# Community Dentistry

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# Forensic dentistry

**Forensic Medicine**

A branch of medicine that applies the principles and knowledge of the medical and related science to problems that concern the general public and issues of the law.

**Forensic Dentistry**

It is branch of dentistry which deals with the proper handling and examination of dental evidence, and with proper evaluation and presentation of dental evidence in criminal or civil legal proceeding in the interest of justice.

Interest in forensic odontology was introduced in the later part of 19 century. The first form instructional program was giving at the armed process institute of pathology in USA, since then the numbers of cases recorded were increased, the rule of forensic odontology in the last few decays. Keiser- Nielsen defines three major fields of activity within forensic odontology namely:

1- Examination & evaluation of injuries to teeth, jaws & oral tissues from various causes.
2- The examination of bite markers with a view to subsequent elimination or possible identification of a suspect as the originator.
3- The examination of dental remains (whether fragment or complete, & including all types of dental restoration) from unknown persons or bodies with a view to the possible identification of the latter.

The purpose of forensic odontology includes the use of dental findings in identification procedures. Because of their high degree of mineralization, teeth are the most durable of human tissue & may be preserved, when much of body has been destroyed by fire, chemicals or decomposition. Consequently the useful method of identification when other means have failed lies in the comparison of dentitions of human remains with ante-mortem dental records. The dentist & physician (pathologist) work together

as a team & combine to observe, document & record all the findings & ensure the retention of all specimens necessary to solutions of the case.

Records dental features in the necessary degree of detail, documentation may range from the simplest comments concerning the presence of plaque, calculus & overall condition to a full dental charting with taking of impression. Dental findings or identification:

Dental identification – is based on the comparison of ante – mortem records with the completely charted records of post mortem remains.

**Following information is recorded**:

1- Shape of the teeth & number present.
2- Relationship of tooth to tooth in the arch.
3- Type of occlusion.
4- Presence of diastema.
5- Shape& numbers of roots.
6- Sites of fluorosis.
7- Sites of sub-surface decalcification of enamel.
8- Special peculiarities of jaw anatomy.
9- Shape & position of restorations & dentures & materials from which they are fabricated.
10- Carious lesions.
11- Unerupted & impacted teeth.
12- Retained root fragments.
13- Root fillings.
14- Congenital missing teeth, premolars removed for orthodontic treatment.

**Radiographs** may be used to locate mental foramen location.

**Cephalometric x-ray** for all teeth & presence of restorations.

**Bite wing x-ray** of post-mortem is compared to the ante-mortem records.

**Photographs** ante- mortem photographs will often demonstrate the teeth & facial structure with sufficient clarity & to help in dental identification & this is compared to post-mortem examinations (diastema & crowding).

**Study casts** plaster casts are useful for comparison.

**Lip prints** are found on drinking glass or napkin, but it is not valid.

**Palate rugae** suggested as a means of personal identification.

If there is no ante- mortem dental records, a post-mortem dental profile will typically provide information on the victim's.

## 1. Age:

• In children the patterns of tooth eruption, the root length, tooth wear were assessed.

• In young adults :the third molar development

• In middle age and older adult : Periodontal disease progression, excessive wear, multiple restoration, extraction, bone pathosis and complex restorative work were assessed. Recently ,dentine composition and cementum deposition were examined to age relation.

## 2. Race

Can be assessed from skull shape and form. Additional characteristic, such as shovel –shaped incisors and multi-cusped premolars.

## 3. Gender
Can be assessed from:

• Skull shape and form (no gender differences regarding teeth morphology)
• Presence or absence of Y –chromatin in teeth
• DNA analysis
• Mandibular canine's size.

## 4. Socio-economic status

Can be assessed through the quality and presence or absence of dental treatment

## 5. Occupation

Dietary habits and dental or systemic diseases. The presence of erosion can suggest alcohol or an eating disorder while stains can indicate smoking tetracycline .Unusual wear patterns may result from pipe stems ,cigarette holders.

## Estimation of age

The most accurate method for age determination of the skull is the dentition analysis. Tooth developed & eruption patterns are positive criteria for age determination from the pre- natal period to maturity

**Using standardized developmental charts.**

The broad range of dental age can be assayed from about 5 months. In uteri studies using vital staining & histological techniques show that the initial calcification of first primary, molars occurs. Determination of age can be done by radiographic evidence of crown & root formation & eruption times are considered. Girls tend to exhibit advanced development compared with boys, at all stages of permanent teeth development this includes teeth calcification and all stages of eruption. Sex differences are maximal in the mandibular dentition.

A wide range of variation in eruption liming is present among different population & / or countries. Eruptions seem to occur earlier in southern (warmer) in northern (cold) ones. Variations also exist in the calcification rates in warmer versus colder- climate.

## Blood group determination:

The ABO system is the most important of the blood groups system used cases. Typing blood performed with fresh blood. In dried blood stain only A, B & H substances are preserved & these identified by modifications of standard techniques. Identification of blood substances secretions & tissue found at the scene of a crime, more complex than it is with blood from blood samples & may be particular valuable in the absence of blood.

In saliva & soft tissues the ABH blood groups are presents & the saliva collected from the site of crime & blood group can be determined. Also blood group can be obtained from bone & teeth this is done by using teeth powder. Personal identification through dental evidence – teeth fragments to DNA: in cases when no ante- mortem information is available DNA technology that employs dental evidence to assist in resolving violent crime. The DNA analysis can be obtained from dental pulp & teeth fragment.

## The role of forensic dentist in mass disasters

Modern man exposed to many natural & accidental disasters & in recent years mass murders. Because of the very nature of mass disaster implies the presence of destructive force. The most durable structure of the human body is the teeth, so they may be remain. The teeth when exposed to the 400 F may become brittle & brake down to as hat 900 F, but they can be protected from such high heat by the insulation of soft tissue and bone, dental restorations an likely to withstand high temp. The collection of fragments of bone & teeth are collected together. The jaws are isolated & radio graphed, charting of the finding is done then comparison between post-mortem / findings & ante- mortem information.

## Bite marks

It has been well documented that owing the factors such as size, shaggy wear rotation, distema, accidental fracture of teeth, not to sets of human teeth are exactly alike. If a good impression is taking; it could prove that teeth marks are unique. There are 4 factors that give the bite mark, its characteristics are:

1- The teeth of the biter.
2- The action of the tongue, lip& cheeks of the biter at the time the bite was inflected.
3- The mental state of the biter at the time the bite was inflected.
4- The portion of the body upon which the bite was inflected.

Also size & shape of the teeth is considered if the bite was done by a human being or animal. The serological evidence associated with the bite mark could be use because saliva left on the bite mark.

The bite mark is legally accepted & admissible in a court of law. It is accented as a powerful tool in the investigative of the crime. Human bite marks are found mostly in cases of murder child abuse.

Several methods are used to record characteristic of size, shape& position of the teeth to generate overlays computer based radiograph. Xerographic hands trace method. The area of edges of anterior teeth & relative rotation of each anterior tooth measured & compared.

**General appearance**:

1- Dental condition, occlusion, restoration & open cavities.
2- Age third molar at 18 years old person.
3- Sex & trace.
4- Occupation: may gained from teeth, example: loss of enamel in battery workers, lead poisoning in some workers.
5- Habits example: pipe smokers, abrasion of anterior centrals.
6- Socioeconomic status: mouth care & type of restoration.
7- Country of origin, type cavity preparation & bridge construction (Differ from different dental schools).