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## Fluoroscopic X-Ray Shoe Fitting Devices

Donald D. Weisberger\*

**E**XPOSURE TO X-RAYS OR OTHER RADIATION over and above a certain cumulative tolerance limit can be damaging to the human body. This fact is thoroughly explained in Mr. Humphrey's article on Radiation in this issue of this law review. But a person thus injured by x-ray radiation from so-called *fluoroscopic fitting machines* in shoe stores will find it virtually impossible to make out a cause of action in negligence against the owners and operators of the machines. Yet, use of such machines now is known to be seriously harmful, unless that use is closely controlled.

There has been much controversy over the safety of x-ray shoe-fitting machines. The American Medical Association,<sup>1</sup> and the American College of Radiology<sup>2</sup> have condemned their use. On the other hand, the British Medical Association<sup>3</sup> has, in its journal, endorsed the use of these machines. The British physicians base their conclusion on certain presumptions, namely: that modern small-dosage machines with five-second timers are used, and that the average person buys at most three or four pairs of shoes a year.

It is the belief of this writer that the public needs protection against these machines, which purport to be innocuous in their nature but which in actuality are distinctly harmful in their effects. Adequate protection from these dangerous machines can come only through statutes forbidding their use in shoe stores, with a strong penalty for violation.

Potential damage to the human body resulting from an over-exposure to x-rays runs the gamut from leukemia<sup>4</sup> (demonstrated by the fact that radiologists have a disproportionately higher incidence of this disease in comparison with other occupational groups), to genetic mutations, which have been noted in

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<sup>1</sup> Shoe Fitting Fluoroscopes, 139 J. Amer. Med. Assn. (15) 1004 (1949).

<sup>2</sup> Ibid.

<sup>3</sup> Dyson, Shoe Fitting X-Ray Fluoroscopes-Radiation Measurements and Hazards, British Med. J., 269-272 (Aug. 4, 1956).

<sup>4</sup> Shoe Store Fluoroscopes, Occupational Health Bulletin F, State of California, Dept. of Public Health, Bureau of Adult Health (Jan., 1950).

the results of laboratory tests with animals, as well as in the widely publicized medical studies of atomic blast survivors of Hiroshima and Nagasaki.<sup>5</sup> Evidence suggests that a slow-down in the growth of the legs is another effect of over-exposure to x-rays.<sup>6</sup>

With human tolerance of x-ray radiation being relatively low, because of the cumulative effect of x-ray radiation, professional groups who have studied the problem thoroughly have prescribed what they believe to be safe limits of exposure. The National Committee on Radiation Protection of the National Bureau of Standards in 1955 stated that:<sup>7</sup>

“For persons under eighteen years of age who are exposed non-occupationally to radiation in the course of their normal activities, protective measures shall be taken to make sure that they receive no more than 1.5 roentgens per year.

“For person eighteen years of age or older whose hands and forearms or feet and ankles are exposed solely to X or gamma rays from external sources for an indefinite period of years, the maximum permissible weekly dose to these regions shall be 1.5 roentgens.

“‘Shall’ denotes that the ensuing recommendation is necessary or essential to meet the currently accepted standards of protection.”

Assuming that only the safest and most efficient x-ray shoe-fitting device on the market is being used; are we then assured that the public is protected from over-exposure? We are not! How many mothers who are shopping for shoes with their children go to three or four stores, using the x-ray machine at each store indiscriminately? If they buy inexpensive shoes, and the child is an active one, there is a strong likelihood that there will be shoe shopping as often as once a month. The shoe merchant and his clerks seldom appreciate the dangers of the machine, and may expose a child to its rays for a whole minute, and think nothing of it. Children themselves will often leave the mother in order to play with the x-ray machine, when the clerk has gone to fetch shoes from the stock room.

On top of this, the fact is that in many cases, the x-ray machines used are not the newest, most up-to-date ones. Measurements made on twelve American machines indicated a dosage

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<sup>5</sup> Personal Communication from Dr. A. Weisberger, Associate Professor of Medicine, Western Reserve Univ., Lakeside Hospital.

<sup>6</sup> *Supra*, British Med. J., n. 3.

<sup>7</sup> X-Ray Protection. National Committee on Radiation Protection, Vol. 60, 1955, National Bureau of Standards.

range of 30 to 350 roentgens per minute.<sup>8</sup> Some had timers set for from three to forty-five seconds. Modern British machines have limits of four roentgens per minute, with five-second timers.<sup>9</sup> Should you expose a child to the radiation from these machines a number of times, you can see how the prescribed limit easily would be exceeded. Then, too, small children have their reproductive organs dangerously close to the opening for the feet. X-rays scattering from some machines might penetrate a child's vitals. Radiation is known to have powerful sterilization effects.<sup>10</sup>

Other sources of x-ray exposure are, of course, machines used by doctors and dentists for diagnostic as well as for therapeutic purposes. Even the radioactive fallout resulting from atom bomb tests in New Mexico, Siberia, and the Pacific islands, adds to the individual's cumulative dosage. Thus the average citizen often is bombarded by radiation from a number of sources and, without knowing it, may absorb more than his safe quota of it.

