

ARCHEOLOGY AND HUMAN OSTEOLOGY AT CA-SCL-137, THE SNELL SITE

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ABSTRACT

The Snell site, CA-SCL-137, provides a heuristic example of skeletal population for the South Bay Middle Period. The deposit itself represents the remains of a habitation site and it appears to have a strong Middle Period component if not being Middle in its entirety. Human remains from the site presented in this report were unearthed in 1987 under Snell Avenue during the construction of an underground pipeline. A total of twenty-two individuals were exhumed in addition to modest grave lots and some isolated artifacts in the midden soil. The skeletal population is described in its metric, non-metric, pathological, and demographic characteristics. A brief description of the site's chronology is provided in order to establish a temporal setting for the osteological data.

GENERAL BACKGROUND OF THE SITE

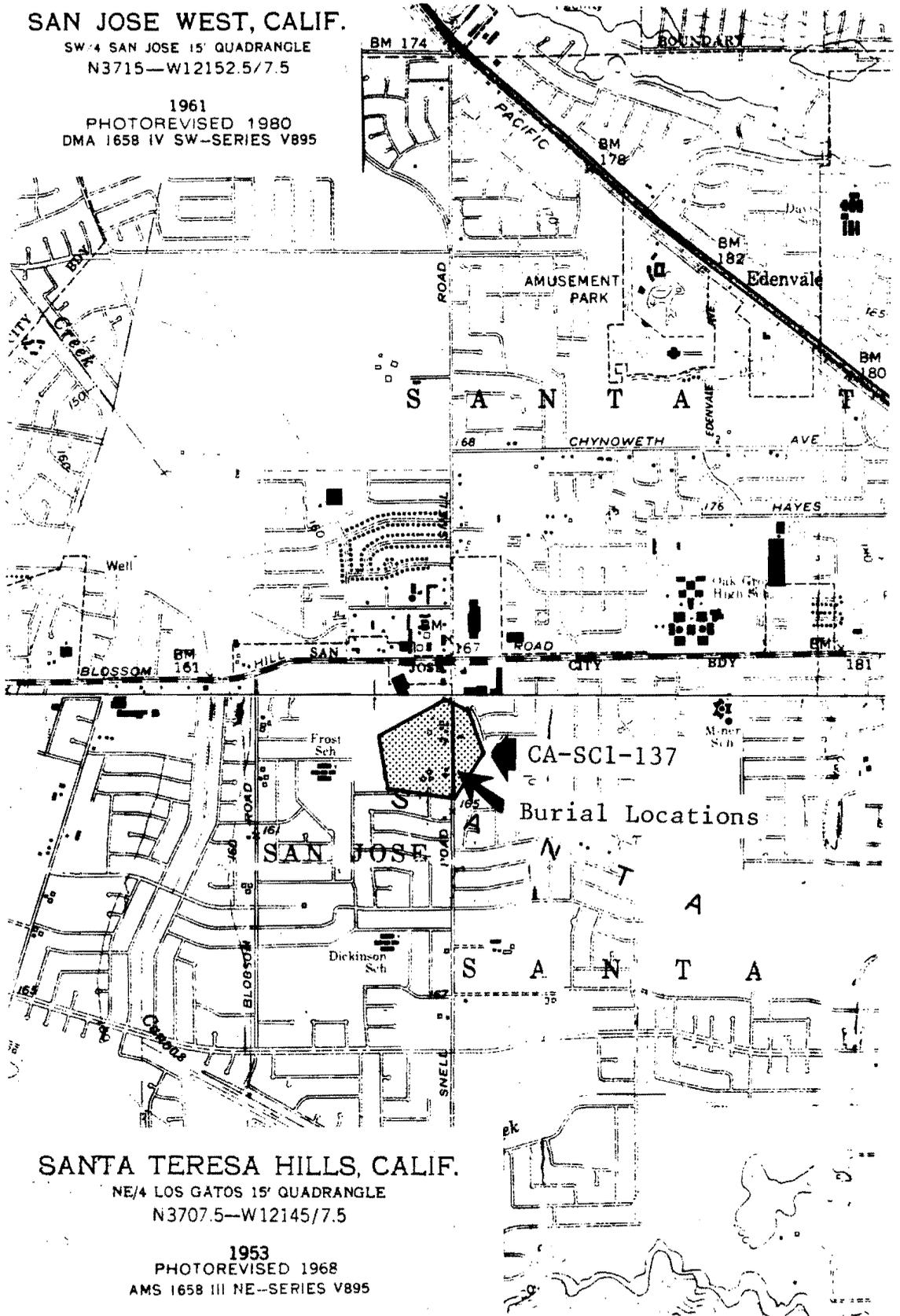
The Snell site is located to the south of the intersection of Blossom Hill Road and Snell Avenue in South San Jose (Figure 1). During the summer of 1987 when the archeological materials were unearthed, the site was partially covered by Snell Avenue, a shopping center, a residential subdivision, and a field being readied for the Guadalupe Transportation Corridor. Prior archeological studies at the site include avocational collecting and burial removal, recording of the site by King, Delgado, and Roehr (1974), and reconnaissance/testing by Dietz 1975; Winter 1977; Roop 1980, 1981; Roop, Gerike, and Duddy 1982; and Bard et al. 1986. Produced from these previous studies are artifact assemblages and other types of data which can be used to understand the nature and chronology of the site.

