 13.2% of the participants; this prevalence was 15.4% in group I and 11.1% in group II, but this difference was not significant ( $p=0.704$ ). Presence of *Candida spp* colony was associated with the pacifier use ( $p=0.036$ ) and with diseases in the first month of life ( $p=0.003$ ).

**Conclusions** It was concluded that oral hygiene before tooth eruption is not associated with colonization by *Candida spp* or with oral candidiasis in the first month of life.

### Presurgical Orthopedics in Patients with Cleft Palate: A Systematic Review

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**Objectives** Cleft lip and palate (CLP) are the most frequent congenital pathology of the maxillofacial territory. There is a great variety of treatment protocols with different surgical procedures and approximately half of them consider the use of pre-surgical orthopedics (PSO). The current evidence regarding this intervention is controversial with reports that suggest that PSO does not present benefits on maxillary growth and craniofacial development and that it could even have adverse effects. Nevertheless, this intervention is included in the "GES de Fisuras Labiopalatinas" program. The objective of this systematic review of controlled and randomized clinical trials is to evaluate the effectiveness of PSO in patients with CLP.

**Methods** Manual and electronic searches were performed in THE COCHRANE LIBRARY, MEDLINE and EMBASE databases. Selection of studies using predetermined inclusion criteria, data extraction and assessment of risk of bias were performed by two independent reviewers. We calculated the mean difference with 95% confidence intervals and performed a meta-analysis using a random effects model. We determined the certainty of evidence for each outcome using the GRADE approach.

**Results** A total of eight studies were included in this review. All studies evaluated maxillary morphology. The intercanine width (anterior arch with) presented statistically significant results favoring control with a mean difference of 2.06 (CI95%: 0.47, 3.66). The intertubercosity width (posterior arch with) had a mean difference of 0.05 (CI95%: -1.85, 1.96) and the sagittal maxillary length had a mean difference of 1.73 (CI95%: -0.71, 4.17). All the presented outcomes had a very low certainty of evidence due to risk of bias, imprecision and inconsistency.

**Conclusions** Definitive conclusions about the effectiveness of PSO and its impact on the growth of the maxilla cannot be drawn because of the very low certainty in the evidence. There is a need for well-designed studies to clarify the effect of PSO, therefore we suggest that the inclusion of PSO in the national program should be reevaluated.

### Correlation Between Vitamin-D and Degenerative Joint Disorders. Review and Meta-analysis

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**Objectives** Evaluate the evidence of the clinical correlation between vitamin D and symptomatic degenerative joint disease.

**Methods** A systematic search and meta-analysis was conducted of randomized controlled studies (RCTs) published in between January 1<sup>st</sup> 2010 and March<sup>th</sup> 2020 on five different databases. The study population consisted of adult patients with symptomatic knee osteoarthritis; the intervention: vitamin D; the comparison: placebo and the outcomes included the Western Ontario and McMaster Universities Arthritis Index (WOMAC) (pain, function, stiffness), tibial Cartilage volume, synovial tissue volume (STV), subchondral bone marrow lesion (BML) volume, effusion-synovitis, serum vitamin D3 levels, serological inflammatory and metabolic biomarkers levels and adverse events.

**Results** Nine RCTs involving 2.168 patients were included in this study. Pooled estimates suggested that vitamin D supplementation was associated with significant reduction in WOMAC pain (Std. Mean=1.08(0.90, 1.25);  $I^2=99\%$ ;  $p=0.00001$ ), function (Std. Mean=1.1(0.92, 1.27);  $I^2=99\%$ ;  $p=0.00001$ ), stiffness (Std. Mean=0.72(0.54, 0.90);  $I^2=98\%$ ;  $p=0.00001$ ) and effusion-synovial in the suprapatellar pouch. There was no significant difference in incidence of tibial cartilage volume (Std. Mean=0.62(0.44,0.80);  $I^2=99\%$ ;  $p=0.00001$ ), STV, BML volume, inflammatory biomarkers and adverse events between the vitamin D and the placebo groups.

**Conclusions** Vitamin D supplementation was effective in improving the WOMAC pain and function in patients with knee OA. However, it had no beneficial effect on structural change of the cartilage and in the reduction of inflammatory biomarkers. Therefore, there is currently a lack of evidence to support the use of vitamin D supplementation in preventing the progression of

knee OA.

### **Low-level laser protocol on the prevention of pain, edema, and trismus due to retained lower third molar extractions. A clinical, comparative, randomized, double-blind study**

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**Objectives** The aim of clinical trial (split mouth) was to evaluate a low intensity laser protocol to control pain, edema, and trismus after third molars extraction.

**Methods** For this, 13 patients with similarly positioned bilateral third molars were used and each patient served twice as a sample unit. Patients were randomized according to the treatment they would receive, Laser side: single low power laser (810 nm), 6 J (100 mW, 60s / dot); and sham side: laser application simulation. After surgery, patients were followed for three consecutive days to assess 1) Pain, by means of rescue analgesic consumption (NAR), Visual Analog Scale (VAS) in the periods of 0h, 1h, 2h, 3h, 12h, 24h, 48h, 72h and mean time of first analgesic use; 2) Edema, through VAS, and mean obtained from the linear facial measurements obtained between the mandibular angle to the corner of the eye, the tragus to the labial commissure and the tragus to the chin (central portion) in the periods of 0h, 24h, 48h, 72h; 3) Trismus, through the mouth opening average in the periods of 0h, 24h, 48h, 72h.

**Results** The VAS results show that the laser better controlled pain at periods of 3 ( $p = 0.010$ ), 24 ( $p = 0.002$ ), and 48 hours ( $p = 0.013$ ). There was no difference between Laser and Sham for NAR ( $p = 0.329$ ) and for the time required for the first analgesic use ( $p = 0.462$ ). VAS results for edema show that the laser controlled better at 24 ( $p = 0.041$ ) and 48 hours ( $p = 0.013$ ). Mouth opening reduction was smaller in the Sham group in all periods evaluated ( $p < 0.05$ ).

**Conclusions** It is concluded that the laser protocol used in this research allowed pain and edema reduction, without effect for trismus.

### **Teledentistry for the Promotion and Prevention of Oral Health: A Systematic Review and Meta-analysis**

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**Objectives** The pandemic for SARS-CoV-2 will accelerate digital transformations in dentistry. Hence, remote approaches for promotion and prevention in oral health will become part of the dental armamentarium. Yet, evidence available on the use of teledentistry in dental practice is rather scarce, lacking consensus about its effectiveness. The aim of this systematic review (SR) of the literature, therefore, was to evaluate the current use and effectiveness of teledentistry, compared to conventional strategies, in patients of any age.

