Forensic dentistry or forensic odontology is the proper handling, examination and evaluation of dental evidence, which will be then presented in the interest of justice. It is the identification discipline based upon the recognition of unique features present in each person's dental structures. It comes into use when identification by the use of skin (ex. fingerprints) is not possible. The teeth and dental restorations are the strongest elements in the human body and survive the destructive influences of fire and exposure to the elements.

Forensic odontology is derived from Latin, meaning forum or where legal matters are discussed. Most forensic dentists are board certified and members of professional organizations, although it is possible to work in the field without special qualifications. Forensic dentistry relies on the detailed knowledge of the teeth and jaws possessed by a dentist. This skill incorporates an education in dental anatomy, radiographs and their interpretation, pathology, dental materials, and developmental anomalies.

Forensic identification plays a major role in man-made or natural disaster. Dental identification of humans occurs for a number of different reasons:
1. The bodies of victims of violent crimes, fires, and motor vehicle accidents,
2. Persons who have been deceased for some time prior to discovery,
3. Those found in water, can be disfigured to such an extent that identification through conventional methods are difficult.

In the case of forensic dentistry, experts (forensic dentists) can use dental records for:

I. Identification of found human remains:
It was done by using dental records. The principle of dental identification is that postmortem dental remains can be compared with antemortem dental records, including
- written notes,
- study casts,
- radiographs,
- photographs etc, to confirm identity.

Limitation: There are two types of discrepancy, those that can be explained and those that cannot. Explainable discrepancies normally relate to the time elapsed between the antemortem and postmortem records. Examples include teeth extracted or restorations placed were found in postmortem records only. If a discrepancy is unexplainable, for example a tooth is not present on the antemortem record but is present on the postmortem record then an exclusion must be made.
If there is no antemortem dental records, a postmortem 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-aged and older adults: Periodontal disease progression, excessive wear, multiple restorations, extractions, bone pathosis and complex restorative work were assessed. Recently, dentine composition and cementum deposition were examined in relation to age determination.

2-Race can be assessed from skull shape and form. Additional characteristics, such as cusps of Carabelli, 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 canines size

4- Socio-economic status can be assessed through the quality, quantity 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.

II. Identification the suspect through the assessment of bite mark injuries in cases of abuse in (child, spousal, elder) and in women during sexual attacks. Bite marks can be found on:
- the victim (by the attacker),
- the attacker (suspect) when a victim attempts to defend himself,
- an object found at the crime scene.

The first published issue based on bite marks, was depend on a piece of cheese found at the crime scene.

**Typical presentation of bitemark injuries**

Human bitemarks may be found on almost all parts of the human body skin. In defensive circumstances, the arms and hands are often bitten. A representative human bite is described as an elliptical or circular injury that records the specific characteristics of the teeth. Alternatively, it may be composed of two U-shaped arches that are separated at their bases by an open space. The injuries caused by teeth can range from bruises to scrapes and cuts or lacerations.
It is possible to identify specific types of teeth by their class characteristics. For example, incisors produce rectangular injuries and canines produce triangular injuries. Other characteristics include fractures, rotations, attritional wear, congenital malformations, etc. When these are recorded in the injury it may be possible to compare them to identify the specific teeth (person) that caused the injury.

**Evidence collection from the bite victim**

Dentists should be familiar with the general principles of evidence collection. These are:

1. **Documentation**
   Make a descriptive record of the injury, including the physical appearance, colour, size and orientation of the injury, location on the body, relative contour and elasticity of the site, and types of injuries.

2. **Photographs**
   Take photographs, both colour and black-and-white films. A reference scale (ruler) should be placed in the same plane as the injury and visible in the photographs to enable subsequent measurements.

3. **Saliva swab**
   a. Saliva will have been deposited on the skin during biting and this should be collected and analyzed.
   b. A buccal swab or a sample of whole blood must be collected from the victim at this time to assess the victim’s DNA. This will enable analysis of any mixtures that are found in the sample from the bite.

4. **Impression**
   Fabricate an impression of the bitten surface to record any irregularities produced by the teeth.

**Evidence collection from the bite suspect**

The following evidence are recovered during examination of the bitemark suspect:

1. **Clinical examination**
   The extra and intra-oral structures are examined and are noted on a dental chart. Special attention is focused on the status of the dental health, occlusion and mandibular articulation, tooth mobility, periodontal pocketing, dental restorations, diastemata, fractures, caries, etc., and the function of masticatory muscles.

2. **Photographs**
   Full facial and profile photographs are produced in addition to frontal and lateral views of the teeth in occlusion.

3. **Impressions**
   It is necessary to produce extremely accurate study casts of the teeth that record all characteristics of the dentition.
4. **Bite sample**
A sample of the suspect’s bite is recorded in centric occlusion using a wax.

5. **Salivary sample**
Saliva is also taken for DNA testing.

**Forensic physical and biological techniques for comparison**
The most common methods to determine if the suspect’s teeth caused the bitemark include techniques to compare:

- the suspect’s **study casts** with the actual or photographs of the bitemark,
- the suspect’s **teeth pattern of dental cast using tracing** with photographs of the bitemark,
- the suspect’s **test bites** with the actual bitemark.

The conclusions are often based on the expert’s level of personal experience.

Factors that may affect the accuracy of bite mark identification include:

1. Time-dependent changes of the bite mark on living bodies,
2. Effects of where the bite mark was found,
3. Damage on soft tissue,
4. Similarities in dentition among individuals,
5. Poor in techniques, exa. photography, impressions.

Also dental profiles of the suspect are subject to change by time, for example

1. Loss of teeth.
2. Teeth attack by dental caries.

So, the suspect’s DNA profile obtained from saliva or blood with salivary DNA surrounding the bitemark area proves to be a more reliable form of identification.

Even if the dentist cannot match the available evidence, to someone's existing dental records, he can provide important clues to identity which may help the investigators. For example, the dentist can make estimates about age, socioeconomic class, and history based on examination of the teeth. By collating this evidence with evidence from other forensic examiners investigators can narrow down the identity possibilities.

Finally….. Dentist not only improves health by doing treatment in private clinic or preventive program in a community, but also play a major role in **justice achievement**.