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THE ALEUT DENTITION

A summary of the findings pertaining to data gathered during the Aleutian Expedition* of the Peabody Museum, *Harvard University*, in 1948.

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The Aleuts are an Eskimoid people who populated the Aleutian Islands as a result of two main migrations from the Alaskan peninsula, approximately 4000 and 1000 years ago (fig. 1). Each migration brought a different strain of Eskimoids to the Islands. The second group of settlers did not reach the western end of the Island chain in as great numbers as did the first group. Therefore, the present inhabitants of the western islands are closer in their morphologic type to the first group of settlers, the Paleo Aleuts, than are the people living in the eastern part of the island chain. This accounts for the morphologic differences between the contemporary Eastern and Western Aleuts who, according to L u g h l i n (9), constitute two separate breeding isolates.

The Islands were discovered in 1741 by Bering, a Dane and an officer in the Russian navy, and were under Russian management until 1867, when they came under the jurisdiction of the United States of America through the Alaskan purchase (A n d r e w s, 1).

The population, estimated at 20,000 to 25,000 in the pre-Russian period, consists at present of only a few hundred Aleuts. During the expedition in 1948, a total of 156 Aleuts were examined, all of them dwelling in Nikolski village on Umnak Island and in Atka village on Atka Island (Table 1, fig. 2).

The dental examination in the field consisted of observations on dental and gingival tissues, the oral mucosa, and torus mandibularis. Hydrocolloid impressions were taken of the teeth of all but the youngest Aleuts, and plaster was poured in the impressions within 30 minutes to produce casts of the dentition.

The present study deals mainly with racial tooth morphology, odontology, tooth emergence, the prevalence of occlusal anomalies and dental disease. An attempt has been made to relate the findings on

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TABLE 1
 Number and age distribution of Aleuts with a permanent dentition, exclusive of
 third molars

Group	Age (years)			
	Number	Mean	S.D.	Range
All inhabitants *				
Males	52	31.28	15.72	11.13—66.33
Females	42	31.15	14.38	11.65—70.00
Eastern Aleuts				
Males	24	31.21	14.62	11.13—61.42
Females	21	34.58	16.44	11.65—70.00
Western Aleuts				
Males	15	35.97	17.50	11.59—66.33
Females	17	28.82	10.82	11.33—53.53

* Eastern and Western Aleuts as well as their intermixtures.

some of the above subjects to what was learned about the nutrition and health of the Aleut.

The value of the dentition in racial studies

Exactly how useful the dentition is for the racial classification of contemporary man is not known as yet. The morphologic patterns of the dentitions of related populations have not been determined fully. There is, however, reason to believe that the permanent dentitions of Mongoloids as a group are characterized by a basic or master pattern which has the following attributes: a marked shovel shape of the maxillary incisors, relatively small differences between the mesiodistal crown diameters of the maxillary central and lateral incisors, an infrequent occurrence of Carabelli's cusp, and a relatively frequent occurrence of torus mandibularis.

The dentition of a Mongoloid subrace may exhibit a specific modification of the Mongoloid master pattern, and a distinctive aggregate of other dental traits. The difference in special characteristics of corresponding master patterns for the dentitions of Negroes and Whites still remain to be elucidated, and it has not yet been established whether special modifications of these patterns exist for the diversity of subraces within each of the three main stocks.

The aim of the present study has not been to demonstrate that the Aleuts are of Mongoloid stock, but rather to find out whether previously known characteristics of the dentitions of Mongoloids apply to the Aleuts. In addition, following Laughlin's hypothesis that the Eastern and

Western Aleuts are separate genetic breeding isolates, the dental characteristics of the two groups have been studied in order to determine whether their dentitions differ from each other morphologically.

FINDINGS

Nutrition

Fish is still the main staple food of the Aleuts. However, a change has taken place in the native Aleut dietary which can be defined best as a substitution of White man's food items such as flour, sugar, and canned foods, for indigenous food staples which comprised the Aleut dietary in former times.

From a number of dietary records of Aleut women, seven were selected as being most satisfactory for more detailed study. Their average dietary intake, calculated as a percentage of the recommended intake levels for American White women as suggested by the National Research Council (1948), showed that the protein, fat, vitamin A, niacin, and vitamin D levels exceeded the N.R.C. standards (15). This was due mainly to the consumption of salmon in large quantities as the staple food and to the use of seal oil. The carbohydrate, calcium, phosphorus, iron, thiamin, riboflavin, ascorbic acid, and caloric levels did not reach the N.R.C. standards for American Whites (fig. 3).

