



Case Department of Occupational and Environmental Safety

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**October/
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How Much Radiation Do You Get From Dental X-Rays?

By Steve D. Rima, CHP

Just the mention of the word “radiation” conjures up an unpleasant image for most people. We associate it with bombs, cancer, and all manner of other bad things. But do you know that there are many beneficial uses of radiation? One type of radiation, x-rays, are used extensively in the medical and dental professions to diagnose and treat a wide variety of conditions.

Just how much radiation do you get from a dental x-ray and how harmful is it? First, let’s talk about what an x-ray is. X-rays are energy in the form of waves, identical to visible light. In fact, the only difference between light and x-rays is that light doesn’t have enough energy to go through your body and x-rays do. Both can make an image on photographic film, so both types of energy are used to make pictures; light makes photographs of the “outside” of objects, x-rays make pictures of the “inside” of objects, including your body.

A unit called a “rem” is used to measure radiation. A rem is a large unit, much like a mile is a large unit of length, so we usually use a millirem (mrem) instead, much as you would measure in inches instead of miles for most purposes. (It takes 1000 mrem to equal one rem.)

Advances in x-ray equipment, especially film technology, allow your dentist to get a good x-ray image using much less radiation than was previously required. A typical dental x-ray image exposes you to only about 2 or 3 mrem. The National Council on Radiation Protection (NCRP) says that the average resident of the U.S. receives

How Much Radiation Do You Get From Dental X-Rays? (continued from page 1)

“[Y]ou receive about 2 mrem per year from sleeping next to someone! This is because all of us have very small amounts of naturally occurring radioactive materials in our bodies.”

(continued from front page) about 360 mrem every year from background sources. This comes from outer space, radioactive materials in the earth, and small amounts of radioactive material in most foods we consume.

Some typical sources that may expose you to radiation also include smoke detectors (less than 1 mrem per year), living in a brick house instead of a wood one (about 10 mrem per year due to radioactive materials in the masonry), cooking with natural gas (about 10 mrem per year from radon gas in the natural gas supply), reading a book for 3 hours per day (about 1 mrem per year due to small amounts of radioactive materials in the wood used to make the paper), and even from flying in an airplane (about 5 mrem for one cross-country flight because of the increased altitude.) In fact, you receive about 2 mrem per year from sleeping next to someone! This is because all of us have very small amounts of naturally occurring radioactive materials in our bodies.

Obviously, you probably would not refuse to fly on an airplane, live in a brick house, read books, live without smoke detectors, or sleep with your spouse because of the small amount of radiation you receive from these activities. Since your dentist gains valuable information from x-rays to aid you in keeping healthy teeth, it is also not in your best interest to refuse dental x-rays because of the very small amount of radiation you receive from them.

Steven D. Rima is a Board Certified Health Physicist with over 20 years of experience in radiation safety, including teaching medical and dental professionals for state licensure to take medical and dental x-rays.

**Mark Your Calendar:
Thanksgiving Day is
November 23**

Construction Safety: Important Reminders

With the reconstruction of the Adelbert Road overpass, the construction on Euclid Avenue and the multiple projects in-progress at the Cleveland Clinic, there are many things to keep in mind in order to stay safe.

When walking:

- Follow signs and stay on designated paths. Do not venture into a construction area for any reason without proper PPE (hardhat, glasses, etc.) and authorization from the foreman in charge.
- Watch for vehicles where you are not normally used to seeing them. While this has presented a parking problem for several areas, this also can mean vehicles backing in and out of the construction site – often, these drivers have a limited range of vision, so give them as wide a berth as possible.
- Be aware of construction actions in motion. This can include overhead cranes as well as overland transport and pulling.

When driving:

- Be careful of construction vehicles on the road and give them ample distance, even more so than when walking. This goes for all driving locations – each year, hundreds of workers die due to construction-related highway accidents.
- Never attempt to circumvent a posted detour. While this may seem like common sense advice, numerous accidents are caused each year by impatient drivers looking for shortcuts. Construction workers and barricades are there for a clear reason. Follow all posted detours.
- Plan ahead. If you know construction is ongoing in a particular area, allow extra time to get to and from your destination. Be reasonable—expect delays.

With so many large-scale projects in process around the Case community, construction can often be frustrating, but as our University is improved and expanded, keep safety concerns in mind for both yourself and the workers who are doing their jobs.

