

Tattooing Hard and Soft Oral Tissues: A Custom, a Trend or a Clue in Forensic Identification

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Abstract

Tattoos symbolize individuality, experiences, status, religion, and art. They come in many shapes, sizes, colours, designs, and styles. A tattoo in forensic odontology serves as a secondary physical characteristic displaying highly individual features, and can be used to enable identification of deceased, unknown individuals. A single unique feature is enough to allow confirmation of identity.

Keywords: Tattoo; Forensic odontology; Identification.

Introduction

A tattoo is a type of permanent, deliberate mark or design made on the human body by implanting indelible pigment into the skin.[1]

It is a localized pigmented area, caused by pricking and ingraining of foreign material into skin or oral mucosa. A tattoo will finally appear as localized, dark gray to black, non-tender, and either macular or slightly thickened.[2-5]

Body piercings and tattoos are body

decorations that date back to time immemorial. Tattoos are generally put, designs on the skin made with needles and coloured ink. A permanent tattoo is meant to last forever.

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History of the Tattoo

The history behind the tattoo is just as intriguing as the tattoo itself.

In recorded history, the earliest tattoos can be found in Egypt during the time of the erection of the great pyramids. As the

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Egyptians expanded their empire, the art of tattooing spread along with it. Archaeological evidence in the form of carved human figurines demonstrates that tattooing was practiced as early as 3,500 years ago far up in the Arctic. Tattooing was practiced by all Eskimos and was most common among women.

The tattoo was used in Greece as a punishing or penalizing symbol, tattooing continued through the middle ages in Europe as a means to mark the bodies of criminals, and thus tattooing as a social practice in Western civilization became synonymous with criminality and deviance.[6]

This custom of tattooing criminals and slaves was then transmitted from the Greeks to the Romans. Gustafson (2000) interpreted that the Romans used tattooing as a state control mechanism.[6]

As for the word 'tattoo', it was published in James Cook's memoirs of his travels to the South Sea Islands, in 1769. He introduced the word 'tatau' into the English language from the Polynesian word referring to the practice of inscribing the skin with indelible ink. This word quickly morphed into 'tattoo' in English and spread through other European languages, including French and Spanish. [6,7,8]

Until the 1880s, criminals, sailors and the working class were the major groups that were tattooed. Suddenly, toward the end of the 1880s, tattoos became fashionable and spread through the upper classes of England and the United States.[6,7]

Tattooing as a fashion or as a craze re-emerged during the late 1960s and 1970s with the hippie and rock star cultures. This trend has had its ups and downs during the past decades, but it has finally emerged as a hip and popular social movement.[7]

Social and Cultural Significance of Tattoo

The purpose of tattooing varies from culture to culture, person to person, and its place on the timeline.

Tattooing began to be used by soldiers as

symbols of allegiance to their state or country by the mid 19th century. Alan Govenar suggests that the American Civil War was the first instance in which soldiers were systematically tattooed with symbols of the military or their cause.[5,6] Through creating specific war images, and inscribing them on the bodies of soldiers, the opposing armies could create difference between otherwise very similar men.

It started to be used by spiritual and devout people as symbols of their religious devotion, and consisted of symbols of their Gods and deities.[6]

In tribal societies, both in India and abroad, it serves as an art form and is used as a means for body decoration.[7-9] It means different connotations for different tribal societies. Women in Borneo tattooed their symbols on their forearm indicating their particular skill. If a woman wore a symbol indicating she was a skilled weaver, her status as prime marriageable material was increased. In certain other tribes, tattoos around the wrist and fingers were believed to ward away illness and bad spirits. Tattooing was an important tool in helping tribal individuals deal with the harsh environment and appeasing their gods. Arctic tattooing was an important part of the hunter-gatherer economy of the north. [9-11]

In the current modern culture, tattoos serve to embellish the body, achieve a fashion accessory or to obtain a piece of art. Piercings are often used as fashionable accessories, whereas an increasing number of tattooed individuals refer to their tattoos as a piece of art. However, whether piece of art or mere fashion accessory, most authors agree that embellishment is the primary force, so reasons concerning beauty, fashion, and art can be combined.[10-12]

The various motivations for getting tattooed include beauty, art and fashion, individuality, personal narrative, physical endurance, group affiliations and commitment, resistance, spirituality and cultural tradition, addiction, or sometimes for no specific reason at all. [11,12]

Uses of Tattoos

Tattoos can be used for medical purposes and cosmetic purposes.

Medical tattoos are not decorative, but are placed for medical reasons. Patients with medical conditions or chronic diseases, such as diabetes, may use a tattoo to alert health care workers in case of an emergency. Doctors often use tattoos to mark specific sites for repeated application of radiation therapy. Tattooing also provides accurate localization for tumor surgery following radiation therapy. India ink and iron oxide give satisfactory tattoos.[13]

After breast reconstruction surgery, a tattoo may be used to simulate the nipple. This use may also be considered a cosmetic tattoo.

Cosmetic tattoos may be used as “permanent” make-up, such as eye and lip liner, lipstick, blush, eyebrows, or hair imitation. Because tattoos do fade over time, the procedure must occasionally be repeated to keep colours fresh.

Types of Oral Tattoos

Based on whether they are done on the soft tissue or hard tissue of the oral cavity, there are two main types- soft tissue tattoos and hard tissue tattoos.