These findings on the small, selected sample of Aleut females pertaining only to their summer dietaries, are in good agreement with those obtained for other Eskimoid populations.

MORPHOLOGY AND ODONTOMETRY

Incisors

The Aleuts have a high proportion of shovel-shaped maxillary central (57 percent) and lateral (56 percent) incisors. The percentage frequency of well accentuated shovel shape is higher for the lateral (10 percent) than for the central (5 percent) incisors (fig. 4).

The difference between the mesiodistal crown diameters of central and lateral incisors is less for the Aleuts than for other Mongoloid populations studied (Table 2).

Because of the high prevalence of shoveling and the small relative difference in the mesiodistal crown diameter of the maxillary incisors of the Aleuts, these teeth furnish clear evidence of the Mongoloid affinity of this population.

The tuberculum dentale and the median ridge are generally absent in the maxillary incisors of Aleuts.

In addition to the marginal ridge formation on the lingual side of the crowns of these teeth, ridges were occasionally observed on the labial side also, in what has been termed „double shoveling”. Generally, the labial shoveling showed an unequal accentuation of one of the two marginal ridges. The presence of labial ridges was not associated with more pronounced degrees of shoveling of the lingual surfaces.

The mandibular incisors of Aleuts, as a rule, have only faintly developed marginal ridges, their lingual surfaces showing little relief.

The difference between the mesiodistal crown diameters of mandibular central and lateral incisors is greater in the Aleuts than in any other racial group in which this relationship has been studied.

Canines

The maxillary canines of the Aleuts show well developed marginal ridges, but there is no shovelshape formation because of well developed median ridges. Unlike the maxillary canines, the mandibular ones have, in general, ill-defined marginal and median ridges.

The mesiodistal crown diameters of both maxillary and mandibular canines of the Aleuts occupy aninter mediate position when this dimension is compared with that found for the other populations studied.

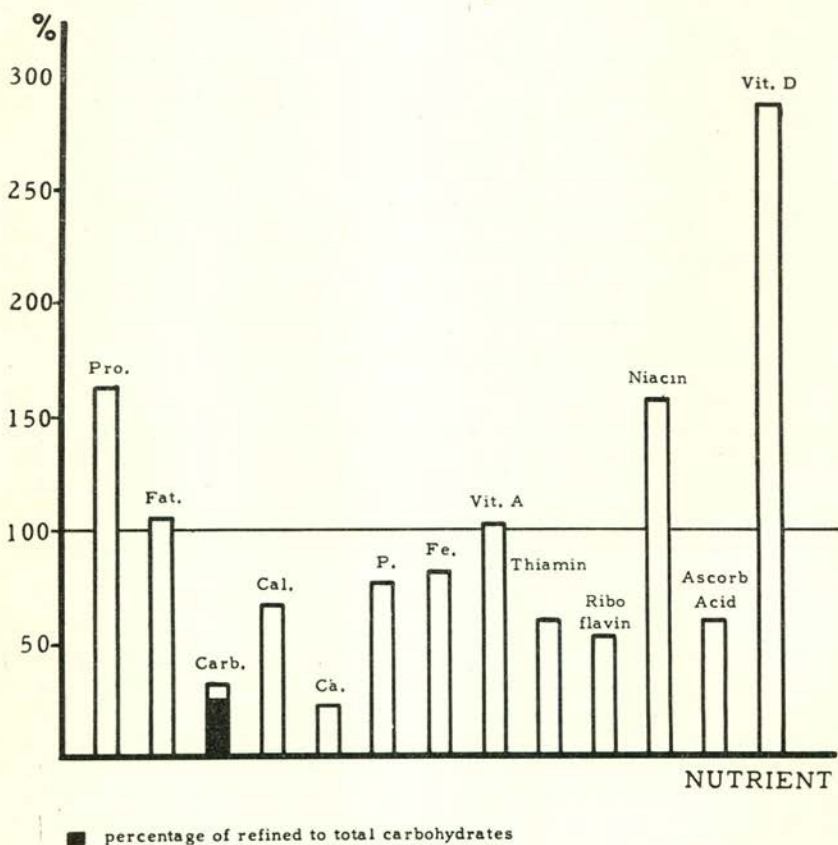


Figure 3. The average dietaries of seven Aleut women expressed as percentages of the recommended intake levels (100 percent) of the National Research Council, 1948 (15)

