

IDENTIFICATION FROM A BITEMARK IN A WAD OF CHEWING GUM

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ABSTRACT

A wad of used chewing gum recovered from the scene of a burglary contained impressions of human teeth. Casts of these impressions displayed unique morphological characteristics which were found to show concordance with corresponding features present on casts of the posterior teeth of a suspect. (**J Forensic Odontostomatol 2001;19:5-8**)

Key words: Identification, bitemarks, chewing gum

INTRODUCTION

The forensic significance of tooth marks has been recognised for many years by the scientific, law enforcement and legal communities.^{1,2} Bitemarks produced in a variety of materials ranging from human skin and foodstuff to bottle caps, cigars, cigarette holders, pipes, musical instrument mouth pieces and wooden cabinets have been used to indicate or eliminate the presence of an offender at the scenes of crimes.^{3,4} The technique involves the comparison of a bitemark pattern with the alignment and other characteristics of the dentition of the suspect.

In 1933, Humble (cited by Whittaker⁵) reported one of the earliest (1906) cases of bitemarks in food, where a burglar was convicted from the marks of his teeth left in a piece of cheese. In 1955 a rapist was convicted because of his tooth marks in a cucumber⁴ and in 1971 the marks left on the pastry portion of a meat pie were instrumental in the conviction of a murderer (Furness, cited by Cameron & Sims⁶). Some foods will elicit clear marks of teeth and cases have been reported of convictions resulting from evidence of bites on apple, chocolate, roast pork⁷ and

cheese⁸. Aboshi *et al.*⁹ documented a case where profiles of both the bitemark and dental arch of a suspect were generated by computer imaging and then simultaneously compared by superimposition on a screen. The bitemark was in a lamington and this comparison contributed to the conviction of the offender. Ström¹⁰ stated that it is often easier to analyse a bitemark in a food than in human tissue, because the skin easily distorts as it moves during the biting episode.

Furuhata and Yamamoto³ stated that chewing gum leaves a poor record of bitemarks but the remaining saliva is suitable for blood group identification. They reported a case where indentations found in chewing gum failed to reveal the actual dental morphology of the biter. However, an offender in South Australia was convicted of burglary as a result of characteristic tooth marks left in a wad of used chewing gum found at the scene of a crime.

SEQUENCE OF EVENTS

In May 1990, the business premises of a physiotherapy clinic in Murray Bridge, South Australia

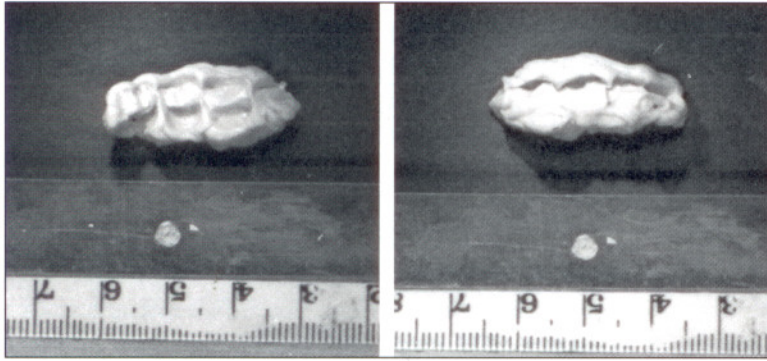


Fig.1: The wad of used chewing gum displaying bitemarks on both the surfaces

were broken into and a number of items were stolen. The owner reported the matter to police and during a full investigation of the scene a wad of chewing gum was found (Fig. 1) which the owner certified was not present prior to the burglary. The chewing gum displayed indentations suggesting human tooth marks and was retained by the police as evidence.

There had been a spate of house and business break-ins around the Murray Bridge area at the time, all with common characteristics. Among them was the manner of entry which was always by smashing of a window, and the items stolen included foodstuffs which indicated the offender(s) were probably juveniles of a small stature.