**Methods** The SR protocol was submitted to PROSPERO. An exhaustive search through MEDLINE, WoS, and SCOPUS databases was conducted using a predefined searching strategy. No year or language limits were applied. Studies were screened by title and abstract, and after full-text review, any study carried out in humans meeting the eligibility criteria (PICOS question) were included. Studies selection, data extraction and risk of bias assessment (Cochrane Risk of Bias tool) were done independently and in duplicate. Homogenous data were quantitatively summarized (meta-analysis).

**Results** Out of the 444 titles found, 24 were eligible for full-text review. Five randomized controlled trials (RCTs) (3 on orthodontics; 1 on paediatrics, and 1 on periodontics) were included. Virtual interventions were asynchronous using apps ( $n=4$ ), WhatsApp groups ( $n=1$ ), notifications as reminders ( $n=3$ ), or PowerPoint slides ( $n=1$ ) to deliver educational content. The overall risk of bias was low. Teledentistry using smartphone notifications, and other Apps were comparable and slightly more effective than face-to-face strategies at reducing gingival inflammation ( $I^2=90\%;p=0.25$ ) and plaque index ( $I^2=86\%;p=0.08$ ).

**Conclusions** Low amount of studies, mainly restricted to asynchronous and non-personalized education in young populations, appear to demonstrate that teledentistry is effective in reducing dental plaque and gingival inflammation. Teledentistry is a promising additional tool for post COVID-19 dentistry.

### **Liners and Shear Bond Strength After Selective Carious Lesion Removal.**

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**Objectives** To approach deep caries lesions, selective removal of soft carious tissue (SRCT-S) is evidence-based and the most rational procedure for the minimally invasive treatment of the lesions. Whether biocompatible cavity liners are needed when deep caries lesions are treated with SRCT-S remains unclear, nonetheless. Objective: To evaluate the mechanical behavior of composite resins (CR) placed over different cavitory liners after treating deep caries lesions through SRCT-S.

**Methods** Materials and methods: 51 human teeth were collected after obtaining ethics approval. 24 decayed and 27 healthy teeth were collected for testing the shear bond strength (SBS). Cross section was made at the maximum depth of the lesion. Each sample was placed in an acrylic resin cylinder and SRCT-S was completed. Sound tooth samples were prepared mirroring carious teeth. Sound ( $n=9$ ) and carious teeth ( $n=8$ ) were randomly assigned to one of the 3 experimental groups: Group A: self-etching adhesive (SEA) + CR, Group B: conventional glass ionomer + SEA + CR, and Group C: calcium hydroxide + SEA + CR. SBS was assessed and strength values were calculated in Newton (N), which were subsequently transformed into Mega Pascals (MPa). Values were compared across subgroups using ANOVA and  $p$  values of  $<0.05$  were considered significant.

**Results** Results: Statistically significant differences in SBS were found between subgroups ( $F_{(5,45)}=3.29$ ,  $p=0.01$ ). The highest

mean value was found in Group A without carious lesions ( $18.34 \pm 6.2$ ) and the lowest mean value corresponded to Group C without carious lesions ( $10.22 \pm 2.6$ ). Pairwise comparisons showed that Group A and Group B were statistically significantly different ( $p < 0.05$ ) only compared with Group C.

**Conclusions** Conclusion: Teeth restored after SRCT-S using calcium hydroxide as a liner material seem to exhibit lower mechanical resistance than those restored with glass ionomer or SEA alone. Further clinical research to deepen these findings is warranted.

### Effects of Omega 3 on Sleep: Systematic Review.

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**Objectives** To determine the effect of omega-3 on the quality and/or quantity of sleep in humans.

**Methods** A systematic search of articles published between the years 2010-2019, in six databases, was carried out. Patients without age or sex limitation, who had undergone diet changes or omega-3 supplementation were included. An evaluation of sleep quality/quantity was performed. The systematic review was conducted under the PICOT eligibility and collection criteria, the PRISMA criteria for systematic reviews were applied and the quality of evidence and bias were assessed according to GRADE criteria.

**Results** Six randomized clinical trials passed all filters, totaling 1013 patients (230 adults and 783 children). Two studies modified the diet by including fish three times a week and in four studies patient's ingested different amounts of omega-3. Omega-3 favorably impacts sleep in four studies, three in adults and one in children, while two studies showed no significant effect. Omega-3 improves moderately the quality of sleep and presents high positive impact in quantity of sleep. The studies were carried out with highly heterogeneous variables, making impossible a quantitative analysis of the data, due to the implementation of various type of questionnaires and especially because objective measurements of comparable biomarkers were not available in all studies. The level of bias was moderate to high.

**Conclusions** A promising trend was observed in the use of omega-3 as an adjuvant to improve the quantity and quality of sleep, as a supplement or directly in food. The studies presented great heterogeneity both in the methodologies to measure the intervention, in the populations studied and in the form of omega-3 intake, making it impossible to conclude recommendations for clinical use. Studies with greater methodological standardization are needed to determine optimal dose, intervention period and EPA/DHA ratio required to improve the quality and quantity of sleep.

### Microbiological Association between Periodontal and Alzheimer's Diseases: a Systematic Review.

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**Objectives** Periodontitis is a non-communicable chronic disease caused by the dysbiosis of subgingival microbiota. There is evidence that intestinal pathogenic and respiratory microorganisms can spread to various organs and tissues, detecting cognitive decline in animal models. Recently, in different patients who died due to Alzheimer's disease (AD), the presence of oral bacteria was detected in the brain cortex, hippocampus, and in trigeminal ganglia. Our research group identified the presence of Porphyromonas gingivalis in the brain of rats after palatal inoculation of both pathogenic and non-pathogenic serotypes. Thus, in this systematic review we performed an analysis of the literature to determine the microbiological association between periodontitis and Alzheimer's disease.

**Methods** The PRISM protocol, based on clinical trials, cases and controls, cohort, and descriptive postmortem studies were used to detect periodontal bacteria in the brain. Research papers from the last 15 years were included, and papers with languages other than English or Spanish were excluded. The search was performed in the Pubmed database using MESH terms and was complemented by gray literature. The studies were reviewed by two independent reviewers and a third reviewer made the final decision in questionable situations.

**Results** Based on 12 studies, the evidence demonstrated that Porphyromonas gingivalis, Treponema denticola or Aggregatibacter actinomycetemcomitans can be detected in Cerebrospinal fluid, IV ventricle, brain cortex or hippocampus. All those bacteria were detected in both patients, affected or non-affected with AD.

**Conclusions** There is a possible link between the development or progression of AD and oral bacteria. However, it cannot yet be established that periodontitis is a risk factor for AD.

