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RESEARCH GAPS IDENTIFIED IN THE PROPOSED FIELD OF INVESTIGATION

The human tongue has the potential to deliver a high level of uniqueness in geometrical shape, physiological texture which cannot be changed and is suitable for the use in forensic identification.

Tongue Prints, as an upcoming and new biometric authentication technique has been found advantageous for identification although in India this identification system is still at a very basic or grass-root level and definitely needs more amount of investigation, examination, research and planning to implement and dental practitioners can play a significantly important role in making Tongue Prints as a widely available and acceptable tool. Despite the fact that tongue is an important organ, it has not been given equal share in the detailed anatomical studies allotted to other organs in the body.

As we all know that tongue is encased and well protected in the oral cavity, it is very difficult to forge. Details of tongue can be evaluated by visual inspection, digital photography and lingual impressions techniques. Additional methods like biometrics validation can be used which promises to convey an intensity of distinctiveness to recognition applications, that uses tongue print, fingerprint, facial scans, iris or voice to recognize users. Tongue print is a distinctive biometric tool which cannot be forged easily. Advantages of tongue prints over other biometric systems are genetic independence (no two tongues are similar), physical protection (well encased in the oral cavity) and its stability over time.⁸

OBJECTIVES OF THE PROPOSED STUDY

- To observe and analyze the various lingual morphological characteristics like tongue shape, dorsal surface texture details, apex and visibility of medial septum which can prove the uniqueness of the tongue, aid in forensic identification and forms a part of the existing Data base.⁸
- To analyze with respect to: various morphological characteristics on the dorsal surface of the tongue.
- To analyze prevalence of: various aspects of tongue morphology with respect to gender of the study group.⁸
- This study motivates to fulfill the need of more alike studies, based on morphological aspects and biometric analysis, for educational and forensic purpose.⁸

RESEARCH METHODOLOGY

Null Hypothesis (HO): There is no difference in various aspects of tongue morphology with respect to age and sex.⁸

Alternative Hypothesis (AH): There is a difference in various aspects of tongue morphology with respect to age and sex.⁸

Sources of information: Journals, papers, Internet, etc.

Tongue Image Attainment Techniques

Tools and Techniques of Research:

1. The pictures will be taken under the same environmental and lighting conditions and from a predetermined distance using a professional camera (Nikon D5200) placed on a tripod. This will enhance the picture quality and stability of the camera.



Nikon D5200



2. Before the clinical examination of the tongue, the patients will be asked to thoroughly rinse their mouth with water in order to remove any surface debris or food particles.
3. Additionally, the subjects will be asked not to suddenly extend their tongue up to maximum protraction, but in a more relaxed position which would prevent a marked contraction of the striated lingual muscles, which would alter the characteristic aspects, as well as the shape of the tongue.

4. The purpose of the direct examination of the tongue is to analyse and record various parameters such as tongue shape, (dorsal surface details) like surface texture, median septum, lingual apex type.
5. Photographs will be taken after clinical examination.

Data Collection and Sampling Method

The study is conducted after the approval from the **ethical committee** of the institute. The signed copy of which will be attached.

1. It is an observational study with random sampling.
2. Data will be collected from the patients in the outpatient department of the dental college after briefing the patient about the study, giving him instructions documented earlier and most importantly taking an informed consent to use the data for this study.
3. The pictures of the dorsal surface of the tongue will be taken from OPD patients in the college following all the guidelines for successful data collection.
4. All the data will be recorded on a Google form by me for the convenience of the patient which will include some of the details of the patient as well as details of the surface of the tongue (morphological characteristics) along with some demographic variables.
5. Photograph of the dorsal surface of the tongue will be attached by me as an attachment in the google form for systematic data collection.
6. Link of the google form
https://docs.google.com/forms/d/e/1FAIpQLSdYF43FfnfJ9HhwspRRtEzCaXbqgc8ykiaFzd1DVx5OT4jDhw/viewform?usp=sf_link
attached copy of the google form.


M.N. D.A.V. DENTAL COLLEGE & HOSPITAL

Tatul, P.O. Oachghat (Solan) H.P. - 173223

UNDER THE AUSPICES (MAY COLLEGE) MANAGING COMMITTEE, NEW DELHI

RECOGNIZED BY GOVT. OF INDIA/DENTAL COUNCIL OF INDIA

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Ref. No. DAV/DCH/425

Date 04/08/2022

Name	Position/ department	Contribution
Dr. Nupur Hingad	Professor and H.O.D Oral and Maxillofacial Pathology and Microbiology	Principal investigator

From: Committee of Research Ethics, MNDAV Dental College, Solan, Himachal Pradesh

Research title: AN OBSERVATIONAL STUDY TO ANALYSE AND COMPARE THE MORPHOLOGICAL DIFFERENCES ON THE DORSAL SURFACE OF THE TONGUE IN THE PEOPLE OF SOLAN

Study Setting: MN DAV Dental College, Solan, Himachal Pradesh

This is to inform you that the Committee of Research Ethics had approved your research proposal.

