

## TOOTH WEAR AND CULTURE

enamel margin. This mutilation sometimes ends mesially in a sharpened transversal surface. It may be the result of some form of extensive tooth cosmetic preparation, since it has a temporal limitation in Eurasia.

In Bronze Age populations, we also observe many deep, vertical striations on the labial surfaces along with chipping on the incisal edges of upper *and* lower incisor teeth. Striations covering the entire surface up to the cervix indicate that the incisors were dug into objects or intentionally brushed. In addition, grooves from many potential sources are present on occlusal, proximal, and frontal tooth surfaces, but are absent from concave areas. Within these grooves are long, closely spaced microstriations that are virtually identical in size. The microstriations resulted from scratching by abrasive substances.

Tooth abrasion gives evidence of hand activity and of its type. Thus, from tooth wear we can infer prehistoric coordinated manipulation involving object transference from hand to mouth, object-substrate manipulation involving one object relative to the teeth, and complex object manipulation involving intentional change of object state.

Although early man has been shown to have considerable hand ability, *Homo erectus* and *Homo sapiens neandertalensis* apparently lacked the complex hand use evidenced by *Homo sapiens* dexterity in the early Bronze Age. During their 2.5 million years of existence, Paleolithic humans made tools and colonized the world. However, according to tooth microwear, human dexterity evolved only within the last 40,000 years. Early man was essentially a bipedal, handy hominid lacking the central cognitive characteristics of modern "sapiens" dexterity.

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## The Oldest Example of Dental Filing North of the Valley of Mexico

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A recent examination of hunter-gatherer skeletal remains from the Chihuahuan desert region (Steele and Powell, 1990) has revealed a new example of dental mutilation not previously reported in the literature. This specimen, with known stratigraphic and temporal provenience, appears to be the oldest substantiated example of dental mutilation north of the Valley of México. Although cultural modification of teeth is well-documented for Preclassic, Classic, and Postclassic cultures of México and central America (Romero, 1958, 1970), there are relatively few examples of dental mutilation north of central México, and none older than approximately 1000 BP (Milner and Larsen, 1991).

### MATERIAL AND METHODS

The example of dental mutilation reported here was recovered from the site of Cueva de la Zona de Derrumbes (NL92), located in the Río Santa Rosa valley in southeast Nuevo León, México. Excavated in 1963 as part of the University of Texas' Northeast México Archaeological Project, the site contained a virtually continuous sequence of cultural material for the past 4700 years (McClurkan, 1966, 1980). During excavation, a well preserved burial (Burial 1) was recovered near the back wall of the shelter in deposits radiocarbon dated to between  $1670 \pm 110$  BP (Tx-206) and  $2160 \pm 100$  BP (Tx-208). The average corrected age of these deposits was  $1747 \pm 113$  BP.

Burial 1 was a flexed inhumation (McClurkan, 1966) of a young adult female approximately 18 to 35 years of age. Dental remains consist of the right maxillary central incisor and canine; the left maxillary lateral incisor, premolars and molars; and the complete mandibular dentition.

Measurements of the mutilation features were done using Helios needle-point dial calipers and recorded to the nearest 0.10 mm. The features were also examined using a binocular microscope (70x magnification) and a scanning electron microscope (LEOL T330J). For SEM study teeth were impressed in a polyvinyl siloxane compound and cast with epoxy resin. The casts then were coated with 200 Å gold palladium.

### SPECIMEN DESCRIPTION

Dental mutilation was observed on the maxillary right central and left lateral incisors, which are shown in Figure 1. The right central incisor contains three notches oriented labio-lingually across the incisal margin of the

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tooth. This type of dental alteration falls under Romero's (1958) classification A3. The notches are located approximately 1 mm apart, beginning at 1.3 mm from the mesial margin of the tooth. Maximum mesiodistal notch width is 0.90 to 1.00 mm. Notch depth (measured from the existing enamel on the labial aspect of the incisal margin) ranges from 0.80 to 0.50 mm (distal notch). Notch depth is greatest on the labial aspect and decreases toward the lingual end of each feature. All three notches extend into the dentin.

The left lateral incisor contains two notches, which conform to Romero's type A2 classification. Notch width dimensions (0.50 to 1.00 mm) are slightly less than those on the central incisor. Again, the deepest part of each feature is toward the labial aspect of the incisal margin. Like the central incisor, notches invade the dentin.

SEM analysis of the notches on the upper right central incisor revealed a number of fine striations (50  $\mu$ m in diameter) on the enamel at the labial and lingual margins of each notch. The mesial and distal margins are smoothed and rounded, and many of the fine striations also display rounded margins. In addition to dentin exposed within notches, dentin also is present on the incisal margin of unmodified portions of the teeth, a reflection of normal dental attrition.

Taken together, these data suggest that mutilation occurred at some time prior to the death of this individual, perhaps as early as adolescence. Modification was probably accomplished through filing with a fine-grained abrasive material, starting at the labial aspect of the incisal margin.

