A Probable Case of Treponematosis Associated with the San Fernando Rey de España de Velicatá Mission, Baja California, Mexico

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Abstract

A 40 ± 5 year old, probable male human skeleton (SFV-F3-1a) discovered near the San Fernando Rey de España de Velicatá Mission in the north central desert of the Baja California peninsula shows a number of skeletal lesions suggestive of a chronic treponemal infection. These include cortical thickening with surface changes of the humeri, left ulna, and left tibia and fibula. Medullary narrowing from endosteal ossification is also present in these bones. The disease was inactive at the time of death. The skeletal lesions are typical of a nonvenereal treponematosis (yaws or bejel), which is consistent with previous data showing that nonvenereal treponematosis, likely bejel, was endemic to the precontact Las Palmas culture of the Cape region of Baja California. An AMS radiocarbon date (uncalibrated conventional radiocarbon date of 60 ± 50 BP [TO-6785]) clearly places this skeleton very late, likely in the Historic period. This is the first case of treponemal disease associated with Comondú period or Cochimí skeletal remains. This individual was buried in the extended position in a southeast-northwest orientation which is not generally regarded as the Christian burial position. The fact that he suffered from a nonvenereal treponemal disease is noteworthy in that this condition provided immunological protection from venereal syphilis, which ravaged the Cochimí Indian missions in the Historic period. This case provides continuing evidence of the pervasiveness of treponemal disease in the New World, even in relatively isolated regions such as the Baja California peninsula.

Introduction

This paper describes a human skeleton with treponematosis that may be associated with the Misión San Fernando Rey de España de Velicatá in the north central Baja California peninsula (Figures 1 and 2). The skeleton was the most complete of a number salvaged by one of us (EWR) in July 1995. Following descriptions of the site, its archaeo-historical context, and human remains, the paper focuses on the broader question of diagnosis (i.e., specific type of treponemal disease) and treponemal disease among the Indians of the Baja California peninsula. In the determination of the specific form of treponematosis, the paper addresses two current models in the often disputatious literature on the subject of the origins and types of treponematosis impacting human populations in antiquity.

Background

Fray Junípero Serra established the Misión San Fernando Rey de España de Velicatá in 1769. Located in the northern part of the Baja California peninsula, approximately 56 km inland from the Pacific Ocean and 18 km south of the Río Rosario, it is the only Franciscan mission site on the peninsula (Aschmann 1959; Tuohy 1979). It ceased operation in 1817, thus lasting nearly a half century. The Franciscans, like the Jesuits before them, were involved in administering Catholicism to the indigenous Cochimí peoples who occupied this region, possibly for several millennia prior to European contact (Tyson 1977). The Jesuits, who pioneered the missionization of the peninsula from 1697 to 1768, documented the traditional Native lifestyle in this sometimes hostile desert ecozone. The people were...
Figure 1. Missions of Baja California. Arrow highlights Misión San Fernando Rey de España de Velicatá (after Consag 2001: Map 1:22).

Figure 2. “Ruins of San Fernando Mission,” April 12, 1953. Howard E. Gulick image courtesy of University of California, San Diego, Mandeville Special Collections Library.
scantly clothed, exploited both terrestrial and marine resources, and moved frequently from camp to camp (Aschmann 1966), all aspects of Native life that were considerably transformed by the time the Franciscans constructed the Misión San Fernando Rey de España de Velicatá. In particular, the Native population was in considerable demographic decline by the mid-1700s, primarily from European diseases (Cook 1937; Mathes 1989). Among these, venereal syphilis was hypothesized to have played a significant role in the decline of the aboriginal populations throughout the peninsula beginning in the Cape region in the 1700s and spreading quickly among the Native Baja Californians thereafter (Cook 1935, 1937). Although doubt persists as to whether the disease was of European origin (Cook 1935; Molto 2005) or whether it originated in the peninsula (Cook 1937), few medical historians doubt that venereal syphilis was pervasive in its effects on Amerindian populations during the sixteenth century.