Upon receiving this approval, you may commence your field work at your convenience.

- You should responsible for upholding the confidentiality of participant's data.
- If any work conducted outside this College, a written approval should be obtained from the concerned authority.
- Kindly, update us on your project advancement every 6 months. On completion of your project, kindly send to us a summary of the project final report.
- Finally, be aware that this approval embraces no financial, or any other, obligations or responsibilities on Qassim University.
- Note: Any corrections and/or alterations of this certificate will make it invalid

Gauri Keemal
Principal
M.N.D.A.V. Dental College
Tatul Solan (H.P.) 173223

GOOGLE FORM DETAILS:

<p>Email *</p> <p>Your email</p> <hr/>
<p>Name *</p> <p>Your answer</p> <hr/>
<p>Age *</p> <p>Your answer</p> <hr/>
<p>Gender *</p> <p><input type="radio"/> Female</p> <p><input type="radio"/> Male</p> <p><input type="radio"/> Prefer not to say</p> <p><input type="radio"/> Other</p>
<p>Address</p> <p>Your answer</p> <hr/>

Habits *

- Smoking
- Zarda
- Alcohol
- Other
- none
- Other: _____

Shape of Tongue *

- U Shape
- V Shape
- Acute Triangular
- Obtuse Triangular
- W Shape
- Ovoid
- Ellipsoid
- Rectangular
- Asymmetrical
- Other: _____

Surface Texture of Tongue *

- Tongue fissures / cracks
- Smooth Tongue
- Scrotal tongue
- Geographic
- Cleft
- Plaqued
- Ankyloglossia
- Bifid tongue
- Macroglossia
- Microglossia

Median Septum *

- Visible
- Not Visible

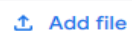
Apex *

- Rounded
- Pointed
- Septate

Colour *

Your answer _____

Image *

 Add file

A copy of your responses will be emailed to the address you provided.

Submit

Clear form

SAMPLE SIZE CALCULATION:

$$n = Z^2 p (1 - p) / d^2$$

n = sample size, z = level of confidence 95% = 1.96, p = expected highest prevalence 71%, d= Precision (5% = 0.05)

sample size was estimated to be 316 subjects.

The subjects were carefully selected for the study so that errors in evaluation do not occur. After a lot of study and evaluation of previously done researches a criterion for inclusion and exclusion were selected. Age lot of importance was given to the age group in order to come to an age-related conclusion.

As this study was selected amidst the COVID PERIOD a lot of care was taken to simplify the study in terms of patient selection. The Data collection was done after the second wave of COVID.

INCLUSION CRITERIA:

- Patients both male and female of age group 20 – 60 was decided to be included in the study till the total number of patients (316) details are recorded.
- Data collection will be random as the patients report to the OPD and age and gender will not be given preference.
- Those patients who are willing to sign the consent form and agreeing to photography will be a part of this study in order to conduct the study ethically.

EXCLUSION CRITERIA:

Patients with Smoking habits and history of systemic illness.

