

## MAXILLARY INCISOR CORONO-RADICULAR GROOVES

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## DENTAL ANTHROPOLOGY OF THE NEOLITHIC RUSSIAN FAR EAST: I EURASIAN RUSSIA

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**ABSTRACT** Dental morphological trait frequencies of Neolithic Russian Far East burials are more similar to those of Neolithic Central and Western Siberia than to percentages found in contemporaneous European Russians and Ukrainians. Yet, archaeological evidence fails to indicate a close relationship between the Neolithic Russian Far East and Central and Western Siberia cultures. The Neolithic Far East sample is also dentally and culturally more like coastal prehistoric burials and present-day Eskimo and Chukchi samples from Chukotka than like non-coastal peoples of the Russian Far East.

### INTRODUCTION

The oldest Russian Far East human remains found to date have been excavated from typologically Neolithic burials at Boisman 2, which is located south of Vladivostok (Fig. 1).



Fig. 1. Map showing the locations of Boisman 2 and the other Neolithic sites discussed in the text.

Boisman 2 is situated beside the Ryazanovka River and named after Boisman Cove on the coast of the Sea of Japan. The site contained a shell mound which covered a cemetery and the shallow foundation pit of a dwelling with a central hearth (Semin, personal communication, 1993).

I have used the dental morphological trait data from the Boisman burials to examine two temporal issues within Eurasian Russia: 1.) the relationship of the Neolithic people of Boisman 2 to the Neolithic population of Siberian and European Russia and Ukraine and 2.) the regional continuity in the Russian Far East and Chukotka during the past 6,000 years. Figure 1 has a map showing the locations discussed herein.

### SAMPLES

The Boisman 2 sample consists of the permanent teeth from eight individuals. The best preserved skull and dentition came from burial 1A. (Figs. 2, 3, and 4). Comparative Neolithic dental samples represent Central Siberia, the region between the Yenisei and the Lena Rivers (18 Kitoi, three Isakovo, and ten Serovo culture cemeteries on the Angara and Upper Lena Rivers, Lake Baykal, and Trans-Baykal, which is south and southeast of Lake Baykal); Western Siberia, the land between the Ural Mountains and the Yenisei River (seven cemeteries and three kurgans west and southeast of Novosibirsk); Ukraine (nine cemeteries on the Dnieper River and three cemeteries in southern Ukraine); and Russia (Oleneostrovski' Mogil'nik, a typologically Mesolithic cemetery on Oleni' Ostrov in Lake Onega). A list with each comparative sample that I examined, its location, and the place of curation is given in Haessler (1996).

The dates of the Neolithic comparative samples, except those of Kitoi Culture (7,610±210 BP in Trans-Baykal to 6,780±80 BP on the Angara River), fall within the temporal range of Boisman 2, which spans 6,010±220 BP to 5,160±140 BP (Popov, 1995:28). Isakovo stage specimens date from 5,320±160 to 5,000±70 BP on the Angara River. Serovo materials date between 5,170±180 BP on the Angara and 3,340±100 BP on the Lena rivers (Mamonova and Sulerzhitski', 1989:Table 3). The Western Siberia samples are materials from typologically Neolithic cemeteries and kurgans. Dates of Ukrainian Neolithic samples range from 8,065±20 BP to 5,245±30 BP (Potekhina and Telegin, 1995). In Russia the recent dates for Oleneostrovski' Mogil'nik (9,910±80 to 5,700±80 BP) (Mamonova and Sulerzhitski', 1990:Table 3; Price and Jacobs, 1990) correspond to dates for Boisman 2.

Prehistoric coastal samples represent the Old Bering Sea Culture cemeteries of Ekven and Uelen on the Bering Sea in Chukotka. My frequencies differ slightly from those reported by others (Zubov, 1969; Turner, 1985) because they represent different collections. My data were obtained from observations on materials in the Museum of Anthropology, Moscow State University. Zubov's and Turner's observations were made on the collection at the Laboratory of Plastic Reconstruction in Moscow. Contemporary coastal Eskimos and Chukchi from the Bering Sea in Chukotka are represented by published data (Dubova and Tegako, 1983:170-171, Figure 1, Tables 1-5,11-13,16). Contemporary non-coastal peoples from the Russian Far East are represented by published data (Khaldeyeva, 1979:Table 96) for indigenous inhabitants of Khabarovsk Kray. They are Nauay, Oroch, Nivkh, Orimif, Udegey, Ulch, and Evenk. Trait frequency data for contemporary Russians (Aksyanova et al., 1979:Tables 2-8) and Ukrainians (Segeda, 1979:Tables 11-19) have been included to provide a non-Asiatic dental morphological perspective to the trait frequency comparisons.

