



### F1 RFId Tag in Dentures as a Tool for Identification

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After attending this presentation, attendees will learn the potential use of a radio frequency identification (RFId) tag implanted in an upper complete denture for identification process.

This presentation will impact the forensic community and/or humanity by demonstrating how the use of a microchip transponder in dentures can open a new prospective to the storing of dental patient clinical history, information regarding dental materials used and ultimately, personal medical data used for potential identification.

Forensic odontological identification is based on the comparison of antemortem and postmortem dental records. The insertion of a radio frequency identification (RFId) tag in dentures could be used as an aid to identify decomposed bodies by storing personal identification data in a small transponder that can transmit to a reader connected to a computer. The RFId technology was introduced for the first time in 1940, but only in 1997 did its use in this field become a possibility thanks to the production of low cost tags. These are a branch of technology called “automatic identification and data capture” and are used to identify, locate and track people, animals and assets. A possible new use of this technology is forensic, namely as an aid in identification.

In pursuit of this development, an Italian RFId manufacturer was asked to provide specimen tags. With the assistance of a dental technician's laboratory a small RFId tag was incorporated into the final manufacturing of a sample complete upper denture and tested for transmission. For this preliminary work the authors will present the technical manufacture of dental prosthetics with the incorporation of the microchip transponder. Twenty ready made upper dentures were geometrically evaluated in order to deduce the best sight for implantation of the tag and obtain a wearable denture. Finally, the RFId implanted in the denture was tested to verify its efficacy and distance of effective data transmission. The authors will give a general overview of the different RFId's available in the market, their technical descriptions and their working principles. In this study a passive, 10 mm length, read-only tag with a low frequency operative frequency was chosen. This choice will be explained with special emphasis as to the frequency as RFId's are categorized by their radio frequency. In fact, only low frequency, 125 - 134 kHz, are employed for veterinary use and are regarded acceptable for human use.

The main object of this presentation is to demonstrate the feasibility in the manufacturing of a dental prosthetic and the technical protocols for its implantation in the denture resin and its working principle.

The information from this study should be considered a preliminary test for RFId-tags for forensic deployment, and to give some indication and suggestions for the design, selection and implantation of the ideal tag in a complete upper denture.

Further research and tests are needed in order to verify human compatibility and technical performance of the tagged denture under static and dynamic conditions, as it would be in an ordinary use during mastication and under conditions in which a forensic identification is necessary as is the case after major accidents or mass disasters.

#### **Radiofrequency Identification Tag, Denture, Forensic Odontology**