Patients suffering from

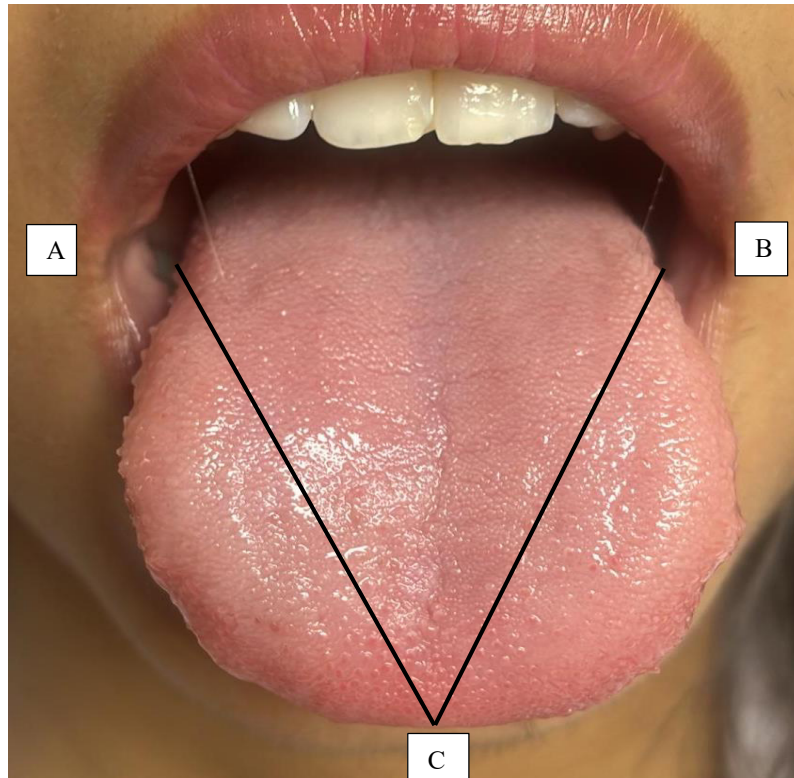
hyperthyroidism, gigantism, dwarfism, ⁸

contagious diseases, syphilis ⁸

Down syndrome

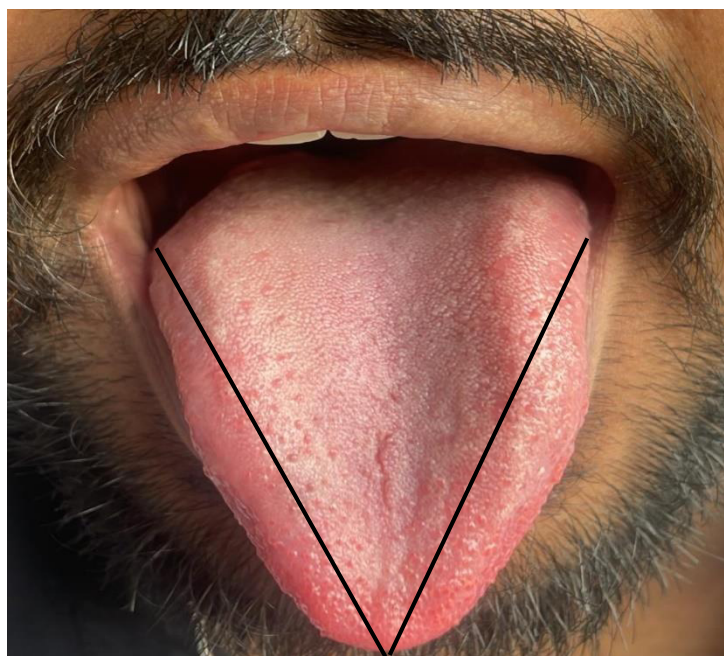
tongue deformity cases were excluded.⁸

TECHNIQUE TO BE USED FOR RECORDING SHAPE OF TONGUE DURING DATA COLLECTION:



Reference points for the determination of shape of the tongue in contact with the commissures (A, B) of the lips and Tip of the tongue (C) showing a 'U' SHAPED TONGUE

Showing a 'V' SHAPED TONGUE





1



2



3

The clinical photographs of the tongue showing morphological characteristics like 'U' (1), 'V' (2) and 'W' (3) shapes