“Be aware of construction actions in motion. This can include overhead cranes as well as overland transport and pulling.”

Eye Injuries under the BLS Microscope

This article is part of our ongoing series of articles emphasizing eye safety.

Originally published in J. J. Keller & Associates, Inc., on 09/06/2006)

In 2004, there were 36,680 nonfatal occupational injuries or illnesses involving the eye that resulted in days away from work, according to a recent article in Compensation and Working Conditions Online. The article, by Bureau of Labor Statistics (BLS) economist Patrick Harris, examines data from the BLS Survey of Occupational Injuries and Illnesses (SOII) and profiles work-related injuries involving the eye or eyes.

Approximately 4.3 million injuries and illnesses were reported in private industry workplaces during 2004, a rate of 4.8 per 100 equivalent full-time workers. Among the 1.3 million injuries involving at least one day away from work, more than 80,000 were head injuries classified into the following areas: cranial region, including skull; ears; face; multiple head locations; and other or unspecified areas of the head.

The typical eye injury resulted from the eye being rubbed or abraded by foreign matter, such as metal chips, dirt particles, and splinters, or by these types of items striking the eye. These injury events resulted commonly in surface wounds, such as abrasions, scratches, and embedded foreign bodies (splinters and chips).

Two-thirds of all head injuries occurred to the face. Injuries to the face are further classified into the following areas: face, unspecified; forehead; eyes; nose or nasal cavity; cheeks; jaw or chin; mouth; multiple face locations; and face, other. About the same number of eye injury cases were reported in 2004 as in the previous year. There were 36,680 eye injuries in 2004, accounting for 69 percent of face injuries and nearly 45 percent of all head injuries requiring days away from work.

Demographics and major industry division

While men were nearly twice as likely as women to experience an occupational injury or illness requiring days away from work in 2004, men made up an even greater proportion (80 percent) of the eye injury cases. The majority of the eye injury cases occurred among workers aged 25 to 34 years and 35 to 44 years. These two age groups combined accounted for nearly 55 percent of all eye injuries.

Nearly 61 percent of all eye injury cases occurred in manufacturing, construction, or trade (wholesale and retail). Educational and health services; transportation and public utilities; and professional business services accounted for another 24 percent. The remaining six industry divisions accounted for the remaining 15 percent.

Days away from work

Compared with injuries to other parts of the body, a relatively large proportion of eye injuries required only one day away from work. The median number of days away from work for eye injury cases was 2 days, 5 days fewer than the median for all cases.

Eye Injuries under the BLS Microscope (continued from page 5)

Occupation

Among specific occupations, nine had at least 1,000 eye injuries in 2004. These occupations accounted for 37 percent (13,680 eye injuries) of all occupational eye injury cases in private industry. With 2,240 cases, welders, cutters, solderers, and brazers incurred the most eye injuries, followed by construction laborers.

Turning to broader occupational groups, four categories — production, installation, maintenance and repair, construction and extractive, and service occupations — accounted for nearly three-fourths of eye injuries among private industry workers. Workers in these occupational groups tend to experience injuries from flying objects, chemicals, harmful radiation, or a combination of these or other hazards.

Characteristics of the injuries

There were 36,680 eye accidents reported in private industry in 2004. The most prevalent (nearly 36 percent) type of event involved the eye or eyes being rubbed or abraded by foreign matter. Somewhat surprisingly, falls, fires and explosions; and assaults and violent acts were not among the most prevalent events or exposures involving eye injuries and illnesses.

The principal source of head and eye injuries was the category scrap, waste, and debris. With 18,950 eye injuries, this category accounted for close to 52 percent of all such nonfatal occupational injuries and illnesses involving days away from work. In addition, among the seven specific sources accounting for 1,000 or more eye injuries, six were classified as scrap, waste, and debris.

More than a third of the eye injuries occurred among nine occupations — each with more than 1,000 eye injuries — which are commonly exposed to dirt, scrap, and flying objects. Examples include laborers, welders, and assemblers, all of whom face a higher risk of encountering the leading sources of eye injuries.

Nearly 89 percent of the 36,680 nonfatal eye injury cases were related to traumatic injuries and disorders. A traumatic injury is the result of a single incident, event or exposure. The most common injuries to the eye (14,070 cases) were surface wounds — more specifically, injuries involving foreign bodies such as splinters or chips. Abrasions and scratches were the second leading cause of eye injuries.