### METHODS

For studying the dental morphological traits I use the Arizona State University and Dahlberg standard reference plaques. Descriptions of the traits and their rankings are given in Dahlberg (1956) and Turner et al. (1991). For evaluation of the dental morphological relationships between the Neolithic burials from



Fig. 2. Skull from burial 1A at Boisman 2 (AMH 60379.13).

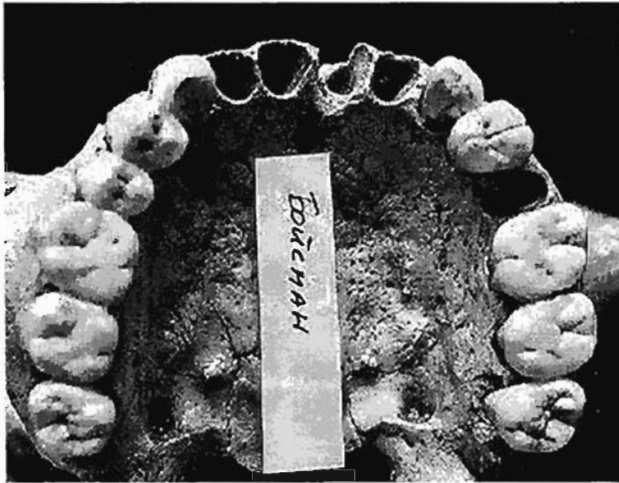


Fig. 3. Boisman 2 maxilla with teeth from burial 1A (AMH 60379.18). This dentition, like all of the Boisman II specimens, lacks canine distal accessory ridge, Bushman canine morphology, maxillary first molar cusp 5, Carabelli's trait (the left antimere has a pit which is barely visible), second molar hypocone reduction (grades 0 to 2), and third molar parastyle. The right canine has a marked (grade 4) *tuberculum dentale*. The third molars are present in this specimen, but are congenitally absent in 28.6% of the Boisman II dentitions. All of the teeth, including the left canine, are anchored in the sockets without preservative. The left canine (7.2 mm mesio-distal, 7.8 mm bucco-lingual dimensions) is smaller than the right antimere (7.9 mm mesio-distal, 8.4 mm bucco-lingual dimensions).

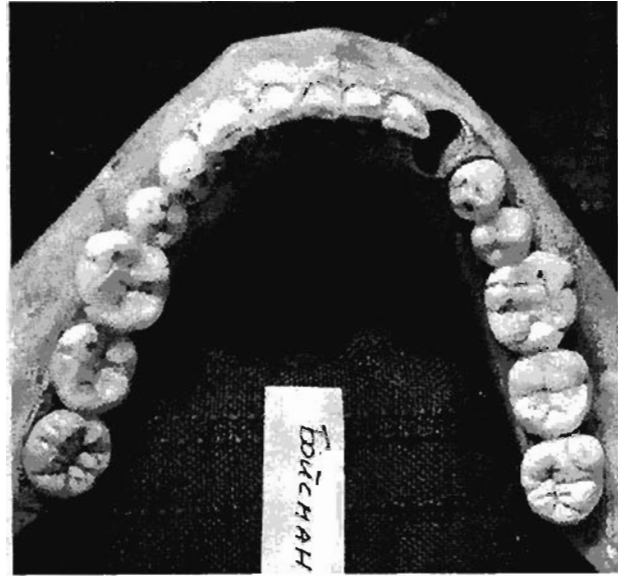


Fig. 4. Mandible with teeth from burial 1A at Boisman 2 (AMH 60379.32). This specimen is similar to the other Boisman dentitions in the presence of first molar distal trigonid crest and lack of congenitally absent central incisors, with presence of first molar deflecting wrinkle, and cusp 7. This specimen also has multiple lingual cusps on the right first premolar (barely visible in the photograph), protostylid pits (grade 1) on both first molars, five cusped first molars (lacking sixth cusp), and X-groove pattern on the left and Y-groove pattern on the right second molars, but lacks third molar congenital absence. The right third molar has well expressed (grade 3) cusp 7 and a large (grade 7) protostylid. All teeth are firmly set in their sockets and lack preservative. The left canine (7.0 mm mesio-distal and 6.5 mm bucco-lingual dimensions) is smaller than both maxillary canines shown in Figure 3.

