

PATIENT EXPOSURES FROM INTRA-ORAL DENTAL
RADIOGRAPHIC EXAMINATIONS

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ABSTRACT

This report describes a study to determine patient exposure to selected areas at the thyroid gland, the central chest area, the testes and ovaries, from conventional radiographic procedures for dental patients. The study was designed also to compare the efficiency of the cervical lead shield with the lead apron which both serve as protection from radiation. A review of the literature indicates little agreement in doses reported, due to wide differences in machine factors, in systems of dosimetry or in anatomic location. No references have been found which compare the efficiency of the cervical lead shield with the lead apron. As phantom a Temex one was used. This tissue equivalent human phantom, developed by Stacey and Dickens, is made in the form of a woman and contains a rubber compound fluid which is a soft tissue equivalent. It is cast on a natural human skeleton and is made in such a way that air pores are located at the appropriate places similar to those of a living being. Full mouth examination was carried out, 14 periapical and 2 bitewing, using a X-ray generator type Siemens Helyodent, 50 KV, 7 mAs, and inherent filtration of 1.5 mm aluminium. The exposure time ran from 0.8 to 1.2 seconds. TLD-100 were placed upon the thyroid gland. In some situations extra pairs of dosimeters were placed upon the neck in the area of the thyroid gland in a scattered fashion along a length of approximately 2 cm. The measurements were conducted under three conditions: 1) with a lead apron; b) without a lead apron; c) with a cervical lead shield. At each of the 4 anatomic sites pairs of dosimeters were positioned adjacent to each other at the same level, and sealed in a poly-ethylene envelope. Results. The dose received by the thyroid gland area with a lead apron is approximately 300 mR and without the lead apron 350 mR. Both results are in the same range, so the dose due to scattering that reaches the thyroid gland is not larger than using a lead apron. The dose received by the thyroid gland area with the use of a cervical lead shield was decreased to 30-35 mR for a single X-ray. The cervical lead shield reduced the radiation dose as much as 90% in the Thyroid region. The cervical lead shield proved to be more efficient than the lead apron in the thyroid gland region. We found a decreasing in the skin dose radiation by as much as 90%. Therefore we recommend the use of the cervical lead shield as the most effective protection measure against radiation when performing dental X-ray examinations.