The five natures of injuries with the most cases accounted for 75 percent of eye injuries. Welder's flash, a common injury that often leads to loss of vision, accounted for nearly half of all systemic diseases and disorders (those that occur over time). Welder's flash accounts for another 5 percent of all natures with 1,870 injuries.

What Can I Do If an Employee's Disability Creates an Unsafe Situation?

“If an individual appears to pose a direct threat because of a disability, the employer must first try to eliminate or reduce the risk to an acceptable level with reasonable accommodation.”

An employer may require that an individual not pose a “direct threat” to the health or safety of himself or herself or others. A health or safety risk can only be considered if it is a significant risk of substantial harm. Employers cannot deny an employment opportunity merely because of a slightly increased risk. An assessment of “direct threat” must be strictly based on valid medical analyses and/or other objective evidence, and not on speculation.

For example, an employer cannot assume that a person with cerebral palsy who has restricted manual dexterity cannot work in a laboratory because he or she will pose a risk of breaking vessels with dangerous contents. The abilities or limitations of a particular individual with cerebral palsy must be evaluated.

Like any qualification standard, this requirement must apply to all applicants and employees, not just to people with disabilities.

If an individual appears to pose a direct threat because of a disability, the employer must first try to eliminate or reduce the risk to an acceptable level with reasonable accommodation. If an effective accommodation cannot be found, the employer may refuse to hire an applicant or discharge an employee who poses a direct threat.

Equal Employment Opportunity Commission (EEOC) - ADA

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Upcoming Training Sessions*

*As always, consult our website (<http://does.case.edu>) for a full schedule of training sessions

New Radiation Safety Training

Retraining is required annually.

DOES conference room - Service Building 1st Floor

PREREGISTRATION IS *REQUIRED* ! - Please call 368-2906

X-Ray Safety Training

DOES conference room - Service Building 1st Floor

PREREGISTRATION IS *REQUIRED* ! - Please call 368-4606 or email yxt13@case.edu

Laser Safety Training

DOES conference room - Service Building 1st Floor

PREREGISTRATION IS *REQUIRED* ! - Please call 368-4600

or email hwj@case.edu

The Laser Safety training schedule is now available online at the DOES website <does.case.edu> under Laser Training.

New Bloodborne Pathogen Training

Please call 368-2907 to preregister for this class.

Class Objective: To go over the Bloodborne Pathogen Standard

Class Frequency and Time: The class is offered every Tuesday from 3:00 to 4:30 pm. Location: The class is held in the DOES conference room in the Service Building First Floor unless otherwise specified in the calendar.

Bloodborne Pathogen Training

Please call 368-2907 to preregister for this class.

There is an online version of this class. You do not have to attend the class if you take the online version.

Class Objective: Retrain workers annually for the Bloodborne Pathogen Standard

Class Frequency and Time: The class is typically offered twice a month. It is approximately 1 hour in duration.

Location: The class is held in the DOES conference room in the Service Building First Floor unless otherwise specified in the calendar.

Formaldehyde, Benzene, Methylene Chloride, and Vinyl Chloride Retraining

Please call 368-2907 to preregister for this class. There are online versions of Formaldehyde and Benzene retraining. If you take the online versions of Benzene or Formaldehyde you do not have to take the class.

Class Objective: Chemical specific training.

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**Mark Your Calendars:
November 11 is Veteran's Day**

Chemical Safety (OSHA Lab Standard Training)

Please call 368-2907 to preregister for this class.

Class Objective: To train all university personnel using hazardous chemicals in a laboratory setting in basic chemical safety principles and the requirements of the OSHA Laboratory Standard 1910.1450.

Class Frequency and Time: The class is offered every Tuesday from 1:00 to 3:00 pm. Also additional classes are available.

Location: The class is held in the DOES conference room in the Service Building First Floor unless otherwise specified in the calendar.

Hazard Communication Training (Right-to-Know)

See website <does.case.edu> for schedule.

Radiation Safety Retraining

Please retrain on the Internet @: <http://does.case.edu>

Annual Respirator Training

DOES conference room—Service Building 1st Floor.

PREREGISTRATION IS REQUIRED ! - Please call 368-2907

Note: *There is an online version of this class.* If you take the online version you do not have to take the class. But you still need to come in for a fit test.

(Again, for a complete listing, please consult the DOES website at <<http://does.case.edu/>>)

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