Boisman 2 and other Neolithic samples I compared frequency data for the 31 dental morphological traits for which all of the samples have data (Table 1). For comparison of Boisman 2 with the prehistoric and contemporary samples, I used the seven traits for which all of the contemporary samples have data. Appendix 1

also gives the grades that I used to signify trait presence or absence. My percentages for traits whose data were taken from Russian publications were calculated using a system of rank matchings developed with A.A. Zubov (Haeussler et al., 1988; Haeussler and Turner, 1992; Haeussler, 1996).

Statistical analysis of the trait frequencies employed the MMD (Mean Measure of Divergence). Through angular transformation with adjustments for sample sizes and modification to determine probability the MMD evaluates frequencies of non-metric traits to determine the similarity of samples. The lower the MMD value, the greater the probability of a relationship between two groups being compared. With large samples and many traits the MMD is statistically significant (0.05 level) when the value the MMD is greater than twice the value of its standard deviation (Berry and Berry, 1967; Green and Suchey, 1976; Sjøvold, 1973).

## RESULTS AND DISCUSSION

### 1. BOISMAN 2 AND THE NEOLITHIC SAMPLES

#### Dental Morphological Trait Frequency Comparisons

The results of the dental morphological trait frequency comparisons of the Neolithic samples show that the Boisman 2 sample is dentally more like the Central and Western Siberian samples than those from Russia and Ukraine. The order of Neolithic samples in increasing distance from Boisman 2 is Isakovo and Kitoi

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TABLE 1. Morphological dental trait sample sizes (N) and percentages (%).

Samples	Winging UI1		Shoveling UI1		Double Shovel UI1		Peg-shape UI2		Congenital Absence UI2		Interruption Groove UI2		<i>tuberculum dentale</i> UI2		Bushman Canine	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Neolithic																
Far East																
Boisman 2	1	0.0	2	50.0	2	50.0	2	0.0	2	0.0	1	100.0	1	100.0	3	0.0
Central Siberia																
Kitoi Stage	5	0.0	25	76.0	27	77.8	26	0.0	34	0.0	24	16.7	24	100.0	20	5.0
Isakovo Stage	2	0.0	10	100.0	11	81.8	12	8.3	13	0.0	11	36.7	8	75.0	4	0.0
Serovo Stage	3	33.3	10	90.0	8	62.5	9	0.0	21	0.0	9	11.1	5	100.0	5	20.0
Western	3	0.0	9	55.5	12	66.7	12	0.0	24	0.0	9	44.4	5	100.1	10	10.0
Ukraine	26	3.8	51	9.8	55	41.8	59	1.7	100	0.0	35	8.6	33	67.7	57	3.5
Russia	3	0.0	15	0.0	13	7.7	21	0.0	26	0.0	13	0.0	10	100.0	13	0.0
Prehistoric																
Chukotka																
Ekven	2	0.0	2	100.0	2	50.0	3	0.0	15	6.7	3	33.3	2	50.0	1	0.0
Uelen	3	0.0	7	28.6	2	50.0	1	0.0	15	6.7	6	33.3	3	100.0	10	20.0
Contemporary																
Far East																
Nanay			108	51.1			108	7.4								
Oroch			53	62.3			60	5.0								
Ulch			85	61.3			100	5.0								
Nivkh			65	65.0			60	3.3								
Udegey			35	51.2			34	0.0								
Evenk			49	34.7			50	4.0								
Chukotka																
Chukchi			328	68.3			207	3.9								
Eskimos			82	63.4			77	3.9								
Russia			1130	2.7			711	1.0								
Ukraine			1489	1.6			61	1.6								
Trait Presence	Presence		2-6/0-6		1-6/0-6		Peg-shape		Absence		Presence		1-6/0-6		1-3/0-3	
Neolithic																
Far East																
Boisman 2	1	0.0	3	0.0			3	0.0	4	25.0	3	66.7	3	0.0	2	50.0
Central Siberia																
Kitoi Stage	17	17.6	31	0.0	1	100.0	14	7.1	29	13.8	23	56.5	26	3.8	3	33.3
Isakovo Stage	4	25.0	10	0.0			13	69.2	18	4.4	15	46.7	13	23.1	1	0.0
Serovo Stage	5	20.0	20	0.0	5	60.0	15	53.3	32	25.0	31	25.8	24	4.2	3	33.3
Western	8	0.0	14	0.0	5	60.0	15	53.3	4	25.0	3	66.7	3	0.0	2	50.0
Ukraine	40	27.5	69	0.0	15	60.0	52	59.6	117	8.5	82	4.9	87	24.1	16	37.5
Russia	11	0.0	10	0.0	1	0.0	15	0.0	4	25.5	19	0.0	18	44.4	4	100.0
Prehistoric																
Chukotka																
Ekven			7	0.0	4	75.0	1	0.0	13	7.7	13	30.8	7	42.9	2	50.0
Uelen	6	0.0	15	0.0	6	83.3	4	0.0	21	4.8	29	51.7	27	44.4	9	22.2
Contemporary																
Far East																
Nanay									74	27.0			38	89.5		
Oroch									47	23.0			24	66.7		
Ulch									76	23.3			39	89.7		
Nivkh									47	17.1			25	88.0		
Udegey									26	27.3			19	73.1		
Evenk									46	34.8			27	85.0		
Chukotka																
Chukchi									208	20.7			79	49.4		
Eskimos									50	18.0			38	28.9		
Russia									1277	23.8			569	46.9		
Ukraine									1395	43.0			1037	40.3		
Trait Presence	2-6/0-6		Presence		1 Root Only		1-5/0-5		2-7/0-7		2.0 mm or Longer		0-2/0-5		3 Roots	