The apparent mission cemetery (Figure 3) is located approximately 150 m southeast of the adobe ruins that are still visible on the landscape (Figure 2). In recent years human remains have been exposed by natural and human agencies. This prompted a quick salvage operation in 1995 by one of us (EWR) under permit from the Instituto Nacional de Antropología e Historia. Figure 4 shows the site location and the known limits of the cemetery. Since systematic archaeological survey/testing was not undertaken, the overall size may be greater. At least 11 incomplete individuals from four loci were recovered in the 1995 salvage. The most complete was a primary burial, SFV-L3-1a (SFV-3), which is of interest for its attendant pathology. The burial was disturbed with some articulations in place (vertebral column). It was 43 cm below the surface and was slightly inclined on its back, oriented in a southeast-northwest axis with head to the north, a burial mode not associated with the general Christian position (east-west with head to the west). However, it is possible that this burial was oriented toward the mission church. This Historic period burial was AMS radiocarbon dated to 60 ± 50 years BP by the IsoTrace Laboratory at the University of Toronto (T0-6785).

**Burial SFV-L3-1a**

Figure 5 provides a diagrammatic representation of the skeletal inventory. Of note is the fact that many key skeletal elements are missing including the skull, the hands, most of the lower infracranial skeleton, and the pelvis. An isolated left tibia and left fibula from adjacent loci are also likely associated with this burial, since they have similar pathological changes and articulate with each other.

The absence of the skull, dentition, and hips complicates the estimate of age and sex. This is further complicated by the fact that there are virtually no comparative data on Comondú period skeletons (Noble 1973). Sex is more likely male than female on the basis of long bone measurements and robusticity (see Table 1). For example, the humeral heads were each 42 mm in diameter, which is above the cutoff point for deciding male Pecos Pueblo Amerindians (France 1983) but intermediate between the sexes in the central Californian populations reported by Dittrick and Suchey (1986). The deltoid tuberosities are moderately robust which is more male-like than female-like, but females in this population may have been involved in strenuous activities. Stature calculated from the humeri using the regression formulae for Mongoloid males produced by Trotter (1970) is 5 ft 2.7 in ± 1.67 in. Thus the individual is small with a 68 percent probability that his height is approximately between 5 ft 1 in and 5 ft 4.25 in. Slight arthritic lipping occurs on the right and left shoulders (humeral heads and the glenoid fossae), on the right and left elbows, and in the right Cervical 7-Thoracic 1 articulation. Spondylitis deformans (osteoarthrosis) occurs on all the lumbar vertebrae, particularly on the superior bodies of L3 and L4 (Figure 6). Such changes do not occur on Las Palmas males until the late third/early fourth decade. The Iscan-Loth method (Iscan and Loth 1985, 1986; Iscan et al. 1984)
Figure 3. Salvage crew inspecting the cemetery for skeletal remains.

Figure 4. Plan view map of San Fernando Rey de España de Velicatá Mission (after Sauer and Meigs 1927:Figure 5).

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for assessing changes in the sternal rib indicates an age of 28.2 (mean of stage 4) to 38.8 (mean of stage 5) years. However, several of the lower ribs (R8 and R9) have the osteophytotic and arthritic changes that suggest this male is older. An estimated age is 40 ± 5 years seems a reasonable compromise to the variant patterns.

The pathological skeletal changes are illustrated and described in Figures 7 to 12. Bone thickening with surface changes occurs on both humeri, the left ulna, the right tibia, and the right fibula. The anterior tibial diaphysis is broken, clearly exposing the medullary cavity and cortex, which shows the bone deposition in the mid to inferior diaphyseal region. This pattern of deposition is characteristic of the development of sabre shin deformity. In the humeri the changes involve fusiform (spindle-like or tapered at its ends) thickening of the diaphyses with the right having more pronounced involvement than the left. Radiographic analysis confirms that the thickening is a concomitant of both periosteal and endosteal deposition. The latter has resulted in medullary narrowing in all these pathological bones. The long healed lesions on these bones represent past periosteal and endosteal swelling and inflammation with concomitant bone deposition and focal points (nodes) of continued infection in the tertiary stage of treponemal bone disease. In active treponemal infections of long bones, there is evidence of a combination of osteoblastic and osteolytic changes, this being characterized by pits within the expanded cortical bone and superficial cavitations which in the living would team with treponemes and the byproducts of the inflammatory response. Clearly the disease process in SFV-3 has long since healed leaving the bones in a siccant (dry-healed) state with a cortex that is thickened with surface changes from past osteoblastic activity and a medullary cavity that has narrowed from endo-osteoblastic bone deposition (see Hackett 1976). The surface lesions can be described as nongummatous treponemal periosteal changes (Elting and Starna 1984). The only other evidence of bone pathology is healed fractures of the left clavicle and two left ribs.
Table 1. Morphological data for SFV-F3-1a; all measurements in mm.