All of the researchers who have addressed the Snell site recognize that it is the remains from a prehistoric village once inhabited intensively with a fairly full spectrum of archeological elements from daily indigenous activities. The presence of stone artifacts, debitage from artifact production, shell ornaments, cooking debris, faunal remains, and graves in a deep and widespread deposit has lead archeologists to the conclusion that CA-SCL-137 was once a prominent habitation site.

SAN JOSE WEST, CALIF.

SW/4 SAN JOSE 15' QUADRANGLE
N3715—W12152.5/7.5

1961
PHOTOREVISED 1980
DMA 1658 IV SW—SERIES V895



SANTA TERESA HILLS, CALIF.

NE/4 LOS GATOS 15' QUADRANGLE
N3707.5—W12145/7.5

1953
PHOTOREVISED 1968
AMS 1658 III NE—SERIES V895

Figure 1. Site location

Several types of time sensitive artifacts and other information from the site have enabled archeologists to interpret the temporal character of CA-SC1-137. Basing an age estimate on temporally diagnostic artifacts excavated/collected up to 1981, Roop (1981) estimated the deposit to be Middle Horizon (1700 to 3000 years ago). Using ethnographic information, it was also postulated that CA-SC1-137 might have been a protohistoric site, 1700-1850s (ibid.). However, a much older estimate was arrived at in the studies by Bard et al. (1986) where artifacts and obsidian rim measurements were interpreted as indicating an activity period (4000 years or earlier) of Early Bay or Early Horizon. The use of obsidian rim measurements in the 1986 study contains several difficulties: 1) individual obsidian measurements are given absolute calendric dates, 2) a base line is assumed for obsidian hydration in the Santa Clara Valley, and 3) several of the obsidian specimens were surface finds. Without going into detail on these methodological questions, it will suffice to say that the designation of an Early Bay or Early Horizon may be considered more hypothetical rather than fact.

The most reliable determinator of chronology at CA-SC1-137 is the battery of radiometric dates available from the 1986 study (Bard et al. 1986) and this current study (Table 1). A total of four radiometric dates have been produced from the site, three from stratigraphically ordered levels in a test unit, and one from a burial association. All of the samples were of charcoal, and all were processed by Beta Analytic Inc. The range on the dates is relatively narrow, spanning a time-period between 50 B.C. to 720 B.C. Three of the radiocarbon dates generated out of test unit S55W25 provided dates which demonstrated superpositioning within the deposit. The fourth radiometric sample was taken approximately 100 feet away from the first three samples. All four samples, as mentioned above, dated within a 670 year bracket. This bracket, in the Central California Taxonomic System, is solidly fixed in the Middle Horizon or Period. The Middle Period, roughly ranging between 1000 to 3000 B.P., firmly incapsulates the 2000 to 2700 B.P. duration radiometrically documented at CA-SC1-137 (Table 2).

TABLE 1

RADIOMETRIC DATES FROM CA-SCL-137

Sample Material	Provenience	Radiometric B.P.	Lab #
Charcoal	ARM 20, 170+52	2070 \pm 90	21923
Charcoal	Unit S55W25, 100cm	2000 \pm 80	12682
Charcoal	Unit S55W25, 110cm	2060 \pm 120	12683
Charcoal	Unit S55W25, 170cm	2670 \pm 90	12684

TABLE 2

MIDDLE PERIOD CHRONOLOGY RELATIVE TO CA-SCL-137

LATE PERIOD	
1000 B.P.	
Transitional Phase	
1100 B.P.	-----
Terminal	
1400 B.P.	-----
Late Phase	
1600 B.P.	-----
Intermediate Phase	
1800 B.P.	-----
Early Phase	CA-SCL-137 Snell Site
3000 B.P.	-----
EARLY PERIOD	