### Impact Of Audiovisual Resources On The Learning Of Dental Students

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**Objectives** COVID-19 has caused a change in the modality of education. Universities continue to teach through teleeducation, making use of Information and Communication Technologies. It is necessary to evaluate whether virtual education guarantees the quality demanded by students. The objective of this study was to evaluate the technical quality and value the impact on the learning process of audiovisual material generated by student assistants, in support of the training units of third-year dentistry students at the University of Chile.

**Methods** A survey was applied to 88 students. The technical scope of the audiovisual material (short video) was evaluated using a

numerical scale from 1 to 4 (1: Needs improvement, 2: Regular, 3: Good, 4: Very good), and considered sound quality, spoken expression and image, legibility of texts, grammar and spelling, and order, logic and clarity of the information. To assess the impact on learning, single and multiple-choice questions were applied regarding the benefits of the information, usefulness in evaluations, continuity of application of the methodology, and a non-failing test was carried out on the content of the video.

**Results** The aspects of technical quality were mainly evaluated with a numerical rating of 4. 30% consider that the readability of the texts and image quality can be improved, 94% that the material based on examples facilitates the understanding of the content delivered in classes, 100% useful for study of subsequent evaluations, 96% agree to continue with the implementation of the methodology. The mean of the test was 5 points out of a total of 6.

**Conclusions** It is necessary to make improvements in the aspects of less technical evaluation to adapt the material to the needs of the students. Short videos in which the information delivered in classes is applied to clinical situations, have a positive impact on the learning process of dental students.

#### Chilean Participation at IADR General Meetings: 2013-2020

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**Objectives** International Association for Dental Research (IADR) Annual General Meetings is one of the most important congresses for dental scientific community. The aim of this study was to analyze the participation of Chilean researchers at the IADR general session between 2013 to 2020.

**Methods** A bibliometric study. All presentations with authors affiliated to some Chilean institution and all kind of presentations were included. The data collected was obtained through the website of IADR Abstract Archive (iadr.abstractarchives.com). Session, Title, Authors, Affiliation institution, International cooperation and Scientific Groups/Networks were registered on an electronic spreadsheet through an electronic form. A statistical descriptive analysis was performed through IBM® SPSS® Statistics v.25.

**Results** At IADR General Sessions, 213 presentations were found from 2013 to 2020 (with an annual average of 22.6), of them 178 correspond to the poster modality, 29 oral presentations, 3 symposium and 1 discussion session. 125 presentations were made exclusive for Chilean researchers and 88 had international cooperation, mostly by the United States (24.8%). The affiliation institution with major participation is the Universidad de Chile (39.1%), followed by the Universidad de los Andes (11.8%) and the Universidad de Talca (11.4%). The most used Scientific Groups/Networks was Dental Materials and International Network for Orofacial Pain and Related Disorders Methodology (INFORM) (11.7%), followed by Microbiology/Immunology and Periodontal Research (9.4%).

**Conclusions** The Chilean participation has gradually increased in the last period, however it's still low and distant compared to the bigger scientific producers worldwide, such as Brazil who has the leadership in the American Latin region. As for the Scientific Groups/Networks it has been observed that scientific production has increased compared to earlier periods in the INFORM and Microbiology/Immunology areas. Currently, four universities are leading the research, reflecting the need for further promotion of scientific investigation at their facilities.

#### Pathogenic Variants Of DLX3 in Trico-Dento-Osseous Syndrome and Amelogenesis Imperfecta.

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**Objectives** To determine the type, location and consequence of the mutations reported in DLX3 that are associated with Trico-Dento-Osseous Syndrome (TDO), Amelogenesis Imperfecta (AI) and both pathologies simultaneously.

**Methods** A systematic literature search was performed in 4 databases, using keywords to create semantic fields adapted to each base. Initially, 115 studies were collected, selecting 15. Data extraction was performed using an excel table containing: reference, inheritance pattern, mutation, location, and various other criteria.

**Results** 10 mutations in DLX3 were found associated with TDO and AI. Two correspond to deletions of the complete gene, 3 to deletions of 1, 2, 4 bp and 5 were substitutions of 1 bp (3 transitions and 2 transversions). The c.571\_574delGGGG and c.545C>T mutations are associated only with TDO, while the rest cause both pathologies simultaneously. In a single case the c.561\_562delCT mutation was associated with hypoplastic hypomature AI.

**Conclusions** Most of the mutations correspond to punctual changes and a minority to small deletions, located in exons 2 and 3. Eight mutations are related to TDO and AI and two to TDO alone.

#### Alzheimer's And Periodontitis: How Are They Related? A Systematic Review.

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**Objectives** To analyze the relationship between Alzheimer Disease (AD) and Periodontitis.

**Methods** Systematic Review was performing, based in the methodology of the Cochrane Manual and PRISMA declaration. The search strategy used was the following: “Alzheimer” and “Periodontitis” as key concepts; ScienceDirect, Pubmed and Scielo as databases; searching without year restriction. The inclusion criteria were: Clinical Trials, Cases and Control studies that describe the relationship between Alzheimer and Periodontitis in human patients. The exclusion criteria were: Bibliographic reviews, animal studies.

**Results** 1177 articles were found after the first search. After title/ abstract revision, 10 articles met the study objectives. After the full reading of these articles, 6 articles met the inclusion criteria and were analyzed. 5 articles were added after reading the bibliography of 6 articles previous included. In general terms, the articles determined through case-control studies that the development of periodontitis is strongly related to the cognitive deterioration suffered by patients with AD in which the decrease in their motor, communicative and cognitive functions lead to a loss of the habit and concern for oral hygiene. In particular analysis patients with AD, have an average probing depth of 3.6, while healthy patients average 1.6, Furthermore, these patients have a higher prevalence of Periodontitis than healthy patients.

**Conclusions** Patients with AD for to their condition and cognitive impairment are more susceptible to develop periodontitis. However, it must be considered that due to the age of the patients with AD, other factors could be contributing to the development of Periodontitis, such as polypharmacy and systemic diseases. Nevertheless These patients must have greater observation and follow-up by the dentists.

### **Osseointegration of LASER modified surface implants with and without hydroxyapatite coating**

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**Objectives** The aim of the present study was to evaluate the osseointegration of implants with the machined surfaces (SU), commercially available surface modified by aluminum oxide blasting followed by acid etching (SJA), modified by LASER beam (SL) and modified by LASER beam with subsequent coating of hydroxyapatite using the biomimetic method without thermal treatment (SLH).

**Methods** The surfaces were analyzed using scanning electron microscopy coupled with dispersive energy X-ray spectroscopy (SEM-EDX) prior to surgery. Twenty rabbits randomly received 40 implants in their right and left tibiae, with one implant on each surface in each tibia. Resonance frequency (ISQ) was performed in surgery, and in the periods of 2 and 4 weeks, followed by removal torque of the implants during the analysis periods. The data obtained were subjected to analysis of variance and Tukey's t test (ISQ) and Kruskal-Wallis (biomechanical analysis).

