Dental X-ray, cancer link assessed

A new study shows for the first time an increased incidence of salivary gland cancer in people exposed to very high levels of dental X-rays, such as those commonly used through the 1950s. While finding no such relationship for exposure to the smaller doses used today, the researchers observed a dose-dependent trend, which they say affirms the importance of minimizing exposure to dental X-rays. Many dentists repeatedly expose their patients to unwarranted risk by not taking advantage of new, low-dose technology, they assert.

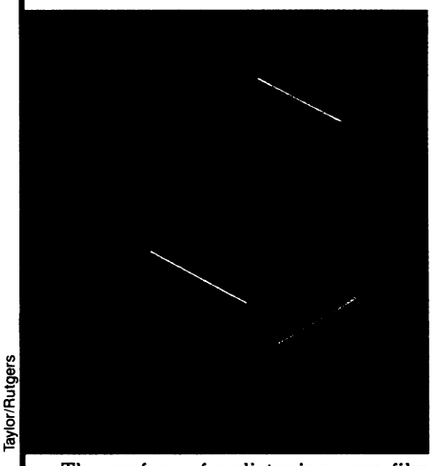
The study focused on tumors of the parotid gland, a major salivary gland located in the cheek and directly in the path of many dental X-rays. Susan Preston-Martin of the University of Southern California School of Medicine in Los Angeles and her colleagues interviewed 408 patients with parotid tumors and an equal number of matched controls. They compared the two groups' exposure to dental X-rays and other types of cranial radiography. After correcting for other risk factors, they found an X-ray-related increase in malignant parotid tumors, they report in the Aug. 17 JOURNAL OF THE NATIONAL CANCER INSTITUTE.

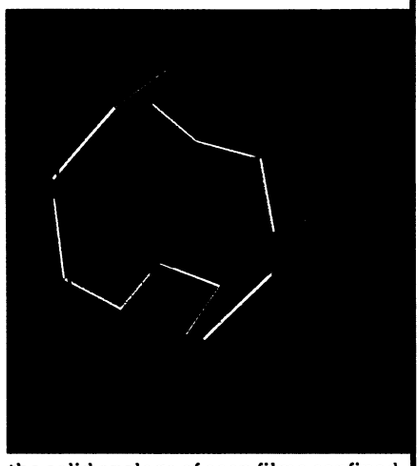
"The paper really is a testimonial to the safety of modern diagnostic X-ray procedures," says Charles Schoenfeld of the American Dental Association in Chicago, noting that X-ray doses today are about one-five-hundredth the minimum average dose the study associates with an increased risk of cancer.

However, says study coauthor Stuart C. White of the University of California at Los Angeles School of Dentistry, the dose-related findings leave open the possibility that even low doses could carry some risk over longer periods of time. He estimates that fewer than half of the dentists in the United States have switched to "E speed" X-ray film. Available since 1981, the high-speed film requires half the X-ray dose of the most commonly used film. Similarly, most dentists do not use rectangularly columnated X-ray beams, which can cut X-ray doses by another 50 percent, White says.

– R. Weiss

The crystalline face of soap films





Taylor/Rutgers

The surface of a glistening soap film tightly stretched across a closed wire loop, of the type kids use to blow soap bubbles, is the smallest possible area that can span the loop. That minimal surface is a reflection of the soap film's tendency to seek a state of lowest energy. A soap bubble is spherical for the same reason. Any other closed shape of the same volume would have a higher surface energy.

Mathematician Jean E. Taylor of Rutgers University in New Brunswick, N.J., has extended this idea to crystals (SN: 1/31/87, p.76). The key difference is that whereas soap films and soap bubbles have a uniform surface energy, crystals do not. Different crystal faces may have different surface energies. In that case, the shape of a single crystal – the analog of a single soap bubble – is no longer necessarily spherical and may show flat faces.

Using her theory, Taylor can now compute and display the different types of minimal surfaces that a crystal surface assumes within a given boundary – the solid analogs of soap films confined within a certain wire loop. In the computer-generated illustrations, the figure on the left shows a single crystal's equilibrium shape. The figure on the right shows one of the possible minimal surfaces that fits within the yellow boundary marked on the crystal. Together, the pair of crystal images is the equivalent of a soap bubble next to a soap film on a wire frame.

Taylor is using such images to study how changes in the crystal shape affect the forms of corresponding minimal surfaces. For example, she has noticed that whenever a crystal's smoothly curved surface meets a flat surface, the corresponding minimal surface has a cusp. Her computer experiments so far support this conjecture.

"I'm hoping that computation will be a useful tool for seeing which conjectures appear to be correct and for generating other conjectures," Taylor says. "There are a lot of phenomena and not very many theorems to explain them."

– I. Peterson

Risk of death from grief may be low

It is a common belief that bereavement due to the loss of a loved one increases the risk of mortality among spouses or parents of the deceased. But the evidence for this has been inconsistent, and recent studies on the health effects of bereavement suggest that any increase in mortality may be more limited than has been assumed. In the latest development, an Israeli study released this week shows that the loss of an adult son leads to no increased mortality in married parents.

In a study of more than 3,600 Israeli parents who lost adult sons either in the Yom Kippur War of 1973 or through accidents occurring between 1971 and 1975, researchers found "no consistent evidence of an elevated risk of death" among surviving married parents by 1983. The study, led by Itzhak Levav of the Hebrew University-Hadassah School of Public Health and Community Medicine in Jerusalem, compared the mortality rate of bereaved parents with that of the general populace.

"These findings raise questions about the effect of grief as a death-provoking factor," the researchers write in the Aug. 25 NEW ENGLAND JOURNAL OF MEDICINE. "Marital status may make a difference, however, in the effects of parental bereavement on health," they add. Widowed and divorced parents of deceased sons – especially mothers – did show a slightly increased mortality. That finding suggests an additive effect of parental and conjugal bereavement, and is consistent with common wisdom that a spouse's emotional support has a protective role during parental bereavement, the researchers say.

Although Israel's culture is unusual for its provision of strong emotional support for parents of killed soldiers, the group's findings are strengthened by the data on parents of accident victims, says Malcolm P. Rogers of the Brigham and Women's Hospital in Boston. "I don't think it's the final word," he says, "but it's still an impressive negative finding."

– R. Weiss