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Title: *Artificial Salivary Gland Dental Implant Development*

**Research Description:**

Sjögren's Syndrome is an autoimmune disease that impairs, among other things, the function of the salivary glands. Our research group proposes to treat Xerostomia (chronic dry mouth) with a radically new approach: An implantable device for continuous relief of chronic dry mouth. This device is a dental implant that will harvest and filter fluid from the jaw bone and then discharge the filtered fluid into the mouth as substitute saliva. The device will appear as an ordinary dental implant supporting an artificial tooth. No maintenance will be required other than the annual replacement of the implant's internal pump/filtration cartridge. We propose to create, test and refine design concepts for the device's internal pumping mechanism as a significant advancement toward the development of the implant system.

**Scientific Abstract:**

Sjögren's Syndrome is an autoimmune disease that impairs, among other things, the function of the salivary glands. Our research group proposes to treat Xerostomia (chronic dry mouth) with a radically new approach: An implantable device for continuous relief of chronic dry mouth through the development of a dental implant to harvest the self-renewing fluid within the marrow space of the jaw bones, to filter the same, and to release the filtered fluid into the mouth as substitute saliva. We propose design, test and refinement of prototypes of this implant system. Much of the work will be done at 3-5x scale with the intention of future miniaturization to anatomic size. This work will emphasize the primary performance requirement of repetitively pumping fluid through the implant at force consistent with tooth contact and mastication. Milestones include design, prototype and testing with at least 0.2 – 0.3 ml/min drawn from bone marrow space analogues.