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# Comparison and Identification of Bite Marks in Kanpur

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**Abstract:-**
**IDENTIFICATION & COMPARISON OF BITE MARKS BACKGROUND: It is of great challenge in forensic dentistry to analyze the human bite marks. As courts always placed emphasis on a scientific approach when presenting expert evidence, the Oral & Maxillofacial surgeons being considered the preferred one's must have a good knowledge and understanding of importance of scientific methods in analysis of Human bite mark to provide courts with testable evidence.**

**AIM: Analyze the different human bite marks & pattern on tooth morphology as a part of forensic odontology.**

**MATERIALS & METHODS - The study was conducted on 100 adult participants in RDC, Kanpur between July 2021 and August 2021. Participants from OPD of Department of OMFS. Bite mark with impression wax was taken along with Intra-Oral pictures. Comparison of different bite mark was done.**

**RESULT – Mesio-Distal width mean was calculated among 100 individuals for Maxillary and Mandibular arch of Male and Female for Rt Central Incisor, Lateral Incisor, Inter Central Incisor, Inter Lateral Incisor, and Inter Canine respectively. Non-human and human bite marks, as well as offensive and defensive bite types, can all be broadly categorized as bite marks. These include diffused bite marks, which have few characteristics and lack individual characteristics, single arch bites, or partial bite marks, which have some individual and some class characteristics, and lastly bite marks that combine both individual and some class characteristics.**

**CONCLUSION: This study was targeted towards increasing the understanding and ability of Oral & Maxillofacial surgeon to support forensic dental investigators in their work to do bite mark analysis of Humanbite mark.**

***Keywords:-*** *Bite mark, tooth morphology, forensic investigation.*

## I. INTRODUCTION

A bitemark is a marking produced by teeth contacting a surface, most often food but also other objects and human skin. It is of great challenge in forensic dentistry to analyze the human bite marks. Identification of individuals based on the morphology of teeth and their minute variations is one of the main goals of forensic dental identification. As courts always placed emphasis on a scientific viewpoint when presenting specialist evidence, the Oral & Maxillofacial surgeons being considered the preferred one is must have a good knowledge and understanding of importance of scientific methods in analysis of Human bite mark to provide courts with testable evidence.

Fig. 1: Bite Mark

## II. AIM

Analyze the different human bite marks & pattern on tooth morphology as a part of forensic odontology.

## III. OBJECTIVE

The main Objective in analysis of Human bite mark is to: Compare difference between male & female bite pattern

## IV. INCLUSION CRITERIA

- Participants of age between 19-30 yrs.
- Participants with no missing teeth from canine to canine in both the arches
- Participants undergoing orthodontic treatment.
- Participants with restorations in any teeth.
- Participants with adequate mouth opening
- Adequate patient compliance with informed consent.

## V. EXCLUSION CRITERIA

- Juvenile participants and above 30 yrs.
- Participants with inadequate mouth opening.
- Inadequate patient compliance.
- Anterior missing teeth between canine to canine in both the arches.

## VI. MATERIAL AND METHODS

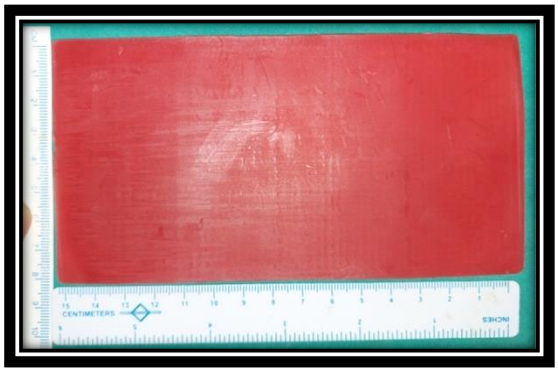

Fig. 2: Modelling Wax Sheet

## VII. SOURCE OF DATA

The study was conducted on participants from OMFS dept in Rama Dental College, Hospital and Research Center, Kanpur between July 2021 and August 2021

## VIII. METHOD OF COLLECTION OF DATA

- Patients were informed about the study and an informed consent was taken.
- Intra-Oral pictures were taken.
- Bite mark impression wax was taken
- Comparison of different bite mark was done.