TABLE 2

Differences in mesiodistal crown diameters of permanent maxillary central and lateral incisors of different population groups

	Population group								
	Aleut (13)	East Green- land Eski- mo (17)	Japa- nese (21)	Java- nese (10)	Norw. Lapp (19)	Pecos In- dian (16)	Tris- tan- ite (20)	Swede (18)	Am- White (14)
Difference (mm)	1.10	1.36	1.4	1.58	1.58*	1.61	1.99	2.01 *	2.03

* Weighted mean of data given for males and females was computed as basis for comparison.

Premolars

The prevalence of three cusps in the mandibular second premolars is fairly common in the Aleut, occurring in 21 percent of the teeth examined.

The mesiodistal crown diameters of the maxillary and mandibular premolars of Aleuts are relatively small when compared with the dimensions recorded for other population groups.

Molars

The percentage frequency of four-cusped maxillary molars in the Aleut is 100 percent for the first molar, 69 percent for the second, and 31 percent for the third molar. The proportion of four-cusp forms probably varies most for the maxillary second molars of different populations.

The combination of cusp numbers of maxillary molars *in situ* in individual Aleuts shows in general a 4-4-3 or a 4-4-4 and to a lesser extent a 4-3-3 formula.

A faintly developed cusp of Carabelli is occasionally found (13 percent) in the maxillary first molars of the Aleut, but not in the second or third molars. A low prevalence of Carabelli's cusp is characteristic of Mongoloid populations.

The three maxillary molars of Aleuts and other Mongoloid groups studied, generally have smaller mesiodistal crown diameters than those of Whites (M o o r r e e s, 11).

The mandibular first molars of Aleuts show an exceedingly low frequency of the typical *Dryopithecoid* pattern (41 percent). The „Y” groove formation is absent in the second and third molars. In contrast to the

high degree of modification of groove patterns, five cusps have been retained in 100 percent of the mandibular first molar, 56 percent of the second, and 75 percent of the third molars (fig. 5). The retention of the 5-5-5 cusp formula may be characteristic of the Eskimo as a group.

The mesiodistal crown diameters of the mandibular molars of Aleuts and other Mongoloid populations do not show differences when compared with the various figures for Whites, except that this diameter of the mandibular first molars seems to be somewhat larger in the Mongoloids.

Supernumerary cusps

One supernumerary cusp occurred on the occlusal surface of the mandibular left second premolar of an Aleut boy (fig. 6). This is the only instance of a supernumerary cusp encountered in the island population.

No paramolar cusps or protostylids were found in any dentition examined.

Supernumerary and missing teeth

No supernumerary teeth were observed in the 156 dentitions that were studied.

With the exception of the third molars, no agenesis of teeth was found in the Aleut. The percentage of missing third molars in the Aleut (40 percent in the maxilla and 39 percent in the mandible) is only an approximation of the true frequency, which seems to be at least as high as that reported for other Eskimoid populations. There are data that show that Mongoloids as a group have a relatively high prevalence of missing third molars.

Exostoses of the maxillae

Torus mandibularis (fig. 7) was present in 35 percent of the Aleuts and in 24 percent of the Aleut children between 1 and 17 years of age from both the Aleutian and Pribilof Islands. An increase in the frequencies of the more marked forms of the torus was noted to parallel increasing age. The presence of torus mandibularis in the Aleut population was attributed to hereditary factors (M o o r r e e s et al. 12). Torus palatinus or torus maxillaris alveolaris was not found in the Aleuts.

Gingival pigmentation

Clinically observable gingival pigmentation affected 62 percent of the maxillae and 63 percent of the mandibulae of the Aleuts seen. These figures include all degrees of the three categories used for classification, diffuse, triangular, and linear.

Morphologic sex differences

When compared to the females, the Aleut males showed a greater prevalence of marked shovel-shaped maxillary central and lateral incisors, tricuspal second premolars in the mandible, cusp of Carabelli in the maxillary first molars, quadricuspal maxillary second and third

molars, „+5” pattern of mandibular third molars, and of torus mandibularis than did the Aleut females.