Characteristics of the midden as seen in the exposure included charcoal, ash, and a dark brown friable silty loam with areas of light brown/tan mottling. The charcoal and ash lenses were often associated with burials and fire pits. Varying frequencies of fire-altered rock, fire-baked clay and vitrified earth were evident with higher concentrations found again at hearth and burial pit locations. Non-artifactual constituents within the midden included large and small mammal bone, some burnt; and shell, including *Ostrea*, *Haliotis*, and *Mytilus*. The midden also contained artifactual materials: groundstone, chipped lithics, bone tools, and shell beads. The cultural deposit contrasted markedly to the subsoils of light tan silt and very fine sand.

Several cultural features were located along the trench's west side wall. Of the twenty-two burials removed from the trench, six were partially within the west wall. Of these six, four burial pits were found below the midden within the yellowish tan subsoil. The remaining two burial pits were within the midden. Charcoal was associated with all burials. Artifacts found with the burial matrices included a Franciscan chert utilized flake, a biface, cores and debitage, a bone awl, antler wedges, shell beads, a mortar rim fragment, a sandstone pestle fragment, a grinding platform metate, and a bifacially pecked mono. Four fire pits were located along the west side wall. They were characterized by fire-cracked rock, fire-baked clay, ash lenses, and charcoal. Also associated with these fire pits were burned mammal bone, groundstone, and Franciscan chert debitage. These fire pits may have been associated with cooking or other activities.

OSTEOLOGICAL DESCRIPTION

This portion of the study presents the analysis of human skeletal remains of twenty-two inhumations from CA-SCL-137. One of the notable characteristics of the burials is that

field records mention scorching on the osteological elements at limb extremities and dorsal vertebra. Thirteen of the twenty-two burials exhibited this trait of partial cremation. Osteological treatment include metric cranial and postcranial data, nonmetric and morphological descriptions, dental attrition, traumas and pathologies. A comparison of lateral cranial contours with an Early Period site, CA-SMA-77, is an attempt to define differences in the skull shapes between the two populations.

Methods

Methods followed in the analysis of the remains from CA-SCL-137 are as follows. Cranial measurements taken are according to Howells (1973), with the exception of the orbital breadth. Orbital breadth, mandibular, and postcranial measurements come from Bass (1971). Nonmetric traits recorded are after Berry and Berry (1967). Molnar's paper (1971) was used as a guide to dental attrition. Calculation of stature derives from Genoves (1967) formula for Mesoamericans. Identification of pathological conditions used traits described by Ortner and Putschar (1981).

Criteria for age estimates include the relative phase of the pubic symphysis (Lovejoy et al. 1985; Meindel et al. 1985), epiphyseal fusion (Bass 1971), and length of the long bones in subadults (Johnston 1962). The basis for sex determinations include the size and shape of the sciatic notch, the width of the subpubic angle, the dimensions of the long bones, and the cranial morphology (Bass 1971).

Demographic data are summarized in Tables 3 and 4. Tables 5 and 6 show the results of stature calculations.

TABLE 3
RESULTS OF AGE AND SEX ANALYSIS
FROM CA-SCL-137

Burial		Burial	
ARM-1	Adult Male, Age 30-35	ARM-12	Adult Female, Age unkn.
ARM-2	Adult Female, Age unkn.	ARM-13	Adult Male, Age 45-50
ARM-3	Adult Male, Age 35-40	ARM-14	Adult Female, Age 35-40
ARM-4	Adult Female, Age unkn.	ARM-15	Adult Male, Age 40-45
ARM-5	Adult Female, Age 40-45	ARM-16	Adult Female, Age 18-21
ARM-6	Child, Age 15-18	ARM-17	Adult Female, Age 40-45
ARM-7	Adult, Age known	ARM-18	Adult Female, Age 35-40
ARM-8	Adult Female, Age 20-25	ARM-19	Adult Female, Age 35-40
ARM-9	Child, Age 9-11	ARM-20	Adult Male, Age 20-25
ARM-10	Adult Female, Age 30-35	ARM-21	Adult Male, Age 25-30
ARM-11	Adult Male, Age 20-25	ARM-22	Child, Age 6-9

TABLE 4
DISTRIBUTION OF SKELETONS BY AGE AND SEX

Age Ranges	Sex:	Unknown	Female	Male
0 to 6 years		-	-	-
6 to 12 years		2	-	-
12 to 18 years		-	2	2
25 to 30 years		-	-	1
30 to 35 years		-	1	1
35 to 40 years		-	3	1
40 to 45 years		-	2	1
over 45 years		-	-	1

