

## Gender recognition from odontometric parameters

1.George Sam , 2.Rakesh K Gorea

Shri J.J.T. University

**Abstract:** - The field of forensic medicine Abstract Forensic Odontology deals with dental evidence presented at court in the interest of justice. Since no two individuals have the same teeth, Forensic odontology has been generally recognized in the area of criminal justice. The pattern of bite marks was studied in order to examine the odontometric measurements such as mesio-distal incisor width and canine interratio and to verify sexual dimorphism between ages 16-25. In the study , a total of 40 samples were considered , i.e. 20 males and 20 females. They also recognized their class and individual attributes. In this analysis, sexual dimorphism in males and females can be determined on the basis of odontometric parameters such as arch-length and intercanine ratio. The analysis showed also the class attributes, i.e. odontometric parameters, and individual characteristics.

**Key words:-**Gender recognition,Orthodontics, Parameters.

**Introduction:-** The basis of culture is human identification, and since the Roman times the distinctive characteristics of the teeth and jaws have used them to identify unknown individuals. The dents are selectively covered and fossilized by the most hard and chemically stable tissue, which has the least natural structural turnover in the body and thus is by far the best record for evolutionary changes [1,2]. Its stability against the fire and the decomposition of the bacteria make it very useful for anthropological, genetic, dentistry, forensic and identifying excellence in living and non-living populations [3,4]. Also, at least a few teeth are normally regenerated as the human teeth complement 32 teeth. Consequently, they are used routinely to compare human remains. It is simple, inexpensive, consistent and easy to perform to determine sex from odontometric features. Sex evaluation is a big step towards building a post-mortem profile and proper sexual identification reduces the number of missing individuals to just half [7,8]. Sexing accuracy using various body parameters such as craniofacial morphology and pubic measurements varies between 96 and 100 percent. Given that most teeth grow fully before skeletal maturation, they are a helpful addition to sex, particularly in young people's teeth. Sexual dimorphism is a group that distinguishes a male from a female [9,10,11] in morphological features. The size of the tooth was calculated for its applicability in anthropological and forensic studies for the classify sex from dentures in several populations between males and females amongst certain morphological differences. In all the dental areas with mean age of 10,87 years, less affected than others by periodontal diseases, the last teeth that have to be removed in age and therefore the most vulnerable to extreme trauma, such as air disasters, hurricanes, or conflagration, the mandibular channels considered as "key-to-teeths" for personal identification are shown to display the largest sexual dimorphism among all the teeth. Forensic experts have a great problem with the identification of sex with skeletal remains, especially when only fragments of the body are recuperated. The mouth enables endless possibilities of forensic identification[15]. Forensic dentists may aid other specialists with their teeth and skull to assess the sex of the debris. Different tooth characteristics are common for men's and women's sexes, such as morphology, the curve size, root length and so on [16,17,18]. In the skull shapes there are also variations. This helps to classify sex by a forensic dentist. New patterns such as amplification of the PCR etc. can help to determine exactly the sex of the remains. In identifying the sex of victims of unrealized corpses mutilated by serious mass catastrophes,

sexual attacks or murder cases, forensic dentistry plays a crucial role[20]. This analysis is based on five odontometric criteria, the arc length and the number of teeth and the bite mark pattern of the male and female, the intercanin distance, the intercaninal ratio. With the aid of these odontometric parameters, the following goals have been met in the above sense. 1. In males and females between 16 and 25 years old, dentistry is simulated to create a pattern in bite marks. 2. Sexual dimorphism analysis with odontometric (metric) scales. 3. To research the class and individual identity characteristics. The research consisted of 40 Mumbai subjects. Materials and Methods On modeling of wax, maxilar and mandibular arches were printed for the purpose of interpretation after providing informed consent. Themes within the age range 16-25 were chosen. Impressions were made of the Maxillary and Mandibular Arches by 40 studying individuals and models for wax modelling were created. The creation of overlays was done by hand. In a manual way the perimeter of the biting surface was marked by a sheet of transparency film and a fine taped marker. The transparent sheet was placed directly over the wax model's bending edges. The biting edges were then traced using a black and fine tipped marker. The Maxillary and Mandibular models were both traced individually to simulate a human bite in a horse shoe style.