1) Soft Tissue Tattoo

Soft tissue tattoos can be again subdivided into intentional or accidental.[14,15]

Intentional soft tissue tattoos can be made using industrial-grade colours or fluorescent ink.

The sites for these tattoos include labial mucosa, tongue (which may even be accompanied with a piercing), buccal mucosa or palate (still uncommon). There are various types of tattoos one can select from to express themselves and one of the latest in that trend is that of tongue tattoos. Practitioners admit it hurts a lot and speech is initially difficult, but they claim the tattoo is worth the effort. The new technique has the same durability as any

regular tattoo, but has the added aspect of eliciting a specific taste (chocolate, vanilla and garlic) to go with the design. Cosmetic tattoos can be done lining the lips or over the surface of the lips to emulate permanent make-up. [14,15]

Accidental soft tissue tattoos are further subdivided into two types- graphite tattoo and amalgam tattoo.[14-17]

By far, the most common source of solitary or focal pigmentation in the oral mucosa is the amalgam tattoo. Lesions are macular and bluish gray or even black and are usually seen in the buccal mucosa, gingiva, or palate. Importantly, they are found in the vicinity of teeth with large amalgam restorations or crowned teeth that probably had amalgams removed. Such lesions are the consequence of an iatrogenic mishap whereby the dentist's bur, loaded with small amalgam particles that accumulate during the removal of amalgam, accidentally veers into the adjacent mucosa and traumatically introduces the metal flecks. Amalgam fragments can also be deposited in oral tissue during multiple tooth extractions.

Graphite tattoos tend to occur on the palate and represent traumatic implantation from a lead pencil. The lesions are usually macular, focal, and gray or black. Since the traumatic event usually occurred in the classroom during grade school it is hard for people to recollect the event.[14,16,17]

However the presence of both these accidental tattoos must be noted by the dentist in the case history of his/ her patient, if present for even these may serve as identifying features for the forensic odontologist.

2) Hard Tissue Tattoo

Hard tissue tattoo sites include either directly tattooing the tooth, or preparing the tattoo on the surface of a crown to be placed on the tooth. The materials used for hard tissue tattoos are indelible ink or precious metals (tooth engraving).[14,15,18]

Tooth tattooing, unlike soft tissue tattooing, involves no needles or pain involved for the

person being tattooed, at least not from the artwork.

These tattooed teeth (crowns) are often created for the incisors, molars or bicuspid. Powdered pigments can be mixed in propylene glycol to turn the stain to paint, and can be painted onto porcelain crowns as miniature art-work. Any image, whether it is a favourite sports logo, a beloved pet or a meaningful symbol can be painted on the crown in painstaking and minuscule detail.

Most people prefer having it on the labial or buccal side of the tooth, some on the lingual side. They are seen either when the person smiles, eats and talks or only when the person wants to share what they have, by pulling their cheek out so it can be seen. They are part of the ceramic process, robust and durable, but just in case, most of these tattoos can easily be removed in five minutes in the dentist's office with just a little polishing with a rubber wheel. A custom tattooed crown takes anything between two to four weeks to create.

'Choumps' are a rare type of tooth tattoo made in gold and placed on the tooth enamel, mainly on the labial surfaces of the maxillary anterior teeth. This unique practice of getting the teeth engraved with these tattoos is prevalent among certain tribes of western Uttar Pradesh and Rajasthan, India, specially the Gujjar Tribes, and also some Jaduvanshi Thakurs & Jaat Tribes. The patterns included single gold spot tattoos, double gold spot tattoos, triple gold spot tattoos or six gold spot tattoos on each of the upper central incisors. [18]

Oral Tattoos and Their Role in Identification of Unknown Remains

A forensic odontologist's most rewarding task is positively identifying unknown remains. When they successfully complete this task, police investigations can continue and the family has some peace of mind, as well as legal resolution of the death.

The dead can be identified either based on primary physical characteristics (*characteristics which are very difficult for a*

person to change during life such as age, sex and race) or based on secondary physical characteristics (*characteristics which can change during life such as teeth, hair, tattooing, piercings and scars*). [19-21]

A tattoo serves as secondary physical characteristic displaying highly individual features, and can be used by the forensic odontologist to enable identification of individuals. Another feature of the tattoo is that it will hardly undergo any alteration or change post-mortem.

A single unique feature such as a tattoo may hold sufficient weight to allow confirmation of identity. However, for scientific verification there must be a pre-mortem record of that feature for comparison. Dentists must be encouraged to detail any oral modifications, including tattoos and tooth art, comprehensively preferably with a photographic record. [19-21]

Lessig R documented a case at the 2004 Tsunami which represents the successful identification and illustrates the potential of tattoos in forensic odonto-stomatological investigations in mass disasters. A tattoo showing a shark was detected during the examination of a male victim. At the same time the German Federal Police sent information about a missing 55 year old man. The detailed description of the missing person included the presence of a tattoo, but though it was referred to as a "dolphin", after examination it was concluded that they were one and the same person. [22]

Conclusion

Tattoos are a unique and highly distinctive form of art. They create and maintain self-identity, being special and distinguishing from others. It is this exact feature which makes it so important to the forensic odontologist.

The need to document unique features such as tattoos, piercings, scars and birth marks is amplified while confronted with a natural disaster, affecting a large number of people,

of different races, ethnicity and nationalities as post mortem examination of these features is one of the most successful methods of identification.

If the presence of a tattoo is documented in the antemortem records, it would greatly facilitate the process of identification of an unknown, deceased individual.

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