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# Odontological Identification in Copenhagen – Typical Workflow and Results from a Five Year Retrospective Study

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## INTRODUCTION

Forensic odontology is a commonly used method in Denmark for securing the identification of unidentified dead bodies. This is due to the Danish system with a central registry of name, residence and health care information, as well as a legal obligation for Danish dentists to keep thorough dental records.

In the years 2007-2011 the most frequent group of identification examinations performed in Copenhagen has been the "confirmation ID" (n=169). The second most common group has been the exclusively AM (n=82) and the least frequent group has been the exclusively PM (n=14).

This poster presents the typical workflow of the "confirmation ID" examinations. The results from a five year (2007-2011) retrospective study are presented. The data shown represent the 169 cases where the police had a strong expectation about the identity of the deceased – the "confirmation ID" cases. The exclusively ante mortem (AM) and exclusively post mortem (PM) cases are not represented.

## BACKGROUND

The odontological identification examinations in Copenhagen are made upon request from the police. The identification cases can be divided in to three main groups: Exclusively AM cases, exclusively PM cases and cases where AM and PM are performed in conjunction with each other – "confirmation ID" cases. The exclusively AM cases are performed when a person is missing and the police request an odontological profile for a potential later identification. The pure PM examinations are performed when an unidentified body is found and there is no expectation about the identity of the deceased. Here clinical and x-ray examinations are performed and an odontological profile is produced for a potential later identification. In the "confirmation ID" cases there is a strong expectation about the identity of the deceased. Reasons for expecting a certain identity might be related to the location where the body is found. I.e. if a person is found dead in an apartment or house it will often be expected that the unidentifiable dead body is the resident. The expectation might also stem from items of identification (e.g. driver's license or passport) found on the unidentified body or close to the body. These examinations result in a conclusion about the degree of identity match.

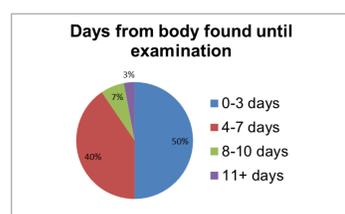


Fig. 1: Timespan from an unidentified body was found to the forensic odontological examination started.

In 50% of the cases the forensic odontological examination was started within 3 days after the unidentified body was found. Another 40% begun 4-7 days after the finding while 10% were performed more than a week after the finding (range 8-17 days). Reasons for delays are: Body found on a Friday/weekend as identifications are performed on all weekdays, but not weekends. Delays in retrieving the dental records (e.g. the dentist on holiday or difficulties locating the dental records)

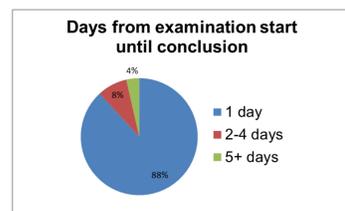


Fig 2: Timespan from start to conclusion of the forensic odontological identification.

In 88% of the cases the AM and PM registrations were made, comparison was performed and a conclusion reached all within one day. In 4% of the cases more than five days passed before a conclusion was reached (range 5-14 days). Typically the reason for the delay is time spent retrieving the dental records. Therefore PM examination is performed on an earlier date than the AM registrations thereby delaying the comparison and the conclusion.

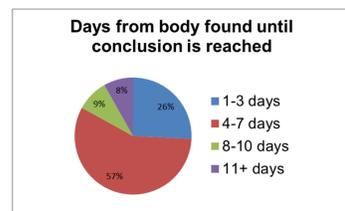


Fig. 3: The total time consumption from an unidentified body is found until an ID conclusion is ready.

In 87% of the 169 cases there was a forensic odontological ID conclusion within one week. In 17% of the cases the time spent was more than a week (range 8-18 days). The reasons for delays are described under fig. 2 and 3

### DAY 1

#### Unidentified body found

- External examination performed at the Institute of Forensic Medicine in Copenhagen. Present at the examination are the police and a forensic pathologist.
- The police decide whether or not there is indication for autopsy and/or odontological identification.
- The police are responsible of locating and collecting dental records of the person expected to be the deceased. This is often done in collaboration with the forensic odontologist.
- Locating the dental records is done via a database only available to the police. The database combines Central Personal Registry number (CPR-number) and a legal number specific to each individual dentist in Denmark (ydemnummer/provider-number).

### DAY 2-4

#### Forensic Odontological examination

- AM registrations using the dental records and x-ray recovered from the dentist/s.
- PM registrations by clinical inspection and x-ray examination.
- Both AM and PM findings are registered using Interpol's Disaster Victim Identification (DVI) forms.

### DAY 3-7

#### Forensic Odontological ID conclusion

- Comparison of AM and PM registrations.
- A conclusion is formed:
  - ID established
  - ID likely
  - ID possible
  - ID not possible
- Official report for the police is written and signed by forensic odontologist and supervising forensic pathologist.
- The report is sent to the police.

