

From ADA Home study CE Course – “Essentials for the Dental Radiographer”

The practical aspects of radiation safety

Ref: doctorspiller.com

Some people do not want x-rays because they have heard that the radiation is dangerous. In fact, dental x-rays pose very little danger. There are currently two methods of measuring exposure to radiation.

The first, oldest and most frequently used unit of measure is called a **rem**. A rem is a large unit, so exposure to medical radiation is generally measured in millirems (**mrem**). (It takes a thousand millirems to make a rem.) The average dental x-ray delivers about 2 mrem. Thus a [full mouth series](#) of dental x rays (18 intraoral films) delivers about 36 mrem. (Note: These figures are based on the use of [D and E-speed film](#). Kodak InSight, an F-Speed film dental film, lets you reduce radiation exposure by up to 60 percent as compared to Kodak Ultra-Speed dental film, a D-speed product.) A [panorex](#) film delivers about 4 mrem. By comparison, the average person in the US is exposed to about 360 mrem per year just from naturally occurring background sources. By this measure, it would take approximately 10 full series of dental radiographs to equal the background radiation that the average citizen is exposed to on a yearly basis. Note that most dentists take a new full series every three to five years on average. The Washington State Department of Health has set the maximum safe [occupational](#) whole body radiation exposure to 5000 mrem per year. By this reckoning, it would take over 138 full mouth series of dental x-rays to equal one years maximum safe radiation level. It would take 1,250 panorex films to get to this limit.

Background radiation comes from outer space, the earth, natural materials (including natural foods), and even other people. For example, flying cross country exposes a person to about 5 mrem over and above the normal radiation he receives from outer space while simply walking outdoors for the same length of time. Cooking with natural gas exposes us to about an additional 10 mrem per year because of the naturally occurring radon gas the cooking gas contains. Living in a brick building adds an additional 10 mrem per year over and above the radiation you would receive from living in a wooden structure. Simply sleeping next to another person exposes each bed partner to an extra 2 mrem per year.

The second, newer measure of radiation is the millisievert (mSV) which is a unit of measure that allows for a more meaningful comparison between radiation sources that expose the entire body (such as natural background radiation) and those that only expose a portion of the body (such as dental and medical radiographs). The table below is lifted from the [website](#) of the American Dental Association and is quite helpful in comparing the amount of radiation received from dental x-rays to other medical and natural sources. As you can see, by this more realistic measure, **it would take 20 full series of x rays (taken with E-speed film) to equal the amount of**

radiation the average citizen picks up from naturally occurring background sources each year---that means 360 intraoral films:

Dental radiographs exposure:	(mSV)
Bitewings (4 films)	0.038
Full-mouth series (about 19 films)	0.150
Panorex (panoramic jaw film)	0.019
Medical radiographs exposure:	4.060
Lower GI series	2.440
Upper GI series	0.080
Chest	
Average radiation from outer space In Denver, CO (per year)	0.510
Average radiation in the U.S. from Natural sources (per year)	3.000