October 2012
Volume 1, Issue 1

DENTAL DIALOGUE

CASTRO COMMONS GENERAL DENTISTRY, 1174 CASTRO STREET SUITE #114 MOUNTAIN VIEW, CA 94040,

T: 650.965.1595, E: CCDENTISTRY@MYCCDENTISTRY.COM, WWW.MYCCDENTISTRY.COM

From Your Dentist

By: Dr. Hsiao-Ting Chen, DDS

Dear friends,

As we are approaching November, the month of Thanksgiving and the month of my practice's anniversary, I have been thinking about how grateful I am, and how I'd like to share my dental knowledge with my patients. A newsletter seems to be a logical start. Let's make this a true dialogue by discussing issues you consider important. Thank you for reading!

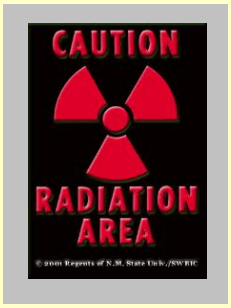
Sincerely,
Dr. Chen

INSIDE THIS ISSUE

Radiation Scare: Is the Hype True?

By: Dr. Hsiao-Ting Chen, DDS

The term "radiation" always evokes a negative feeling in most people. After the 2011 earthquake in Japan, a number of nuclear accidents from the Fukushima nuclear power plant overwhelmed the news media and the science community. I got a lot of questions about the safety of dental X-rays during that time.



This age-old subject continues to come up. I feel that it is time to separate the facts from the myths. A few weeks ago, I took a class from Dr. Gurminder Sidhu, the Director of Radiology at University of the Pacific. I would like to share the science and its implications. My hope is that through knowledge, our anxiety and paranoia can be alleviated.

Please see *Bottom Line* article on page 3

Radiation: The Science

By: Dr. Hsiao-Ting Chen, DDS

When radiation hits a cell nucleus (where DNA, the genetic material, lies), one of three events happens:

1. The damage to the DNA is so great that the cell dies.
2. The DNA is damaged, but our innate repair mechanism fixes the damage and the cell lives on as a viable cell.
3. The DNA is damaged but the cell lives on and is "transformed", or mutated, from the original sequence (as shown in Figure 1).

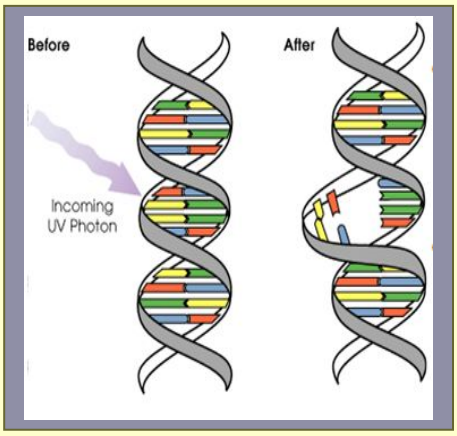


Figure 1. Helical structure of DNA.

It is the third outcome, the mutated cell, which can lead to a genetic or cancer causing effect. The severity of this effect increases with dose, and with the duration of exposure.

Radiogenic health effects (primarily cancer) are observed in humans only at doses in excess of 100,000μSv (micro Sievert, the unit used to measure biological effects of ionizing radiation) delivered every day or every other day. Annual background radiation is estimated to be 3600μSv.

Out of the 3600μSv average annual dose, about 8% of which comes from the sky (cosmic radiation), 8% from the soil (terrestrial radiation), 56% from radioactive gas (Radon), 15% from medical X-rays and other 13% from consumer products and other sources.

The average annual effective dose from dental X-rays is approximately 20μSv. The negligible individual dose established by the NCRP (National Council on Radiation Protection) is 10μSv.

A few more comparisons for the number-oriented minds:

Examination	Effective dose (μSv)	Equivalent background exposure (days)
Digital Dental Panoramic	9-26	1-3
Digital Full-Mouth Dental X-Rays	20-25	2-3
Medical Plain Film - Chest	20	2
Medical Plain Film - Skull	70	9
Medical CT - Head	2,000	243
Medical CT - Abdomen	10,000	3 years

Frequent Fliers: *Approximate radiation exposure when flying at 36,000 feet:*

- *New York to Los Angeles round trip = 40μSv*
- *New York to Paris round trip = 60μSv*
- *Los Angeles to Paris round trip = 100μSv.*

The Bottom Line: Do Not Lose the Big Picture!

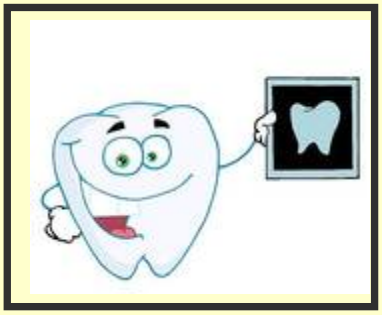
By: Dr. Hsiao-Ting Chen, DDS

According to legitimate research, a digital radiograph requires about 6μSv. This is less radiation exposure than any one of us receives just existing for one day in our normal home or work environment, which generates an average of 7-8μSv from the background or ambient radiation.

Dental X-rays are necessary for accurate diagnosis of many dental conditions. They allow the detection of decay, diseases of the mouth, and any abnormalities of the jaw bones that may not be detectable during a visual exam.

In my office, I use the most modern equipment that filters out unnecessary radiation and focuses the X-ray beam to the area of interest. Digital sensors in general require 90% less radiation exposure compared to the dose needed for traditional films.

Lead aprons with thyroid collars used in my office can further reduce a patient's exposure. With these safeguards in place, the small amount of radiation you are exposed to from dental X-rays generally represents a much smaller risk to your health than an undetected and untreated dental infection.



In April of this year, CBS, ABC, and NPR and other news media released an interview that created some health buzz: they claimed dental X-rays could end up giving you a brain tumor! As we have seen this is highly unlikely due to the negligible exposure. The response from the American Dental Association proved this work to be invalid.

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Kid Corner

What is an X-ray? Why does the dentist put a heavy blanket on me?

X-rays are little bundles of energy in the form of tiny light particles called photons. You wear a heavy apron because it contains lead. Lead is heavy and it does not let the photons pass through to your body

Do you have a question or issue that you would like Dr. Chen to address in her next newsletter?

Please email us at:
ccdentistry@myccdentistry.com