TABLE 5
ESTIMATION OF STATURE IN MALES

Burial	Bone	Length	Stature	Burial	Bone	Length	Stature
ARM-1	Femur	44.4	164.50	ARM-15	Femur	45.4	166.50
ARM-3	Femur	43.4	162.00	ARM-15	Femur	44.5	164.50
ARM-11	Femur	46.8	169.00	ARM-21	Tibia	37.3	164.50
ARM-13	Femur	43.5	162.50				

TABLE 6
ESTIMATION OF STATURE IN FEMALES

Burial	Bone	Length	Stature	Burial	Bone	Length	Stature
ARM-2	Humerus	31.8	149.00	ARM-14	Tibia	34.0	153.50
ARM-4	Humerus	26.7	143.50	ARM-16	Femur	45.8	165.50
ARM-5	Femur	39.4	149.00	ARM-17	Femur	39.1	148.50
ARM-8	Femur	42.7	156.50	ARM-18	Femur	38.5	147.00
ARM-10	Femur	40.7	152.50	ARM-19	Femur	39.8	150.00
ARM-12	Femur	39.5	150.00				

Bone measurements and stature estimates are in centimeters. Tibiae are measured without the intercondyloid eminence.

Description

Nonmetric morphological descriptions have been used increasingly since the 1967 paper by Berry and Berry to show genetic relationships between populations. Most traits included in that paper have been scored for this population (see Table 7). Some traits have been deleted due either to their subjective nature or the fragmentary condition of the present series, other traits have been added. Sutural ossi-

TABLE 7

SUMMARY OF NONMETRIC TRAITS

Trait	Total	Percentage
1. Ossicle at lambda	2/14	14
2. Lambdoid ossicles	3/28	11
3. Parietal foramen	11/26	42
4. Ossicle at bregma	0/13	--
5. Metopism	0/14	--
6. Coronal ossicles	1/27	4
7. Epipteric bone present	0/7	--
8. Fronto-temporal articulation	0/8	--
9. Parietal notch bone present	4/26	15
10. Ossicle at asterion	2/26	8
11. Auditory Exostoses	0/27	--
12. Foremen of Huschke	10/30	33
13. Mastoid foramen exsutural	23/26	88
14. Mastoid foramen absent	4/27	15
15. Posterior condylar canal pat.	9/14	64
16. Condylar facet double	0/14	--
17. Precondylar tubercle present	0/7	--
18. Anter. condylar canal double	2/15	13
19. Acces. less palatine for. pres.	1/15	7
20. Palatine torus present	5/14	36
21. Maxillary torus present	0/27	--
22. Zygomatico-facial foramen abs.	4/21	19
23. Supraorbital foramen complete	16/30	53
24. Frontal notch/foramen present	17/29	59
25. Ant. ethmoid foramen exsutural	4/9	44
26. Posterior ethmoid foramen abs.	0/10	--
27. Acces. infarorbital foramen pres.	1/11	9
28. Infraorbital suture present	3/9	33
29. Median frontal torus present	1/14	7
30. Os Inca	0/14	--
31. Multiple Mental foramen	1/21	5

cles were scored as present only if they measured larger than 5 mm., and Inca bone was defined as present if a suture was present between both asterions. The cranial morphology of the remains from CA-SC1-137 site are summarized below.

The orbits are characterized by shapes that are equilateral or ellipsoidal. Brow ridges in the small male sample are robust, while in the females they range from slight to moderately heavy. The nasal apertures are pyriform in shape and the nasal bones are generally hourglass in shape. The nasal profile, where observable, is concave-convex. A supra-nasal suture, a persistence of the metopic suture in the brow ridge region, is present in 75 percent of the cases studied. Supraorbital foramen are complete in sixteen of thirty sides examined, and seventeen of twenty-nine possess frontal foramen. Frontal grooves were noted in eight of seventeen frontal bones, and zygo-facial foramina are absent in 23 percent of the cases examined. Frontal bossing is generally slight, as are zygomaxillary tuberosities.

Palatine tori are present in five individuals, four females and one child. The posterior condylar canal was found double in two of fifteen skulls with a base preserved well enough for determination. Because of the damaged nature of most basal regions, foramen ovale and spinosum were not included in the study.

No auditory exostoses was found. Parietal notch bones and ossicles at asterion were recorded in 15 percent and 7 percent of the skulls respectively. Tympanic dehiscence was found in ten of thirty sides reviewed, although two cases were found in Burial 22, which is a child, and would be expected.

