

## The use of radiographs in pediatric dentistry: the challenge of the 80's

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The assigned title of this paper is a rather imposing thing. It implies that there is to be some global statement that will capture the entire spectrum of issues we are to address at this conference, followed by profound statements as to how we might successfully solve these problems in the next decade. I doubt that any individual can satisfy that expectation. I certainly cannot. Indeed, that is the very purpose of this conference — to deal with the issue of how best to apply radiographic methods in the child patient in order to obtain the necessary diagnostic information at minimum risk to the patient.

Having listened to excellent presentations, and having engaged in a workshop session, we are now to tackle the development of recommendations to be applied to the use of radiographs in pediatric dentistry as we launch into the decade of the 80's. We are to make use of our collective expertise and wisdom in an effort to accomplish the task as best we can. The workshops this afternoon are the real guts of the conference.

The importance of such recommendations has been emphasized by several of the speakers. The increasing concerns of the public about radiation and its effects, and the inconsistencies found in authoritative publications on the subject, demand that an intensive effort be expended to sort things out and to provide the dental profession with current information and proper guidance. This conference and the workshop sessions that follow are most timely and of utmost importance. The organizers and sponsors of the conference are to be complimented on their vision and initiative in making it possible to deal with the issue in an organized and thorough manner.

These organizers asked that this paper set the stage for this afternoon's workshops. In trying to do that I have already stated the obvious — the importance of the work to be done. I think it best that I now turn to the practicalities of the situation. It seems to me that the task is beset by some difficult problems, some of which will be ever present in our discussions and others that may have to be recalled from time to time in order to maintain our perspective.

The first problem is, as Dr. Fabrikant has explained, that we cannot be certain what the risks to our patients really are. He has given us a comprehensive review of the implications of the Beir-III Report and has highlighted the points of disagreement and the areas where critical data are unavailable. He has talked for the most part about whole-body radiation but commented during the discussion yesterday about some of the specific aspects of dental radiography. Dr. Goepp has focused on that issue in his excellent paper. He has reviewed the most current and relevant research on the subject. There are some new methods being employed, and some new findings are available regarding the possible risks, exposures, and evaluation of advances in technology. But the information gap is still a serious one. The answers are coming slowly to the questions about the biological risks generated when the various dental radiographic methods are used in children.

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Of greater concern to me is that I doubt that the pace at which the answers come will quicken in the 80's — unless the research activity related to dental radiography expands dramatically. Important solutions to significant problems are usually derived from sound basic research. Considering the extent to which the dental profession uses diagnostic radiographs, our contributions in the field of radiation research are miniscule. I am not criticizing the few good people who work in the discipline. It's just that they are pitifully small in number, and grossly underfinanced.

To illustrate the point, at the recent annual session of the International Association for Dental Research, 1,383 papers were presented on the spectrum of dental research activities. The radiology section included reports on only seven studies. I could find one additional related paper in the other sections. There may have

been a few I missed, but not many. Only one of the reports seemed to deal with radiation effects. I am sure that there are other meetings where such papers are given, but I would be surprised if the presentations were more than a scattered few. I also looked over the listing of currently sponsored dental research projects in the United States and other countries published by the Department of Health and Human Services. The publication arrived last week. It lists projects supported by a variety of funding agencies. I could find just one project, funded for \$47,000 related to biological effects of low-level radiation. I called the National Institute for Dental Research to get an update on their support of research on the biological effects and risks involved in dental radiography. In the current fiscal year, only *one* grant concerning dental radiology is funded. Three projects are approved but not funded. Only three grants were disapproved. It is obvious that NIDR is not getting much action from investigators in this field. The people from the Bureau of Radiological Health have told me, since I arrived at this meeting, that they support a limited number of research projects in the field of dental radiology. Unless there is a sector of relevant research activity I have overlooked, the prospects of advancing our knowledge concerning biological effects in the field of dental radiology are not promising to say the least.