Fingerprints were also found at some of the crime scenes which were subsequently identified as those of a suspect who was a male aged 15 years. The suspect was eventually located, interviewed and arrested but at the time he denied involvement in the break-ins. When questioned specifically about the

break-in at the physiotherapy clinic where the chewing gum had been found, he again denied any involvement.

Acting under Section 81 of the Summary Offences Act, 1953 (South Australia), the police arranged for impressions of the teeth of the suspect to be obtained by a local dentist. These, together with the chewing gum wad were referred to the Forensic Odontology Unit, University of Adelaide for examination.

Upper and lower casts were prepared from the suspect's dental impressions (Fig. 2) and a thorough examination of the chewing gum performed. It was pink coloured, with an aroma suggestive of strawberry flavour and measured about 29 mm in length and 12 mm in maximum breadth, roughly oval in shape with an abrupt curve at one end. Impressions of human teeth were present on two opposing surfaces. Photographs were taken of both surfaces and positive replication of the tooth impressions made with a polyvinyl siloxane impression material (Fig. 3).

Although there was some distortion of the tooth marks, it was possible to recognise clearly certain morphological characteristics of the teeth, and when these were compared with the corresponding teeth on the casts, both directly and by means of photographs, the following observations were made:

a) The impressions of teeth 23, 24, 25, 26 were produced on one surface of the chewing gum. There were 7 morphological features present on these teeth

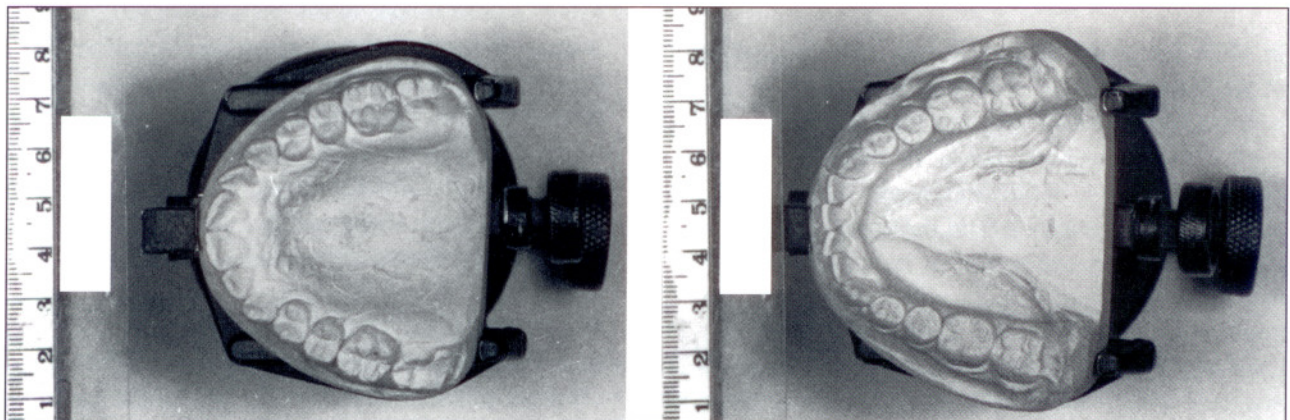


Fig.2: Upper and lower casts of the suspect

which were concordant with the corresponding teeth of the upper cast (Fig. 4).

b) On the reverse surface of the chewing gum it appeared that teeth 34, 35 and 36 had produced impressions but there was insufficient detail for teeth 34 and 36 to provide any positive comparison. However, tooth 35 demonstrated six morphological features which were concordant with the corresponding tooth of the lower cast (Fig. 5).

The results of these comparisons indicated that the impressions were indeed human tooth marks produced by teeth 23, 24, 25, 26, 34, 35 and 36. They also demonstrated that certain characteristic morphological features observed on their reproductions were concordant with corresponding features in the respective teeth of the casts of the suspect.

When confronted with the fingerprint evidence, a guilty plea to all charges was entered by the suspect in early 1991. A guilty plea was also entered to the charge of burglary at the physiotherapy clinic following the submission of the evidence confirming the positive identification of the tooth marks in the chewing gum as those of this same suspect.