Sagittal elevation is found in all cases, and flattening at lambda is a common conditions. Moderate parietal bossing and post-coronal constriction is noticeable in all skulls studied. The palates are horseshoe shaped with shelving in the anterior region, a feature related to prognathism. Cranial indices are presented in Table 8.

The male skeletons are generally robust with distinct muscle markings, while the females appear more gracile. The mean of the stature for males is 165 cm., the female mean is 151 cm. Stature range for males is 162 to 169.5 cm. The female stature range is 143.5 to 165.5 cm. The bones of the males are larger and are distinctly more rugged in appearance. Radio-humeral indices indicated relatively short fore-arms. Several humeri have a prominent deltoid tuberosity. Septal apertures are a common occurrence in the females.

The femurs of the females are platymeric although the males fall in the eurymeric category. The male tibiae are platycnemic, while the majority of the female tibiae are

TABLE 8

CRANIAL INDICES FROM CA-SCL-137

Females	Mean	Std.Dev.	Number	Range
Cranial Index	76.5	3.19	11	72.7-81.6
Height-Length	72.9	2.58	8	68.1-76.3
Height-Breadth	95.5	3.47	7	91.6-100.7
Cranial Module	146.5	2.63	7	143.0-150.0
Total Facial	87.2	4.19	3	81.6-88.7
Upper Facial	51.2	4.18	6	45.7-56.2
Orbital Index	87.4	5.10	7	44.7-56.3
Nasal Index	50.5	3.88	7	102.0-128.1
Maxillo-Alveolar	112.8	8.54	11	73.9-91.1
Mandibular	84.9	5.42	8	1256.8-1329.2
Cranial Capacity	1290.7	28.20	7	
Males	Mean	Std.Dev.	Number	Range
Cranial Index	70.8	-	1	-
Maxillo-Alveolar	109.5	-	1	-
Mandibular	78.3	-	1	-

Indices are expressed in mm.

mesocnemic to eurycnemic. This appears to contradict the trend of platycnemic tibiae found in other Middle populations in the area (Anastasio et al. 1986). The difference found in this index is a result of the shorter anterior-posterior diameter of the tibiae in CA-SC1-137. The etiology of a flat platycnemic index relates to functional, rather than generic causes (Lovejoy, Burnstein, and Heiple 1976). Precisely what functions contribute to the tibial shape are unknown; however, later, urban populations are usually eurycnemic (Bennett 1973). Cranial measurements are summarized in Appendices I and II. Postcranial measurements are in Appendix III.

The following is a brief description of the cranial forms of CA-SC1-137.

Cranial Capacity:

The mean cranial capacity of the female skulls reveal a small capacity. Because of the smaller number and conditions of the male crania, no capacity figures are available

Cranial Index:

The male crania are dolichocranic, or long-headed, while the female crania are mesocranic.

Length-Height Index:

The female skulls are in the orthocranic category, being average in height in relation to length. No male figures are available.

Breadth-Height Index:

This index indicates that the females from CA-SC1-137 are average or metriocranic.

Facial Index:

The females display total facial and upper facial proportions which are mesoprosopy and meseny respectively.

Orbital Index:

The orbits in the females are mesoconchy or medium. Condition of the male crania make it impossible to determine this index.

Nasal Index:

Values for this index indicate a medium, or mesorrhiny nasal aperture.

Maxillo-Alveolar Index:

The male and female values present an average or mesurancic palate.

Mandibular Index:

The values calculated for this index reveal brachygnathic or broad, short lower jaws for this population.

Pathology

Cranial

A preliminary analysis of the cranial pathologies of CA-SC1-137 include at least four examples of osteoporosis or hyperostosis. This condition usually appears confined to the sagittal regions of the vault. In two cases, mild forms of this condition exist in the orbital regions (cribra orbitalia).

Degenerative arthritic disease appears on the mandibular fossa and associated mandibular condyles of two individuals.

Lesions, possible depressed fractures, of indeterminate origin are present in two cases. One sample is situated across the lambdoidal suture on the right side of skull 18. A much larger example is present in skull 8. This lesion is 15 mm. long, 12 mm. wide, and 4.5 mm. deep. Surrounding this oblong depression is reactive bone which is light in color and smoother than the surrounding bone.

Dental

Of the total number of teeth available for study (267), thirteen, or 5 percent, were carious. The thirteen carious teeth are distributed among five individuals, or 31 percent of the crania examined. The number of crania observed with antemortem tooth loss is eight, or 50 percent. Seven individuals, or 43 percent, exhibit abscesses of the maxilla or manible.