<table>
<thead>
<tr>
<th>Clavicle</th>
<th>R</th>
<th>L</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length</td>
<td>150</td>
<td>144</td>
<td>healed fracture</td>
</tr>
<tr>
<td>Humerus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum length</td>
<td>282</td>
<td>284</td>
<td></td>
</tr>
<tr>
<td>Maximum head</td>
<td>42</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Maximum distal</td>
<td>56</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Cap-trochlea length</td>
<td>43</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Maximum midshaft</td>
<td>X</td>
<td>X</td>
<td>not taken, bone thickened</td>
</tr>
<tr>
<td>Septal aperture</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Suratrocchlear spur</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Ulna</td>
<td></td>
<td></td>
<td>left proximal thickened 17mm</td>
</tr>
<tr>
<td>Maximum length</td>
<td>248</td>
<td>247</td>
<td></td>
</tr>
<tr>
<td>Radius</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum length</td>
<td>X</td>
<td>230</td>
<td>proximal right broken</td>
</tr>
<tr>
<td>Maximum head</td>
<td>X</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Maximum distal</td>
<td>26</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Scapula</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertebral border</td>
<td>136</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Glenoid fossa height</td>
<td>35</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Vertebrae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divided transverse foramen</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td>P</td>
<td>Trace</td>
<td>complete on R partial on L.</td>
</tr>
<tr>
<td>C7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supernumerary vertebrae</td>
<td>13 thoracic vertebrae</td>
<td>13 thoracic vertebrae</td>
<td></td>
</tr>
<tr>
<td>SBO</td>
<td>0/19 (2C, 12T and 5L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spondylosis L4 and L5</td>
<td>absent</td>
<td>absent</td>
<td></td>
</tr>
<tr>
<td>Sacralization L5</td>
<td>absent</td>
<td>absen</td>
<td></td>
</tr>
</tbody>
</table>

**Differential Diagnosis**

The osseous changes noted are consistent with a chronic but inactive (at the time of death) disease process. It suggests a successful immune response following a prolonged exposure period. A number of diseases are characterized by bone thickening with periosteal changes. These include hypertrophic osteoarthropathy; thyroid acropachy; melorheostosis; Paget’s disease; hypervitaminosis A; fluorosis; fungal diseases such as norcardiosis and blastomycosis; and bacterial diseases such as actinomycosis and treponematosis. The most likely candidate in this case is treponematosis on the basis of lesion type and distribution (see Steinbock 1976; Ortner and Putschar 1981; Rothschild and Rothschild 1995) plus the fact that treponemal disease is known to be endemic to the Baja California peninsula in precontact (Molto 2005) and historic times (Cook 1935, 1937; Molto 2005). In this regard Cook’s (1935:433) comments from an anonymous padre are relevant:
However; the disease which has killed most of the Indians of the missions has been syphilis. It has been spreading so rapidly that, after having annihilated all the people of the south (Pericu), it has spread to the north; and in the most prosperous missions, where formerly were to be found thousands of inhabitants, they are now found hardly numbering into the hundreds. Fatal misfortune! Some believe that this disease is of native origin, in that they have seen heathens (I have seen many) present that were infected with other sores and boils. I have noticed that these sores are not as bad as those which afflict the Christians. This leads me to believe that they might be of another kind, because the heathens never remain disabled for their task, and they are cured with the greatest ease and in a short space of time. The sores of the Christians are cured with the greatest difficulty and the disease spreads with great rapidity among them, while the heathens hardly infect each other. [Cook 1935:433]

This pattern, whereby the Christianized Indians suffered considerably whereas the pagans did not, suggests that the pagans had an acquired immunity to treponemal disease as a lifelong experience. In the non-Christianized Native population every individual would have been infected during childhood, and only those with compromised immunity, thus at risk to reinfection, would have bone changes in the tertiary stage of infection. The factors contributing to this nonvenereal treponemal pattern are lack of clothing.
poor hygiene, close physical contact (e.g., sleeping together, etc.), and sharing of common food sources. It is important to note that the immunity acquired from long-term exposure among the Native peoples would have protected adults from venereal infection. This is a possible reason why venereal treponematosis (syphilis) had a transient period before it impacted the Native populations on the peninsula (Molto 2005). The other is that the Indians raised from childhood in the missions wore clothes, bathed, slept in separate beds, etc. and thus would not have experienced the degree of childhood infection as their pagan brethren. Ultimately this missionization removed or considerably reduced the immunological surveillance resulting in venereal syphilis in adults that were exposed to the spirochete during sexual intercourse (Molto 2005).