**Results** SEM and EDX showed differences in surface topography. There was no statistically significant difference between the groups in the resonance frequency. There was a statistically difference in the removal torque between the SL and SLH group when compared to the SU group in the period of 2 weeks. In the 4-week period, a statistical difference was observed between the 2 experimental surfaces SL and SLH when comparing the SU and SJA surfaces. In the histological analysis, the SL and SLH groups presented bone remodeling in the period of 2 weeks and mature bone in the period of 4 weeks, unlike SU and SJA which presented a delay in repair before the experimental surfaces.

**Conclusions** Implants with SL and SLH surfaces showed topographic and biomechanical properties superior to those of SU and SJA surfaces.

### **The Regional Acceleratory Phenomenon in Tooth Movement: Role of Saliva**

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**Objectives** In current orthodontics, it is accepted to perform maneuvers to accelerate dental movement, including microosteoperforations (MOPs). Xerostomia is a pathology that affects a significant part of the population and is linked to multiple causes. In adults, this situation can modify the response to treatment with MOPs. Animal studies conducted in our laboratory showed that hyposialia delays healing of bone tissue, also alters the biomechanical properties of the maxilla by increasing bone stiffness and maximum fracture load, as well as the density of the alveolar bone repaired after 30 days post- extraction. Objective To assess the effect of submandibulectomy (SMx) in the early stages of tooth movement (MD) accelerated with MOPs therapy at 7 days.

**Methods** Materials and Methods 48 male Wistar rats 200-250gr were divided into 8 groups Control (C), MOPs, experimental Orthodontics (O) y O+MOPs; and the same four groups subjected to SMx. Nickel-titanium closed-coil springs exerting a 50g force (T0) were secured from maxillary incisors to first molars for tooth movement. Three MOPs were performed mesial of the maxillary first molars using a 1/4 bur at low speed. The SMx was performed one week before T0. Animals were euthanized 7 days after T0. Tooth movement was determined as the distance from mesial of the first molar to the alveolar bone crest of de incisors with a digital caliper (mm). Results were analyzed with one way ANOVA and Tukeys post test (p<0.05).

**Results** Results After 7 days of treatment, greater tooth movement was observed in group O+MOPs+SMx(10.43±0.05) vs. O+MOPs(10.88±0.09; p<0.05), y vs. O+SMx (10.84±0.05, p<0,05). However, no statistically significant differences were

observed between the groups O(10.81±0.2) vs O+MOPS.

**Conclusions** Conclusion The state of hyposialia conditions the MD, probably due to an increase in the inflammatory response induce by MOPs therapy.

### Novel Methods to Assess Midpalatal Suture Maturation. Systematic Review.

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**Objectives** Assessment of midpalatal suture maturation is highly important in clinical decision making on whether to correct a transverse discrepancy in a conventional or assisted surgical manner. For this purpose, there are some methods such as hand-wrist bone analysis, cervical vertebral maturation method and occlusal radiography. The aim was to identify in the current literature the use of new methods and technologies to evaluate the maturity of the midpalatal suture before performing a maxillary expansion.

**Methods** A systematic review was performed on electronic databases PubMed, Cochrane Library, Scielo, Epistemonikos, Web of Science and ScienceDirect between 2010 and 2020, including all languages; using as search strategy the terms "midpalatal suture" AND "maturation" AND "maxillary expansion" AND (evaluation OR assessment OR assess).

**Results** 97 articles were found as a result of the first search (algorithm). 15 articles were analysed and fulfilled all the inclusion/exclusion criteria. The reported methods for individual assessment of midpalatal suture maturation were the use of ultrasonography, fractal analysis, bone density and Angelieri method.

**Conclusions** The quality of evidence available is insufficient to support the newest technologies and proposed methodologies that evaluate midpalatal suture maturation. The novel methodologies mentioned lack validation with histological reference/gold standard. Therefore, it is still advised that clinicians use a multitude of diagnostic methods to subjectively assess palatal suture maturation and drive clinical decision-making.

### Preventive effect of glass-ionomer versus laser in Molar-Incisor-Hypomineralization affected molars

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**Objectives** Several treatment modalities can be applied for the management of teeth affected by molar-incisor hypomineralization (MIH), depending on the defects' severity. This preliminary analysis is part of a larger study, aiming to verify the preventive effect of two treatment modalities against progression of the defect and dental caries in MIH affected molars.

**Methods** 71 children (6-10 years) with at least one MIH affected molar (opacities without or presenting a post-eruptive breakdown restricted to enamel) were randomized into two groups: a) laser diode and b)glass ionomer sealant. Clinical examinations were performed at baseline and after 6 months, and a failure was considered when a progression of the defect and caries lesions were observed. Logistic regression and chi-square test were performed to verify the association between outcomes vs. variables related to the patient and the treatment received ( $\alpha < 0.05$ ).

**Results** After 6 months (drop-out 15%), there was no association between the treatment performed and the outcomes progression of the defect and caries. Additionally, no association was found between the failures and other independent variables ( $p > 0.05$ ). However, there was an association between partial loss of sealants and progression of the defects ( $p < 0.01$ ).

**Conclusions** No difference was found between the types of treatments performed and the outcomes progression of the defect and caries in MIH affected molars after 6 months of follow-up; however, the partial loss of sealants were associated with progression of the defects.

### KNOWLEDGE AND MANAGEMENT OF DENTAL TRAUMA BY TEACHERS AND PARENTS

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**Objectives** Evaluate the knowledge and management referring to dentoalveolar trauma of teachers and parents of 2-3 and 7-8 years old children in the commune of Talca.

**Methods** A cross-sectional study was conducted. A sample of 161 people was used, corresponding of 35 teachers and 126 parents from 6 private and public educational establishments from the commune of Talca. A validated survey on knowledge and management was applied with proper informed consent after a meeting performed in the schools by 1 investigator. Fisher's exact Test was used.

**Results** The following statistically significant associations were found: participants from the highest grade (2<sup>nd</sup> grade) obtained better knowledge (value  $p = 0,027$ ), private establishments obtained better knowledge (value  $p = 0,000$ ) and management (value  $p = 0,020$ ), teachers who had first aid training during their formation obtained better management (value  $p = 0,030$ ). Concerning the knowledge in teachers, it was determined that 57,1% of them obtained the necessary score and in management, 31,4% of them obtained the necessary score. In relation to knowledge of the parents, 46,8% of them obtained the necessary score and in management, 23% of them obtained the necessary score.

**Conclusions** The present study determined that the knowledge and management of dentoalveolar trauma of teachers and parents is insufficient, therefore educational campaigns to improve the management of dental trauma emergencies are needed.

