Abstracts

Study on dental diagnosis and treatment using millimeter waves

Y. Nikawa, N. Hoshi, K. Kawai and S. Ebisu. "Study on dental diagnosis and treatment using millimeter waves." 2000 Transactions on Microwave Theory and Techniques 48.11 (Nov. 2000, Part I [T-MTT] (Mini-Special Issue on RF/Microwave Applications in Medicine)): 1783-1788.

In order to diagnose dental caries noninvasively, the transmission coefficient of the dental caries is measured and compared to that of a sound tooth. It has been revealed that dental caries are significantly more lossy than a sound tooth in millimeter waves. This characteristic can be utilized as a new caries diagnosis method. This paper also presents microwave and millimeter-wave heating results for the lossy dental caries that can be used as a sterilization treatment. Temperature-distribution results from microwave power heating have revealed that dental caries are easily heated. Furthermore, the results of the calculated specific absorption rate distribution using the finite-difference time-domain method indicate the possibility of caries treatment by millimeter-wave heating. It is concluded that millimeter waves can be used for dental medical diagnosis and treatment.

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