### DISCUSSION AND CONCLUSION

Examples of dental filing similar to that observed in the two incisors from Burial 1 have been reported for Mississippian sites near Cahokia, Illinois (Holder and Stewart, 1958; Milner and Larsen, 1991; Perino, 1959, 1967, 1971a, 1971b; Stewart, 1941; Stewart and Titterington, 1944, 1946) and in Tennessee (Milner and Larsen, 1991), Hohokam sites in Arizona (Campbell, 1944; Milner and Larsen, 1991), and hunter-gatherer localities in Texas (Willey and Ubelaker, 1976). Many of the specimens from Mississippian contexts exhibit a combination of incisal margin notches and alteration of the labial surface, similar to Romero's type F5. Dental mutilation specimens from Illinois, Tennessee, and Arizona post-date 1000 years BP. Instances of dental mutilation from Gun Site Shelter and Taylor Ranch, Texas have been classified as type A1 and attributed to the Archaic period by Willey and Ubelaker (1976). However, these specimens are from "questionable archaeological contexts" (Milner and Larsen, 1991: 360).

Based on the data cited here and those presented in Milner and Larsen (1991), previously reported examples of dental mutilation north of the Valley of México are no older than 1000 BP. Thus, the specimen from Cueva de la Zona de Derrumbes (NL92), dated to  $1747 \pm 113$  BP, is the oldest verified example of dental mutilation north of the Valley of México, thereby extending the geographic and temporal range of preclassic dental modification.

Although Romero's (1958, 1970) model of a northward diffusion of dental mutilation is questionable when applied to Mississippian cultures of eastern North America (Milner and Larsen, 1991: 362), hunting and gathering populations in the area of Cueva de la Zona de Derrumbes may have been influenced by complex societies to the south. As early as 1700 BP, Mesoamerican cultures were well established in the Zacatecas and Durango regions of north-central México (Kelley, 1966, 1971). Interaction between populations in Zacatecas and Nuevo León is indicated by the presence of *Chalchihuites* pottery (600 - 1700 BP) at hunter-gatherer sites in the Laguna Mayran region of Nuevo León (Hartfield, 1980). Furthermore, during the period around 1700 BP, expeditionary groups from Teotihuacán were mining turquoise at the site of Concepción del Oro, 180 km due west of Cueva de la Zona de Derrumbes (Weigand et al., 1977). The observation of dental mutilation in a female hunter-gatherer from Nuevo León, combined with strong evidence for a Mesoamerican presence in the same region, provides evidence for the interaction of complex societies in central México with neighboring hunter-gatherer groups to the north (Powell and Powell, 1992).

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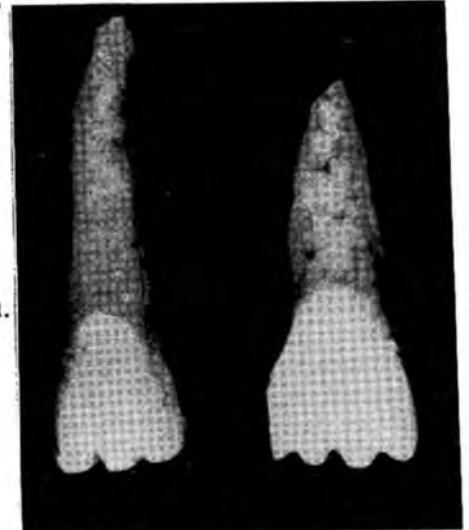


Fig. 1. Maxillary left lateral and right central incisors from Cueva de la Zona de Derrumbes, Nuevo León, México. Mutilation conforms to Romero's (1958) types A2 and A3. Scale: 1 inch = 1 cm.



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### Software Review

MACPRIMATE.FORENSIC. By Claud A. Bramblett. Santa Barbara: Intellimation Library for the MacIntosh. 1990. For Apple MacIntosh, requiring 512K, suggested system 6.0.5. Price: \$39.95 per copy, Site License available for \$49.00.

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Dr. Claud Bramblett has recently developed computer software for the Apple MacIntosh which can assist physical anthropologists, archaeologists, and others in analyzing skeletal remains. This software incorporates numerous formulae, regression equations, and discriminant function analyses which calculate race, gender, and stature estimations from various combinations of 132 skeletal measurements (including 13 of the dentition). Software analyses are separated into three independent subroutines labeled respectively biological affinity, gender, and stature. Data can be entered for analysis from either a disk or directly. Numeric results are given and interpreted for each analytical run. For instance, the skeleton being analyzed is assigned a male or female gender in the gender subroutine. Results of all analyses in all subroutines include source references for the equations or analytical techniques being used.

The biological affinity subroutine uses discriminant function analysis and interorbital and frontal indices to discriminate between American Blacks/American Whites or American Whites/Native Americans on the basis of fourteen cranial measurements. Discriminant function analysis is likewise used with three measures of the pelvis to discriminate between American Blacks/American Whites.

The gender subroutine estimates gender from measurements of the skull, teeth, sacrum, sternum, scapula, arm, pelvis, leg, or ankle and foot using discriminant function analyses and other statistics. Computations are done independently for each of the above areas and information is provided about the particular biological group (e.g.