TONGUE PRINTS – ARE THEY TRUE???

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Abstract:-

Tongue is a vital organ situated in the oral cavity. Tongue has unique features of its shape, size as well as has sexual dimorphism. No two individuals have same features of tongue not even identical twins! This idea prompted to consider tongue prints as an innovative and new research tool in forensic sciences for individual identification. Along with other biometric identification tools used in forensic sciences, tongue prints are also playing an important role and a promising tool in human identification. This is a small review illustrating the importance of tongue prints in identification.

Key words: tongue prints; identification; forensic

INTRODUCTION

Identification of humans is prerequisite for personal, social and legal reason.¹ Biometrics refer to a real-time identification system which is used in the identification of an individual.² Biometric authentication is an important process for the identification and verification of individuals for security purposes. There are many biometric systems that are currently in use. Forensic science refers to the areas of endeavour that can be used in a judicial setting and accepted by the court and the general scientific community to separate truth from untruth.³

In forensic identification, oral cavity allows for a myriad of possibilities. Due to various distinctive features of teeth, dental identification is one of the most popular, fast and secure way to positively identify an individual.⁴ Many techniques have been used in forensic sciences for human identification. One of the new upcoming tool in forensic dentistry is tongue prints. These are also unique as finger prints and lip prints thereby can be used as an adjunct in forensic sciences.

Tongue is the only exposed internal organ enclosed in the oral cavity which can be easily drawn out and displayed for inspection and palpation purposes for its shape and texture.⁵ This is the only structure which is well protected in an environment and cannot be manipulated or forged with

TYPICAL FEATURES

The uniqueness of the tongue print is that no two tongues are the same, and studies have found that the tongue of identical twins also does not resemble each other.⁶ The tongue provides both static and dynamic features for authentication.⁷ Various features were examined by direct examination such as:

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1. Shape such as U or V shaped
2. Type,
3. Characteristics of the longitudinal medial septum and the related grooves,
4. Lingual apex type.
5. Fissures such as vertical, central, single or multiple.

FEATURES IDENTIFICATION

A thorough clinical examination of tongue is done with proper inspection as well as palpation. Subsequent to clinical examination, photographs (front and side view) are taken from a predetermined distance using a digital camera (7 megapixels). Alginate impression of the dorsal surface of the tongue are made, and a positive replica is prepared using Type II dental stone. Lingual impression is the impression of the dorsal surface of the tongue along with the lateral borders. This will be useful in determining the shape and the surface characteristics of the tongue and can serve as a permanent record through the cast.

The photographs and the cast are analyzed and compared for morphological features such as shape and characteristics of fissures. Three reference points are considered to determine the shape of the tongue. The reference points included the region of the tongue in contact with the commissure of the lips (when protruded outside the mouth) and the tip of the tongue.

CLASSIFICATION (Fig 1)

The characteristic features observed on the dorsal surface of the tongue have been classified by various authors in different studies.

Fig 1: Classification of tongue features by Stefanescu et al.

Tongue texture	Shapes of tongue	Longitudinal grooves	Lingual apex
Physiological	Ovoid	Perceptible/imperceptible	Sharp
Scrotal	Ellipsoid	Rectilinear/twisty	Septate
Geographic	Rectangular	Superficial/deep	
	Pentagonal		
	Trapezoidal to asymmetrical		

Fig 1:- Classification of Tongue Prints

Therefore, the use of tongue prints as a biometric authentication system is gaining a lot of momentum. In the past 10 years, research has been targeted towards developing a tongue print recognition system, and the first of its kind was proposed by Liu et al. in 2007.

Various studies have been conducted to prove as to whether tongue prints play any role in forensics. Nadeem Jeddy et al in 2007 proved that the most common morphological feature on the dorsum of the tongue was the presence of central fissures. Multiple vertical fissures were observed in males whereas single vertical fissure was a common finding in females. The fissures were predominantly shallow in males and deep in females. The tongue was predominantly U shaped in males and females. V-shaped tongue was observed in 25% of females. Thus, gender predominance was associated with tongue patterns too!

TONGUE PRINTS VS OTHER BIOMETRIC ANALYSIS

The different biometric systems that are employed for security purposes are fingerprint, retinal scan, skin color, voice check, palm print, face scan, signature check, etc. Each of these systems has their own advantages and disadvantages. The disadvantages for each system make it vulnerable for security breach and also a hassle in identification purposes. Fingerprints can be eroded, changed due to work, altered by surgery, and subjected to injuries and burns, so they are not stable. When voice is considered, it is affected by sicknesses such as cold and cough. In case of extreme emotional states, there are chances of misspoken words. Retinal scan is highly sensitive. It is dependent on the user and can be affected by bright light and diseases such as cataract and astigmatism. Skin color is also one type of biometric system, but it presents with stability problem as considerable differences are seen with age, burns, diseases, and use of skin creams or medications.

CONCLUSION

The main basic threat to Indian society is identification fraud. Innovative and efficient identification systems are an urgent need to combat this social issue. In India, this system of identification is still in the grassroot level and needs more efficient ways of research and planning to implement the same. Creation of a database is pivotal for identification, so tongue prints can be an adjunct amongst other identification tools used in

forensic identification. Use of tongue prints as a biometric authentication tool has been under research, and studies have found it to be beneficial and comparable to other biometric tools. Research on the potential of tongue prints as a forensic tool is warranted.

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