5. Like shovel-shaped incisors, nearly all fossil lower molars found in China exhibit the deflecting wrinkle.
6. Three-rooted lower first molars were found on the right side of the mandible of the *Homo erectus* excavated from Zhoukoudian in 1959.
7. All the lower second molars of fossil teeth of China have five cusps.

SUMMARY

In sum, we have accumulated some basic dental morphological data for Neolithic human groups in north China. The preliminary impressions from the findings mentioned above also confirm south-north differences represented by Sundadonty and Sinodonty. Further analyses are necessary to explain some phenomenon revealed in this research, especially the temporal changes of certain dental morphological traits. Such an interpretation will demonstrate the course of the origin of modern Chinese. In the near future, some more dental and cranial specimens will be collected and the research will continue.

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The Anthropological Significance of Alveolalgia ("dry socket")

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The clinical syndrome known as "dry socket" (DS) is a frequently encountered complication of tooth extraction. The major symptom of this troublesome condition is a delayed-onset, excruciating pain following 2-4 days of minimal post-surgical discomfort (Archer, 1975, p.1106). Variously known as alveolalgia (inflammation of the alveolus), alveolar osteitis, and alveolitis, dry socket is characterized by 1) non-production or loss of socket blood clot, 2) improper granulation bed formation, and 3) localized jawbone inflammation (Schofield and Warren, 1981; Tomasetti et al., 1993). First documented a century ago, dry socket was initially described as "disintegration of a normal socket blood clot" (Crawford, 1896). X-rays can help to confirm the diagnosis of dry socket in two ways: a) by revealing another key defining indicator—"ghost imaging" of the socket, detectable up to three weeks following the extraction, and b) by ruling out jaw damage or sequestra (fragments of necrotic bone in the socket) as the source of the inflammation and pain (Abrahmsohn et al., 1993).

Reported incidence rates of dry socket range from 1-30% in various random and consecutive samples of dental removals, with an average of 3-5% for all extraction sites (Archer, 1975, p. 1628; Lilly et al., 1974). Dry socket incidence is highest in impacted mandibular tooth extractions, especially third molars where the rate of occurrence is 14-35% (Belinfante et al., 1973; Krekmanov, 1981). The latter author reported dry socket in 17.4% of a sample of 195 extraction patients with "partially erupted or totally impacted" mandibular third molars (Krekmanov, 1981).

While the exact cause of dry socket has been a debated issue among researcher since its initial discovery, "faulty healing" is usually cited as the principal precipitating factor. Amber (1973) pinpoints the pathogenesis to a disruption in the healing process between "Stage 1" (blood clot formation) and "Stage 2" (granulation tissue deposition) of normal extraction recovery. Lacking the necessary amount of granulation tissue, the bony walls of the empty socket are subsequently exposed to the outside air which may increase both the severity of the pain and the risk of local infection (Tomasetti et al., 1993).

TABLE 1. Dry Socket (DS) incidence in samples of dental extraction patients.

N	DS Frequency	Reference
696	3.5%	present study
6,403	2.2%	Krogh (1937)
1,274	2.6%	Turner (1982)
300	7.6%	Schatz et al. (1987)
400	5.0%	Belinfante et al. (1973)

A variety of possible contributing influences in the etiology and development of dry socket have been suggested in the literature on this controversial subject, ranging from bacterial infection to anesthetic side effects, fibrin breakdown, nutritional deficiency (e.g. iron, calcium, vitamin D, etc.), insufficient blood supply in socket or surrounding bone, decreased oxygen supply to socket due to cigarette smoking, and patient usage of drugs and medications such as contraceptive tablets during the recovery period (Nordenram and Graves, 1983; Schatz et al., 1987; Nitzan, 1983). The latter author has identified a specific bacterium (*treponemea denticola*) that may be responsible for the fibrinolysis that might lead to dry socket (Nitzan, 1983), and Krekmanov (1981, p. 183) noted that dry socket patients had "denser oral microbial populations than normal" immediately prior to their extraction operations. Other investigators have thus attempted to treat or prevent dry socket with antibiotics (e.g. Sorensen and Preisch, 1987; Swanson, 1989). The elevated frequency of dry socket incidence in sockets of impacted molars points also to surgical trauma accompanying more difficult extractions as another potentially contributing factor. The possibility of genetic predisposition to dry socket has not been discussed in the literature.

