Detection of Opiates in Dentin after Simulated Drug Uptake

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Objective
Incorporation of medicinal and illicit drugs into dental hard tissues has been shown by previously conducted in vitro studies[1] and analysis of post mortem samples[2]. Aims of the presented in situ study were to investigate the drug concentrations in dentin samples after simulation of single or daily opiate uptake and to estimate the window of detection.

Methods
- Five volunteers
- Intraoral appliances with 3 or 4 bovine dentin samples
- Appliances incubated for 30 minutes in drug solution
- Drug solution (10 µg/mL): morphine, codeine, 6-acetylmorphine
- Analytical preparation: rinsing with water, drying, grounding, extracting with methanol → quantitative analysis by LC-MS/MS

Results and discussion

- Concentrations are given as average of the respective 3 or 4 dentin samples.
- Concentrations of one volunteer were more than one order of magnitude higher than the other concentrations (see Fig. 2) → outliers.
- Mean and median were calculated without outliers.
- Concentrations below the limit of quantification (LOQ) were extrapolated.

Conclusions
The study shows that a simulated, repeated drug uptake over seven days is detectable for at least 40 hours. Even a single simulated drug uptake is detectable after 16 hours. The relatively low differences between the concentrations reached after single and repeated drug exposure (16 hours) suggest a finite binding capacity of dentin for the drugs. This is also supported by the rather small decrease of concentrations in case of sample removal after 40 hours compared to 16 hours.

References

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Acknowledgement
The authors would like to thank the Deutsche Forschungsgemeinschaft (DFG) for funding the project "Determination of Drugs in Dental Material" (NE 1879/2-1, AL 1665/9-1).