

Effect of Microwave Oven Radiation on Tooth Development of Rats Embryo.

(Immunohistochemical Study for Platelet derived growth
factor and Insulin growth factor).

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Abstract

Background and Objective:

Exposure to microwaves radiation from microwave oven may be harmful for users especially for ladies or who have highest contact with microwave oven. Exposure to microwave emissions also had an unpredictably negative effect upon the general biological welfare of humans and because the body is electrochemical in nature, any force that disrupts or changes human electrochemical events will affect the physiology of the body by destabilization and interruption of many chemical body substance including growth factors.

The insulin-like growth factors (IGFs) are a family of mitogenic proteins that control growth, differentiation, and the maintenance of differentiated function in numerous tissues. It fulfils an important role in growth and development of teeth, mandible, maxillae, and tongue. It has been postulated that IGF-I may be of great value in the treatment of periodontal defects and in tissue healing.

Platelet derived growth factors (PDGF) are proteins that regulate cell growth and division. In particular, it plays a significant role in blood vessel formation (angiogenesis). It seems that IGF and PDGF share in much tissue developmental process. Therefore they were included in the present study in correlation to tooth growth & development.

Aims of the study:

To evaluate the effect of microwave oven radiation at 2.45 GHz on tooth development during gestational periods at 16th day I.U.L, 18th day I.U.L and 1 day post natal life of rats embryo (histological and immunohistochemical studies).

Materials and Methods:

Animal model: Thirty-six female rats were used in this study .Starting from zero days (time of gestation that recorded).The pregnant rat was isolated in separated cage in similar environment. They were maintained under controlled temperature of 22-24 C° and kept on 12/12 hours light /dark cycle.

Experimental rats were divided into three groups. Group A serve as a control and the remaining two groups B and C will expose to EMF radiation generated by microwave oven on specific time of the day(during light period).Experimental group(B) exposed to microwave oven radiation for (15 minutes; 5 min /hour for 3 hours continuously) daily starting from zero day(time of gestation) till the last day in gestation. Group (C) exposed to microwave oven radiation for(45 minutes ;15 min /hour for 3 hours continuously)daily starting from zero day of gestation till the last day. The embryo of rats at 16th day and 18th day of intrauterine life and one day old rat (new born rat) were studied histologically for tooth development and immunohistochemical for localized of platelet derived growth factor (PDGF)and insulin growth factor (IGF) markers.

Results:

The results showed that experimental group (B) exposed to short duration of radiation (5/min.group) stimulates the development of tooth germ as it was shown in histological findings that records an early and faster tooth growing in comparison to control .While immunohistochemical results showed strong to moderate intense stain for positive expression of growth factors(PDGF,IGF) by dental tissue.

For long exposure period of radiation(15/min.group) it showed retardation in the tooth growth and immunohistochemical findings record weak to negative intense stain for the expression of growth factors(PDGF,IGF) by dental tissue.

Conclusion:

Exposure to microwave (oven) radiation during pregnancy might be harmful to the development of tooth germ depending on exposure time. Therefore we suggest that pregnant woman should be away from microwave oven during pregnancy period.