As part of a wider investigation of the possible role of dietary and supplemental nutrients in enhancing tooth extraction recovery (Halberstein, 1993; Halberstein and Abrahmsohn, 1988, 1995; Abrahmsohn et al., 1993), dry socket was analyzed in a sample 696 consecutive extraction patients who visited a dental/oral surgery clinic in Miami, FL. In addition to dry socket evaluations, extensive demographic and health history data were collected from each subject including gender, age, occupation, marital status, past diseases and injuries, previous medical care, recent or current medication, allergies, smoking/non-smoking status, etc. Dental X-rays were taken before each extraction and following one full week of recovery. A deliberate effort was made to standardize each extraction and the post-surgical experience of each subject in the sample. The post-operative dietary and supplemental nutrient intake of the patients was closely monitored and quantified through the analysis of patient's daily food/drink diaries.

In the present sample of 696 extraction patients, 24, or 3.5%, experienced a dry socket. As Table 1 indicates, this incidence rate is generally in line with other published reports regarding all extraction sites combined.

In Table 2 demographic and clinical characteristics of the present sample of dry socket patients (n=24) are compared to the total sample of extraction patient (N=696) as follows. The higher incidence of dry socket in females in the present study corroborates previous research (Krogh, 1937; Nordenram and Grave, 1983; Tomasetti et al., 1993), although the absence of gender differences has also been reported (Turner, 1982). Dry socket subjects appear to differ from the remainder of the extraction patients in the present sample in overall health status, as suggested by higher rates of previous diseases/medical care, allergies, and cigarette smoking. Pre-operative oral infection was not observed in any of the extraction patients eventually diagnosed with dry socket.

TABLE 2. *Dry socket (DS) patient compared to all extraction patients in the present study.*

Variable	DS sample (N=24)	Total sample (N=696)
Gender (m/f)	41.7%/58.3%	48.4%/51.6%
Age range	16-60	10-88
Under Physician's care in past five years	37.5%	25.6%
Allergies to food or drugs	29.2%	17.0%
Smoker/Non-smoker	16.7%/83.3%	12.2%/87.8%

Each of the presently described dry socket individuals was provided supplemental vitamin C (total intake = 4,000 mg/day), and the symptoms completely subsided within four days in every case. Vitamin C was also tested a possible dry socket preventive, as it was associated with reduced incidence compared to placebo recipients and other control patients who underwent tooth removal (Abrahmsohn et al., 1993; Halberstein and Abrahmsohn, 1988).

The present data indicate that a complex combination of factors, perhaps both genetic and environmental, may be involved in the etiology and development process of dry socket. Gender and health status appear to be related to dry socket incidence, although the present sample is relatively low. Our research also supports prior work which characterizes dry socket as a problem of inflammation more so than infection. Further research is required on additional dry socket patients in order to investigate these possible correlations. The present findings indicate that the possibility of genetic predisposition to dry socket also deserves additional attention.

According to McKusick (1992) in order to determine its genetic basis a biological trait should have a clear-cut, well-defined phenotype (measurable biological expression for gene action or genetic combinations); and pedigree data consistently demonstrating transmission within family and/or population lineages, such as concordance between twins, parent-offspring, or siblings irrespective of environmental variations. The present study provides evidence for the hypothesis that dry socket is a well-defined characteristic with consistent, nearly stereotypical symptomatology. On the other hand, pedigree analysis is proving exceedingly difficult due to the previously noted fact that dry socket has often been misdiagnosed or undiagnosed altogether (Amber, 1973; Nitzan, 1983). Thus, additional investigation is required to ascertain whether or not a pattern of dry socket incidence exists in family, kinship, or ethnic/racial groups.

