

**Using tooth enamel minisamples for individual dose determination by EPR spectroscopy**P. Izhevskij<sup>a</sup>, E. Kleschenko<sup>b</sup>, V. Olesova<sup>c</sup>, A. Smelcov<sup>c</sup> and Y. Illewich<sup>c</sup>

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The problem of determination of the individual absorbed dose is one of the key issue of radiation medicine. Conventional dosimetry methods have several disadvantages which is especially important at individual accidental exposure. The method of tooth enamel EPR (electron paramagnetic resonance) dosimetry is one of the most sensitive and specific among all main methods of biological indication of ionizing radiation dose. It allows to determine organism irradiation dose after accidental or uncontrolled exposure. The most essential limitation of this method is the need for tooth extraction in order to get the dental enamel. This cannot be admitted as expedient action solely for irradiation dose estimation. Use of the part of the enamel taken during dental treatment, and the following restoration of anatomic shape and functions would allow wider application of EPR method in medical practice. Method of taking enamel mini-samples from a person followed by restoration of anatomic shape and functions has been developed. This method allows not only the determination of irradiation dose with rather high accuracy but also complete restoration of tooth functions by dental products. For the most accurate determination of the dose accumulated during lifetime we recommend to take enamel samples from lingual and palatine surface of permanent teeth according to their eruption in oral cavity: 6,4,5,7,8. The light-curable fine-dispersed hybrid composites are proposed for the restoration of hard tissues defects. Materials of this group are the most similar to the hard tooth tissues by their physical parameters. Distinctive feature of these materials is the possibility of universal using for restoration of both frontal and masticatory teeth. Five-years supervision of patients shows that taking mini-samples of enamel during dental treatment by the developed method does not cause pathologic changes of hard tooth tissues and fully ensures its functional recovery. This technique would allow to use the method of EPR dosimetry in medical practice for objective determination of individual accumulated doses more widely, to take medical- prophylactic measures with higher operational efficiency and also would help to make an examination of the relation between absorbed dose and patient level of health. On this technique to use the method of EPR dosimetry in medical practice was grant patent of Russia from 2005.