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"EVALUATION OF CYTOTOXIC EFFECTS OF PANORAMIC RADIOGRAPHY ON EXFOLIATED GINGIVAL EPITHELIAL CELLS- A CLINICOPATHOLOGIC STUDY"

by

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ABSTRACT

Introduction: X-rays are an important tool for diagnosis in medical and dental practice, even though they are potent inductors of genetic damage. Panoramic radiographs for the evaluation of dental arches, is an important diagnostic tool, since it is considered less harmful than several periapical radiographs. It is known, that there is no safety in radiation doses and that the biological effects of the exposures received for diagnosis or therapy are accumulated thorough a period of time.

Objectives:

1. To evaluate cytotoxic effects of Panoromic Radiography on exfoliated gingival epithelial cells using differentiated protocol for micronucleus test.

2. To assess other nuclear abnormalities such as karyorrhexis, karyolysis, pyknosis, broken eggs which are the indicators of cytotoxicity and biomarkers for cancer risk.

3. To provide a baseline data for future studies on nuclear abnormalities.

Material and Method: Seventy-five healthy individuals who underwent this procedure for diagnostic purposes on request from their dentists agreed to participate in this study. All of them answered a questionnaire before the examination was done. Epithelial gingival cells were obtained from the keratinized mucosa of the upper dental arcade by a gentle scraping with a help of a cervical brush once before exposure and another scraping 10 days later. Cytological preparations were stained according to the Feulgen-Rossenbeck reaction, counterstained with fast green 1% for

1 min and analysed under a light microscope. Micronuclei, nuclear projections (broken eggs) and degenerative nuclear alterations (pyknosis, karyolysis, karyorrhexis and condensed chromatin) were scored under 1000x magnification.

Results: The frequency of micronuclei was significantly higher after exposure ($P < 0.05$), as were the frequencies of nuclear alterations indicative of apoptosis ($P < 0.001$).

Interpretation and Conclusion: With the study conducted it was found that X-ray radiation emitted during panoramic radiography induces cytotoxic effect on epithelial gingival cells that increases the frequency of chromosomal damage and nuclear alterations indicative of apoptosis.

Key words: X- radiation, panoramic radiography, Micronuclei