### Subgingival Irrigation with Phytotherapies Adjunct to Scaling and Root Planing

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**Objectives** This study evaluated influence of subgingival irrigation with *Matricaria recutita* (MAT) and *Plantago major* (PLA) adjunct to scaling and root planing (SRP) on treatment of experimental periodontitis (EP) in rats.

**Methods** EP was induced in 72 rats with a ligature around the mandibular left first molar. After 7 days, the ligature was removed, and the animals were randomly distributed into 3 groups: SRP – SRP and irrigation with saline; MAT – SRP and irrigation with MAT solution; and PLA – SRP and irrigation with PLA solution. Each group was subdivided into 3 subgroups (n = 8) and euthanasia performed after 7, 15 and 30 days. It was evaluated colony-forming units (CFU), area of bone loss (BL) in the furcation region, percentage of mature and immature collagen fibers, tartrate-resistant acid phosphatase (TRAP), ligand of the nuclear factor kappa B activator receptor (RANKL) and osteoprotegerin (OPG). Data were statistically analyzed (p<0.05).

**Results** Groups MAT and PLA had significantly lower number of CFU than Group SRP within 15 days. Group PLA had significantly lower BL than Group MAT 7 days. Group MAT had significantly higher percentage of immature collagen fibers than groups SRP and PLA 15 days. Group PLA presented significantly higher OPG than Group SRP 7 days and significantly lower RANKL than groups MAT and SRP 15 days.

**Conclusions** It can be concluded that subgingival irrigation with *Matricaria recutita* and *Plantago major* adjunct to SRP reduces the amount of CFU and improves periodontal healing in the treatment of EP in rats.

### Odontogenic Tumors: A Study Based on 2005 and 2017 WHO Classifications

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**Objectives** The aim of this study was to determine the relative frequency of this heterogeneous group of lesions in a Chilean population, and to compare these data with previous reports.

**Methods** We reviewed the records of 34,123 specimens from 1975 to 2014 since the pathological anatomy service of the Faculty of Dentistry of the University of Chile, using the criteria for histological typification published by the 2005 and 2017 World Health Organization (WHO).

**Results** For 2005 and 2017 WHO, a total of 937 and 497 odontogenic tumors was confirmed, respectively. The most frequent clinical-histological type was to 2005 WHO: keratocyst odontogenic tumour (50.9%), followed by odontoma (22.84%) and ameloblastomas (11.21%) and to 2017 WHO: odontoma (43.1%), followed by ameloblastomas (21.1%) and cemento-ossifying fibroma (13.5%).

**Conclusions** Odontogenic tumors are infrequent lesions. Thus, the review of a large number of cases becomes a necessity for both the pathologist and the clinician. Studies on odontogenic tumors have been published in many parts of the world, but there is little information available in the English language literature on the relative frequency of odontogenic tumors in Latin America. Odontogenic tumors are uncommon lesions in the Chilean population and malignant odontogenic tumors are very rare. The relative frequency of various types of odontogenic tumors, as well as the age and sex distribution are similar to those reported in the North American series and different from those found in recently published Asian and African series.

### Antimicrobial action of NeoMTA Plus: an *in vitro* study

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**Objectives** The aim of the present study was to evaluate the antimicrobial capacity of NeoMTA Plus (Avalon Biomed, Houston, TX, USA) on single and mixed biofilms of *Enterococcus faecalis* and *Candida albicans*.

**Methods** A total of 171 sterile dentin blocks, measuring 4 × 4 × 1 mm, were incubated in medium containing *E. faecalis* (3.1×10<sup>8</sup> cells/mL) and/or *C. albicans* (1×10<sup>7</sup> cells/mL) for 2 days. These blocks were randomly divided into three groups: control (no treatment with biomaterials); MTA, treated with a sample of MTA after setting, with the same width and thickness of the dentin block; and NEO, similar to the MTA group, but treated with NeoMTA Plus. The biomaterials remained in contact with the biofilms for 24 h. Quantitative analyses, including the number of colony-forming units (CFUs) and metabolic activity (XTT), were performed. Furthermore, qualitative analysis of biofilm structure was performed using scanning electron microscopy. Data were analyzed and subjected to statistical analysis using a significance level of 5% (p<0.05).

**Results** XTT and the number of CFUs were similar among the groups (p>0.05). The type of biofilm (i.e., single or mixed) or biomaterial used (i.e., MTA or NeoMTA Plus) did not affect the results. The structure of the biofilms remained homogeneous among the groups.

**Conclusions** NeoMTA Plus was not effective against single and mixed biofilms of *E. faecalis* and *C. albicans*. Further research

investigating methods to remove biofilms is warranted, including the use of these biomaterials with antiseptics and supporting therapies.

### **Collagen Quantification In Peri-Implant Soft Tissues Of Human Peri-Implant Lesions**

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**Objectives** To quantify the percentage of collagen fibers present in the peri-implant soft tissue of patients with peri-implantitis.

**Methods** Descriptive observational cross-sectional study. Eleven peri-implant soft tissue samples were collected from patients with peri-implantitis at the Peri-implantology Polyclinic of the Faculty of Dentistry of the Universidad de La Frontera, Temuco, Chile. Ethical approval to carry out the study was granted by the Ethics Committee of the Universidad de la Frontera, Report N°. 024\_2018 (REDI Project 0170658, CONICYT). After the written informed consent, the biopsies have undergone a histopathological analysis at the Oral Pathology Laboratory of the University of Talca. All samples were processed using Mason's Trichomic Technique. The reading and interpretation of results and image capture were performed under 40X magnification light microscopy with a camera (Canon EOS Rebel XSI, Tokyo, Japan). 5 fields per sheet were analyzed. Quantification of collagen fibers was performed using Image J software (version 1.46j; National Institute of Health, USA) with application of deconvolution color. Collagen density is expressed as a percentage of the estimated total area. The data is grouped to represent a mean value and standard deviation, determining minimum and maximum values.

**Results** Macroscopic collagen fiber bundles were calculated in all samples, with an average percentage (38.69%), standard deviation (16.64%), with a minimum value (8.99%), and a maximum value (69.91%) density.

**Conclusions** This study showed that in human peri-implantitis lesions there is a moderate percentage of collagen fibers (38.69%) in peri-implant soft tissue. This is interpreted as connective tissue in a permanent process of reparative response, in the presence of an inflammatory infiltrate. This phenomenon should be investigated in depth in future studies with a larger sample size, and compared to healthy peri-implant soft tissue samples, however it serves as a preliminary result for future research.

### **LPRF conditioned media stimulates human periodontal cell proliferation.**

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**Objectives** The main goal of our study was to evaluate the effects of conditioned media isolated from L-PRF plugs on the proliferation of periodontal ligament mesenchymal cells.

