

Are Dental X-rays Dangerous?

Some people are concerned about diagnostic 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 medical radiation.

The first and oldest unit of measure is millirems (mrem). According to the National Council on Radiation Protection and Measurements, the average person in the US is exposed to about 360 mrem per year from background sources alone. Background radiation comes from outer space, the earth, natural materials (including foods), and even other people.

Some examples of background radiation:

Flying across country	3-5 mrems
Cooking with natural gas	10 mrems per year
Living in a brick building versus a wood building	10 mrems per year
Sleeping next to another person	2 mrems per year

The average dose for one intraoral x-ray with standard film is about 2 mrems. The panoramic delivers about 4 mrem. In our office we use digital radiography, which further reduces the exposure to radiation.

By comparison, the Washington State Department of Health has set the maximum safe occupational whole body radiation exposure to 5000 mrem per year. It would take over 1200 panoramic x-rays or 2500 individual intraoral x-rays to get to this limit. The 5000 mrem yearly limit applies to persons who are routinely exposed to radiation in the course of their jobs. This is not to suggest that a member of the general public should routinely expect to be exposed to 5000 mrem per year of diagnostic x-rays, but it is an indication that the benefits of routine yearly diagnostic x-rays far outweigh the dangers posed by the radiation.

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). Dental x-rays are aimed in a tight, focused beam at a small area on the face. The only structures that receive the full dose of the x-radiation are the tissues in the beam's path. The rest of the body receives only the small amount of radiation that is scattered off of the targeted structure. Furthermore, the tissues at which dental x-rays are aimed are much less prone to injury from x-radiation than are tissues in other parts of the body, such as the intestinal lining or reproductive organs and other constantly reproducing tissues. The mSV was designed to take this factor into account.

The information below is from the American Dental Association website and is helpful in comparing the amount of radiation received from dental x-rays to other medical and natural sources.

Dental radiographs exposure:	
Bitewings (4 films)	0.038 mSV
Panoramic	0.019 mSV
Medical radiographs exposure:	
Lower GI series	4.060 mSV
Upper GI series	2.440 mSV
Chest	0.080 mSV
Average radiation per person from outer space in Denver, CO per year	0.510 mSV
Average radiation per person in the US from natural sources per year	3.000 mSV

As you can see, by this more realistic measure, it would take almost 80 bitewings (each bitewing series consists of 4 films) or over 150 panoramic x-rays to equal the amount of radiation the average person picks up from background sources each year.