The average mesiodistal and labiolingual crown diameters of all teeth of Aleut males are larger than those of Aleut females; this is especially true of both the maxillary and mandibular canines of the permanent dentition.

Females show a greater prevalence of „Y5” pattern in mandibular first molars of „+5” pattern in mandibular third molars than Aleut males.

The application of Butler's (3) field concept to the human dentition

The findings dealing with tooth morphology and odontometry support Butler's hypothesis of fields of influence, in that they show that the mesial or key teeth in each morphologic tooth group are less variable in form and in size than the distal teeth of each group. In the mandible, however, the central incisors are more variable than the lateral ones (Dahlberg, 4).

Morphologic characteristics of the permanent Aleut dentition

The anatomical variations in the dentitions of individuals are essentially due to combinations of certain basic characteristics which have been intensified, simplified, or retained to different degrees in the course of human evolution.

When the findings in the morphology of Aleut dentitions are grouped on the basis of intensification, simplification, or retention of these basic characteristics, it becomes evident that, in general, they are modified to a lesser extent from the hypothetical basic pattern than are dentitions of other racial groups (fig. 8). A similar comment has been made regarding the dentitions of the American Indians (Dahlberg, 4) and the East Greenland Eskimos (Pedersen, 17).

The marked forms of shovel-shaped maxillary incisors and the frequent occurrence of torus mandibularis can be looked upon as examples of intensified traits in the Aleut dentition. Retention of ancestral forms is shown by the relatively great prevalence of four cusps in the maxillary second molar and of five cusps in the mandibular second and third molars. Simplification is observed in the near absence of Carabelli's cusp, the high incidence of „+” groove patterns in the mandibular molars, and the frequent occurrence of bicuspal mandibular second premolars. The last mentioned characteristic conforms, however, to the trend toward simplification observed in the teeth of other populations.

Differences between the dentitions of Eastern and Western Aleuts

In comparison to the Western Aleuts, the Eastern Aleuts show a greater frequency of marked shovel-shaped maxillary central and lateral incisors, quadricuspal maxillary second molars, „Y5” pattern of the

mandibular first molar, „+5” pattern of the second and third molars, and of torus mandibularis. With the exception of the maxillary first molar, Eastern Aleut males have larger mesiodistal crown diameters than the Western males.

The Western Aleuts have a greater prevalence of tricuspal mandibular second premolars, of the cusp of Carabelli in the maxillary first molars,

A THEORETICAL CONCEPT OF THE ALEUT DENTITION.

Morphologic Characteristics		BASIC PATTERN		
		Intensified	Retained	Simplified
MARGINAL RIDGING. ⁽¹⁾	MAX. INC.	■		
3 - CUSPED	MAND. Pm ₂			□
CARABELLI'S CUSP	MAX. M ₁			□
4 - CUSPED	MAX. M ₁		■	
	M ₂		■	□
	M ₃			□
Y-GROOVE PATTERN	MAND. M ₁		■	□
	M ₂			□
	M ₃			□
5 - CUSPED	MAND. M ₁		■	
	M ₂			□
	M ₃		■	□
TAURODONTISM ⁽²⁾	MAND. M ₁		■	
TORUS MANDIBULARIS ⁽³⁾		■	■	□

Figure 8. The Aleut dentition seen as an agglomerate of modifications of the hypothetical basic pattern of man's dentition.

Notes: 1. Marginal ridging (shoveling). All degrees other than „trace” were considered as intensifications. 2. Taurodontism. Because of the few data available the classification in the retained category is questionable. 3. Torus mandibularis. The degrees „marked” and „very marked” were considered as intensifications

