LETTER TO THE EDITOR

Orthodontic cephalometric X-rays overdone: a commentary

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This letter is in response to the recent DFMR article: Mutagenicity and cytotoxicity assessment in patients undergoing orthodontic radiographs.¹

In the introduction, the authors state that “a lateral cephalometric X-ray must be obtained for all patients, before the start of treatment, when the information obtained from this film is expected to benefit or enhance the formulation of the patient’s diagnosis and treatment plan.”

The reference in support of this statement is to a paper on legal and ethical aspects for post-treatment records.² Obviously, this concerns the protection of orthodontists from malpractice suits and has no bearing on whether or not cephalographs benefit or enhance diagnosis and treatment. It might better be termed “defensive orthodontic radiography.”

The introductory statement may be appropriately termed a “pious platitude” about which it is assumed no one will disagree because obviously no one would recommend X-rays that would not benefit or enhance diagnosis and treatment. The only problem is that it is a false platitude.

An evidence-based study by Atchison et al³ demonstrated that cephalographs are of no value in deciding on treatment in approximately 70% of orthodontic cases. Nonetheless, cephalographs continue to be routinely prescribed for routine orthodontic cases for which there is no documented evidence.

Although conceding that cephalographs should be employed only when beneficial, the authors state that “At present, lateral and frontal cephalograms are considered mandatory in orthodontic therapy.” With emphasis on “and frontal” patients are being subjected to these X-rays whether or not they are beneficial, “Although it is generally accepted that there is no safe level of radiation exposure...”.

But is this a peripheral criticism of the paper, which is not about the necessity or validity of cephalographs for orthodontic diagnosis and treatment, but rather is the radiation harmful to the tissues radiated? The answer is

yes and no. There was a large increase (69%) in cytotoxic cellular damage 10 days after radiation, but whether this translates to significant damage in terms of overall health is not known. There was no difference in the number of cells exhibiting DNA (micronucleus) damage before and after. In other words, this type of radiography does not appear to increase the risk of cancer in the oral tissues.

Whether the damage that occurs was due more to cephalographic or panoramic radiation was not considered in this study and is probably not an issue with respect to the oral tissues. What the study does not consider is the effect of cephalographic radiation on the brain. If oral cells are damaged, then is it not likely that brain cells are damaged? We can conclude that cephalography is not only cytotoxic to oral tissues but also cytotoxic to brain tissues.

The authors conclude “radiography is able to induce cytotoxicity... radiographs should be used only when necessary.” yet they accede to mandatory cephalometric X-rays for all orthodontic patients as if their need is self-evident and without any potential harm.

In the absence of palpable benefit, it is unconscionable that children continue to be exposed to brain radiation and its cytotoxic effect on brain cells by orthodontists who may be more concerned with protecting themselves from negligence lawsuits while performing negligent diagnosis.

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