Tooth wear is characterized by oblique wear angles. Eighty-one percent (13) of the individuals examined presented this wear pattern. A small enamel pearl is present on an isolated second molar from Burial 15. Two individuals had supernumerary teeth.

Postcranial

Instances of developmental pathologies in the remains from CA-SC1-137 include degenerative arthritic disease. Osteophytosis and lipping of the articular surfaces of the long bones and vertebrae is noted. This occurs on five of the individuals, or 23 percent of the population. There is one incidence of a bony spur on the right tibia, possibly an ossified ligament, on Burial 17. The fibula from this burial shows a distinct depression where it has articulated with the spur on the tibia.

Traumatic pathologies show up in a high percentage of these burials. There are five definite cases of broken long bone and one additional possible case, making the percentage at least 23 percent. Fractures of the upper long bones are the most prevalent. There are two broken radii and two ul-

nae, these include a double fracture from Burial 17. One humerus shows a healed fracture of the distal end. Burial 4 exhibits three healed fractures on the right ribs.

There are two cases of pathology due to infectious causes. Both of these involve the tibia. Burial 11 has a pronounced swelling of the distal end of the left tibia. Burial 6, a subadult, has periosteal build-ups on the right tibial shaft, one anteriorly, and one posteriorly within 50 mm. of each other.

INTERSITE ANALYSIS

The purpose of this analysis is to demonstrate in a univariate approach, the morphological changes that occurred in size and shape between an Early and a Middle Period Amerindian population in the South Bay region.

The material for this study is derived from two sources, an Early Period site in San Mateo County and the Snell site. The Early sample, from CA-SMa-77, consists of four males and three females (Gerow 1968) with radiocarbon dates encompassing 2596-3460 B.P. (Breschini et al. 1986). The specimens from the Snell site represent a Middle Period component as discussed above. The Snell site burial sample is comprised of seven males and twelve females. The radiocarbon dates from the Snell site are presented elsewhere in this paper. Many of the original measurements of the Snell burials are contained in Cartier et al. (1987).

The technique employed in this analysis is dependent on the construction of lateral cranial contours composed of a series of cranio-facial measurements taken from familiar landmarks (Frayer 1984). The measurements consist of twenty lengths and chords taken in the sagittal plane as outlined in Table 9. Comparisons are made by superimposing one lateral contour over another with basion and bregma overlapping exactly. Differences in size and shape can be more readily recognized with this method than with standard columns of data normally employed in univariate analysis. Percent of change was calculated and is presented in Table 9.

Lateral cranial contours were constructed using data collected from the females of the two sites. Males were not included in the study because of the fragmentary nature of the CA-SC1-137 sample.

The information presented in Table 9 reveals that the earlier population displays in vault height (basion-bregma) 1.1 percent greater than the later population. Upper facially, the Middle Period skulls present a 2.9 percent increase in length over the earlier group. The frontal chords are similar in the two populations compared, being 103.5 mm. in the earlier group and 103.6 in the later group. The Early

TABLE 9

MEANS AND PERCENTAGES OF DIFFERENCE
 BETWEEN FEMALES OF EARLY AND MIDDLE PERIOD SITES

Measurement	CA-SMa-77 Early Site		CA-SC1-137 Middle Site		% Diff
	Mean	N	Mean	N	
Nasion-Bregma	103.5	3	103.6	11	0.09
Bregma-Lambda	100.1	3	107.2	12	2.50-
Lambda-Inion	66.1	3	68.9	12	4.20
Inion-Opisthion	54.9	3	47.6	11	13.20-
Lambda-Opisthion	101.4	3	101.0	11	0.20-
Basion-Nasospinale	90.0	2	88.6	5	1.50-
Basion-Glabella	102.0	2	106.9	7	4.80
Basion-Lambda	123.5	2	110.1	7	10.90-
Basion-Inion	90.5	2	76.5	7	15.40-
Lambda-Glabella	168.3	3	167.8	11	0.20-
Nasion-Lambda	169.3	3	167.0	11	1.30-
Bregma-Prosthion	162.9	3	162.6	5	0.10-
Nasion-Inion	166.6	3	167.4	11	0.40
Glabella-Bregma	101.4	3	97.5	11	3.80-
Basion-Bregma	130.1	3	128.7	7	1.10-
Prosthion-Nasion	65.1	3	67.0	7	2.90
Basion-Nasion	95.6	3	99.9	7	4.50
Basion-Prosthion	91.6	3	97.4	4	6.30
Nasal Height	46.0	2	34.7	7	6.30
Foramen Magnum Length	31.8	2	34.7	7	9.10

females present a 2.5 percent greater parietal chord, while the occipital chords in the two groups are the same, being 101 mm. in length. Greater diversity is apparent in the lambda-inion, inion-opisthion chords. The Middle Period sample shows a 4.2 percent increase in size in the lambda-inion chord, but on the other hand, a decrease of 13.2 percent in inion-opisthion length.

