

# Are there any similarities and/or differences in sex determination methods used in forensic dentistry and paleodontology?

• Aleksandar Kovačević, Lea Gruengold •

University of Zagreb, School of Dental Medicine, Zagreb, Croatia - Students

## Address for correspondence:

Aleksandar Kovačević

Tel: +385 98 970 7058

E-mail: [aleksandar.kovacevic@yahoo.com](mailto:aleksandar.kovacevic@yahoo.com)

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## Abstract

Estimation of sex is one of the most important procedures in the identification of an unknown person. Teeth are a potential source of information in that process. Estimation of sex in paleodontology is based on two approaches: visual inspection and statistical analysis. Many techniques have been developed within these two approaches. Forensic dentistry and paleodontology are two disciplines that share common observation platforms and methodology.

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Forensic dentistry and paleodontology are two distinct disciplines that share common observational platforms and methodology, but have serve different purposes (1).

Forensic dentistry or forensic odontology is the science of teeth and the stomatognathic system applied in legal processes serving justice. Forensic dentistry covers a wide variety of topics including individual or mass identification (including age and sex assessment) and bite mark analysis (1).

Paleodontology is a discipline that investigates teeth, the features of the stomatognathic system and oral health of ancient populations or early forms of life through skeletal or fossil remains (2).

The cut-off point for distinguishing human remains as archaeological or forensic varies considerably between countries and a simple chronological boundary can't always be determined. There is no regulation that determines when human remains are considered to originate from archaeological contexts, and when they are considered to be part of a forensic investigation. The general rule usually observed states that human skeletal remains dated up to the end of the 19th century are

considered archaeological.

Although forensic dentists and paleodontologists frequently use the same methods, the aim of their work is different. The identification of an unknown body is one of the most important parts of a forensic dentist's work. Matching an unknown body to the name of a missing person is the most important task in forensic dentistry. This bears less or no importance in the field of paleodontology, since single bodies or individual's skeletal remains are mostly used in reconstructing the life of a whole population. Constructing profiles of earlier human populations in dental pathology (including data on dental caries, antemortem tooth loss, periapical abscess, enamel hypoplasia, dental calculus and alveolar resorption) yields valuable clues regarding diet, food preparation, nutrition and subsistence. The distribution of dental diseases by age, sex and status group can aid in identifying the differential effects of nutritional stress within a population. Diagnosis and interpretation of dental illnesses in paleodemographic contexts are important steps in the attempt to reconstruct human life in the past.

Paleodontology combines methods used in forensic dentistry and interprets the results in archaeological circumstances.

- Sex determination (cranial traits, odontometrics, tooth morphology)
- Age assessment (cranial suture closure, tooth development and eruption, tooth wear)
- Dental profile (type of dentition, enamel hypoplasia, antemortem tooth loss, postmortem tooth loss, dental caries, periapical abscesses)
- Periodontal health (alveolar bone resorption, dental calculus, dehiscences and fenestrations of alveolar bone, furcation involvement)
- Orthodontic anomalies (tooth position anomalies, dental arch anomalies, occlusion anomalies), (3-7)

Apart from their role in forensic dentistry, teeth suitably play a part in sex determination required when investigating archaeological populations. Sex determination using teeth is carried out through the analysis of gender discriminant dental data such as tooth dimensions and tooth morphology. Sex determination using dental features is primarily based upon the comparison of tooth dimensions in males and females, or upon the comparison of frequencies of non-metric dental traits, such as Carabelli's trait of upper molars, deflecting wrinkle of lower first molars, distal accessory ridge of the upper and lower canines or shovelling of the upper central incisors (4, 6).

Each metric method for sex determination including odontometrics requires population specific data. There are numerous studies identifying the differences in male and female odontometric features. Considering the fact that differences have been established between the odontometric features in specific populations, even within the same population in an historical and evolutionary context, it is necessary to determine population-specific values in order to facilitate identification using dental measurements.

## Conclusion

Forensic dentistry and paleodontology share some of the methods available for sex determination. The measurement of tooth dimensions and the assessment of certain crown traits present readily applicable, non-invasive techniques useful in the process of sex determination, both in forensic dentistry and paleodontology.

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