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TABLE 1. (continued)

Samples	Parastyle UM3		Congenital Absence UM3		Congenital Absence LII		1 Root LC		Lingual Cusps LM2		Enamel Extension LM1		Distal Trigonid Crest LM1		Deflecting Wrinkle LM1	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Neolithic																
Far East																
Boisman 2	2	0.0	4	50.0	2	0.0	1	100.0	5	20.0	4	75.0	4	100.0	1	0.0
Central Siberia																
Kitoi Stage	17	5.9	33	9.1	32	0.0	4	100.0	17	0.0	43	29.5	12	33.3	9	44.4
Isakovo Stage	1	0.0	13	15.4	20	0.0	3	100.0	8	25.0	20	35.0	17	23.5	16	31.2
Serovo Stage	8	0.0	28	7.1	21	4.8	4	100.0	3	0.0	22	13.6	9	22.2	7	85.7
Western	19	0.0	28	10.7	31	0.0	6	100.0	14	35.9	39	35.9	12	8.3	13	7.7
Ukraine	84	1.2	115	0.9	110	0.9	8	75.6	52	17.3	109	10.1	35	0.0	43	13.9
Russia	19	0.0	27	3.7	26	0.0	5	100.0	11	45.4	30	10.0	14	0.0	16	12.5
Prehistoric																
Chukotka																
Ekven	8	0.0	20	5.0	14	0.0	6	100.0	18	0.0	14	71.4	2	0.0	1	0.0
Uelen	11	0.0	30	6.7	14	21.4	3	100.0	10	0.0	23	43.5	8	0.0	7	28.6
Contemporary																
Far East																
Nanay													60	31.7	60	21.0
Oroch													35	20.0	35	17.4
Ulch													50	17.5	50	38.4
Nivkh													41	22.2	41	9.0
Udegey													20	20.0	20	25.0
Evenk													30	13.3	30	33.3
Chukotka																
Chukchi													145	17.9	145	26.9
Eskimos													21	14.3	22	27.3
Russia													784	1.8	785	6.1
Ukraine													1769	2.40	1326	4.7
Trait Presence	1-6/0-6	Absence		Absence		1 Root Only		2-9/0-9	2.0 mm or Longer		Present		2-3/0-3			
	Cusp 7 LM1		Protostylid LM1		3 roots LM1		6 cusps LM1		4 cusps LM2		Y-Groove LM2		1 Root LM2		Congenital Absence LM3	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Neolithic																
Far East																
Boisman 2	6	0.0	6	16.7	3	0.0	4	25.0	5	0.0	6	16.7	4	100.0	7	28.6
Central Siberia																
Kitoi Stage	27	3.7	21	81.3	4	50.0	25	28.0	22	36.4	30	33.3	4	25.0	46	17.4
Isakovo Stage	21	9.5	24	54.2	3	0.0	17	11.7	16	6.2	14	14.3	3	33.3	17	17.6
Serovo Stage	19	15.8	19	42.1	7	0.0	18	27.8	14	50.0	22	27.3	8	12.5	31	12.9
Western	29	0.0	32	71.9	4	0.0	20	20.0	24	33.3	35	25.7	5	80.0	46	13.0
Ukraine	104	5.8	122	34.4	5	0.0	47	19.1	77	64.9	118	35.6	8	37.5	157	2.5
Russia	17	0.0	31	45.2	1	0.0	17	5.9	18	77.2	274	45.1	6	50.0	33	0.0
Prehistoric																
Chukotka																
Ekven	8	0.0	11	27.3	5	20.0	6	0.0	6	0.0	10	30.0	3	0.0	19	31.6
Uelen	18	5.5	16	18.7	18	11.1	14	21.4	14	28.6	20	30.0	13	15.4	33	18.2
Contemporary																
Far East																
Nanay	60	3.3					57	18.0	32	0.0						
Oroch	35	0.0					35	8.6	35	8.6						
Ulch	50	0.0					53	26.3	31	6.4						
Nivkh	41	0.0					37	15.6								
Udegey	20	0.0					18	50.0								
Evenk	30	10.0					33	15.1	26	28.0						
Chukotka																
Chukchi	96	4.2	96	3.1			194	19.4	127	21.3	103	38.8				
Eskimos	23	26.1	21	0.0			36	41.7	16	18.8	15	13.3				
Russia	811	3.3					400	4.8	601	84.0	469	7.3				
Ukraine	1353	3.7					1456	1.7	1264	86.0	1264	6.9				
Trait Presence	2-4/0-4	1-7/0-7		3 Roots		6 Cusps		4 Cusps		Y/X, Y, +		1 Root		Absence		