**H**ow can it be that a profession that makes such extensive use of radiographs is doing so little basic research on the subject of radiation biology? One problem is that there seems to be only one active program offering advanced training in dental radiology in the United States at this time. I believe that four others are approved but have no trainees. I am not familiar with these programs in detail, but it is my impression that — even collectively — they do not represent a major resource for the study of radiation exposure, effects, or methods, particularly in the basic research dimension. In my opinion, this totally inadequate base of training and research activity is, in part, a reflection of the fact that dental radiology is not a recognized specialty and does not enjoy the advantages and influence that go with such status. In this day and time, when the dental specialists are perceived by public policy makers as bad and the generalist as good, we have to recognize that there are trade-offs involved in such decisions. While it may not seem practical that dental radiology could function to advantage as a bonafide specialty in the dental care delivery system, neither should we expect the development of a critical number of skilled investigators to conduct the research we need to have done under existing conditions. One thing that specialists and their respective organizations and departments in dental schools seem to do, is to foster research activities in their areas of

interest. Dental radiology lacks that impetus to a large extent, and some innovative approaches will have to be applied if the extent and sophistication of such investigative activity is to be improved. Discussion of this problem may not be on your workshop agenda, but it should be on someone's agenda someday. I think that it is *the* most important item of all. If there is not considerable advancement in the basic research effort associated with dental radiology during the 80's, a meeting held in 1990 to develop recommendations pertaining to use of radiographs in pediatric dentistry for the 90's will not be noticeably different from this one.

**I**n our workshop session yesterday it was also pointed out that the limited number of training programs in dental radiology fosters the lack of qualified faculty available to teach radiology in dental schools. The problem of ill-informed practitioners is then initiated in the first step of their education. That is a most serious situation; not soon to be resolved. Over the long haul it is a more serious problem than many of the problems we have discussed to this point. Without qualified, informed faculty to teach radiology in the dental schools, anything we may decide here has little chance of being taught properly where it is most needed. It may be the most important factor in the information gap Dr. Goepf described.

The tone of this conference has been to set aside the unknowns of the risk factor, and concentrate on how to get the necessary diagnostic information with the least possible exposure to the patient. The problem boils down to agreement on what constitutes the "necessary" diagnostic information. This is where we must be extremely practical as well as careful. We must consider the problems and the attitudes of the typical clinician; not only the pedodontist and orthodontist, but also the general practitioner who sees children in his practice. In fact, it is through the general practitioner that most dental radiation exposure of children occurs.

**A**s one who teaches in a dental school pedodontic clinic, and who conducts a private pedodontic practice, I admit quite frankly that I am one of the defensive clinicians of whom Dr. Santangelo spoke. I have seen enough malpractice suits to make me sensitive to that problem. Of more importance, some of the most serious diagnostic errors I have made involved the failure to obtain a key radiograph. So, I tend to overcompensate in an effort not to miss anything of importance.

As several speakers have pointed out, there is no substitute for a meticulous clinical examination, and radiographs should be ordered only after careful consideration of the clinical findings. The well-informed

clinician exercising sound clinical judgment can then make confident decisions about the need for certain radiographs. The area of the radiograph to be obtained on an asymptomatic patient is where controversy appears to center. In particular, the value and potential risk of the panoramic film on the young patient has been called into question. There has been discussion of the low quantitative information yield from such a diagnostic method, and the attendant relatively high dose of radiation delivered. There have been some persuasive arguments advanced. In our teaching and private practice clinics in Chapel Hill, we presently take a panoramic film on most children at age six, but seldom thereafter. We rarely take a full mouth series. Recently, there was a sizable ameloblastoma in the ramus area of one of these six-year-olds. No clinical symptoms were present. In the last two weeks our oral surgeons have operated on three cases involving major lesions in children. Two of them, an ameloblastoma and an odontogenic keratocyst, resulted in large surgical defects and subsequent attempts at surgical reconstruction with rib grafts. Both cases have a difficult prognosis. The surgeons would like to have found those lesions considerably before any clinical symptoms were detectable. Would the more radiation-conservative radiographic methods have located the lesions at an early stage when the surgical procedure could have been handled in a relatively straightforward way? The third case showed cyst-like lesions in the ramus of a five-year-old. Biopsy established a diagnosis of cherubism. The prognosis is good. In my experience, such devastating or potentially devastating problems are not everyday occurrences, but they happen often enough in our setting to be of continual concern. So, there is the matter of the *importance* of information to be gained or missed as well as the *quantity*.