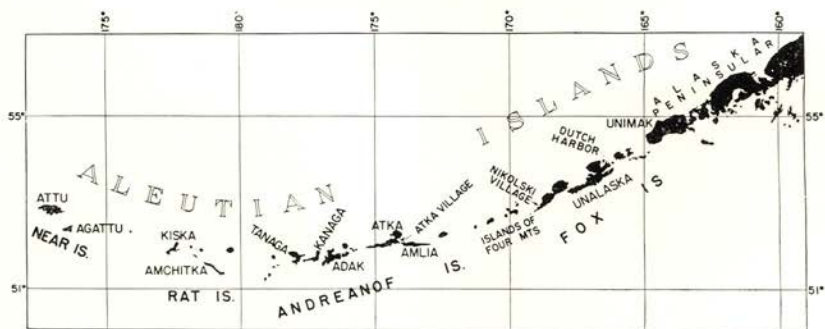
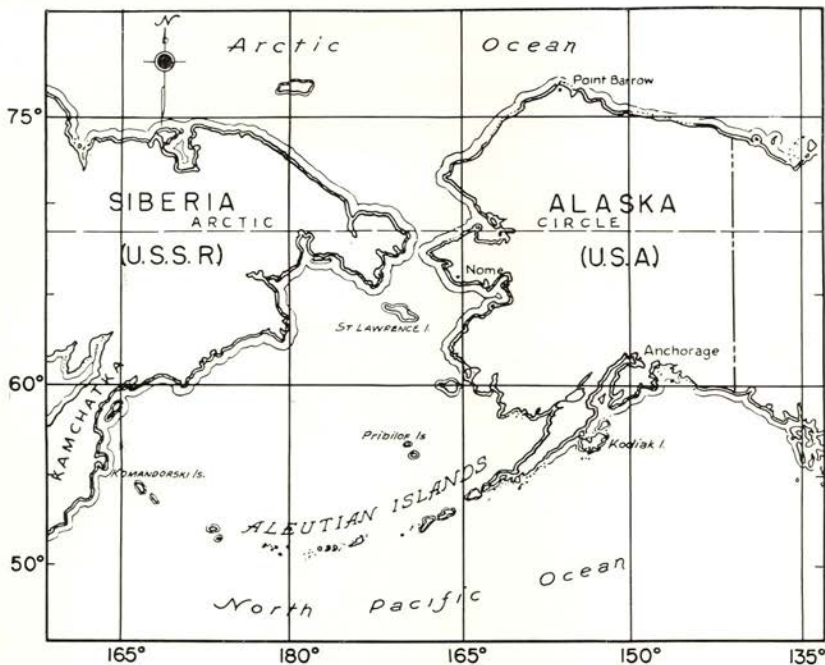


Figure 1. The Aleutian Islands in relation to Alaska and Siberia and a map showing the Island chain in greater detail