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TABLE 2. MMD values for Neolithic comparisons with Boisman 2 given in increasing order of magnitude.

	MMD	Standard Deviation	Significant
Central Siberia Isakovo	-0.160	0.145	no
Central Siberia Kitoi	-0.029	0.120	no
Western Siberia	-0.020	0.119	no
Central Siberia Serovo	-0.001	0.130	no
Russia	0.308	0.124	yes
Ukraine	0.324	0.107	yes

Based on 31 traits (all except 1 rooted maxillary first molar). Data are given in Table 1.

TABLE 3. MMD values for prehistoric and contemporary comparisons with Boisman 2 given in increasing order of magnitude.

	MMD	Standard Deviation	Significant
Ekven	-0.136	0.366	no
Eskimos	0.089	0.203	no
Chukchi	0.127	0.190	no
Oroch	0.186	0.202	no
Uelen	0.227	0.234	no
Udegey	0.252	0.209	no
Nanay	0.273	0.195	no
Evenk	0.369	0.203	no
Uich	0.376	0.194	no
Nivkh	0.382	0.199	no
Russia	0.780	0.188	yes
Ukraine	0.825	0.187	yes

Based on seven traits: shoveling maxillary central incisor, Carabelli's trait on the maxillary first molar, hypocone reduction on the maxillary second molar; distal trigonid crest, deflecting wrinkle, cusp 7, and six cusps on the mandibular first molar. Data are given in Table 1.

cultures from Central Siberia, the pooled sample from Western Siberia, Serovo Culture from Central Siberia, Russia, and Ukraine (Table 1).

The major factor accounting for the greater similarity of Boisman 2 to the Siberian Russian than to the European Russian and Ukrainian samples is that Boisman 2 has moderate to high frequencies of traits reported in people with Asian physical features (Dahlberg, 1945, 1963; Hanihara, 1969; Zubov, 1979; Turner, 1983; Scott and Turner, 1997). Boisman 2 teeth have shovel-shape (50.0%) and double shovel-shape (50.0%) on the maxillary central incisor, no reduction of the maxillary lateral incisor (peg-shape) (0.0%), and a low percentage of reduction of the hypocone (0.0%) on the maxillary second molar (Table 1). In the mandible Boisman 2 teeth have the distal trigonid crest (100.0%), six cusps (20.0%), and the protostylid (16.7%) on the first molar; an absence of the four-cusped mandibular second molar; and a high percent of upper and lower jaws without the third molar (congenital absence) (50.0% in the maxilla, 28.6 % in the mandible) (Table 1).

