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A pilot study of photoacoustic (PA) imaging applications in dentistry to monitor post-implant diseases

Over the past decade, dental implants have gained popularity as individuals' investments in health and aesthetic appearance have increased. Despite of its benefits, dental implant is often accompanied by a number of diseases and side effects. One of the most common problems during the post-implant state is inflammation, which could severely destruct oral tissue. Although conventional imaging techniques such as X-ray and computed tomography (CT) are currently used in clinical settings to monitor post-implant problems, they are not the ideal methods in detecting early inflammation or treatment effectiveness. Lately, there has been a trend of researchers studying the application of photoacoustic (PA) imaging in clinical diagnosis and treatment. PA imaging excludes the use of non-radiative light and provides a real-time imaging of cell, tissue and blood. Among those benefits, our study will particularly exploit its capacity to observe the blood information related with one of the post-implant diseases. In this experiment, we had set up a PA system to get PA signals from both samples of an implant and the blood (Cedarlane: Sheep Blood in Heparin). PA signals of implant and blood were measured after they were placed within the chicken breast tissue, which replaced a human oral tissue. The results showed the possibility of detecting both the implant and the blood with PA imaging and most importantly, distinguishing the blood from the implant. These results have demonstrated that PA imaging could be a great substitute for conventional methods in monitoring post-implant diseases.

Biography

Chang Yong Yang is an undergraduate Student in the Kinesiology program at York University, Canada. His research is focused on the application of innovative technologies in Dentistry. His current research project is done in collaboration with Dr. Seung Hee Han, who is working at University Health Network, Canada

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