## IX. SAMPLE SIZE

100 Adult participants (aged 19-30yrs) with their age, sex and any dental treatment history record was noted, were randomly selected and divided into 2 Groups.

- Group I – comprise of Males.
- Group II – comprise of Females

## X. MATERIAL

Modelling wax sheet was used to record the human dental bite mark impressions.

## XI. PROCEDURE

- Firstly, 48MP digital camera was used to take intra oral photographs of the participants with mouth open to compare & evaluate the required parameters.

Fig. 3: MAXILLA

Fig. 4: MANDIBLE

- We divided a single wax sheet of approx. (15*8cm) into two halves of equal dimension.

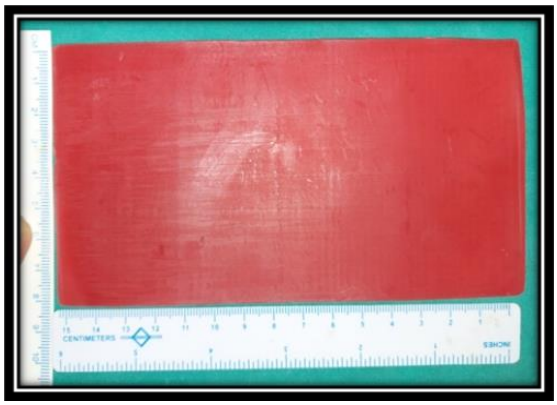

Fig. 5: Single Wax Sheet

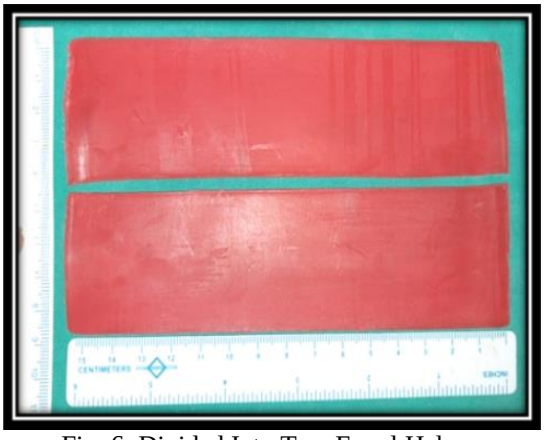

Fig. 6: Divided Into Two Equal Halves

- The divided part was rolled and was given a bend to acquire a desired arch form according to the participant.

Fig. 7: Wax Sheet Rolled

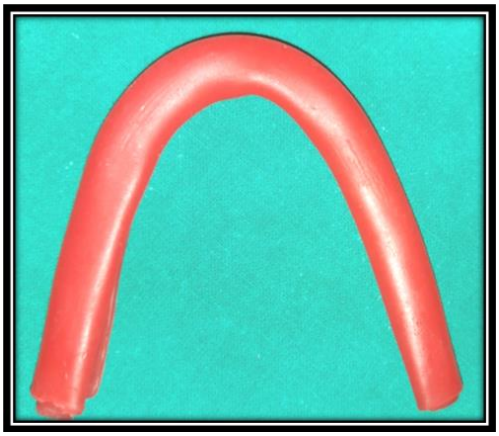

Fig. 8: Given Arch Shape by Bending

- Extra extensions from the rolled wax were cut to acquire the impression of desired arch length.

Fig. 9: Extra Extensions Cut

After insertion of the rolled wax participant were then asked to take a bite on the rolled wax


Fig. 10: Bite Impression Taken

- The 48MP camera was used to take the photographs of sample, marked with the serial no. of the participant, and stored for analysis later.


Fig. 11: Maxillary Bite Mark Impression


Fig. 12: Mandibular Bite Mark Impression

- All impressions & photographs were taken by same investigator.

All impression were examined by hand held magnifying lens and Vernier caliper.

Fig. 13: Bite Impressions

Fig. 14: Magnifying Lens

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Fig. 15: Vernier Caliper

With the help of vernier caliper the following mesiodistal width from all the impression was recorded of both maxillary and mandibular arch.

