Biophotonics 3

16:00–17:10 / Room 3

OS-O-WED-07-01

(Invited Paper) Advances in the prevention and monitoring of root dentin demineralization using lasers

Patricia da Ana, Daisa Pereira, Elizabete Ferreira, Daniela Figueredo, Juliana Daguano, and Denise M. Zezell

16:00–16:30 / Room 3

The increase in the life expectancy and the longer permanence of the teeth in the oral cavity also led to an augment in the prevalence of root caries lesions. These lesions require more attention because of their rapid progression and difficulty in early diagnosis and monitoring. In this context, the irradiation of the tissues with high intensity lasers has been shown as an important way for preventing lesion formation because lasers chemically modify the irradiated dental hard tissues and make them more resistant to acid challenge. In addition, the association with ceramic biomaterials may allow additional remineralizing results. Together with therapeutics, the effective early diagnosis of incipient lesions is indispensable. Techniques that use lasers, such as optical coherence tomography, have also been promising in this aspect because they allow the early diagnosis and monitoring of demineralizations with high resolution and in a non-detrimental way. This article aims to show the actions of high intensity laser therapies when associated or not with biomaterials, on the prevention and remineralization of root caries lesions, as well as the effectiveness of optical coherence tomography in the diagnosis and monitoring the effects of the treatments in these lesions.

OS-O-WED-07-02

Influence of the reference spectrum used as input to the RMieS-EMSC algorithm for correction of spectral distortions induced by Mie scattering in FTIR hyperspectral images

Cassio Lima, Luciana Correa, Hugh Byrne, and Denise M. Zezell

16:30–16:50 / Room 3

Fourier transform infrared (FTIR) microspectroscopy has shown great promise as a tool to assess the histological architecture of tissue samples by providing morphochemical

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maps that enable the evaluation of both spatial and compositional information based on the signatures of molecular vibrations. However, FTIR datasets collected in transmission and transflection modes are subjected to undesired spectral contributions non-related to the phenomenon of light absorption that must be corrected prior any analysis. The algorithm so-called "Resonant Mie Scattering – Extended Multiplicative Scatter Correction (RMieS-EMSC)" has been well succeeded in vibrational spectroscopy in removing spectral distortions. The main idea of the algorithm is to reconstruct the datasets that present undesired spectral contributions based on a scatter-free reference spectrum. In this study, FTIR hyperspectral images acquired from cutaneous malignant lesions were submitted to RMieS-EMSC protocol using Matrigel and average spectrum in order to evaluate the influence of the reference spectrum in the final correction. False-color maps obtained after segmentation were compared in terms of image quality and consistency with standard histopathology in order to evaluate the ability of each method to reproduce the histological structures of the specimen. Our findings indicate that the choice of reference spectrum has very little difference on the outcome of image analysis. The images obtained by both spectra used as reference may not have resulted in identical false-color maps, but the differences between the morphochemical maps are relatively small.

OS-O-WED-07-03

Analysis of the treatment of knee osteoarthritis using Photobiomodulation performed with a low power laser

Ana Pelosi, Salmo Silva, Alessandra Baptista, Amanda Barros, Ricardo Navarro, Livia Garcia, Martha Ribeiro, and Silvia Cristina Nunez

16:50–17:10 / Room 3

Osteoarthritis is a degenerative process that affects the joints, it begins in the articular cartilage that undergoes a process of deterioration, and may even disappear totally in a more advanced phase. The main symptoms of osteoarthritis are functional disability and pain that usually worsens with movement and improves with rest. The pain can become continuous and can lead to functional disability, which reduces the quality of life of the individual. For the treatment of knee osteoarthritis (KOA) photobiomodulation (PBM) using low power laser /LED can represents a good non-pharmacological approach. The aim of this study is to analyze the effects of PBM in the treatment of KOA. We performed a randomized prospective clinical study with an experimental and quali-tative/quantitative analysis, it was carried out through the analysis of the Visual Analogue Scale the WOMAC questionnaire and the range of motion measurement in 15 patients with knee osteoarthritis (KOA). The results showed that PBM was efficient for KOA treatment, in all analyzed variables. The intensity of stiffness and physical function improved with PBM. It is concluded that the therapy is effective in the treatment of KOA, PBM seems to promote significant good results in relieving the clinical signs of KOA without use of any pharmacological approach.