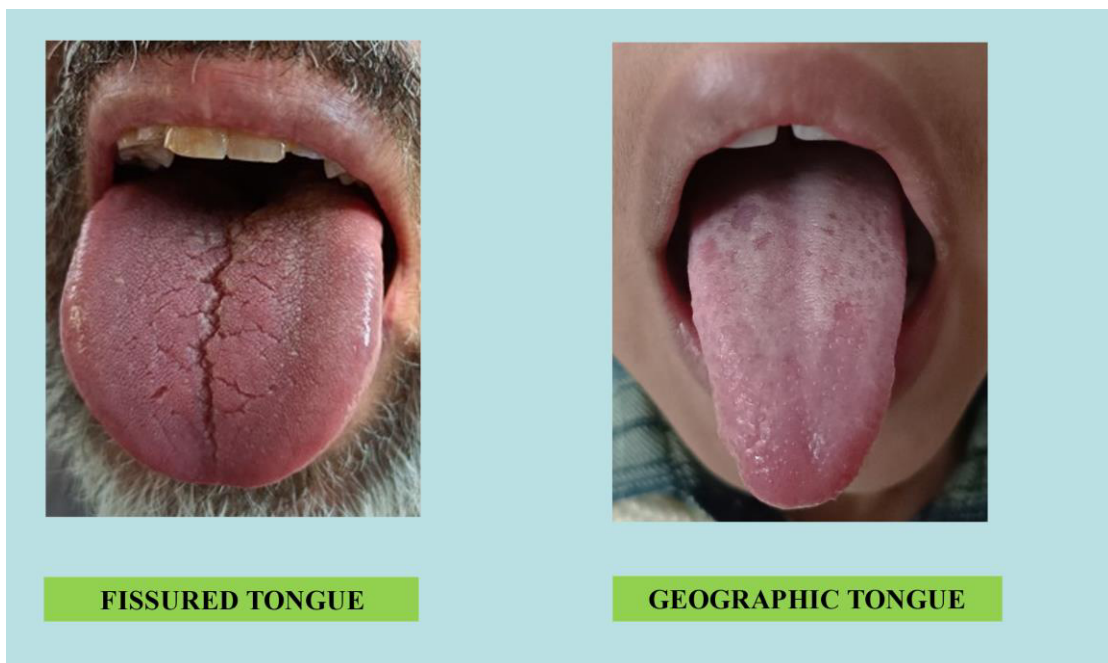
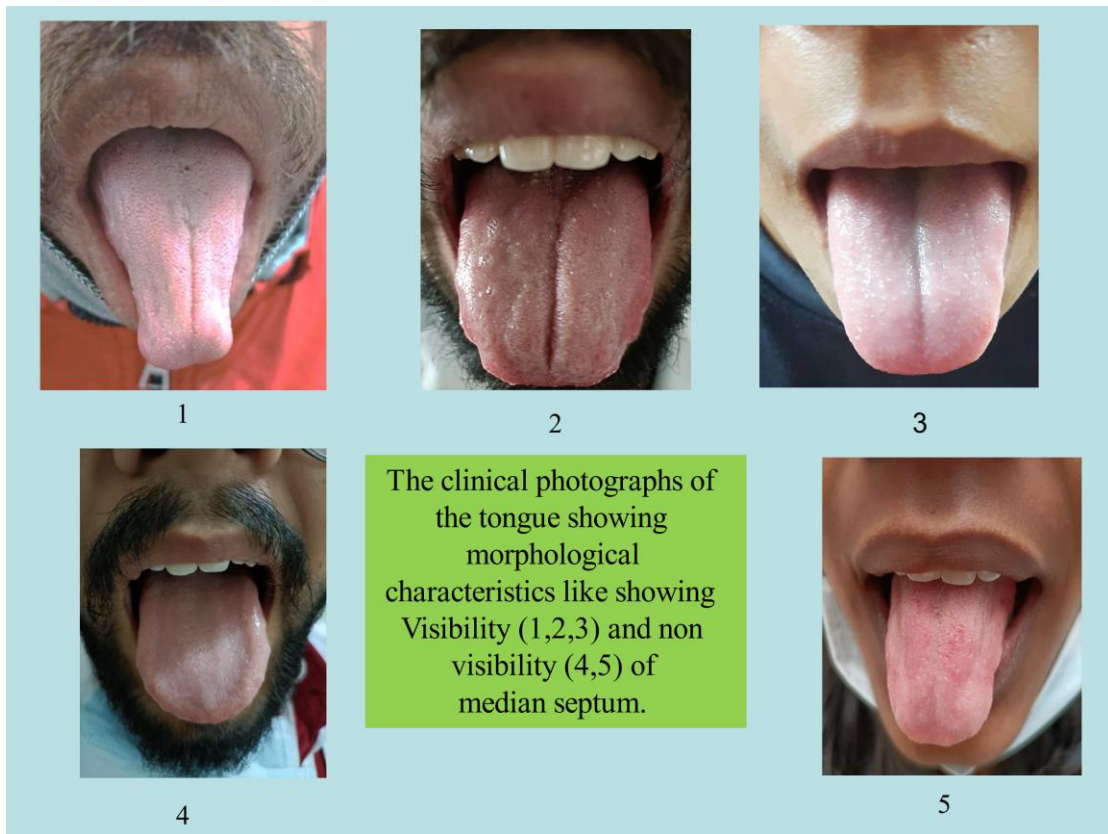


(a)



(b)

The clinical photographs of the tongue showing morphological characteristics like showing 'Smooth' (a) and 'Rough' (b) texture



Data Investigation and Interpretation

DATA ANALYSIS:

- The observed data will be tabulated and descriptive analysis would be done using *Microsoft Excel and SPSS software*.
- Cross tabulation of various aspects of dorsal surface of the tongue with respect to age dummies and sex will be studied.
- Statistical analysis will be carried out using *Chi – Square test* to analyse prevalence of various aspects of tongue morphology with respect to age and sex of the study group.⁸