DISCUSSION

This case illustrates that chewing gum can in some circumstances render sufficient detail of an offender's teeth for comparison and is probably only the second case on record which resulted in a conviction. In the first in 1981, Sperber¹¹ reported a case where chewing gum had been an essential part of the evidence in a homicide conviction of an adult female. In this case the imprint of the lingual opening of an endodontic procedure in an upper incisor and the mesial cavity of the same tooth was reproduced in the gum - favouring a valid, positive comparison with the teeth of the suspect.

In the majority of cases, qualitative evaluation of the bitemarks is usually easier with bitten foodstuffs than human skin although it must be emphasized that certain foods make poor media for bitemark registration. The case of chewing gum is



Fig.3: Positive replication of the teeth impressions in the chewing gum

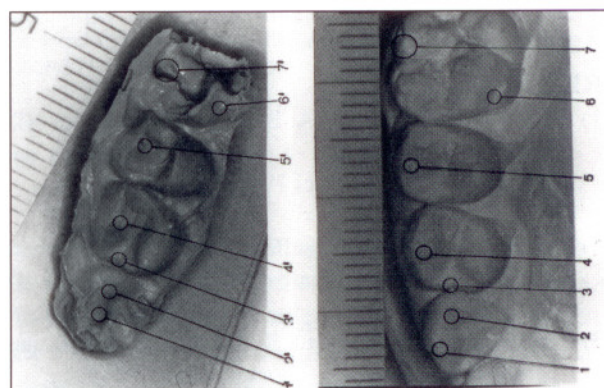


Fig.4: Concordant features of teeth 23, 24, 25, 26 with corresponding teeth of the upper cast of the suspect

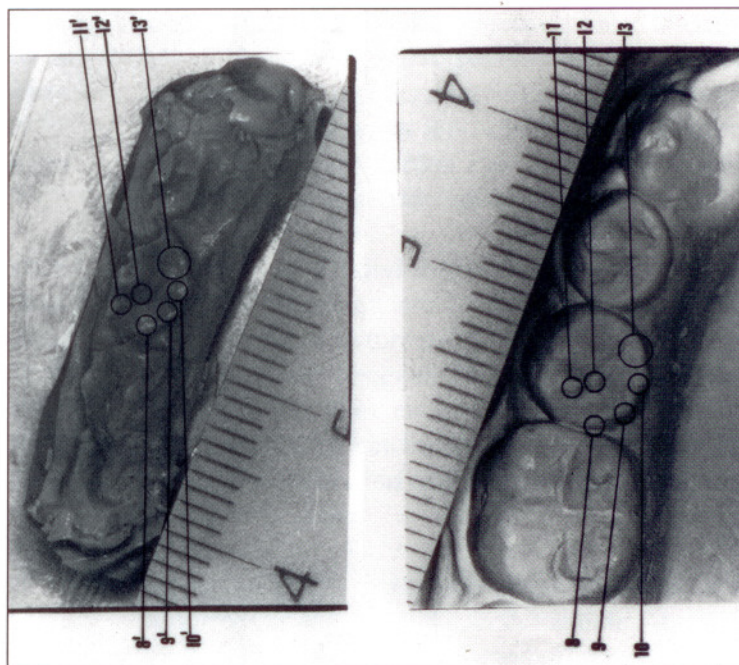


Fig.5: Concordant features of tooth 35 with corresponding tooth of the lower cast of the suspect

however quite different and is probably the only "food" which will record in relative detail the occlusal surfaces of posterior teeth, providing information which is unique and unlike that obtained by the more common incising of other foods.

The interpretation of a bitemark is difficult and requires a considerable amount of experience on the mechanics of human biting and the understanding of subsequent changes that occur in the bitten material. It is definitely a highly specialized skill belonging to the forensic dental experts by virtue of their training in tooth morphology, occlusion, articulation and the ability to reproduce fine details of the marks by modern impression technology.

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