

Introduction: Due to the rising prevalence of dental health issues, the market for dental implants has grown recently. People are becoming aware of the aesthetic and health issues of their teeth, but current dental implants dissuade many people because of the high price, painful process, and frequent review. [1] Here a new photonicly supported dental implant system is introduced which is a great solution to these problems.

Product Description

Photon-Assisted Implant System is a product that uses laser, Optical Coherence Tomography (OCT) to provide precise and minimally invasive dental implants. Jawbone and surrounding tissues of patients are initially modeled in three dimensions by OCT to obtain a fine image of the implant site. OCT uses the time delay between the emitted and reflected light waves. [2] Laser is positioned using this information to ablate the tissue through its thermal effect and create an incision into which an implant can be inserted. [4] Finally, light energy is delivered to the tissue using low-intensity laser treatment to promote wound healing. X-rays are used in traditional dental implant surgery to locate the implant. OCT is an accurate imaging method that uses less ionising radiation than X-rays. In contrast to products that use special computer software to plan the exact implant site, OCT provides real-time images that facilitate the necessary adjustments during the implant process. [5] Fig 1 and 2 show the use of OCT and laser respectively.

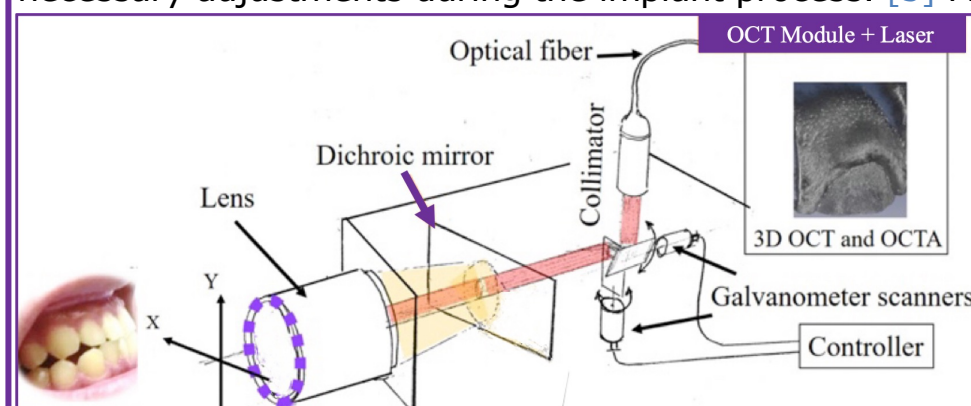


Fig. 1 OCT Module to get the image of the implant site [2]

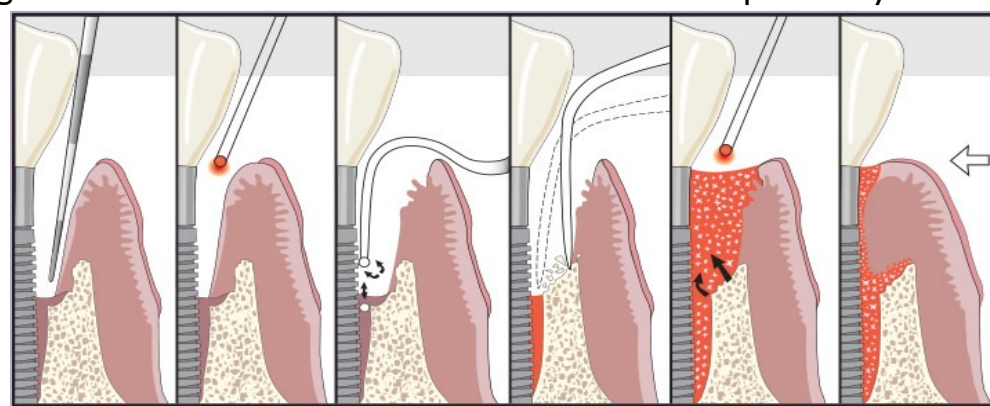


Fig. 2 Creating and healing implant wounds with laser [3]

Analysis of Market

Dental professionals make up the core market of the product, while medical technology firms make up its secondary market. [1] More people will seek implants as knowledge of dental health rises. In Fig.3, the market for dental implants is \$3.65 billion in 2020 and is expected to grow to \$6.31 billion by 2026. [1] Despite the high cost of the product when it first comes to the market, the product can save money by improving accuracy and reducing the risk of failure. There are several well-established dental implant systems, such as Nobel Biocare. [5] To compete successfully, it needs to differentiate itself by using its technically advanced, safe selling points to increase patient satisfaction and attract more patients seeking advanced technology. Thus, increasing revenue for the dental practice and driving its future markets.



Fig. 3 Global market trends for dental implants [1]

Benefits to consumers and society

For consumers: Firstly, the OCT of the product offers higher-resolution imaging, which makes it simpler for dentists to obtain reliable diagnoses. Patients who have minimally invasive operations benefit from shorter recovery times, reduced pain, and decreased risk of complications. Laser technology makes these procedures possible. Secondly, it is more affordable than traditional dental implants that require multiple consultations, offering clients a more convenient and economical option by reducing the number of necessary visits.

For society: Firstly, the product has environmental benefits as it uses non-ionising radiation and produces no hazardous waste compared to X-rays. Secondly, it reduces the risk of human error by providing more accurate images and timely adjustments than traditional dental implants. This not only reduces the burden on the healthcare system and the cost of healthcare to society, but also creates new employment opportunities for dental professionals, which in turn leads to economic growth and development.

Conclusion: This new product offers accurate imaging and minimally invasive operations by combining OCT and laser technology. It has significant commercial potential and provides advantages for the environment as well as a lower risk of problems and quicker recovery times.

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