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pp 50-52

## MAIN SUBJECT HEADING:

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ANALYTICS	HUMAN EFFECTS	ANIMAL TOXICITY	WORKPLACE PRACTICES- ENGINEERING CONTROLS	MISCELLANEOUS

SECONDARY SUBJECT HEADINGS: AN HU AT IH M

Physical/Chemical Properties

Sampling/Analytical Methods

Review

Reported Ambient Levels

Animal Toxicology

Measured Methods

Non-occupational Human  
Exposure

Work Practices

Occupational Exposure

Engineering Controls

Epidemiology

Biological Monitoring

Standards

Methods of Analysis

Manufacturing

Treatment

Uses

Transportation/Handling/  
Storage/Labeling

Reactions

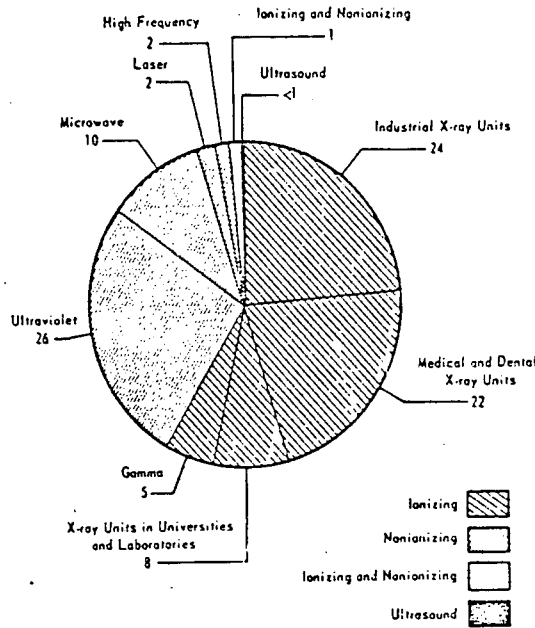


Figure 1. Percentage of Persons Reportedly Exposed to Ionizing and Nonionizing Radiation and Ultrasound; Radiation Incidents Registry, as of December 1970.

C. BIOLOGICAL EFFECTS OF DIATHERMY

Loren F. Mills

The purpose of this project is to determine the biologic effects associated with the therapeutic application of heat by means of microwave diathermy. The need for this information is based on the widespread use of diathermy in medical and dental practice and the probable association between microwave radiation and cataract formation. Therefore, by determining the frequency of cataracts or other lens opacities in a treated population, this study will evaluate the biologic effects associated with acute exposure and repeated exposure to therapeutic microwave diathermy.

Persons previously treated with microwave diathermy, with or without prior eye examination records, will be recalled for a thorough clinical appraisal of the eyes, ears, nose, and oral cavity (head and neck physical). The lens of the eye will be examined utilizing the slit-lamp

technique. Persons about to be given heat treatments with microwave diathermy will also be given the same head and neck physical examination and then recalled periodically at a later date. Efforts will be made to reduce examiner bias, i.e., patients will not be identified by group, prospective or retrospective, at the time of examination. The physical examination data will be tabulated and analyzed employing appropriate statistical procedures.

At present there are three known exposed populations available for study. All of the people, in each population, have had therapeutic diathermy treatments with microwave radiation at the 2450 MHz range.

(1) The Oral Surgery Department, Clinical Center, National Institute of Dental Research, has been utilizing microwave diathermy, following the extraction of teeth, for approximately two years. Each therapeutic diathermy procedure lasts from five to eight minutes and has a power density range between 150 mW/cm<sup>2</sup> and 200 mW/cm<sup>2</sup>. The emitting device is usually held by the patient at a distance no greater than one inch from the surface over the angle of the mandible. No more than three such treatments are given. Usually one or two are sufficient following tooth extraction.

The population consists mainly of individuals used as "controls" for one or more of the other institutes at the National Institutes of Health, e.g., controls for the Heart or Cancer Institutes. These persons are young, under 30 years of age, usually college students, and in excellent health. There are fewer than 100 of them and they would make up a short acute exposure population.

(2) There are several clinics throughout the U. S. that utilize microwave diathermy for the therapeutic heating of the temporomandibular joint in cases of arthritis and traumatic injury. Each therapeutic procedure lasts from 15 to 20 minutes and has a power density range between 150 mW/cm<sup>2</sup> and 200 mW/cm<sup>2</sup>. The emitting device is usually held by the patient at a distance no greater than one inch from the surface over the region of the temporomandibular joint. The number of heat treatments varies, so that a person might return once a week for a year. These populations are mostly older persons and their general state of health ranges from fair to poor. These individuals would constitute an acute long-term exposure group.

(3) A large number of naval personnel have been treated with microwave diathermy for post-immobilization trismus following fracture, reduction of the maxillo-mandibular facial complex, and other surgical procedures. The therapeutic diathermy procedure lasts from 15 to 20 minutes and has a power density range between 150 mW/cm<sup>2</sup> and 200 mW/cm<sup>2</sup>. The area irradiated is the bilateral buccinator-masseter-internal pterygoid muscle complex. The procedure is either done by the therapist or by the patient under supervision. Usually four or five treatments are sufficient.

These individuals are young, usually under 25 years of age, and in fair health. The exact number available for study is not known; however, a good estimate would be 200. This population would constitute an acute intermediate exposure group. This study could be done on a collaborative basis.

The duration of the study is another important factor to be considered. Since the length of time required for cumulative and latent bio-effects to appear is not known, the study duration period of these three populations should therefore be on an "open-end" basis.