

The Matty Canyon Population: Dental Observations of Late Archaic Individuals from Southern Arizona

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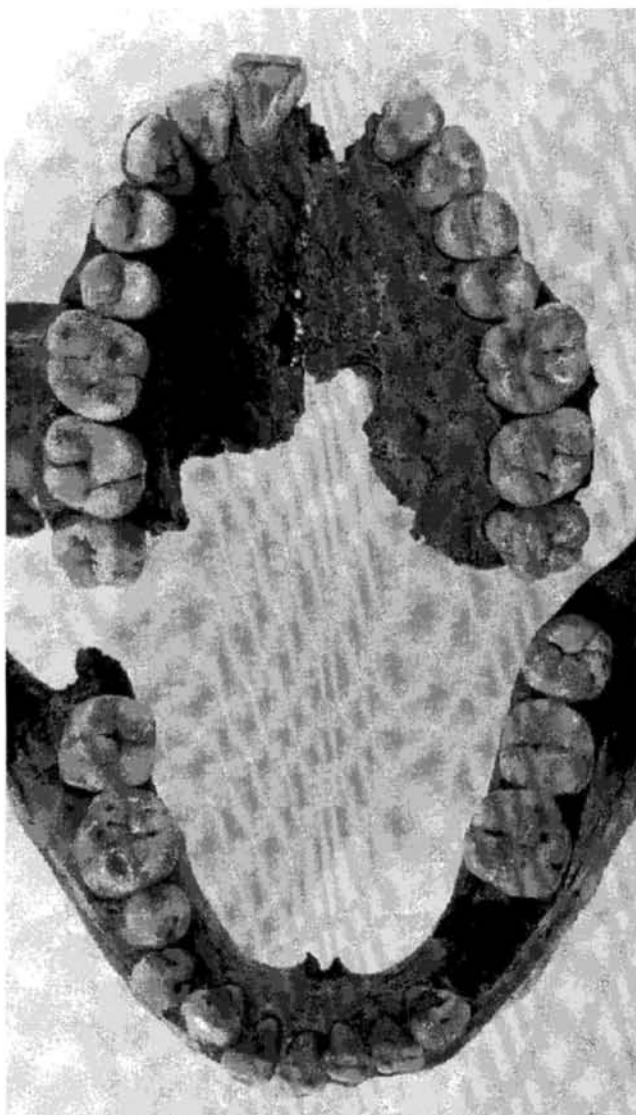
ABSTRACT Skeletal and dental material from the largest known burial population from the Late Archaic Period of southern Arizona was analyzed (Minturn and Lincoln-Babb, n.d.). Minturn performed the skeletal analyses, including the standard observations for age, sex, and pathologies. The dental analyses support a mixed economy subsistence of hunting - gathering and agriculture. This conclusion is based on observations for caries, enamel chipping, abscessing, and enamel hypoplasia.

THE MATTY CANYON SITES

The Donaldson Site and Los Ojitos are floodplain sites (Eddy and Cooley 1983, Huckell 1988) located in Matty Canyon, southeast of Tucson, Arizona. These pre-ceramic sites have been dated at 2800 to 2400 BP (Huckell, personal communication). Both sites produced multiple pit structures for habitation and storage.

Evidence of maize and abundant remains of various wild faunal and floral resources were identified. These features are standard for many Late Archaic floodplain sites in the Tucson Basin (Roth 1992; Mabry and Clark 1994).

Eight primary burials and one multiple secondary burial with four individuals were excavated from the two sites. The primary burials were in simple pits without associated grave goods. According to Minturn, the nine burial features contained 19 individuals, seven of which were represented by only a few elements. Of the 19 individuals, 12 could be analyzed for dental pathologies.



An example of the quality of preservation and general dental health of the Matty Canyon population (Burial 8, Los Ojitos, female 18-20 years). (Photo by K.D. Turner).

DENTAL PATHOLOGIES

The assessment of dental pathologies in a burial population can provide useful information about the diet and general health of those people (Turner and Cadien, 1969; Turner, 1979; Schmucker, 1985; and Goodman and Rose, 1991). Observations for caries, enamel hypoplasia, abscessing, and enamel chipping, commonly employed in such studies, were carried out on the Matty Canyon samples.