It may not be a coincidence that venereal syphilis emerged as a significant disease approximately a generation after missionization in the Cape region, but which of the three treponemal diseases (i.e., syphilis, yaws, and bejel) known to involve the skeleton affected our individual?

Addressing this question is difficult since these diseases cannot be successfully distinguished microbiologically, biochemically, histologically, molecularly (using DNA), or immunologically (Baker and Armelagos 1988; Ortner et al. 1992). Also, the skeleton and the sample are incomplete, and we are dealing with a single specimen and not a population. Recently, Rothschild and Rothschild (1995) argued that long bone lesions can not only be used to diagnose treponematosis in archaeological bone but also that the distribution and type of lesions differentiate the three

Figure 7. Posterior views of the upper appendicular skeleton arm bones. The right and left humeri and left ulna show healed lesions with diaphyseal thickening. The right ulna and radius are healthy.
treponemal diseases (i.e., bejel, yaws, and venereal syphilis) known to involve the skeleton (Table 2). In their model, ironically called SPIRAL, they note that the number of bone groups (e.g., tibia is one bone group) involved is greatest with yaws (always greater than three) and least in syphilis and bejel (both with two or less). They propose that tibial thickening (sabre shin) is always bilateral with bejel and yaws and unilateral with syphilis, and bejel and yaws always have evidence of bilateral periosteal reactions. Spiculated periosteal reactions are most common in bejel. Both bejel and yaws have a higher prevalence of skeletal infection that involves subadults. This model, which to date is based on just a few samples, is controversial primarily because human treponemal diseases can only be differentiated on the basis of ecological patterns; as noted above the bacteria of pinta, yaws, bejel and syphilis cannot be biologically separated.

This fact is the cornerstone of the Unitarian Model of Butler (Butler 1936), which was given its strongest advocacy and support by Hudson (1958, 1965).
Table 2. Criteria for differentiating the various treponemal diseases affecting SFV-F3-1A.

<table>
<thead>
<tr>
<th>Lesion Type</th>
<th>Yaws</th>
<th>Bejel</th>
<th>Syphilis</th>
<th>SFV-F3-1a</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology - hot, dry desert</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>likely bejel</td>
</tr>
<tr>
<td>Lesions healed</td>
<td>yes/no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>likely bejel</td>
</tr>
<tr>
<td>Sabre shin</td>
<td>33%</td>
<td>25%</td>
<td>4%</td>
<td>yes</td>
<td>yaws/bejel</td>
</tr>
<tr>
<td>Sabre shin without periostitis</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>bejel/yaws</td>
</tr>
<tr>
<td>Unilateral involvement of tibia</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>?</td>
<td>can't assess</td>
</tr>
<tr>
<td>Tibia without fibula involvement</td>
<td>49%</td>
<td>71%</td>
<td>36%</td>
<td>no</td>
<td>syphilis</td>
</tr>
<tr>
<td>Average number of bone groups &gt; 3</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yaws/bejel</td>
</tr>
<tr>
<td>Osseous thickening</td>
<td>8%</td>
<td>16%</td>
<td>4%</td>
<td>yes</td>
<td>bejel/yaws</td>
</tr>
</tbody>
</table>

*Tertiary syphilis is deadly.