**Methods** All procedures were approved by the Ethical committee of health science at Pontificia Universidad Católica de Chile. Briefly, cells isolated from human periodontal ligament (LPH) were seeded in 24-well plates and treated for 24 and 48 hours with conditioned media obtained from LPRF plugs. For LPRF plug obtention, venous blood samples from healthy donors were centrifuged at 406 Xg for 12 minutes. LPRF clots were compressed using pistons in a stainless-steel device and immersed in cell culture media. We recovered and changed this media after 3 hours, 3 days and 7 days. Likewise, exudates released after LPRF clot compression were recollected. As controls, we used conventional cell culture media, DMEM supplemented with 10% or 0.1% fetal bovine serum. Then, cells were fixed with 4% and immunostaining with the Ki67 proliferation marker was done. Total number of cells was evidenced by DAPI nuclear staining. Finally, images on epifluorescence microscopy were taken to determine the percentage of positive Ki67 cells.

**Results** The conditioned media collected from LPRF plus, promote the proliferation of periodontal cells after 24 and 48 hours, even in a greater proportion than the conventional culture medium. Cells incubated with exudates similarly stimulated cell proliferation. Being greater in those treated at 40%.

**Conclusions** Conditioned media from LPRF plugs were able to stimulate periodontal cell proliferation, an important biological activity during the wound healing process.

### **Boldine's Effect on Cell Viability in Macrophages Stimulated with Lipopolysaccharide from *Porphyromonas spp.***

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**Objectives** To evaluate the effect of boldine on cell viability and toxicity in human macrophages stimulated with lipopolysaccharide (LPS) of *Porphyromonas spp.*

**Methods** LPS strains were purified by a modified TRIzol extraction protocol. Macrophage-differentiated THP-1 cells were stimulated with LPS from either *P. gingivalis*, *P. endodontalis* or *E. Coli* in the presence of different concentrations of boldine (0-500 µg/ml). Viable cells were counted in an automated cell counter and cytotoxicity was determined through MTT assay. Statistical analysis was carried out through Stata v12.

**Results** THP-1 cells stimulated with boldine at 500 µg/ml evidenced morphology changes suggestive of cell death. The cell viability analysis significantly dropped when using 500 µg/ml of boldine whereas a borderline significant decrease was observed in the group with boldine 50 µg/ml compared with controls (undifferentiated cells). A difference in the cytotoxicity was obtained when comparing the control group with the group stimulated with *P. gingivalis* at 25 µg/ml ( $p < 0.05$ ). There was no significant difference between the groups stimulated with *P. endodontalis* LPS.

**Conclusions** High concentrations of boldine (500 µg/ml) can affect the viability of macrophages. Boldine over a certain



concentration (25 µg/ml) in the presence of *P. gingivalis* could induce macrophage cytotoxicity. More studies are needed regarding the action of boldine on human macrophages in the presence of LPS from oral pathogens.

### **Living FRISBEE: Transconjunctival versus Subciliary approach for orbital fractures**

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### **Objectives**

To identify and analyze all published systematic reviews (SR) on the effectiveness and safety of the pre-septal transconjunctival approach (TCA) compared to the subciliary approach (ACS) for orbital floor fractures and infraorbital rim.

### **Methods**

We performed a systematic search in Epistemonikos, the largest database of SR in health, which is maintained by searching multiple sources of information, including MEDLINE, EMBASE, Cochrane, among others. We ordered the body of evidence using the evidence matrix tool using Epistemonikos and extracted the data from the SRs that compared both techniques. We re-analyzed the data and performed a meta-analysis using a random-effects model. Finally we prepared a summary of findings table using the GRADE framework. All processes were performed in duplicate and reviewed by a methodological and clinical team.

### **Results**

We identified six systematic reviews that presented 21 PS, four randomized clinical trials (RCTs), and 17 observational studies. RCTs included 120 patients with 120 orbital fractures without age restriction. The use of pre-septal TCA compared to the SCA may reduce the risk of ectropion (low certainty of the evidence), RR 0.41 [95% CI 0.11 to 1.56]. The use of pre-septal TCA compared to the SCA probably reduces the risk of other complications (moderate certainty of the evidence), such as diplopia, transient paraesthesia, ecchymosis, scleral show, tarsal plate laceration, and lower eyelid laceration, RR 0.30 [95% CI 0.09-0.94]. On the other hand, TCA's use probably increases the risk of entropion (moderate certainty of the evidence), 5.97 [95% CI 1.10-32.60].

### **Conclusions**

Both approaches are associated with specific complications. Overall, TCA's use showed the lowest incidence of complications. New RCTs comparing both techniques are required for other outcomes of clinical relevance, effectiveness, safety, and patient preferences.

### **FRISBEE: Botulinum Toxin Type A for Sleep Bruxism in Adults**

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**Objectives** This research aims to determine the effectiveness of Botulinum toxin type A (BoNTA) to manage sleep bruxism in adults.

**Methods** A search of relevant studies including multiple databases such as MEDLINE, EMBASE, Cochrane was performed through Epistemonikos. Data from identified systematic reviews was extracted using a standardized sheet form and outcomes from primary studies was analyzed. The primary outcomes included bruxism events during sleep. As secondary outcomes we considered the following: Sleep time, sleep quality, tooth wear index, muscle pain and adverse effects. Then, a structured summary named FRISBEE (Friendly Summaries of Body of Evidence using Epistemonikos) was generated following a protocol that included key messages, a matrix of evidence in Epistemonikos (summary of the analyzed evidence), a summary of the results using the GRADE approach and a decision-making section.

**Results** The search strategy retrieved fifteen relevant systematic reviews in Epistemonikos. Two randomized clinical trials involving 35 patients were selected to extract the relevant information. Both studies used placebo (saline solution) as control. One study used bilateral injection of BoNTA in the masseter and temporal muscles, and one study implemented bilateral BoNTA injection in the masseter muscles. The dose range was between 20U and 100U of BoNTA and the follow up evaluation from 1 to 3 months. Both trials measured the bruxism events using electromyography, without significant difference between groups.

**Conclusions** There is no enough evidence to support the use of BoNTA to manage sleep bruxism in adults.

### **EXPRESSION OF BRCA1 PROTEIN IN DIAGNOSED BIOPSIES WITH ORAL EPITHELIAL DYSPLASIA AND ORAL SQUAMOUS CELL CARCINOMA**

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**Objectives** BRCA1 is a tumor suppressor gene that is part of the DNA detection and repair system. It has been used as an important biomarker for diagnosis and prognostic evaluation in various carcinomas; however, oral cancer research is still in its beginning. The purpose of this study was to characterize the protein expression of BRCA1 in samples of DEO and COCE, and associate them in addition to variables such as age and gender.