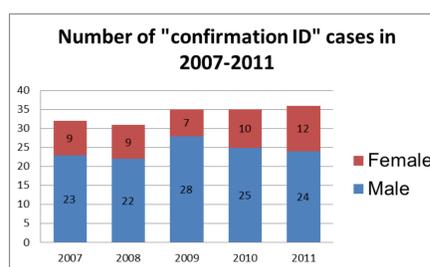


Fig. 4: Number of forensic odontological identification cases where a certain ID is expected in the years 2007-2011.

The total number of identification cases where there was a strong expectation about the identity of the unidentified body, divided into genders in the years 2007-2011. During the five years there were 169 cases averaging 33,8 per year (range 31-36).

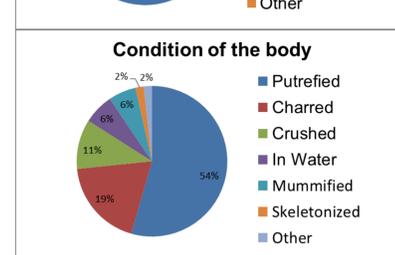
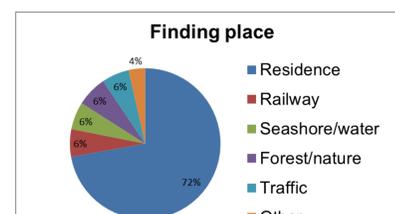


Fig. 5a and 5b: Where the bodies examined were found and the condition of the bodies. By far the most typical case is a body found 'at home' either putrefied or burnt.

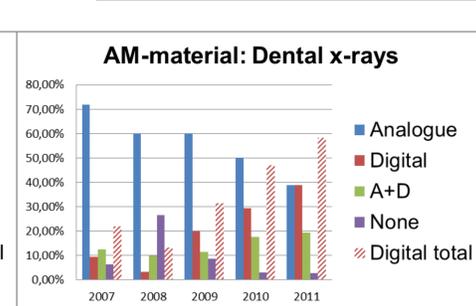
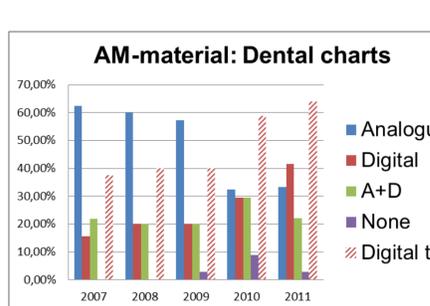


Fig. 6a and 6b: The Ante Mortem material available to the forensic odontologist. The material is divided in to written material and x-rays. Furthermore it is noted if there was analogue material, digital material or both analogue and digital material available.

The striped column shows in how many percent of the cases digital material was available, either solely digital or along with analogue. There is an evident trend of digital material becoming increasingly common. From 2014 all dental clinics in Denmark are obligated to use digitalized dental records so this trend is likely to continue.

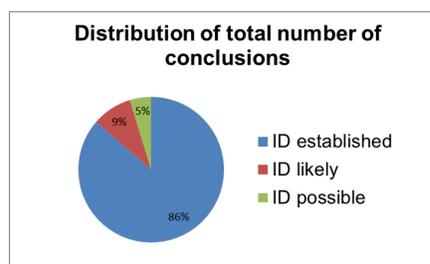


Fig. 7: The distribution of the four different types of conclusions (n=169).

In 86% of the cases ID was established, i.e. there was sufficient material, no inexplicable differences and enough common findings between AM and PM registrations to conclude the identity. In 9% of the cases it was concluded that AM and PM registrations were likely to be the same persons but the findings were not enough to make a certain ID match. In 5% of the cases there was a possible ID i.e. no inexplicable differences but not enough findings to guarantee an ID match. There were no exclusions of identity.

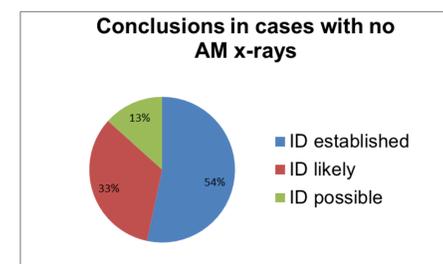


Fig. 8: Distribution of conclusions in cases where no AM x-rays were available (n=15).

This figure illustrates the importance of AM x-rays when reaching a forensic odontological identification conclusion.

## CONCLUSION

In Copenhagen in cases where there is an expectation about the identity of an unidentifiable body:

- Odontological identification in the majority of the cases offers an identification conclusion within one week.
- The most common type of unidentifiable body was found at place of residence, either putrefied or charred.
- The conclusion in almost 90% of the cases was an established ID. There were no exclusions of identity.

- There was a different distribution of ID-conclusions in cases with AM x-rays available compared to cases with no AM x-rays.
- Digitalized dental records and x-rays are increasingly common as AM material.