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Kushdeep Kumar Gupta
Post Graduate Student, Department of Oral Medicine & Radiology, KD Dental College & Hospital Mathura, Uttar Pradesh, India

Dr. Dhwani Patel
Assistant Professor School of Medico-Legal Studies National Forensic Sciences University Gandhinagar Gujarat, India

Corresponding Author:
Kushdeep Kumar Gupta
Post Graduate Student, Department of Oral Medicine & Radiology, KD Dental College & Hospital Mathura, Uttar Pradesh, India

Determination of sex at a microscopic level from oral cavity: A pilot study

Kushdeep Kumar Gupta and Dr. Dhwani Patel

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Abstract
Introduction: The identification of a gender done by barr body which is present in the saliva, blood, tooth, buccal smear, hair, etc. A Barr body is situated at the periphery of the nuclear membrane. Barr body is formed by the inactivation of one of the two female x chromosomes.
Materials and Methods: The study had been conducted on 10 normal females of age 20-26 years. Samples taken from Buccal mucosa, Saliva and Dried saliva from paper. Slides were prepared, stain with Giemsa stain air dry; study under oil immersion lens of compounds microscope**.**
Results: Buccal swab shows more barr body as compared to other samples.
Conclusion: Buccal cells shows more barr bodies as compared to saliva and least in dried saliva on paper.

Keywords: Barr body, saliva, buccal cells, sex determination

Introduction
The determination of gender is an important in identification of an individual whether it is living or dead. When identifying a person, forensic investigators prioritize determining a person's gender in situations involving mass disasters (Natural or manmade), burn cases, criminology (Suicide or murder), accidents etc. Identification of an individual either by morphometric examination of the dental chart, cranium, and other oral and paraoral region or by molecular analysis such as Polymerase Chain Reaction (PCR) and karyotyping-can be used to determine a person's sex. Among the many other sources utilized for identification in the head and neck region, it has been demonstrated that buccal mucosal cells comprised of the more Barr bodies [8].
Sex Chromatin (Barr Bodies) as it was first named by Barr and Bertem (1949) it is normally one X chromosome which is in interphase nucleus completely or partially coiled [2]. Barr bodies are chromatin structures that develop in the nuclei of female mammals. In seventy to eighty percent of interphase cells, Barr bodies are found next to the nuclear envelope [8]. The no. of Barr Bodies is less than one in no. of X Chromosomes. Barr body is developed by the inactivation and condensation of one of the two female chromosomes [3].

Materials and Methods
Material required glass slides, cotton swab, giemsa stain, immersion oil, dropper and compound microscope. The sample was collected from student of Gujarat Forensic Sciences University, Gandhinagar Gujarat of age between 20-26 years. Sample was taken from 10 healthy female volunteer with informed consent. Following types of sample were taken; Buccal swab, Saliva and Dried saliva from paper with the help of cotton swab. Samples swab were rolled over glass slides gently and let it air dry, then stain with diluted Giemsa stain into the ratio of 10:12 (Giemsa stain: Distilled water) by the help of dropper, remove the excess stain. Then air dry it for 15-20 minutes. Wash the slides with running distilled water slowly and then air dry it and studied under oil immersion lens of compound microscope. This study was done during my M.Sc. forensic Odontology from Gujarat Forensic Sciences University, Gandhinagar Gujarat in 2017.