**Material Culture Comparisons**

In spite of the biological relationship between Boisman 2 and Neolithic Siberia indicated by the MMD values, comparison of archaeological materials from the Neolithic burials fails to indicate a close cultural relationship. Each Neolithic culture, including Boisman 2, is unique. As can be seen in Table 3, not a single archaeological attribute, including, location, number and position of the skeleton, ocher, or type of grave goods, is common to Boisman 2 and all of the comparative cultures.

For example, Boisman 2 and the Central Siberian cemeteries were situated adjacent to a large body of water

(Okladnikov, 1950:116-411:passim; Semin n.d.; Michael, 1958; Popov, 1995; Mamonova and Sulerzhtski', 1989:passim), whereas Western Siberian cemeteries and kurgans were not routinely near water (Polos'mak, 1989a,b:passim). Boisman 2 cemetery is associated with the Boisman habitation site (Popov, 1995:passim; Semin n.d.). In contrast the Central Siberian Kitoi, Isakovo, and Serovo cemeteries lack evidence of a domestic site (Okladnikov, 1950:116-411:passim; Michael 1958), while Western Siberia cemeteries were sometimes located near a dwelling place (Molodin, 1977:passim).

The type of grave and the number and position of the skeletons also varied among the Neolithic cemeteries. Boisman 2 burials were in a shell midden (Popov, 1995:passim; Semin, n.d.), but Central and Western Siberian burials were in a pit or kurgan (Okladnikov, 1950:116-141:passim; Michael; 1958; Polos'mak, 1995a,b; Molodin, 1977:passim). At Boisman 2 one or two skeletons were found in a grave, yet Kitoi graves had one, two, three, and many skeletons. In contrast Western Siberian kurgans (Protoka) had many skeletons that were secondary burials, whereas cemeteries (Krutikha) had one skeleton to a grave (Molodin, 1977:passim; Polos'mak, 1995a,b:passim). The position of the Boisman 2 skeletons also differed from those of the other Siberian Neolithic burials. Males were situated on their sides with legs bent, and the females were face down with knees bent (Popov, 1995:passim; Semin, n.d.), while Central and Western Siberian cemeteries contained extended skeletons whose legs and spines were in various positions (Molodin, 1977:passim; Polos'mak, 1995a,b:passim).

All of the cemeteries had personal grave goods, but they differed from one culture to another. For example, Boisman 2 burials contained decorations (bracelets and pendants) made from bone and shells (Popov, 1995:25), whereas Kitoi burials contained pendants made from canine teeth, polished nephrite adzes, and calcite rings. Isakovo

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burials had characteristic ceramics, while Serovo burials had cylindrical shell beads and perforated elk teeth (Okladnikov, 1950:116-411; Michael, 1958). Western Siberia grave goods included pendants (a fox canine at Krutikha) (Molodin, 1977:26) as well as ceramic fragments (Protoka) (Polos'mak, 1989:15-16). Ocher was present in one grave (burial 4) at Boisman 2, while being usual in Central Siberia Kitoi burials, but seldom found in Isakovo and Serovo burials (Okladnikov, 1950:116-411 passim; Michael, 1958), and not in reported in Western Siberia cemeteries and kurgans (Molodin, 1977:passim; Polos'mak, 1989:passim).

Stone and bone tools also differed from one region to another and reflect coastal and riverine subsistence in the Far East and Central Siberia, respectively. For example, Boisman 2 burials had a quiver, arrows, fish hooks, harpoons, and bone needles (Popov, 1995; Semin, nd). Central Siberia Kitoi burials had composite fish hooks and harpoons in addition to daggers with inserts. Isakovo burials had a dagger (Okladnikov, 1950:116-411; Michael, 1958). However, Serovo burials contained a composite bow and polished adzes (Okladnikov, 1950:116-411; Michael, 1958). In contrast to the Far East and two of the Western Siberia cultures, Western Siberia burials (Krutikha) contained stone choppers, axes, knife-shaped blades, knives, scrapers, arrow heads, and stone and bone points (Molodin, 1977:26, Table 7; Polos'mak, 1989:15-16).

Boisman 2 had a non-utilitarian object, a crescent-shaped pendant thought to be a zoomorphic figure, which differed from the other Neolithic Siberian zoomorphic figures. For example, Central Siberia Kitoi burials had elk-head figures and Serovo graves had stone fish (Okladnikov, 1950:116-411 passim; Michael, 1958), yet only one Western Siberian cemetery (Krutikha) had a figure (a bone bird) (Molodin, 1977:Table 7).