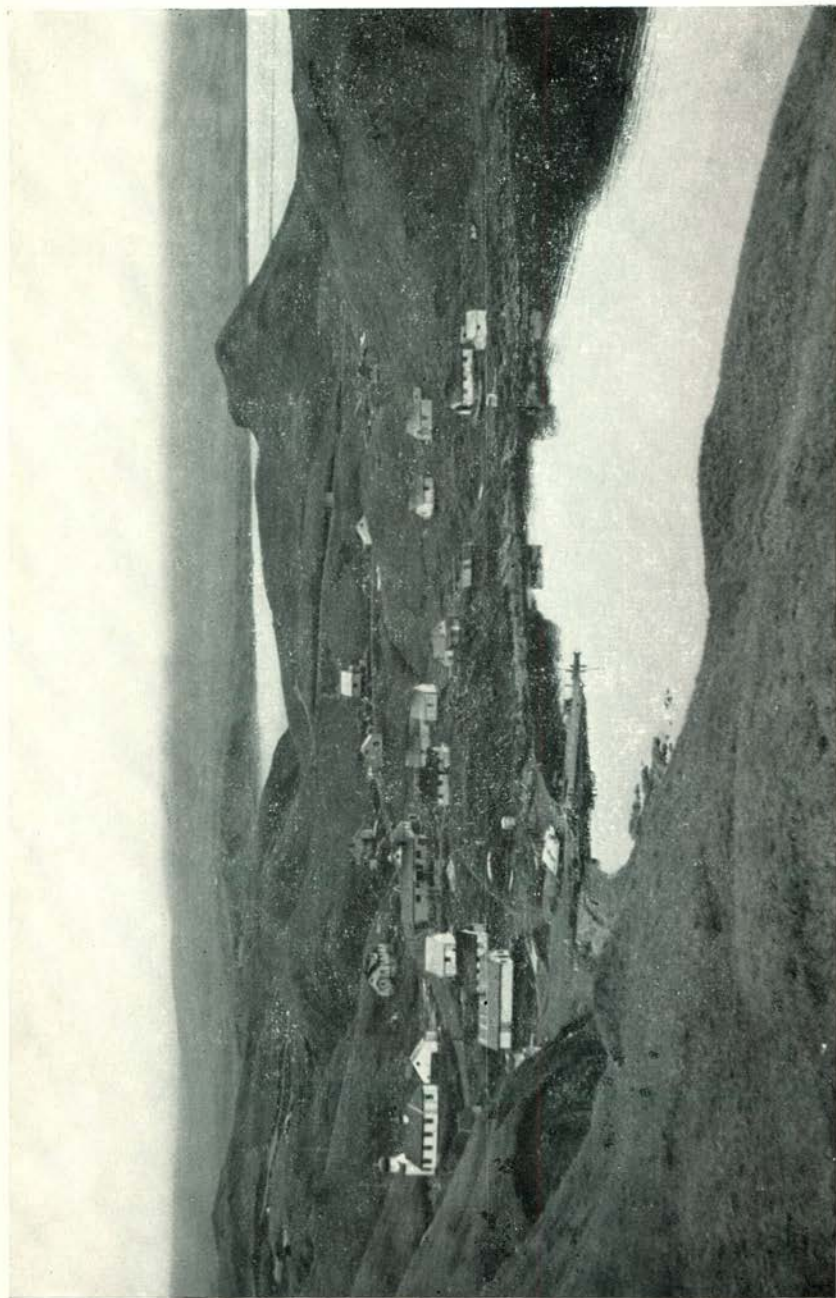


Figure 2. A view of Atka Village on Atka Island



Figure 4. Shovel-shaped maxillary incisors with thickening of the marginal ridges resulting in a ridge and fossa formation on the lingual side (keilo-koilo-morphy), Hrdlicka (7). In the present study the scale of grading consisted of four degrees: marked shovel, shovel, semi-shovel, and trace shovel.

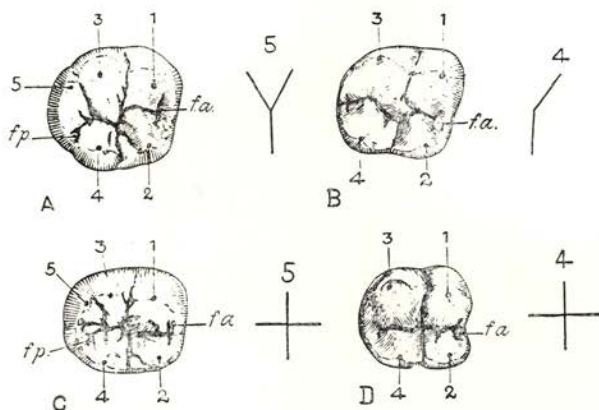


Figure 5. A. The *Dryopithecus* pattern (Y_5) of grooves and cusps in permanent mandibular molars as it occurs in man, the great apes and the *Dryopithecinae*, considered to be ancestral to the anthropoids and related to man

B. The Y_4 pattern after reduction of the number of cusps from 5 to 4 and loss of the posterior limb of the Y-shaped groove configuration

C. The $+5$ pattern with retention of five cusps, but a change in the groove configuration from Y to a cross

D. The $+4$ pattern with both groove configuration and number of cusps modified. (After Hellman, 6)



Figure 6. A supernumerary cusp on the occlusal aspect of the mandibular left second premolar of an Aleut boy

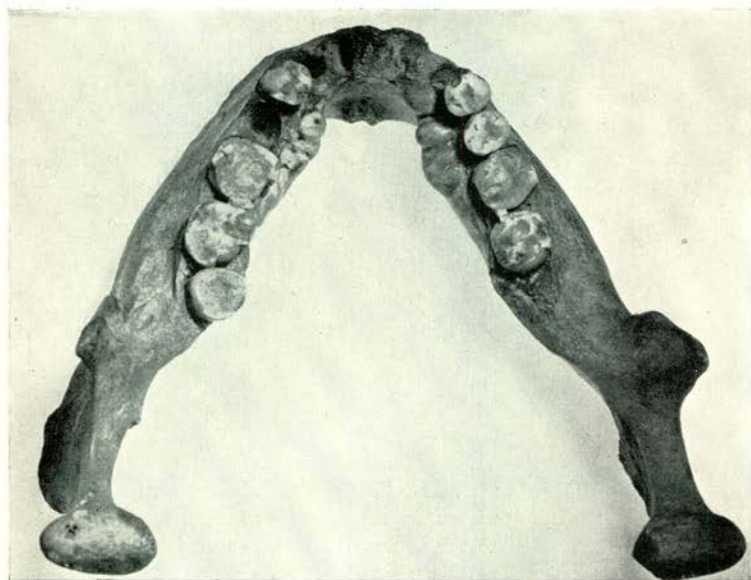


Figure 7. Torus mandibularis, an exostosis occurring on the lingual surface of the mandible (Specimen courtesy of the Peabody Museum, Harvard University)