The facial region is generally more posteriorly placed (nasospinale being the exception) in the Early sample, while the later group presents greater alveolar prognathism. In the posterior aspects of the skull, lambda and inion are more posteriorly and superiorly oriented in the Early group, revealing a higher more perpendicular nuchal plane. This positioning of lambda and inion amounts to a 10.9 and 15.4 percent change respectively. In addition, opisthion is superiorly placed in the earlier females resulting in a foramen magnum that is more horizontally oriented in contrast to an oblique orientation of the foramen magnum in the Middle Period females.

From the data presented above, shape as well as size differences are revealed between the Early and Middle Period populations. The graphic configuration in Figure 3 clearly displays that the change is most evident in the posterior and basal aspects of the skull. In light of the small sample used in this study, and until such time as the data set is enlarged to encompass other samples, any speculation or conclusions drawn would be highly tentative.

SUMMARY AND CONCLUSIONS

The recovery of materials at the Snell Site has produced an archeological assemblage for advancing our knowledge of this important prehistoric deposit and the better understanding the cultural history in the South Bay. The fair sized corpus of anthropomorphic data describes the cranial morphology of the skeletal remains along with bone pathologies, demographics, and nonmetric traits. Chronology of the remains are established with the use of radiometric dating at the site, thus providing a diachronic framework which allows comparison with other archeological sites of known ages. The chronology of the Snell site (2000-2700 B.P.) appears, from the radiometric dates, to be bracketed within the Early Phase of the Middle Period. Studies of the twenty-two inhumations from the site reveal general population trends and individual osteological traits, some traits being compared with skeletal data from University Village. Although limited by sample size, the population comparison indicates differences in size and shape of crania from the two sites, especially in the posterior and basal portions of the crania.