This research underscores our repeated observation that vitamin C might be an effective therapeutic treatment for dry socket. It should also be re-tested as a potentially powerful preventive for dry socket in carefully administered "megadose" form. Our data suggest that the value of dietary and supplementary ascorbic acid in promoting rapid extraction recovery lies mainly in its well-documented role in scar tissue and granulation bed formation: vitamin C stimulates the body's manufacture of collagen, a non-dietary protein which is a major component of connective tissue.

Dry socket is an intriguing clinical phenomenon that should be reexamined by medical and dental anthropologists. In order to better understand the causes and potential treatment for dry socket it is necessary to clarify the array of assorted precipitating factors that may be involved. Increased research and information on the likelihood of various genetic, environmental, and biodemographic forces might ultimately lead to greater predictability, management, and control of this problematic condition.

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TOOTH EVULSION AMONG THE ANCIENT ETRUSCANS: RECYCLING IN ANTIQUITY

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Tooth evulsion among the southern Etruscans, particularly around the area of Tarquinia, about 96 km north of Rome, has been suggested by indirect evidence. A long term program of study of Etruscan and other ancient dental appliances (Becker 1994a,b; in press) has revealed answers to many questions regarding the use of these items. The myth that the Poggio Gaiella appliance had orthodontic value (Corruccini and Pacciani, 1989) has been dispelled (Becker, Ms. A). The most notable finding of this research, based on direct, intensive study of nine examples and the skulls and teeth which they are now associated, has been that all of these appliances were made for women. In particular, the majority appear to have served purely ornamental functions, with the retention of loose teeth clearly a secondary and possibly only incidental result of their use. This fits with what we know about the public presentation of Etruscan women, who held relatively high status in their society. Both Greek and Roman women at that time were bound by cultural "avoidances" that severely limited their appearance in public.

Another important conclusion from this research is that the manufacture and use of these "appliances" was concentrated in southern Etruria (in central Italy between the Arno and Tiber rivers and between the Apennines Mountains and the Tyrrhenian Sea), perhaps limited to the region within the cultural sphere of Tarquinia. The decline and end of the use of the Etruscan type appliances appears to correlate with the Romanization of this region, which accelerated sharply in the first century BC. Since jewelry and other ornaments continued to be worn by women from all cultures in this region, the question to be asked concerns the loss of that quite specific aspect of Etruscan culture relating to women and dental ornamentation.

Placing this question in another context has opened up the possibility that a hitherto unrecognized cultural phenomenon is critical in this particular aspect of culture change. Since maxillary central incisors are not commonly lost to decay or to any other natural cause, one might wonder about the source of a demand for pontics that almost invariably include one or both maxillary central incisors.

My hypothesis is that tooth evulsion was practiced in Etruria and that the gold pontics were used as replacements and as ornaments. Furthermore, the false teeth may have been made from ivory or other durable materials. I suspect that in some cases the removed teeth were recycled as the material from which false teeth were cut and later riveted into the gold appliance.

The Etruscans and most Iron Age Italic peoples practiced cremation, thereby reducing sharply possible observations of the alveolar regions by which tooth evulsion might be identified. By the 7th century BC inhumation had become the rule throughout this region. Yet, preservation in large open tomb situations was poor (Becker, 1993).

Before 1987 few skeletal remains had been recovered from the area, let alone provided adequate curation. Recent excavation programs at Tarquinia have generated useful samples of skeletal material. A careful review of the fragmentary remains now in storage at Tarquinia may provide support for this thesis regarding tooth evulsion.

At this time I am interested in archaeological as well as ethnographic information regarding tooth evulsion. A. M. Haeussler has pointed out to me Suzuki's (1982) important paper. I would very much appreciate having interested colleagues send to me other references to tooth evulsion, from any context. The information contained within the literature will be useful in drawing possible cultural comparisons with what is now known regarding Etruscan culture.