The one cultural parallel between Boisman 2 and the Siberian Neolithic material remains is evidence of violence, which in turn may indicate some social stress. I found an unhealed 6.8 mm cut mark on the mandible inferior to the first and second molars of a subadult from burial 3B and one of many stone arrow points embedded in vertebrae in

Table 4. Comparison between Boisman 2 and Neolithic Central and Western Siberia Burials.

	Far East Boisman 2	Kitoi	Central Siberia Isakovo	Serovo	Western Siberia Pooled Sample
Proximity to water	Boisman Bay	Angara River, Upper Lena River, Lake Baykal, Selenga River	Angara River	Angara and Lena Rivers	None
Habitation site	Yes	None found	None found	None found	Sometimes
Pit	Shell midden	Oval or rectangular pit, without stone lining or covering			Kurgans (Protoka), Cemeteries (Krutikha) pit
Single/ multiple skeletons	Single & multiple	Single, double, triple, several			Kurgans multiple Cemeteries single
Body position	Males on side with knees bent, females face down with knees bent	Extended on back or on side with legs flexed, head to northeast or southwest	Extended, occasionally with flexed legs	Extended, occasionally with flexed legs.	Kurgans (Protoka) secondary burials. Cemeteries (Krutikha) extended on back.
Personal grave goods	Decorations made from bones and shells, quiver, arrows, fish hooks, harpoons, bone needles	Polished nephrite adzes, calcite rings, boar tusk pendants, daggers with inserts, harpoons, composite fishhooks with hole for a barb	Special ceramics, dagger	Composite bow, polished adzes, ceramic shards, cylindrical shell beads, perforated elk teeth	Fox canine pendant, ceramic fragments, stone choppers, axes, knife-shaped blades, knives, scrapers, arrow heads, and stone and bone points
Red Ocher	Burial 4	Yes	Rare	Rare	None
Zoomorphic figures in burial	Crescent-shaped pendant out of white stone	Elk head figures		Stone fish	Bone bird figure (Krutikha)
Additional features	Arrow in a vertebra, multiple arrows, cut mark in mandible as evidence of violent death	Lokomotiv: many skeletons without skulls, many with evidence of violent death			

Compiled from Okladnikov (1950: 116-411:passim), Michael (1958), Mamonova and Sulerzhitski' (1989, 1991:passim), Mamonova and Basili'ski' (1991: passim), (1977: passim), Polos'mak (1989a,b), Popov (1995:passim), Semin (n.d.).

Burial 1A. Violent deaths also occurred in the Central Siberian Kitoi Culture Lokomotiv cemetery (Mamonova and Bazali'ski', 1991: *passim*). Since Kitoi Culture predates Boisman 2, the explanation may lie in parallel social situations, such as those related to cultural and subsistence related stresses suggested (Nuzhnyi, 1990; Balakan and Nuzhnyi, 1995) in Mesolithic Ukraine refugia.

### Conclusions

Analysis of dental morphological trait frequencies suggests that Neolithic Russian Far Eastern people at Boisman 2 and Central and Western Siberians were more closely related than were Boisman and contemporaneous people in Ukraine and European Russia. Differences in material culture remains fail to support close cultural relationships between Neolithic Russian Far East and Central and Western Siberian cultures. Therefore, the biological relationship among the Neolithic Russian Far East and Siberian peoples was likely through an ancient common biological ancestor.

## 2. BOISMAN 2 AND THE PREHISTORIC AND CONTEMPORARY SAMPLES

### Dental Morphological Trait Frequencies

The results of the MMD comparisons of dental morphological trait frequencies show that the Boisman 2 sample is more similar to the prehistoric coastal Ekven and Uelen and contemporary Eskimo and Chukchi samples than to all of the non-coastal samples except Oroch (Table 2). The observation of the similarity with the Chukchi agrees with that of Chikisheva and Shpakova (1995:36), whose study was based on cranial measurements. The least like the Boisman 2 sample dentally are contemporary Russians and Ukrainians, whose high MMD values reflect the vast geographical, temporal, and dental morphological trait frequency differences (Table 1) between contemporary Russians, Ukrainians, and Neolithic Russian Far Easterners.

