



# Evaluation of salivary DNA obtained from dental prosthesis and its applicability in forensic investigations



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## ARTICLE INFO

### Article history:

Received 20 April 2016

Accepted 20 May 2016

### Keywords:

DNA

Saliva

Dental prosthesis

STRs

## ABSTRACT

**Aim:** This study evaluated the salivary DNA obtained from dental prosthesis after a period of storage and its applicability in human identification.

**Material and methods:** In first phase, DNA was extracted after a span of 1 week and 1 month from the dental prosthesis dipped in whole saliva for 15 min. It was followed by PCR and electrophoresis. In second phase, from extracted DNA samples 15 STRs (short tandem repeats) of human genomic DNA were amplified via polymerase chain reaction.

**Results & conclusion:** DNA isolated from saliva stained dental prosthesis after a period of storage and the techniques employed are adequate for further forensic analysis.

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## 1. Introduction

DNA fingerprinting plays a pivotal role in personal identification. It has not only revolutionized forensic science but has also become a dominant tool in law enforcement. In routine DNA fingerprinting analysis, DNA is isolated from the blood. In forensic science, conviction or exoneration of suspects of various types of crime, from theft to rape and murder, diverse sources for DNA ranges from blood, tissues, organs, feces, sweat, semen, urine, hair strands and saliva are used. Studies have shown that saliva and mouth swabs can serve as an important and easy source for DNA isolation.<sup>1–3</sup>

Dental evidence has become one of the most reliable methods for human identification in forensic science.<sup>3–6</sup> Forensic studies have also demonstrated the use of saliva containing oral epithelial cells deposited in bite marks<sup>7–9</sup> cigarette butts, tooth brushes, marks and prints left on stamps and other objects may help in individual identification.<sup>10–14</sup> Dental prosthesis are used to restore intraoral defects such as missing teeths, soft or hard structures of

the jaw and palate. Taking into consideration that these structures are in continuous contact with saliva in mouth, we hypothesize there is high probability of adherence of oral epithelial cells to these structures and can serve as important source of DNA in forensic cases. Still there is dearth of studies which attempt to isolate DNA from dental prosthesis used by patients for forensic analysis.<sup>15</sup>

Thus, the main objective of this study was to evaluate the DNA obtained from human saliva collected from dental prosthesis after a period of storage in order to develop a systematic approach for DNA typing in forensic cases. Secondly this study also tried to amplify 15 tetranucleotide loci (13 core CODIS loci, plus D2S1338 and D19S433 loci), and the gender identification locus, Amelogenin using AmpFLSTR<sup>®</sup> Identifiler<sup>®</sup> PCR Amplification Kit.

## 2. Materials and methods

1) **Samples:** For preliminary experiment, three saliva samples (5 ml each) from three different individuals were obtained and marked as A, B, C. Six separate dental prosthesis, two for each saliva sample were taken and designated as a1 and a2 for saliva sample A, b1 and b2 for saliva sample B and c1 and c2 for saliva sample C. Dental prosthesis were dipped in respective saliva sample for 15 min and then kept for drying at room temperature (Fig. 1).

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Fig. 1. Saliva stained dental prosthesis used for the study.

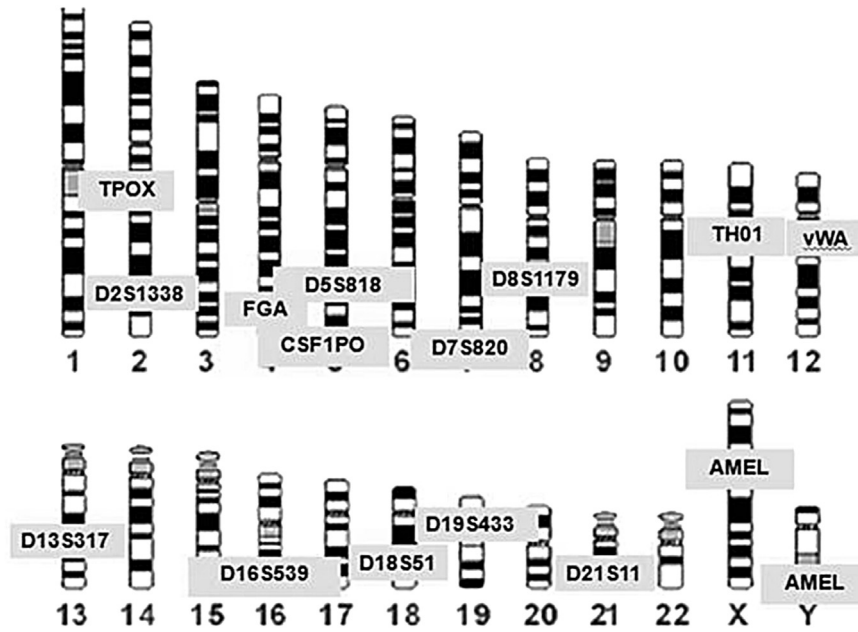


Fig. 2. Loci designated for use in the Combined DNA Identification.

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