

# Identification for Qualitative assessment of the dental groove pattern and its uniqueness

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## ABSTRACT

Teeth are invaluable in both the living and the deceased for forensic identification and profiling purposes. The occlusal surface patterns in the molars of an individual depend on both intrinsic and extrinsic factors. The individualistic nature of the groove pattern can be used to determine the identity of an individual by the process of comparative identification. The objective of this study is to determine the uniqueness of the groove pattern among individuals by the means of digital analysis. An experimental study was conducted on 80 dental casts where the occlusal groove patterns of 1st and 2nd molars from each cast were traced digitally using image analysis software GIMP (v 2.10.6). The traced patterns were then examined to determine their uniqueness. The human dentition has long been used for identification as the dental tissues are the only ones to survive any disasters or events of violence. The large variation in the morphology of human tooth cannot be easily altered. Thus, the human dentition plays an important role in the forensic identification and it also provides crucial data regarding the ethnicity and cultural background of an individual. Over the years, researchers in forensic odontology have been contributing various other parameters to be used for identification purposes, such as lip prints, rugae patterns, and enamel rod patterns. Even the Interpol considers dental records as one of the most reliable parameters for disaster victim identification. The patterns of the occlusal surfaces of molars are polygenically conditioned and determined by a combination of allele on two or more sites/loci, and they occur in one of the final stages of molar growth, as a result of the terminal deposition of enamel. Numerous studies have shown that the genes of the X chromosome regulate the deposition of enamel, whereas genes of the Y chromosome influence the division of the cells involved with the formation of the dentine-enamel bond and enamel deposition.

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