

The Triform Variant: I. Definition, Classification and Population Distribution

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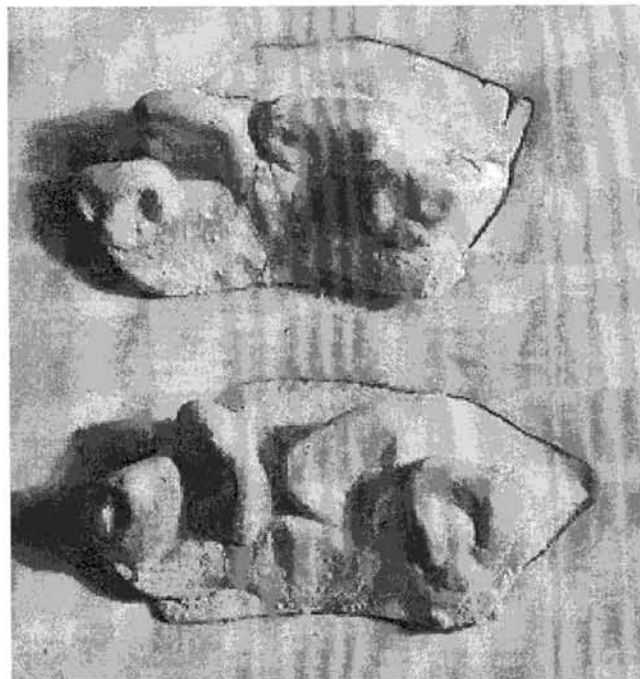


Fig. 1. Two-grade classification of the triform variant. Grade 1 on the right UI2 on the top; grade 2 on the right UI2 on bottom (Photo by S. Bailey-Schmidt).

In 1921 Hrdlička remarked that the cingulum of maxillary incisors can be so marked that occasionally it will reach the cutting edge of the tooth. Other anthropologists have referred to a tooth that resembles an "aberrant barrel-shaped incisor" (Dahlberg, 1949), or that has a "bicuspid appearance" (Goaz and Miller, 1964). Clinicians, too, are familiar with this aberrant form, as it is sometimes associated with *dens invaginatus* - an invagination of the tooth tissue (both dentin and enamel) towards the pulp (Oehlers, 1957; Lee et al., 1988).

The term "triform" was first used by Scott (1973) to describe this unusual variant that affects the maxillary lateral incisors. It is characterized by prominent mesial and distal marginal ridges combined with a projecting cingulum that is attached to the incisal edge by a transverse ridge (Fig. 1). According to periodic references to the variant in the literature (Nelson, 1938; Goldstein, 1948; Dahlberg, 1949; Goaz and Miller, 1964; Larson, 1978), the triform variant occurs in pre- and post-contact Native American groups. The geographic distribution and relative frequency of this variant have not been systematically examined until now.

MATERIALS AND METHODS

The materials used in this study are derived from crania and casts from the following 16 populations: San

Francisco Chinese (Asian); South African Indian (Asiatic Indians); South African and American White (Europeans); Solomon Islanders (Melanesian); Easter Islanders (Polynesian); Bantu and Bushman (Africans); and Arikara, Zuni, Pima, Papago, Hopi, Navajo, Yaqui, Eskimo, and Mohr site (Native Americans). More than one Native American sample was included in order to examine the triform variant's distribution within North America.

The Arikara and Zuni material are curated in the National Museum of Natural History, Washington D.C. The Mohr site archaeological material and Solomon Island casts are curated in Temple University, Philadelphia, PA. All other samples are hard stone casts (Fig. 2) curated in the Arizona State University Dental Anthropology Laboratory, Tempe, AZ.

A two-grade classification was devised by the author for this study (Fig. 1). Both grades are regarded as presence and can be described as follows:

- Grade 1: characterized by a marked mesial or distal marginal ridge that is attached to a medium-size cusp which reaches one-quarter to one-half of the way to the incisal edge;
- Grade 2: characterized by marked symmetrical marginal ridges (shoveling), with a large cusp that is attached to the incisal edge by a transverse ridge.

RESULTS AND DISCUSSION

The results of the population analysis are presented in Table 1. Native Americans clearly show the highest frequency for this variant. In fact, with the exception of one Bushman, the variant did not occur outside of North America. Perhaps the most salient feature of this table is the frequency observed in the Pima and Papago groups (10% and 7.5% respectively). While almost all other Native American groups exhibited the variant, its presence was less than in these two groups.

The fact that the variant occurs in early post-contact groups (Arikara and Zuni) as well as in living populations (Navajo, Hopi, Papago, and Pima), indicates that it not the result of a recent mutation, but was likely brought to North America by Paleo-Indian groups. The finding by Lee et al. (1988) of the triform's

bilateral presence in a Chinese girl, indicates that the variant occurs in Asians.

The concentration of the triform's occurrence in the Pima and Papago is intriguing. The Pima are a biologically unusual population in more than just their dentition. Lampl and Blumberg (1979) have found that the Pima have an unusually high frequency of albumin Mexico - three to four times that of other Uto-Aztecan groups. In addition, Wallace and Torroni (1992:406) have recently found that "an extraordinary 41% of the Pima and Papago harbor the rare Asian (mtDNA) variant *HincII morph 6*." It is possible that these peculiarities are indicative of a genetic drift event that could be relatively recent.

The triform variant is still an enigma that requires additional study regarding its genetic nature and its relationship to other dental traits. Preliminary studies have shown that triform incidence runs in family lines (Bailey-Schmidt, in progress). It is also probable that this variant is part of the continuum for the *tuberculum dentale* complex. Part II of this study will address these issues. In the meantime, I am interested in other readers' thoughts and observations regarding this variant.

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Fig. 2 Hard stone cast of a Papago Indian exhibiting the triform variant on both lateral incisors. Left UI2 has grade 1; right UI2 has grade 2 (Photo by S. Bailey-Schmidt).

TABLE 1. Population variation of the triform variant.

Group	N	Absence Triform		
		0	1	2
Americas				
Arikara	96	97.9	0.0	2.1
Hopi	101	96.0	0.0	2.0
Mohr	29	100.0	0.0	0.0
Navajo	105	99.1	0.0	0.9
Papago	107	90.6	2.8	4.7
Pima	100	86.0	3.0	7.0
Yaqui	116	100.0	0.0	0.0
Zuni	99	99.0	1.0	0.0
Eskimo	98	100.0	0.0	0.0
Polynesia				
Easter Island	101	100.0	0.0	0.0
Melanesia				
Solomon Islands	103	100.0	0.0	0.0
Asia				
Chinese	67	100.0	0.0	0.0
Asiatic Indians				
South African Indian	100	100.0	0.0	0.0
European				
S. African White	107	100.0	0.0	0.0
American White	97	100.0	0.0	0.0
Africa				
Bushmen	103	96.1	1.0	0.0
Bantu	107	100.0	0.0	0.0