

# Dental Identification of the Carbonized Body: Case Review

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## Summary

*This paper presents a case of dental identification of a carbonized body in a traffic accident with a private vehicle. After the police inspection performed on the spot of the accident, the carbonized bodies were transported to the Department of Forensic Medicine and Criminology at the School of Medicine in Zagreb for identification and determination of the cause of death. Dental identification was enabled by tracing the dental chart of the Croatian subject who had been a patient of the Dental Polyclinic in Zagreb. The dental chart of the foreign person was not available, which excluded the possibility of teeth comparison method. However identity was confirmed by DNA analysis from the pulp of the dental tissue.*

**Key words:** *dental identification, teeth, fire, DNA.*

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## Introduction

Traffic accidents are the most frequent cause of violent death. During accidents bodies in the vehicles are subjected to powerful mechanical forces, often combined with fire that develops after explosion of petrol at the moment of the crash. Temperatures that develop in such a situation increase up to 1000°C and result in rapid carbonization of bodies. Damage to soft tissues disables determination of identity by recognition and dactiloscropy and therefore such cases require dental identification. Because of the specific composition of the solid dental tissues, of their perseverance as well as of their position within the oral cavity, the teeth remain the only

organs that enable determination of the victim's identity (1-15).

## Case review

On the 4th of October 2000 in the early morning hours on the state road No. 4 near Samobor a traffic accident occurred in which a private vehicle crashed at a high speed into the rear of a bus. The vehicle rebounded into the opposite lane, where it crashed into an approaching truck (Fig. 1). The bodies of the driver and passenger were carbonized by fire following the petrol explosion. After the police had performed an inspection on the spot of the accident,

the carbonized bodies were transported to the Department of Forensic Medicine and Criminology at the School of Medicine in Zagreb for identification and determination of the cause of death (Fig. 2).

The autopsy confirmed that deaths of both the driver (protocol no. 65.495-806/2000) and the passenger (protocol no. 65.494-805/2000) were caused by multiple mechanical injuries. Blood samples for determination of alcohol concentration were taken from the bodies during the autopsy. According to the Nicloux method it was found that the driver had been drunk at the moment of the accident (0,90‰), while the passenger had been sober (0,00‰).

Data collected by the police on the spot of the accident were helpful in the identification process. Based on the license plates found as well as statements of witnesses it was suspected that the victims of the accident were a Croatian subject and a foreign person. A forensic odontologist from the Department of Dental Anthropology at the School of Dental Medicine participated in the identification process. He performed the postmortem division into joints of the dentition of the carbonized bodies of the driver and the passenger. Both dentitions were very well preserved, in original color and subjected to different odontological dental interventions in the past (Fig. 3 - 6). Dental identification of the Croatian subject was possible due to dental records of the Dental Polyclinic in Zagreb (dental chart no. 130/94). The dental record clearly showed all appointments at the dentist were marked (XX). The first appointment was marked on the 2nd July 1991, and the last one on the 16th September 1999. (Fig. 7, 8). By comparison of the ante mortem dental interventions recorded on the dental chart with the post mortem status of the carbonized bodies, it was confirmed that the Croatian subject was the passenger. All the antemortem dental interventions recorded on the dental chart of D.W. were found on the dentition of the carbonized body protocol No. 805.

The body was identified based on the following: five teeth extractions 16, 26, 37, 36, 46; ten composite fillings: 15-MO, 11-V, 21-V, 22-D, 35-MO, 34-OLD, 31-D, 45-O, 47-O, 48-O; two amalgam fill-

ings: 18-O, 17-O, and one crown on tooth 13 (Fig. 9, 10). Furthermore, the age determined by the dental characteristics was the same as for the Croatian subject. The dental record of the foreign subject was not available, which excluded the possibility of using the teeth comparison method. However, identity was confirmed by DNA analysis from the tooth pulp. The tooth was extracted from the carbonized body found in the position of the driver and the DNA analysis results were compared with the division into joints of the DNA, isolated from the biological samples taken from family members of the foreign subject.

### Conclusion

The case review of the determination of identity by comparison of ante mortem dental interventions with the dental status found at the time of the autopsy, confirmed the fact, observed from a review of the literature, that teeth can remain well preserved despite longer exposure to fire. Neither the macrostructures nor the microstructures of the teeth were damaged in spite of being exposed to very high temperatures. This was confirmed by the possibility of isolating the DNA from the teeth tissue pulp. It is probable that the anatomy of the oral cavity itself, also has an influence on the resistance and preserved condition of the composite fillings that normally fuse at a lower point than those of amalgam: the lips and cheeks from the outside and the tongue from the inside formed an isolation zone, disabling the direct impact of fire on the teeth.

The existence of efficient dental records, as well as marking of the data related to other dental characteristics, is essential for dental identification. The role of the odontologist in this process is manifold - from conducting the therapeutical interventions and recording them correctly in the dental chart, to the post mortem division into joints of the dentition, comparison of the ante mortem and post mortem data and final determination of the identity of the unknown human remains.