**Methods** A total of 45 patients (20 DEO, 20 COCE and 5 FI) were studied, whose samples were obtained from the Diagnostic and Emergency Service of the Universidad Mayor's School of Dentistry. They were analyzed by immunohistochemical technique and the cell count was performed using the ImageJ Software. The expression was compared in terms of staining, expression pattern, percentage of positive cells and the index of marking; and these variables were related to the degree of cell differentiation of the samples, histological layer of expression, in addition to being associated with clinical variables such as age of diagnosis and gender.

**Results** Differences were obtained between the protein expression of BRCA1 in DEO and COCE, specifically regarding the marking index of them; likewise, the existence of a down-regulation of expression was observed in the transition from DEO to COCE, to later generate an increase in protein expression. In the normal state of expression, BRCA1 was found in the basal and parabasal layers of the tissues with a low intensity of expression, and then during the carcinogenesis process, it changes towards an intermediate and lucid layer. Aberrant locations of expression were observed, both in cytoplasm and membrane, which may be related to the migration of cancer cells and their potential for malignancy. In addition, a trend was observed in relation to the male gender ratio in DEO and BRCA1 expression; and no relationship regarding protein expression and age of diagnosis of pathologies

**Conclusions** Finally, it can be concluded that the protein expression of BRCA1 does differ according to the degree of tissue differentiation, and that the aberrant location of expression may be a future therapeutic strategy in these lesions

### **Difference In Dentin Demineralization Using Different Phosphoric Acid Application Protocols**

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**Objectives** This study evaluated the effect of different etching times of four commercial phosphoric acids on demineralization pattern, roughness of dentin and chemical mapping, as well as resin-dentin microtensile bond strength ( $\mu$ TBS) and nanoleakage (NL).

**Methods** The following commercial phosphoric acid were used: Ultra-etch [ULE], Scotchbond Universal Etchant [SUE]; Dentsply Dental Conditioner [DDC] and Total Etch [TTE]. After occlusal dentin exposure of 188 molars, the phosphoric acid was applied for 3 and 15s. The demineralization dentin patterns were observed in SEM (occlusal and lateral view). The roughness of the conditioned surfaces was measured by optical profilometry and Micro-Raman spectra were used for chemical mapping. After completing restoration, specimens were sectioned into resin-dentin sticks and tested for  $\mu$ TBS and NL. All data were statistical evaluated by two-way ANOVA and Tukey's test (Tukey  $\alpha = 0.05$ ).

**Results** After 15s of etching, a smaller depth of demineralization was verified for ULE compared to DDC and TTE, while SUE showed an intermediate behavior ( $p = 0.001$ ). No differences were observed after 3s of etching ( $p > 0.05$ ). The ULE and SUE obtained similar results with a lower tubular density compared to DDC and TTE ( $p = 0.001$ ). Both roughness and chemical mapping showed a lower demineralization rate at 3s for all groups ( $p < 0.002$ ) except ULE acid, which showed similar behavior at 3 and 15 s ( $p > 0.05$ ). The  $\mu$ TBS and NL values were significantly better in ULE and SUE than DDC and TTE for both 3 and 15 s of etching ( $p < 0.05$ ). The ULE acid showed greater demineralization control, followed by SUE acid, which had a positive impact on the bonding process.

**Conclusions** Three seconds dentin etching time cause significant changes in the dentin structure, but it is enough to guarantee an adequate monomer penetration into the demineralized dentin, without jeopardizing the bond strength and reducing nanoleakage.

### **Chronic administration of zoledronate affects healing parameters in C57Bl/6 mice**

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**Objectives** The aim of this study was to investigate the development of MRONJ-type lesions in C57Bl/6 adult male mice (IACUC n°00262-2019) at the late time point of socket healing, after continuous and cumulative administration of ZL in two different dosages

**Methods** Mice were divided into 3 groups according to the treatment: intraperitoneal injection (IP) of saline solution (SS, control,  $n=3$ ) or ZL at a concentration of 250 $\mu$ g / Kg ( $n=3$ ) and 500 $\mu$ g/Kg ( $n=4$ ), once a week, starting 4 weeks before extraction of the right upper incisor and continuing until the day 30 post-surgery. At the end of 30 days, bone samples were collected for histomorphometry (H&E), and immunohistochemistry for bone and inflammatory markers

**Results** While the control group exhibit a dental socket filled with mature bone, the ZL-250 and ZL-500 groups presented a significant and gradual increase in the area density of inflammatory infiltrate dependent of each dosage. Bone matrix area density was significantly lower in ZL-250 and ZL-500 groups. Area density of COX2+ cells, an inflammatory parameter positively related to bone neoformation, was decreased in both ZL treated groups compared to the control. Area densities of fibroblasts, RANKL+

cells, and empty osteocyte lacunae were increased in ZL-250 and ZL-500 groups. Interestingly, the area density of detached osteoclasts, a typical characteristic of MRONJ lesions, was higher in the ZL250 group compared to the SS, while ZL500 group presented a lower density of attached osteoclasts compared to the others.

**Conclusions** Chronic administration of both ZL dosages significantly affected inflammatory and healing parameters post tooth extraction in mice in C57BL/6, with increasing effects at the higher dosage.

### 3D-FEA evaluation of stress distribution in narrow diameter implants

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**Objectives** The aim of this study was to evaluate the stress distribution generated by the prostheses on single implants, in maxillary anterior region, varying the diameter of narrow implants (2.9 mm and 3.5 mm), using the 3D finite element analyses.

**Methods** Six 3D models were simulated using Invesalious, Rhinoceros 3D and SolidWorks software's. Each model had a bone block from anterior maxillary region (type III bone) contain the teeth central incisor and canine, simulating a rehabilitation with a cemented zirconia single crown, supported by a 2.9 mm or 3.5 mm diameter Morse taper dental implant, varying the length (8.5 mm; 10 mm and 13 mm), installed 1.5 mm infrabone. The models were processed by ANSYS 19.2 software, using 178 N strength at different slopes (0, 30 and 60). The results were plotted on Von Mises maps (vM), Maximum Principal Stress (MPS) maps.

**Results** In the analysis of vM there was an increase in the stress concentration for implants with smaller diameter. The increase in strain inclination increased the stress concentration in the implants/components and bone tissue. In bone tissue analysis under the MPS maps, higher concentrations of tensile and compression stresses were found in the oblique loads (30 and 60) around the implant neck, especially when using 2.9 mm implants.

**Conclusions** We can conclude that the use of larger diameter dental implants under the conditions of the study improve a reduction of stress in bone tissue adjacent to the implant, regardless of the length of the implant used.

### Antibiotic Prescribing In Endodontic Therapies: A Cross-Sectional Study

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**Objectives** Aim: Evaluate and compare the view of general practitioners (GP) and dentistry undergraduate (UGRAD) on the prescription of antibiotics for pulpal and periapical pathologies.