Caries is a multifactorial disease that can manifest itself as a necrotic pit in the enamel or dentine. Consumption of sticky, processed carbohydrate foods contributes to the development of caries. A high frequency of caries may indicate a carbohydrate-rich diet. A number of high carbohydrate content foods were present in the prehistoric Southwest. These include maize, agave, yucca, mesquite, and acorns (Schmucker, 1985; Sobolik, 1994). The potential these foods have to contribute to caries formation depends on the processing technique. Age and host resistance factors, such as non-immunological characteristics of the saliva, may contribute to an individual's caries susceptibility (Mendel, 1979).

Analysis of the five primary inhumations (all females) from Los Ojitos with intact and relatively unworn dentitions revealed 14 carious teeth out of 142 (9.9%). The carious lesions were small and mainly located interproximally. Antemortem and postmortem missing teeth prevented a proper assessment of the Donaldson sample.

The caries frequency fits into Turner's (1979) range (0.44 to 10.3%) indicative of a mixed economy and the range (2.3 to 26.9%) indicative of agricultural groups. One individual had seven caries. The amount of caries in the remaining four individuals ranged from zero to four (4.9%). The total caries frequency in the population places the Los Ojitos group in the mixed and agricultural range. However, when the outlier is omitted from the calculations, the sample belongs in the mixed economy and hunter-gatherer subsistence groups.

Prehistoric hunters and gatherers from California had a similar percentage of individuals affected with carious lesions (Walker and Erlandson, 1986). This was attributed to a high carbohydrate diet of indigenous tubers and roots.

Enamel hypoplasia is a macroscopic defect of the enamel that is usually due to some systemic interference (Pindborg, 1970). The cause of enamel hypoplasia has been attributed to episodic types of nutritional, pathogenic, environmental, and cultural stresses (Turner, 1979; Goodman et al., 1980; Walker, 1981; Goodman et al., 1984; Van Gerven and Beck, 1988; Ogilvie et al., 1989; Moggi-Cecchi et al., 1994). The pathology is more prevalent among prehistoric agricultural populations than hunters and gatherers (Goodman et al., 1980; Schmucker, 1985).

Out of the twelve individuals examined for enamel hypoplasia (hypoplastic pits, grooves on one or more teeth), only one evidenced this pathology. This finding suggests that the majority of the population did not experience pathology-inducing stress in their developmental years.

Enamel chipping has many causes. Chipping can result from using teeth as tools, as holding and gripping devices, and in food preparation. Enamel chipping is more prevalent in meat eating populations than in groups with an intensive agriculture subsistence (Turner and Cadien, 1969).

In this study, 13 tooth crowns from seven individuals show enamel chipping. The premolar and first molar tooth region contains most of the chipping. This location suggests use of premolars and molars for processing foods. The substantial amount of faunal remains recovered from both sites (B.B. Huckell, personal communication, 1994) indicates that bone breakage may have caused a significant amount of the chipping. Additional factors could be breaking seeds or nut hull fragments.

Abscessing, defined as at least one abscess per dentition, occurred in seven out of the twelve individuals examined for this pathology. The majority of the abscesses were small and did not involve significant degeneration of the alveolar bone. Most of the abscessing was associated with pulp chamber exposure from excessive attrition. Caries were infrequently observed in relation to the abscesses.

DENTAL WEAR ANALYSIS

Huckell and Huckell (1988) utilized the wear plane angle method (Smith, 1984) to examine these samples. They placed the Los Ojitos sample within the range for agriculturists. Molar wear of individuals omitted from the 1988 study also exhibited varying degrees of an oblique wear plane. Wear is generally more extreme on the posterior than anterior dentition. Although findings support the notion that the Matty Canyon population relied to some degree on agriculture, food consistency and processing techniques also may be influential factors contributing to an oblique wear pattern (P.L. Walker, personal communication, 1995).

SUMMARY AND CONCLUSIONS

High frequencies of enamel hypoplasia and caries are common for prehistoric agricultural groups of the Southwest (Berry, 1985; Schmucker, 1985; Turner, 1979). Only one individual out of 12 demonstrated physiological stress during the developmental years resulting in hypoplasia. The caries frequency is 9.9%, which is considered high for hunters and gatherers. A number of high carbohydrate foods besides maize were accessible for the Matty Canyon peoples. The amount of enamel chipping suggests substantial protein intake and the utilization of wild resources. Considering these observations and Huckell and Huckell's (1988) wear

analysis, I propose that a mixed economy of hunting and gathering with some agriculture provided subsistence for the Late Archaic individuals of Matty Canyon in southern Arizona.

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