If x-ray machines actually were necessary in order to insure proper fitting of shoes, then perhaps their use could be tolerated. But shoes have long been fitted, and just as successfully, without the use of these machines. They are, in the last analysis, only psychological sales devices, used to help promote sales.

If somehow we could make merchants liable for the damage that they are doing through negligence in this respect, no doubt they quickly would take action to eliminate the machines. But there is no actionable negligence without proof of proximate causation. Such causal connection here is most difficult to prove, because of the invisible and painlessness nature of radiation, and because of the time-lapse between this cause and its effects.

We therefore must do what the legislature of Pennsylvania recently did in Pennsylvania Bureau of Environmental Health, Regulation 433 (Amendment). Pennsylvania disposed of the problem unequivocally, by adopting the following rule:

"In order to protect the people of this Commonwealth from indiscriminate, unnecessary, and potentially harmful exposure to radiation, the following regulation is promulgated: It shall be unlawful after February 1, 1957 for any person, partnership, association, or corporation to maintain within this Commonwealth any fitting devices or machines which

<sup>8</sup> *Supra*, British Med. J., n. 3.

<sup>9</sup> *Ibid.*

<sup>10</sup> *Supra*, Dr. Weisberger, n. 5.

use fluoroscopic X-ray or radiation principles for the purposes of selling footwear through commercial outlets.”

There are many experts who believe that restricted control of these x-ray shoe fitting devices will suffice to prevent harmful exposure to the public. Therefore, they say that absolute abolition is not only unnecessary, but also unduly detrimental to the many owners of these machines and to the four manufacturing firms that produce these devices. Specific regulations governing the use of shoe fluoroscopes have been enacted in Indiana, Kansas, Mississippi, and West Virginia, as well as in four local jurisdictions, namely Detroit, Milwaukee, New York and Louisville—Jefferson County in Kentucky.

A merely restrictive control program, however, is open to criticism beyond that set forth above. This is because one is still faced with the practical necessity of *being sure*, in the case of each shoe store, that the equipment in use is properly designed, shielded, maintained and operated. As concluded by New York State's division of Industrial Hygiene and Safety Standards:<sup>11</sup>

The practical difficulties involved are, indeed impressive. Licensing of shoe fluoroscopes and the type of constant surveillance, which is essential, are both time-consuming and costly. The equipment in each store must be periodically inspected and radiation measurements must be made by a specially qualified staff. Quite aside from budgetary limitations, this type of individual is scarce at present; almost unattainable.

In Ohio, such protection as is afforded to the public now consists of the “catch-all” provisions of a public health statute.<sup>12</sup> Its inadequacy is obvious.

Ohio, and every other state, should adopt Pennsylvania's salutary law. It also would be wise to add to it a severe penalty for violations—a penalty severe enough to act as a sharp deterrent.

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<sup>11</sup> Radiation Exposure in Shoe Stores. Bulletin Nos. 9-10, N. Y. State Dept. of Labor, Monthly Review, Division of Industrial Hygiene & Safety Standards, Vol. 31, Sept.-Oct., 1952.

<sup>12</sup> Ohio Rev. Code, Sec. 3703.13.

[EDITOR'S NOTE:

Dean Wilson G. Stapleton of Cleveland-Marshall Law School, who also is the Mayor of the City of Shaker Heights, Ohio (among his many other public services), on April 22, 1957 signed into law the subjoined Municipal Ordinance of the City of Shaker Heights. Coincidentally, Dean Stapleton was putting this ordinance into effect while the above article was being written to urge adoption of this kind of law.

**“To amend Section 2103 of Ordinance No. 6137 and to establish the qualifications of the operation of a fluoroscope shoe fitting machine.**

**Be it ordained by the Council of the City of Shaker Heights, State of Ohio:**

**Section 1. Section 2103 of Ordinance No. 6137 is hereby amended to read as follows:**

**Section 213. Operation of machines.**

**1. No machine shall be used for the examination of feet without shoes.**

**2. No person shall be permitted to receive more than five (5) exposures (each of 5 seconds duration) per day, nor more than twenty (20) such exposures per year.**

**Section 2. Ordinance No. 6137 is supplemented by enacting new Section 2104 to read as follows:**

**Section 2104. Qualifications of operator.**

**No person shall operate a machine unless he is certified by the Ohio State Medical Board as a practitioner permitted to practice medicine or surgery or any limited branch thereof and is thereby permitted to practice radiology or is supervised by a person on the premises having such qualifications.**

**Section 3. This ordinance shall take effect from and after the earliest time allowed by law.”]**