### Material Culture Comparisons

The salient cultural feature that parallels the MMD values is the mode of subsistence. The Boisman 2 sample is dentally more similar to the maritime samples than to the non-maritime samples. For example, the coastal prehistoric Ekven and Uelen samples were excavated from Old Bering Sea Culture cemeteries, which contained artifactual remains indicating subsistence on sea mammals and a rich material culture that included artfully crafted objects for obtaining them (Arutiunov et al., 1964a,b; Arutiunov and Fitzhugh, 1988). Historically, Eskimos and coastal Chukchi inhabited Chukotka and lived a maritime subsistence, although Chukchi are also known to have herded reindeer (Batalden and Batalden, 1993; Kolga et al., nd).

None of the non-coastal peoples presently has a maritime lifeway. All six of the indigenous peoples (Evenk, Nanay, Oroch, Nivkh, Udegey, and Ulch) are historically semi-sedentary fishers and seasonally migrational hunters. The Ulch and the Nivkh have also been known to hunt sea animals along the coast. The Evenk, a mobile people who hunt and raise reindeer as well as fish, are the only peoples to live in mountainous sections of the taiga and tundra (Batalden and Batalden, 1993; Kolga et al., nd).

On the question of regional continuity in the Russian Far East, these observations on dental morphological frequencies and culture can be interpreted in one or all of three ways. First, the Neolithic maritime population may have remained in place over the last 6,000 years, with genetic drift accounting for the changes in dental trait frequencies. Second, non-maritime adapted Evenk, Nanay, Nivkh, Oroch, Udegey, and Ulch with Asian dental traits, but with frequencies dissimilar to those of the Neolithic coastal people, could have moved into the Russian Far East and replaced some of the descendants of the aboriginal marine-adapted people. Third, sampling error may be leading to an over-interpretation of the data, because some of the broad ranges in frequencies result from small sample sizes.

### Conclusions

The Neolithic peoples who were buried at Boisman 2 are dentally more similar to people buried in the prehistoric sites of Ekven and Uelen and to present day Eskimos and Chukchi than to contemporary people living in the Russian Far East. The people buried at Boisman 2, Ekven, and Uelen, and contemporary Eskimos and Chukchi all had a maritime cultural adaptations, suggesting some continuity of the maritime peoples through time.

## SUMMARY and CONCLUSIONS

Dentally, the Russian Far East Boisman 2 sample is the most like Neolithic Central and Western Siberia samples. The cultural uniqueness of Boisman 2 and the dental anthropological similarity suggest the possibility that they and



the Neolithic Central and Western Siberians were descended in a parallel manner from a common biological, but not cultural, ancestor. The Boisman 2 sample is dentally and culturally more similar to prehistoric marine-adapted inhabitants of the Bering Sea coast and present day Eskimos and Chukchi than to contemporary non-maritime peoples of the Russian Far East. This finding indicates both biological and cultural continuity of the maritime peoples over the past 6,000 years.

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## BOOK REVIEWS

ODONTOLOGISCHE VERWANDTSCHAFTSANALYSE (in German) [ODONTOLOGICAL KINSHIP ANALYSIS].  
By Kurt W. Alt. Stuttgart, Ulm: Gustav-Fischer-Verlag, 1997. 331 pp. ISBN 3-437-25248-8. \$52.00, Dm 98.

Teeth are, next to bone, usually the best preserved remains in prehistoric anthropological material and in any other type of macerated contemporary human material. Due to their morphology on macroscopical and microscopical levels, as well as their molecular structure, teeth store an abundance of information useful for detailed anthropological research. So, to search for details to enable us to perform kinship analysis using dental material was necessary and rewarding.

Kurt W. Alt has recently presented a well written book densely packed with valuable facts, morphometrical data, schematic drawings, and practical examples covering the topic of odontological kinship analysis. The author begins with a treatise dealing with the meaning of kinship analysis. He also discusses the difficulty in defining the term kinship. Kinship analysis cannot not simply be done by study of biological relationship. Realized social relations must be regarded as well. A separate chapter covers general formal genetics and special dental genetics. Four other chapters give a catalog of characteristic features of teeth and deal with variable characteristics within the normal range and with anomalies of the teeth. In addition, dentally aberrant features in conjunction with craniofacial dysplasia syndromes and epigenetic odontological marks are described.

After the prerequisites have been extensively described, an extra chapter deals with the odontological kinship analysis, itself. Here, the meaning of each single finding and factor, evaluated regarding its probability within the web of analytical statistics, leads to a probable kinship relation. Kurt W. Alt gives several examples of his method applied to real prehistoric populations in an extra chapter. Finally, he discusses the potentials and limits of this method.