An in-crown/in-denture electrical system and the process of electrical stimulation with a through-hole stimulation channel and an inductive link

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Technology description

Technology
In-Crown / In-Denture Electrical System
System and process of electrical stimulation to residual nerves to enable the recovery of missing sensory feedback
Due to the aging population, many adults are at risk of losing nerve function in their teeth due to endodontic procedures such as root canals, dental implants, and dentures. Animal and human research has demonstrated that mastication maintains cognitive function in the hippocampus, an important area in the brain for learning and memory. With the loss of the nerve structure due to endodontic procedures, there is a loss of the neural control system / mechanosensory information to the brain and a potential loss or reduction in cognitive ability.
Researchers at Lehigh University have developed a concept for an in-crown / in-denture electrical system utilized to provide electrical stimulation to residual nerves on the teeth through the root canal or internal hole of the dental implant. The proposed electrical system and stimulation process could enable the recovery of missing sensory feedback from the teeth, by generating electrical stimulus synchronized with the mastication. The proposed electrical system could be installed on and inside the crown, either over the root canal or dental implant. The system is comprised of a piezoelectric transducer, a movement sensor, a supercapacitor, a magnetic coil, a controller, and a stimulator.Opportunity
Approximately 70 percent of Americans age 35 to 44 have at least one missing tooth, and one in four over the age of 74 has lost all of their natural teeth. Due to the increasing prevalence of periodontal disease and tooth loss, more Americans are receiving root canal treatment and dental implants. It is estimated that 3 million individuals in the United States have implants with an additional 500,000 implants performed annually. In addition, there are an estimated 15 million root canals performed annually.

Application area

⍰ Could be integrated into a number of current dental treatments including root canals, dental implants, implant-supported denture

Advantages

⍰ Alleviates the potential problem of missing sensory feedback from teeth
⍰ Could potentially prevent or slow down the progression of the cognitive impairments and / or neurodegenerative diseases, and further, to improve \ brain health

Institution

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