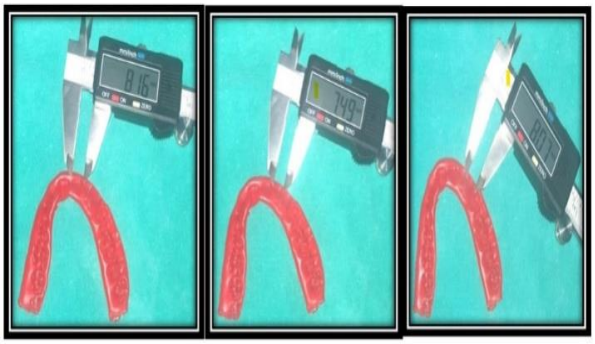

Fig. 16: 1) Right Incisor: 2) Right Lateral Incisor: 3) Right Cannine

Fig. 17: Right Central Incisor to Left Central Incisor

Fig. 18: Right Lateral Incisor to Left Laterl Incisor


Fig. 19: Inter Canine

## XII. RESULT

Mesiodistal width was taken among 44 males and 56 females which revealed mean values as follows:

Table 1:

| S.No | CATEGORY | MALE | FEMALE |
|---|---|---|---|
| | ***MAXILLARY(MESIO- DISTAL WIDTH)*** | **Mean of 44 bite marks (mm)** | **Mean of 56 bite marks (mm)** |
| 1. | Rt…CENTRAL INCISOR | 8.6 | 7.9 |
| 2. | Rt..LATERAL INCISOR | 6.9 | 6.5 |
| 3. | Rt...CANINE | 7.7 | 7.0 |
| 4. | INTER CENTRAL INCISOR | 17.4 | 16.2 |
| 5. | INTER LATERAL INCISOR | 29.6 | 27.6 |
| 6. | INTER CANINE | 39.3 | 36.8 |
| | ***MANDIBLE (MESIO- DISTAL WIDTH)*** | | |
| 1. | Rt. CENTRAL INCISOR | 5.2 | 5.0 |
| 2. | Rt…LATERAL INCISOR | 5.7 | 5.2 |
| 3. | Rt... CANINE | 6.5 | 6.0 |
| 4. | INTER CENTRAL INCISOR | 10.8 | 10.8 |
| 5. | INTER LATERAL INCISOR | 21.1 | 20.5 |
| 6. | INTER CANINE | 31.4 | 29.9 |

Table 2:

| THIS IS THE FINAL RESULT | |
|---|---|
| ***MAXILLARY(MESIO- DISTAL WIDTH)*** | |
| Rt.CENTRAL INCISOR | = 0.7mm |
| Rt.LATERAL INCISOR | = 0.4mm |
| Rt.CANINE | = 0.7mm |
| INTER CENTRAL INCISOR | = 1.2mm |
| INTER LATERAL INCISOR | = 2.0mm |
| INTER CANINE | = 2.5mm |
| ***MANDIBLE(MESIO- DISTAL WIDTH)*** | |
| Rt.CENTRAL INCISOR | =0.2mm |
| Rt.LATERAL INCISOR | =0.5mm |
| Rt.CANINE | =0.5mm |
| INTER CENTRAL INCISOR | =0.0mm |
| INTER LATERAL INCISOR | =0.6mm |
| INTER CANINE | =1.5mm |

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## XIII. DISCUSSION

Canine teeth generate triangular cross-sectional markings while human incisor teeth produce rectangular ones. In comparison to the mandibular arch, the maxillary arch is typically larger and made up of larger incisors and canines. Anamalgamation of rotated teeth, buccal or lingual version, mesiodistal drifting, and horizontal alignment contributes to disparity between individuals. The quantity, particularity, and precision of these arch attribute, all play a role in the assessment when evaluating the level of certainty that a certain suspect caused the bitemark.

## XIV. CONCLUSION

- The goal of this study was to improve oral and maxillofacial surgeons' comprehension and capacity to assist forensic dentistry investigators in their job to perform bite mark analysis of Human bite mark.
- Bite mark help to solve crucial cases as human dentition is unique and no two teeth are similar
- It is significant to expand the scientific knowledge and research in bitemark analysis.

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