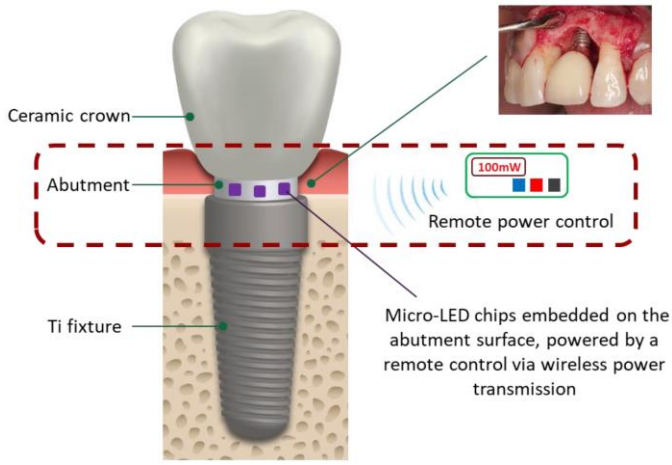
Centre of Applied Photonics

A Disinfection Solution to Prosthetic Devices via Wireless LED System (DISOLE)



Value Proposition

In approximately 5% of all implants, surgery failure occurs due to infections shortly after surgery and up to 45% of all implants in humans have problems with infections during the next 10-20 years. Currently there's no effective therapy method to fight against severe infection. Our previous research found that UVB LED can effectively eradicate bacteria and reduce the risk of infection. We recently propose a new disinfection concept for dental implants by using micro UV-LED devices embedded in the dental implant surface and powered via wireless power transfer. This new technology is a non-invasive physical method and has no drug dependency. It can also be applied in other prosthetic devices as a new disinfection technology in the future. The technology can reduce the risk of dental infection for patients, enable the dentist to provide a better implant for their patients, and give the implant manufacturer an opportunity to introduce a better implant product in the market.

Commercial Perspectives

The global dental implant market is about 4 billon USD today and growing by 4-5% yearly. In Denmark more than 1,000 dental clinics do implants surgery. The total market for dental implants in Denmark alone is more than 40 million USD. In depth personal face-toface interviews with senior dentists (from different clinics in Copenhagen area) have been conducted and it confirms that bacterial infection is a major problem for dental implants and a reduction of this would create significant value to patients, doctors and society.

Technology Description

We have invented a novel concept to eradicate bacteria attached to the implant surface by using UV-LED (embedded in the implant surface). The UV-LED device will be controlled remotely via wireless power transmission. The basic UV disinfection principles behind the concept has been validated at DTU Fotonik (Sci. Rep. 8. 16360, 2018). The proposed technology is a non-invasive physical method and has no drug dependency. It can eradicate a bacterial biofilm in minutes and reduce the usage of antibiotics significantly.

Development Phase

Current technological readiness level: TRL 3/4. The designed wireless LED system has been successfully demonstrated in the lab. Further progress is expected. Next step is to optimize the system and test it in relevant clinical scenario.

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