

第2会場

IS-01~05



国際セッション口演

(第2会場)

5月22日(金) 第2会場 14:40~15:30

IS-01

Artificial dental calculus promotes bone resorption in experimental periodontitis in rats via NLRP3 inflammasome pathway

Ralph Jacob Elazegui

Keywords: periodontitis, hydroxyapatite crystals, inflammasome, bone resorption

Objectives: Recognizing that dental calculus stimulates IL-1 β production via the NLRP3 inflammasome, this study investigated whether artificial dental calculus, hydroxyapatite (HA) crystals, enhances tissue destruction in rat periodontitis model and elucidated the involvement of NLRP3 inflammasome.

Materials & Methods: Experimental periodontitis was induced in Lewis rats via silk ligatures on the right second molar (experimental side), with the left serving as a control. Artificial dental calculus (HA crystals) in 3%hydroxymethylcellulose was applied daily to the experimental gingival sulcus for 14 days, and the control side received vehicle alone. Alveolar bone levels were assessed using micro-CT. Histological changes were assessed with HE, TRAP, and immunohistochemical (IHC) staining. Periodontal tissues were analyzed by Western blotting to detect target proteins and check underlying mechanism.

Results: Micro-CT, TRAP, and HE analyses revealed significantly greater bone resorption and severe inflammation in the experimental group. Crucially, Western blotting and IHC staining revealed elevated NLRP3 inflammasome components, linking to the observed tissue destruction.

Conclusion: Artificial dental calculus administration induced NLRP3 inflammasome activation and periodontal tissue destruction, suggesting that dental calculus plays a critical role in periodontitis pathogenesis.

IS-03

Prevalence of bleeding on probing and gingival overgrowth in patients Periodontal clinic of Universitas Airlangga Dental and Oral Hospital Surabaya Indonesia

Eka Fitria Augustina

Keywords: Bleeding on probing, Gingival Overgrowth, Periodontal disease, Prevalence, Age

Background: Periodontal problems in Indonesia are increasing, with a prevalence of 57.6% in 2018. Gingival overgrowth (GO) may promote inflammation and bleeding on probing (BOP) is an important indicator of periodontal inflammation. Data on GO and BOP prevalence remain limited, highlighting the need for further research.

Purpose: To determine the prevalence of GO and BOP in patients at the Periodontology Clinic of Universitas Airlangga Dental and Oral Hospital Surabaya Indonesia.

Material and Methods: The research analyzes data from the Periodontology Clinic of Universitas Airlangga Dental dan Oral Hospital. Sample size calculation involves total sampling from 2022 patient records meeting specific criteria.

Results: Positive GO (+) was found in 36 samples (37.11%) out of the total inclusion data, while negative GO (-) was observed in 61 samples (62.89%). The findings revealed that 91.76% of the patients experienced BOP >10%, while 8.24% had BOP <10%.

Conclusions: Approximately 37.11% of patients exhibited GO, and the majority had BOP >10%, indicating of periodontal disease.

IS-02

Clinically relevant functional testing of a dual-porosity MEW-PCL membrane: wet cyclic compressive recovery, suture retention, and *in vivo* compartment stability

Marisca Pereira

Keywords: melt electrowriting, PCL, dual porosity, compressive recovery, suture retention, calvarial defect, micro-CT, histology

Objectives: Melt electrowriting (MEW) enables fabrication of architected polymer membranes with spatially programmable porosity. Dual-porosity membranes may allow simultaneous soft-tissue exclusion and defect-side space maintenance; however, clinical utility also depends on wet-state mechanical resilience and fixation reliability. This study evaluated whether a dual-porosity MEW-PCL membrane demonstrates pore stability under cyclic compressive loading in hydration and adequate suture retention strength, and related these metrics to *in vivo* compartment stability in a rat calvarial defect model.

Methods: Dual-porosity MEW-PCL membranes were fabricated with larger pores facing the defect and smaller pores toward the soft-tissue side. Bench testing was performed in hydrated conditions and included cyclic compressive loading to quantify pore compression/recovery and suture retention using a standardised pull-out protocol. *In vivo*, 5-mm rat calvarial defects were treated with control or MEW-PCL membrane with particulate xenograft. Micro-CT at 2 and 8 weeks assessed mineralised defect fill within a defined ROI; histology is ongoing to characterise new bone, residual graft and tissue architecture.

Conclusion: Integrating wet-state functional testing with *in vivo* micro-CT and histology provides a pragmatic framework to evaluate dual-porosity MEW-PCL membranes and link mechanical resilience and fixation reliability with healing compartment stability.

IS-04

Multivariable analysis to identify predictors of dental implant failure after alveolar ridge preservation: a non-interventional observational study

Dae-Young Kang

Keywords: Alveolar ridge augmentation, Bone substitutes, Dental implants, Risk factors, Tooth extraction

Objectives: The aim of this study was to determine predictors of implant treatment failure after alveolar ridge preservation (ARP).

Materials and Methods: The study included patients who received implant treatment after ARP between 2014 and 2020. The demographic, clinical, and radiographic data of these patients were collected. Implant success was defined as the absence of pain or tenderness, no mobility, a change of <2 mm in marginal bone level, and no exudation. A Cox proportional hazards model with shared frailty was used to estimate hazard ratios (HRs) for the demographic, clinical, and radiographic factors contributing to implant failure.

Results: The study included 528 implants from 412 patients. The cumulative success rate over 3.5 ± 1.8 years (mean \pm standard deviation) was 89.0% (95% confidence interval [CI], 85.4%-92.8%), with 43 failed implants. The multiple Cox proportional hazards model with shared frailty indicated that a pristine bone engagement (PBE) of <1.1 mm was significantly associated with implant failure (HR, 2.50; 95% CI, 1.34-4.67; $P=0.004$).

Conclusion: PBE of at least 1.1 mm appears to decrease the probability of implant failure after ARP.

IS-05

Does an untreated peri-implant dehiscence defect affect the progression of peri-implantitis?: A preclinical *in vivo* experimental study

Young Woo Song

Keywords: Animal experiment, Dehiscence defect, Dental implant, Histology, Peri-implantitis

Objective: To investigate the early impact of plaque accumulation in a buccal dehiscence defect on peri-implant marginal bone resorption.

Materials and Methods: In six male Mongrel dogs, four dental implants were placed in the posterior maxilla on both sides (two implants per side). Based on the group allocation, each implant was randomly assigned to one of the following four groups to decide whether buccal dehiscence defect was prepared and whether silk ligation was applied at 8 weeks post-implant placement for peri implantitis induction: UC (no defect without ligation); UD (defect without ligation); LC (no defect with ligation); and LD (defect with ligation) groups. Eight weeks after disease induction, the outcomes from radiographic and histologic analyses were statistically analyzed ($p < .05$).

Results: Based on radiographs, the exposed area of implant threads was smallest in group UC ($p < .0083$). Based on histology, both the distances from the implant platform to the first bone-to-implant contact point and to the bone crest were significantly longer in the LD group ($p < .0083$). In the UD group, some spontaneous bone fill occurred from the base of the defect at 8 weeks after implant placement. The apical extension of inflammatory cell infiltrate was significantly more prominent in the LD and LC groups compared to the UC group ($p < .0083$).

Conclusion: Plaque accumulated on the exposed implant surface had a negative impact on maintaining the peri-implant marginal bone level, especially when there was a dehiscence defect around the implant.