suggests that there is one treponemal bacterium, *T. pallidum*, and the four treponemal diseases pathogenic to *Homo sapiens* represent different opportunities of infection offered by human populations. In the tropics where clothing is scanty, children are continually exposed to the bacterium and will develop skin lesions followed by systemic seeding. Bone involvement occurs in the tertiary stage after a prolonged but variable period of latency. In hot humid areas yaws is found, whereas bejel occurs in hot dry regions. According to this hypothesis, syphilis evolved later in more urban populations where better hygiene, clothing, and other cultural practices combine to break the pattern of childhood transmission found with bejel, yaws, and pinta. Congenital syphilis is only associated with venereal treponematosis, since the host (an infected pregnant female) had no previous exposure precluding antibody surveillance of the treponemes, thus increasing the likelihood of mother to fetus transmission. In populations where females are exposed to treponematosis from birth, they develop antibodies which reduce the risks of subsequent infection and mother to fetus transmission. While the osseous lesions are similar in the three treponematoses known to involve the skeleton, variant timing and portal entry characteristics hypothetically could result in differences in the distribution and manifestations of the lesions. For example, in hot humid tropics people characteristically have moist skin, and abrasions on the extremities (hands, feet, arms and legs) increase the chances of treponemes infecting underlying bones. This, for example, could be a reason for the Rothschilds’ data showing osseous impact of the hand and foot bones only in yaws. Why there are differences in the tibial lesions between yaws, bejel, and syphilis is difficult to address (Bruce Rothschild, personal communication 1997). The important point is that the Unitarian model sees the patterns of osseous impact as concomitant of a single organism, while the same variant pattern is interpreted by the Rothschilds (1994,1995) as a concomitant of different treponemal diseases as reflected in clinical classification.

Table 2 summarizes some of the criteria from the Rothschild and Rothschild model. Both models eliminate venereal syphilis, although for different reasons. The lesion pattern and ecological circumstances clearly suggest a nonvenereal treponematosis. First and foremost the lesions are well healed, which is rare in sufferers of venereal syphilis and particularly common with those experiencing bejel. Concerning the latter, the ethnohistoric documents note that the region was a desert and the native inhabitants (Co-chimi and likely their antecedent Comondú culture) were scantily clothed, thus facilitating the childhood transmission pattern typical of the nonvenereal
A Probable Case of Treponematosis, Baja California, Mexico

While the Comondú skeletal sample is very small and fragmentary and lacks a representative sample of infracranial skeletons for subadults, the Las Palmas people in the southern region adjacent to the Central Desert had an endemic nonvenereal treponematosis (Molto 1994). The distribution of lesions in the 17 affected Las Palmas skeletons is typical of those of bejel (Molto 2005), although it is important to note that though the Cape region, like the central peninsula, is a dry desert ecozone, the weather from June to November can be very hot and humid, ecological correlates for yaws. Using the Rothschilds’ criteria (see Table 2), the classification of the nonvenereal treponematosis affecting SFV-F3-1a only slightly favors bejel. The polystotic bone involvement (at least four types) is typical of yaws, whereas the thickening and spiculated periosteal reactions favor bejel with the tibial criteria essentially being neutral between the two diseases. Since this is a population based model, it has a limited application to isolated and incomplete specimens. For example, while the Las Palmas data had an average of ≈ 2 bone groups involved (Molto 2005), nine of 17 that could be analyzed for a large number of bone groups had at least three or more groups involved. Moreover, while both the fibula and tibia are involved in SFV-3, the bilaterality of the infection could not be analyzed. Thus, when dealing with a single skeleton, it is problematic to assign a disease based on population criteria. Considering the climate and the presence of bejel in the Las Palmas material, we posit that bejel is the most likely treponemal infection experienced by SFV-3, although it is unequivocally a nonvenereal form.

It is important also to note that venereal syphilis was hypothesized to be present in the Velicatá mission population:

This [mission expansion northward] accelerated congregation of Indians in the missions [Velicatá], and thus placed a larger number of people at risk to epidemic-disease-related death in a shorter period of
time. Increased traffic through the northern region also facilitated the spread of epidemics, and the presence of a permanent garrison of soldiers led to the spread of syphilis. [Jackson 1983:77]

The burial position and the late radiocarbon date indicate that the cemetery containing SFV-3 was likely associated with the mission. If the hypothesis about the effect of missionization on the immunological experience of Christianized Indians is correct, then SFV-3 was likely a late convert to the mission rather than a person who was raised at the mission as a child. In preantibiotic periods individuals with tertiary venereal syphilis rarely would have survived the disease, leaving active lesions on the skeleton.