and of quadricuspal maxillary third molars than can be found for the Eastern Aleuts.

None of the differences in the dental traits of Eastern and Western Aleuts is statistically significant, except that for torus mandibularis, for which a critical ratio of 3.3 was obtained.

The dentitions of the Eastern and Western Aleuts also show divergent trends in the evolutionary modification of several morphologic characteristics. Compared to the Western Aleuts, the Eastern Aleuts show more intensification of two of the basic characteristics already mentioned; they have a greater prevalence of markedly shovel-shaped maxillary incisors and of prominent mandibular tori. They also show more retention of certain other anatomical features exhibiting a higher incidence of the „Y” pattern in the mandibular first molar, of five-cusped second and third molars, and of four-cusped maxillary second molars.

As contrasted with the Western Aleuts, the greater proportion of Eastern Aleuts with bicuspal form of the mandibular second premolar and tricuspal form of the maxillary third molar is suggestive of a trend towards simplification in the form of these teeth among the latter.

Thus, despite the fact that interpopulation differences between the Eastern and Western Aleuts are statistically significant only for torus mandibularis, an analysis on the basis of intensification or retention of basic characteristics reveals rather distinctive trends in each subgroup. These divergent trends strengthen L a u g h l i n's (9) hypothesis, according to which the population of the Aleutian Islands consists of two different breeding isolates.

Tooth emergence

Tooth emergence in Aleut children is advanced compared to that in Whites of the northern hemisphere (H u r m e, 8). The mean deviation for the 54 emerging permanent teeth in Aleut children between 6 and 13 years of age was -0.79 ± 0.10 standard scores. In the younger Aleut children (under 10 years of age) the mean deviation in standard scores was -1.00 ± 0.12 . In the older group (over 10 years of age) the mean deviation was only -0.27 ± 0.12 standard scores. Thus the younger Aleut children are more advanced in tooth emergence than the older ones. They are likewise more advanced in stature when expressed as a percentage of adult stature (Garn and M o o r r e e s, 5). The earlier tooth emergence noted in Aleut children may be due to environmental factors or it may have a racial basis. It is impossible to determine whether tooth emergence in the Aleuts was equally early a generation or two ago, before the changes in the mode of living became as prominent a they are today.

Occlusion and arch form

Few Aleuts had completely intact dentitions with anatomically normal occlusion. In 12 out of 27 Aleut over 40 years of age an edge-to-edge relationship of the incisors was noted.

The prevalence of facial disharmonies resulting in malocclusion is restricted to very pronounced mandibular prognathism (Class III) in those Aleuts (13.2 percent of the population) having one or both parents belonging to the Eastern group. In the families studied, this particular skeletal disharmony seems to be determined by a Mendelian recessive gene, while in Whites it appears to be determined by a Mendelian dominant.

Crowding of the teeth was seen in 52 percent of the maxillary and in 59 percent of the mandibular arches. (In 21 year old Swedes, Seipel (18) observed crowding in 25 percent and 56 percent of the maxillary and mandibular dentitions, respectively). The older islanders did not exhibit any more crowding or to any higher degree than the younger Aleuts.

The shape of the dental arch was studied by visual inspection and with the aid of measurements, supplemented by an index derived from arch length and breadth. None of these methods proved completely satisfactory. The maxillary dental arch in Aleuts is broader and shorter than in North American Whites (C.R. = 3.4 and 2.1, respectively); the mandibular arch is also broader than it is in Whites (C.R. = 3.2), but its length is similar in both racial groups.

Indices for the maxillary arch breadth and bizygomatic breadth (Berger's Index, 2) and for the mandibular arch breadth and bigonial breadth show a distinct positive relationship between arch breadth and facial breadth. The coefficient of correlation between the maxillary arch breadth and bizygomatic breadth was, however, much higher ($r = +0.74 \pm 0.08$) than that between the mandibular arch breadth and bigonial breadth ($r = +0.35 \pm 0.17$).