**Methods** Methods: an electronic questionnaire recorded general information about the participants, their clinical experiences, their knowledge about the guidelines available for prescribing antibiotics for endodontic therapies. Furthermore, six hypothetical clinical scenarios were presented to the volunteers to prescribe or not antibiotics.

**Results** Results: 443 volunteers responded to the questionnaire. 84.2% attend endodontic emergencies in their daily practice, 85.1% declared to prescribe antibiotics only for a limited number of selected patients, however 5.4% listed the prescription of antibiotics in cases of symptomatic reversible pulpitis. Most of volunteers (77.7%) reported not knowing the current guidelines for prescribing antibiotics, however 92.8% are aware of the consequences of its indiscriminate use, citing, mainly, bacterial resistance. Two of the six clinical cases presented had no statistically significant difference between the responses of the GP and UGRAD ( $p > 0.05$ ), however in one question, approximately half of the total participants answered incorrectly and fortunately in the other 62.3% answered correctly. In three cases, the GP and UGRAD did not agree on the therapies used, two of which were more favorable to the GP ( $p < 0.05$ ) and only one for the UGRAD ( $p < 0.05$ ). Finally, in one case presented, the majority of the total respondents responded inappropriately, but among those who answered correctly the majority were GP ( $p < 0.05$ ).

**Conclusions** Conclusion: in general, the GP and UGRAD have knowledge about the prescription of antibiotics, but a lack of knowledge was detected about the current guidelines and conducts used, causing errors in the hypothetical cases presented.

### Coating of titanium surfaces with hydroxyapatite and strontium on osseointegration

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**Objectives** The aim of this study was to develop surface treatments with hydroxyapatite and hydroxyapatite modified by strontium in two concentrations (10 and 90%) on titanium alloy surfaces (Ti-6Al-4V), to evaluate the chemical and morphological properties

of these surfaces, as well as evaluate its osseointegration in healthy(control) and osteoporotic(OVX) female rats.

**Methods** Fixing screws and titanium alloy discs were used, which divided into 4 groups: machined, Hap, HapSr10% and HapSr90%. The surface treatments with apatite were carried out by biomimetic method, from deposition of phospholipid bilayers in subphases containing CaCl<sub>2</sub> and SrCl<sub>2</sub>, using the Langmuir-Blodgett technique and immersion in the SBF solution. The morphology characteristics, structure, chemical composition, wettability, surface energy and surface integrity were evaluated. They were tested in vivo, in which screws were randomized and installed in control and OVX tibias. Osseointegration was evaluated by biomechanical analysis (reverse torque), confocal microscopy, contact area between bone tissue and screw and linear extension 60 days after installation (BIC).

**Results** In the laboratory analyzes, Hap, HapSr10% and HapSr90% were seen on rough, thin films and the presence of pores on a nanometric scale, the presence of Hap chemical groups similar to that of bone tissue, and a increase in wettability and surface energy. In the in vivo analyzes of reverse torque, in ovariectomized rats the values presented higher for surfaces coated by strontium, while in the control group the Hap surface showed greater torque for removing the screw. The fluorochrome area for calcein and the newly formed bone area were significantly greater on the HapSr10% compared to the control group. Regardless of the animals' systemic condition, the machined surface group showed lower values than the other groups

**Conclusions** In conclusion, surfaces treated with HAp improve surface morphology, composition, and reactivity, and showed promoting effect on screw osseointegration in healthy and osteoporotic female rats.

### Surface Properties of a New Lithium Disilicate After Grinding

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**Objectives** This study aimed to evaluate the effect of grinding on some surface properties of a new experimental lithium disilicate glass-ceramic, by simulating a clinical core adjustment and comparing it with a commercial material.

**Methods** Discs (N=24, 12 mm in diameter) were separated into four groups: Experimental material with no grinding (E), Experimental material with grinding (EG), IPS e-max Press (Ivoclar) with no grinding (C) and IPS e-max Press with grinding (CG). Using a diamond stone in a low-speed handpiece device, 0.1mm deep grinding was carried out on the surface of the samples EG and CG (final dimension 1.4mm). The thickness of groups E and C were already 1.4mm. The effect of grinding on the sample surfaces was evaluated by X-ray diffraction, mechanical (mean roughness, Ra) and optical profilometry, scanning electron microscopy, goniometry (surface energy (SE), by the sessile drop method) and Vickers hardness (VH) testing. Ra was analyzed by the Kruskal-Wallis and Student-Newman-Keuls statistics. SE and VH were analyzed using two-way ANOVA.

**Results** The Ra medians (µm) were: E = 1.69, EG = 1.57, C = 1.45, CG = 1.13, with p = 0.0284. SE and VH did not show any statistical difference between materials and treatments. The grinding procedure smoothed the sample surfaces.

**Conclusions** Grinding did not significantly alter the surface properties of experimental material and IPS e-max Press. This new glass-ceramic has similar surface properties to the commercial material, which suggesting that clinical adjustment can be performed without changing these properties.

### Panoramic Radiography for Detection of Calcified Carotid Artery Atheromas.

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**Objectives** Atherosclerosis is a progressive inflammatory disease that can trigger serious consequences like acute myocardial infarction or stroke. The reference diagnostic method to report calcified atheromatous plaques in the carotid artery is angiography or doppler ultrasound. Nevertheless, it has also been described that it is possible to visualize them using a panoramic radiography. The purpose of this study is to determine the diagnostic utility of panoramic radiography in the screening of calcified atheromatous plaques in the carotid arteries at dental office.

**Methods** The Preferred Reporting Items for Systematic reviews and Meta-analysis of Diagnostic Test Accuracy studies were used as guideline. Two authors independently searched MEDLINE (PubMed), EMBASE, Web of Science and Cochrane Library (CENTRAL) databases up to June 01, 2020. Cross-sectional, case-control or randomized clinical trials describing the diagnostic accuracy of panoramic radiography versus doppler ultrasonography or angiography were included, restricted to english or spanish language and full availability. We excluded trials which not reported enough information. According to the Cochrane Collaboration, the QUADAS-2 instrument was used to the quality assessment of the included studies. The main outcome measures collected were sensitivity and specificity per-lesion.

**Results** A total of 781 studies were identified after duplicates were removed and a total of 14 trials involving 925 participants contributed to the final analysis. The pooled sensitivity and specificity of the different studies were 0.688 (95% confidence interval (CI) 0.56 to 0.81) and 0.66 (95% CI 0.5 to 0.82), pooled diagnostic odds ratio was 27.97 (95% CI 1 to 63.26).

**Conclusions** Panoramic radiography is a potentially useful complementary resource for detection of atherosclerotic plaques of the upper carotid region. It is the duty of dental professionals to be careful not to underestimate these findings and to make a properly derivation to prevent major morbidities in our patients.



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