Figure 10. A. Anterior view of the left tibia and fibula showing thickening and surface changes. B. Closeup of broken mid-diaphyseal area showing bone thickening and the trabecular nature of the underlying cortical bone. This bone probably had “sabre-shin” development, but the postmortem breakage makes confirmation of this presumptive.
Conclusion

Clearly, both the Unitarian and Rothschilds’ models suggest that SFV-3F-1a had a nonvenereal treponematosis. The disease was longstanding and was inactive at the time of this person’s death, and thus it was not an associated cause of death. The problem of specific diagnosis, that is differentiating the two nonvenereal forms, is considerable. The pattern of lesions and the number of bone groups involved fit most closely with yaws, using the Rothschilds’ model. Yet, as demonstrated, the larger Las Palmas sample from the Cape region (Molto 1994, 2005) indicates bejel was the form of treponematosis endemic to the peninsula in the late precontact and early contact period. SFV-3 is a single specimen, and the Rothschilds’ model is based on population data; it is risky to attempt a specific diagnosis on isolated specimens. Also, the literature on both the origins and nature of the osseous impact of the treponemal diseases is in dispute. For example, on the question of origins, both models discussed herein see yaws as the original treponematosis that was brought to the Americas during the peopling of the New World. Based on infracraniel lesion patterns, Rothschild and Rothschild (1996) suggest that yaws mutated to syphilis and bejel in the New World at a later date. Yet, in modern epidemiology, yaws is a tropical disease, and many anthropologists familiar with the cold Beringia and northern North America ecozones question this evolutionary construct. Baker and Armelagos (1988) posit that treponematosis is a New World disease syndrome. What this case shows is that virtually any New World population sample from tropical, subtropical, and lower temperate ecozones will provide skeletal evidence of treponematosis. This unbroken cline shows the pervasiveness of this disease syndrome in the precontact Americas.

The SFV-F3-1a evidence is a case in point. If a large representative sample of skeletons was available for Comondú groups, it is almost certain that
a predictable number, about 20 percent, would show treponematosis. In the Old World a number of pre-Columbian sites show presumptive evidence of treponemal disease (e.g., Metaponto Italy [M. Henneberg and R. J. Henneberg 1994]; Merotic and x-Phase Nubian sites [Rothschild and Rothschild 1996]); yet there are large geographic and temporal hiatuses in the distribution. For example, from the Dakhleh Oasis, located north of the Nubian sites, and interphasing with the latter cultures temporally, the senior author has examined over 1400 skeletons, and there is not a single lesion that can be unequivocally assigned to a treponematosis; there are no cases of caries sicca, sabre shin, or the type of healed lesions described herein for SFV-F3-1a. If a nonvenereal treponematosis (i.e., bejel) was endemic to the Old World, it should show up in Egypt. In the Dakhleh sample at least 120 and more likely 280 skeletons would be expected to show osseous treponematosis. Since these Middle East populations were in dynamic trading relations and other interactions, the absence of skeletal treponematosis in Dakhleh and

Figure 12. Radiographs of the humeri and ulnae of SFV-3 (posterior views). Note the cortical thickening of both humeri and the left ulna. Thickening occurs throughout the right diaphysis. Medullary narrowing from endosteal deposition is present in each of these bones.

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the rest of Egypt does not make epidemiological sense. Since the senior author has worked with New World treponematosis and is familiar with the skeletal lesions manifested, failure to recognize skeletal treponematosis when it was present is highly unlikely. The problem of pre-Columbian treponematosis in the Old World continues to challenge paleoepidemiologists.

In sum, the San Fernando Velicatá skeleton provides the first evidence of treponemal disease in central Baja California. The pattern of lesions and the presence of bejel in the precontact and postcontact Las Palmas populations suggest the disease impacting the SFV-3 skeleton was bejel. The exclusion of venereal syphilis is interesting given the ethnohistoric literature which indicates syphilis was common at the Baja California missions. Epidemiologically, only one treponemal disease should be expected among contiguous populations (see Steinbock 1976). This suggests that when dealing with small or isolated samples the recent population model for diagnosing specific treponemal diseases from infra-cranial lesions should be done with caution. This case in an “isolated” peninsula adds to the corpus of data showing the pervasiveness of this disease syndrome in the New World. Since the earliest evidence of treponemal disease comes from central Mexico (see Anderson 1967), an Occam’s razor approach would support a tropical New World origin for treponemal disease.

Acknowledgments

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