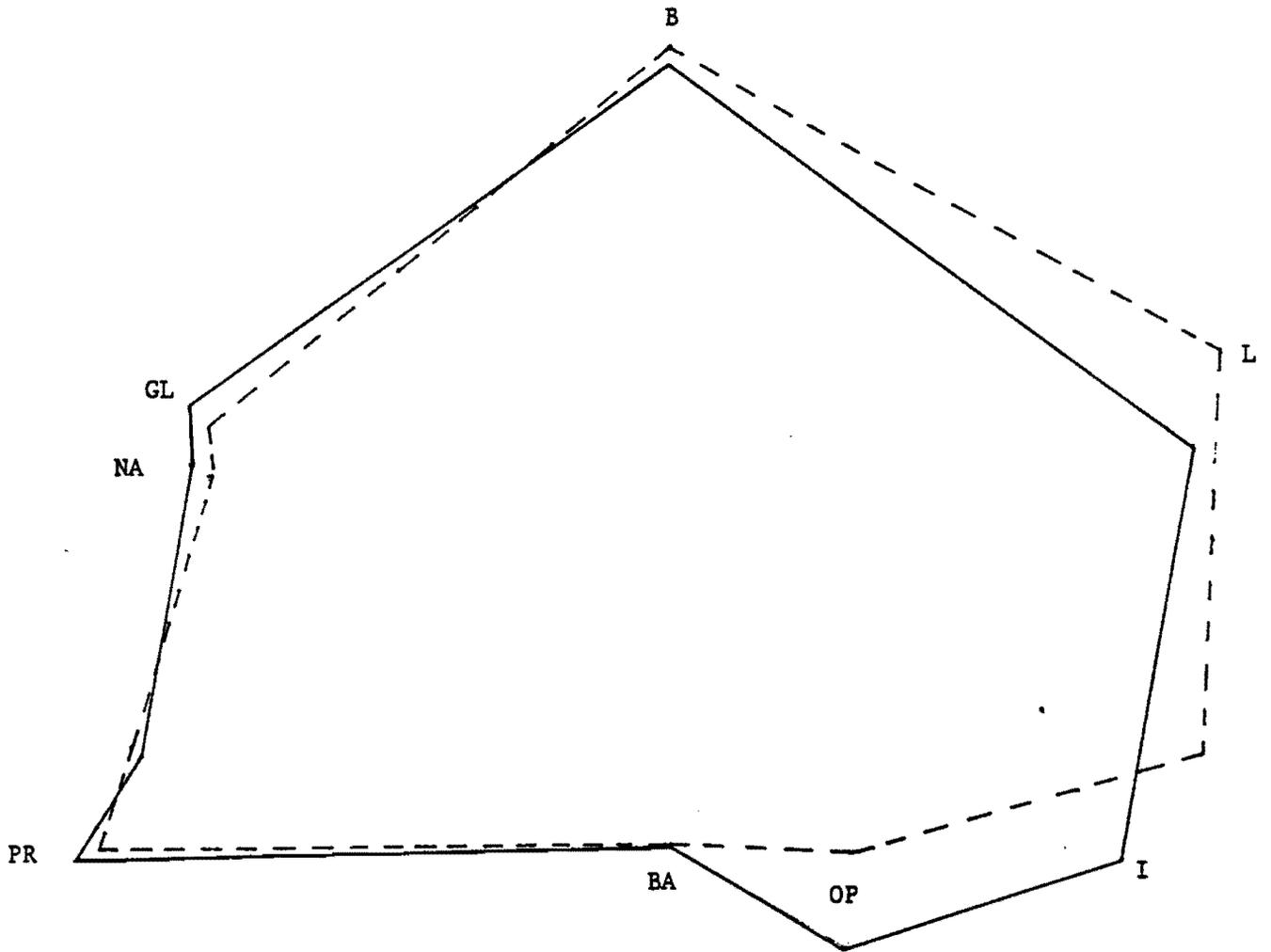


Figure 3. Lateral Cranial Contours from the Early and Middle Periods. Solid line: CA-SC1-137, and Dotted line: CA-SMa-77.

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APPENDIX I

CRANIAL MEASUREMENT FEMALE

Measurement	Mean	Std.Dev.	Number
Glabella-occipital l.	176.7	3.43	11
Maximum Breadth	136.0	5.15	12
Basion-Bregma ht.	128.8	3.67	7
Min. Frontal Breadth	89.9	4.50	11
Bizygomatic Breadth	129.2	4.26	8
Basion-Nasion len.	100.2	3.80	7
Nasion-Bregma ht.	103.6	3.04	11
Nasion-Prosthion	63.4	1.65	7
Biasthion Width	108.7	4.85	12
Basion-Prosthion ht.	97.4	4.63	4
Nasal Height	48.9	2.76	7
Nasal Breadth	24.9	1.45	11
Orbital Height	33.5	2.01	7
Orbital Breadth	38.3	0.77	7
External Palate len.	54.3	2.91	10
External Palate br.	60.9	2.75	10
Nasion-gnathion ht.	111.5	7.57	4
Bigonial dia.	96.9	5.85	7
Symphyseal ht.	32.1	2.60	10
Ramus ht.	61.7	2.88	11
Ramus Min. breadth	33.1	2.19	11
Mandibular len.	102.5	3.58	7
Bicondyular breadth	120.8	6.46	7

APPENDIX II

CRANIAL MEASUREMENT MALE

Measurement	Mean	Number
Glabella-occipital l.	185.0	1
Maximum Breadth	131.0	1
Basion-Bregma ht.	-	1
Min. Frontal Breadth	94.7	3
Bizygomatic Breadth	138.5	1
Basion-Nasion len.	-	
Nasion-Bregma ht.	102.8	1
Nasion-Prosthion	67.0	1
Biastherion Width	104.2	1
Basion-Prosthion ht.	-	
Nasal Height	-	
Nasal Breadth	-	
Orbital Height	-	
Orbital Breadth	-	
External Palate len.	61.2	2
External Palate br.	69.0	2
Nasion-gnathion ht.	-	
Bigonial dia.	100.0	2
Symphyseal ht.	37.1	2
Ramus ht.	76.4	2
Ramus min. breadth	37.1	2
Mandibular len.	103.2	1
Bicondyular breadth	131.7	1

APPENDIX III

POSTCRANIAL MEASUREMENTS

Measurement	Male Mean	Female Mean
Femur Length	441.67 N=6	407.38 N=8
Femur Head Dia.	44.73 N=6	39.75 N=10
Tibia Length	376.50 N=6	344.38 N=6
Fibula Length	363.26 N=4	336.33 N=6
Humerus Length	325.00 N=1	292.40 N=10
Humerus Head Dia.	44.20 N=2	39.75 N=10
Radius Length	255.60 N=5	217.00 N=7
Ulna Length	275.00 N=4	240.29 N=7