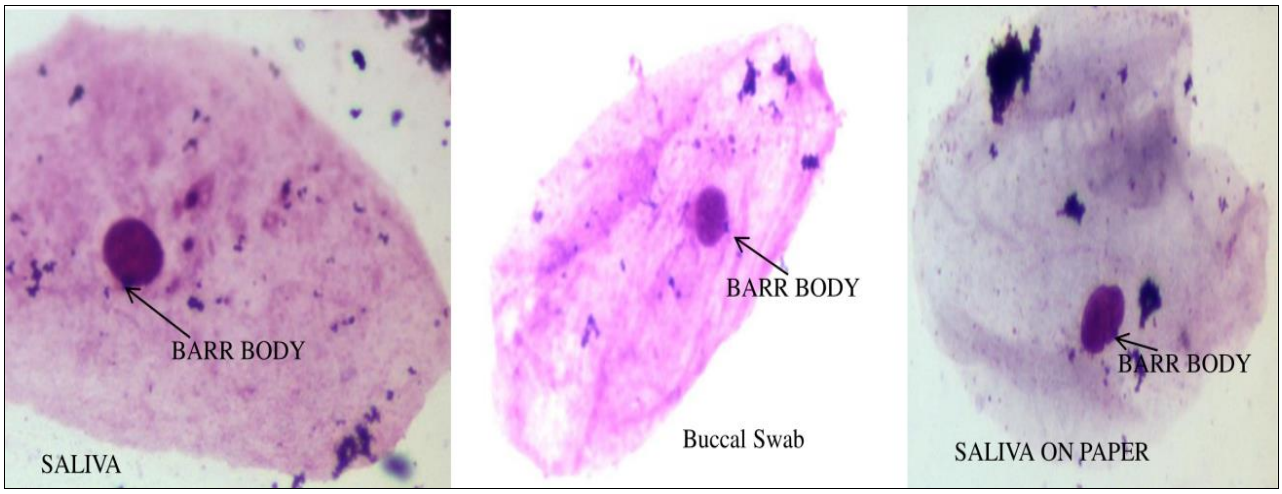

Fig 1: Barr body in the buccal swab, Saliva and saliva on the paper (Giemsa Stain) under oil immersion lens (100x) of compound microscope

Results and Discussion

We have taken 10 samples each of buccal swab, saliva, saliva on paper of 10 females of age 20-26 years. The result obtained indicate that buccal swab shows more barr body as compared to saliva and least in saliva on paper. In Tibin *et al.* [9] study shows there was no correlation of Barr bodies in age of the individual in both males and females. According to R Shankar *et al.* [6] study in all 50 females the sex chromatin was positive and it showed variation from 20 to 52% in the age group of 12 years to more than 60 years. In all male buccal smears the sex chromatin was absent. In the present study comparison of barr body in Buccal mucosa, Saliva and Dried saliva from paper which can be helpful in evidence collection and in identification of the criminal.

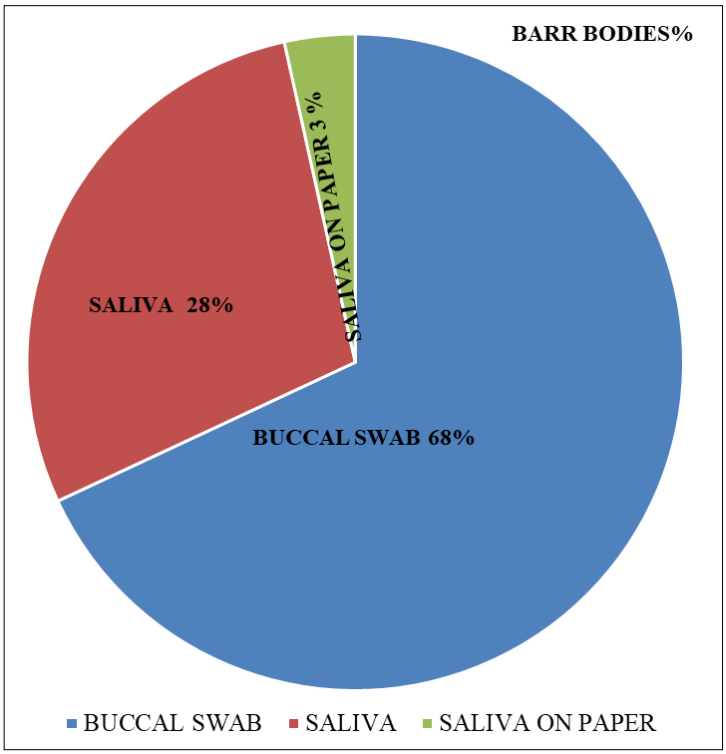

Fig 2: Shows percentage of Barr Bodies present in Buccal Swab, Saliva and Saliva on paper

Table 1: Shows number of barr bodies present in different samples

Sample	Age	Buccal	Saliva	Saliva on paper
F1	25	62	28	0
F2	25	53	38	0
F3	25	56	15	1
F4	26	42	21	0
F5	25	71	27	0
F6	23	18	3	0
F7	22	32	10	0
F8	22	20	14	1
F9	22	23	0	0
F10	21	15	8	0

Conclusion

The gender of an individual identified by the presence of percentage of Barr body in the cells. Giemsa stain was less technique sensitive and easier to use as compared to other techniques. In the comparative study between three samples buccal, saliva and saliva on paper, we come to the conclusion that buccal cells shows more barr bodies compared to other samples.

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