**The tests analyzed are as follows:** - The measurements are

1. **Arc Length:** - the size / length of each pattern, i.e., the particular maxilla or jaw arch, was calculated and reported in the table by measuring the length between one extreme and another arc using a Vernier caliper (the entire arch has been considered). The arc was calculated.
2. **Teeth number:** - total teeth found on the bite mark of the sample have been noted.
3. **Breakthrough:** - The width of the maxilla and mandible central accidents has been calculated using a Vernier caliper
4. **Inter canine distance:** the distance between the two canines was determined using both the maxillary and the mandibular arches on a Vernier caliber.
5. **Inter canine ratio:** The ratio of inter-canine maxillary distance and inter-canine mandibular distance was determined.

**Result:** - Research shows that traced mark patterns for bites could be used to fit the sample markings, and odontometric measurements, such as tooth amount, arch duration, central incisor width, intercanine ratio, could be performed. In the mandibular arch there were more toothmarks than in the maxillary arch. However, there was no gender-sensitive overall tooth marking. The length of the arch was found to be higher for men than for women. Furthermore, the length of the maxillary arch was found to be longer than the length of the Mandibular arch. Incorporation was observed in maxillary more width than mandible in both men and women without major sexual dimorphism. In male maxilla and mandible the canine inter gap was found to be more than female. The canine interval ratio for males was higher than for females. All bite marks are peculiar, as they have unique characteristics such as arch form, arch length, numbers of marks of tooth, incisor width, canine interval ratio, tooth arrangement etc. For each person, these features are different.

**Conclusion:** - In cases involving bite marks and also in cases of missing or unavailable other evidence, human identity will be significant. Certain odontometric parameters have proved to be good testing methods. The study showed that more tooth marks than the maxillary arch are present in the Mandibular Arch. The incisors of maxilla have a longer arc length and width than the mandible. The research also demonstrates sexual dimorphism characteristics.

Odontometric parameters such as the number of gear marks on a morsel mark and the widths of the incisors do not indicate extensive sexual dimorphism, but parameters such as the arch length and the inter-canine ratio indicate the sexual dimorphism of both men and women. It can also be inferred that bite marks are special to all people on the crime scene. For ante mortem registration of bite marks, a database may be maintained and used as a method to identify biometrically.

### References:-

1. Andria LM, Dias JC. Relation of maxillary and mandibular intercuspid width to bizygomatic and bigonial breaths. *Angle Orthod.* 1978; 48: 154-162.
2. Hemanth M, Vidya M, Nandaprasad, Bhavana V Karkera. Medico-legal update for sex determination using dental tissue. 2008; 8: 2.
3. Baume LJ. Physiological tooth migration and its significance for the development of occlusion; the biogenesis of accessional dentition. *J Dent Res.* 1950; 29: 331-337.
4. Khangura RK, Sircar K, Grewal DS. Four odontometric parameters as a forensic tool in stature estimation. *J Forensic Dent Sci.* 2015; 7: 132-136.
5. Clark DH. (Ed) 1992, Knight B, 1996. Features of a suspect's dentition useful in bite mark analysis.
6. Fastlicht J. Crowding of mandibular incisors. *Am J Orthod.* 1970; 58: 156-163.
7. Graber and Swain 1998. Current orthodontic principles and practice.
8. Hasan NH. The correlation between certain facial and dental measurements.?
9. Moorrees CFA 1959. The dentition of the growing child, a longitudinal study of dental development between 3 and 18 years of age. Cambridge: Harvard university press.
10. NidhiYadav, Prem Chandra Srivastava. Bite Marks: An indispensable forensic odontological evidence in rape cases. *J Indian Acad Forensic Med.* 2014; 36: 3.
11. Sreedhar G, Sumalatha MN, Ramesh G, Nagarajappa R, Murari A, Agrawal A. Dimorphic mandibular canines in gender determination in Moradabad population of Western Uttar Pradesh. *J Forensic Dent Sci.* 2015; 7: 32-36.
12. KhezranQamar, Irfan Ahmed Shaikh, SajidNaeem: Journal of Ayub medical college Abbottabad. Relationship of the inter-condylar width with mandibular inter-canine width. 2013; 25: 1-2.
13. Knott VB, Meredith HV. Statistics on eruption of the permanent dentition from serial data for North American white children. *Angle Orthod.* 1966; 36: 68-79.
14. Magne P, Gallucci GO, Belser UC. Anatomic crown width/length ratios of unworn and worn maxillary teeth in white subjects. *J Prosthet Dent.* 2003; 89: 453-61.
15. Bajpai M, Mishra N, Yadav P, Kumar S. Efficacy of lip prints for determination of sex and inter observer variability. *Euro J Exp Bio.* 2011; 1: 81-86.