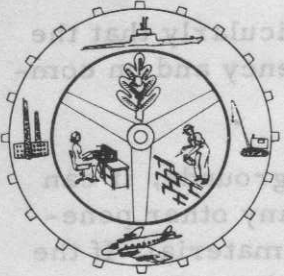


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OCCUPATIONAL MEDICINE

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Hazards of Microwave Radiations - A Review

Since World War II, radar and other microwave equipment have come into use by the Armed Forces, commercial aviation, navigation, and to a lesser extent, by medical science. While it is generally believed that microwaves in these applications are harmless, sporadic reports of injuries attributed to microwaves are in the literature.

The term microwaves is used to designate a certain portion of the electromagnetic spectrum; it generally includes frequencies between 1000 and 30,000 megacycles per second, or in terms of wave length, between 30 cm and one cm.

Two radar bands are now in common use: the "S" band, with a frequency of 2880 megacycles and a wave length of 10.4 cm, and the "X" band, with a frequency of 9375 megacycles and a wave length of 3.2 cm.

Microwaves are used in clinical medicine as a means for heating tissues beneath the skin and subcutaneous fatty layers. The diathermy application depends on the fact that heat is produced wherever microwave or any other energy is absorbed.

Microwave diathermy machines typically have a frequency of 2450 megacycles, a wave length of 12.2 cm, and a power output of 125 watts.

Absorption of Microwave Energy in Tissue. Any biologic effect, beneficial or harmful, produced by microwaves can result only from absorption of energy by the tissues. The amount of energy absorbed by a small volume of tissue in a large mass of tissue subjected to microwave radiation depends on a number of factors:

1. Intensity or field strength of the microwave radiation incident on the surface of the tissue mass
2. Duration of the exposure
3. Frequency or wave length of the microwave radiation
4. Thickness of tissue between the irradiated surface and the small volume of tissue
5. Composition of the tissue

The degree of temperature rise produced in the small volume of tissue will depend on the five factors above and on the ability of the irradiated portion