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As a teaching and practicing pedodontist I am afraid that it will take some good evidence and logic to move me from my so-called defensive mode of diagnostic practice — to get me to take more diagnostic risks and fewer radiation risks. Or, to convince me that the alternative method does not increase the diagnostic risk, or even the eventual risk. I may be wrong in my attitude, but I think that I am a rather typical clinician in that regard. Therein lies the knotty problem. Our recommendations must deal effectively — or I might better say “persuasively” — with these concerns of the clinician, or we will be whistling in the wind with respect to acceptance of our recommenda-

tions by the practicing profession. Once it is decided what radiographs to take, it is then imperative that the best technical method be applied. There seems to be much less controversy as to what those are.

**A**nother difficulty centers around the fact that the dental practitioner is unique because he is his own radiologist. The typical medical practitioner refers all of his diagnostic radiology to a radiologist. Even the occasional internist, surgeon, or pediatrician who does some of his own radiology rarely owns the equipment. The medical radiologist spends all his time on radiology, including consideration of radiation risks and safety. Since his equipment is the handpiece of his trade, if he even owns it, he can afford to make considerable financial investments to keep pace with advancements in technology.

The dentist, on the other hand, uses radiology as only as part of his practice. He must try to keep up with the information and technological advances in this field along with all the other aspects of his practice. That's a tough job, especially for the generalist. This means that there are considerable problems in getting information concerning any new recommendations on the use of radiographs in the child patient to the people who need it; then getting them to assimilate it and apply it in their practices. The selection of appropriate publication vehicles is of paramount importance. The manner in which the recommendations are presented and documented must provide for effective assimilation of the information by the busy dental practitioner whose clinical interests are diverse.

The situation is even more difficult when advances in methods and technology dictate major modifications in the practitioner's equipment — or even the purchase of additional equipment or replacement of old equipment. Dr. Goepf pointed out the relatively small percent of practice income derived from taking radiographs. It may not be financially feasible to keep pace, but the practitioner can hardly cease using his X-ray equipment. Considering the current public attitudes about radiation he may then be playing with four fouls from a legal standpoint. So, the dental profession has some very real problems in the area of radiology not often encountered in medicine. The non-dentists in the group should keep that in mind.

Another problem relates to the legal implications of any recommendations that may result from this conference. If we do our job well, it is fair to assume that the recommendations will be regarded as authoritative. If they depart substantially from methods generally used in practice today, will they be regarded by the courts as the standard of practice? If a clinician follows the recommendations and misses a critical lesion, will he be in a good position to defend himself in a malpractice suit? Or, if another clinician departs

from the recommendations and is sued by a radiation-conscious parent, where will he stand? I am confident that a sharp malpractice lawyer will test the validity of our conclusions one way or another before too long.

Yesterday someone mentioned concern as to how the recommendations emanating from this conference will be viewed by the public. If the material is not worded very carefully it may be misinterpreted by other folks. That could create serious difficulties, especially for the responsible practitioner. Writing the final report and recommendations will be a delicate task in that respect.

Perhaps there are other problems that occur to you. And, perhaps I have played the devil's advocate to a certain extent. But these examples serve to make the point that proper consideration of the subject at hand will require your best efforts; the matter is of utmost importance.

New recommendations are needed. They must be based on careful consideration of the best information available. They must be practical. They must address the legitimate concern of the clinician who treats children in his practice, or teaches pediatric dentistry in a dental school. They must consider the legal implications involved. And most of all, they must consider the patient. These recommendations must then be applied widely in practice.

Working with these considerations in mind, the specific tasks of the workshop participants are to: 1) develop referral criteria for use in pediatric dental radiology (as Dr. Thurow pointed out, the term referral criteria is probably inappropriate and a better one should be selected); 2) list and describe alternatives to dental radiology in children; 3) describe the risks if radiographs are not taken; and 4) recommend methods to protect both the patient and the dental team during radiation exposure.

To do all that in the time allowed is a formidable job. However, I hope that this conference will also develop some ideas as to how research associated with dental radiography can be significantly expanded in the next decade; also, how we can move toward education of the dental radiologists who will be needed to teach the subject properly in the years to come. A few more fellowships are not the answer; the problem is far more complicated than that.

Plainly our task is a demanding one of considerable importance. I am confident that this group will lend its best efforts to meet this challenge.

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