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Age estimation of teeth with Raman spectrometry - preliminary study

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Raman spectroscopy is a spectroscopic technique used to observe vibrational, rotational, and other low-frequency modes in a system relying on Raman scattering, of monochromatic light, usually from a laser which interacts with molecular vibrations resulting in the energy of the laser photons being shifted up or down. The aim of this work is to establish a correlation between ageing and Raman spectra imaging of human teeth. For this purpose 37 human extracted molars were analyzed by Raman spectroscopy. Three points were recorded on each tooth: first on enamel, second on the neck of the tooth and third on tooth apex. Each point is recorded with 10 spectrums (100 scans and 500 mW). At the apex of the tooth, the closest to the expected result was achieved, with an error of predicted and measured age of 6.8 years. Recorded spectra were analyzed with principal component regression to establish correlation between age and Raman spectra.

Keywords: Raman spectroscopy; age; tooth; forensics; Croatia