The dentitions of Aleuts show marked wear of the teeth. This wear, due to both attrition and abrasion, increases with age and helps to bring about a shift from a scissor bite (psalidodonty) to an edge-to-edge bite (labiodonty).

Dental disease

Localized gingivitis observed in a number of Aleuts was frequently associated with crowding of the teeth. There was practically no periodontal disease in this population with the exception of two Aleuts with marked, but non-suppurative pockets. Leukoplakia was observed only in the males and females who chewed tobacco extensively.

The prevalence of dental caries was greater in Aleuts of the 12 to 20 and 21 to 40 year old age groups than in islanders over 40 years of age. Examinations of histologic sections of five extracted teeth suggested that the Aleuts older than 40 years had structurally better teeth, with more perfectly calcified dentin, than did the younger individuals.

A statistically significant sex difference was found for tooth morbidity, Aleut males having an average of 18.8 sound teeth against 15.2 in Aleut females, out of a total of 28 teeth studied in each instance. The critical ratio of the difference between these averages is 2.8.

The percentage of sound teeth varied among the different tooth classes and was greater for the incisors and canines than for the molars (fig. 9). Sex differences were found also for the various morphologic groups, the percentage frequencies of sound teeth for Aleut males being invariably greater than those for Aleut females, although the levels of statistical significance were unequal.

The distribution patterns of health and disease in the permanent dentition were quite similar in the two sexes, and there were no essential differences in these patterns between the young, middle-aged, and older Aleuts. A comparison between similar recorded data for various groups

PERCENTAGE OF SOUND TEETH IN EACH MORPHOLOGIC CLASS

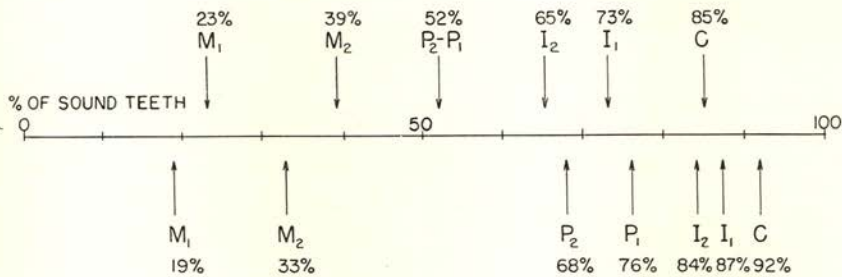


Figure 9. The percentage of sound permanent teeth in Aleuts for each morphologic class

of White stock did not reveal any differences between these and the contemporary Aleuts.

The deterioration in the dental health of the young and middle-aged Aleuts has been pointed out. Special attention has been paid to the apparent decline in the general health status of these people and to the changes in their daily dietary in the recent past. The possible influence of these factors on tooth development and tooth health after emergence is recognized. The poorer dental conditions of today could not be related to any genetic factors, or to the influence of recent racial admixture.

Samenvatting

Bovenstaande studie is een poging tot het analyseren van de gegevens omtrent de gebitten van 156 Aleoeten, verzameld tijdens een expeditie naar de Aleoeten-eilanden, die door het Peabody Museum, Harvard University, werd georganiseerd in 1948.

Het doel was, na te gaan, in hoeverre de tot heden bekende kenmerken van de gebitten der Mongoloïden van toepassing zijn op die der Aleoeten, eerder dan aan te tonen dat de Aleoeten tot het Mongoolse ras behoren. De studie leidde

tevens tot het verifiëren in het odontologische vlak van de beweerde verschillen, die zouden bestaan tussen twee zeer nauw gelieerde Aleoeten-stammen.

De bevindingen betreffende de tanddoorbraak, een van de waardemeters voor de bepaling van de fysiologische leeftijd, zijn gebruikt om de verschillen in ontwikkeling tussen blanken en Aleoeten te berekenen. Milieu-invloeden op de cariës-frequentie werden bestudeerd, omdat de laatste 50 jaar belangrijke wijzigingen hebben plaats gehad in levenswijze, dieet en gezondheid van de Aleoeten.

De bevindingen wijzen erop, dat de reeds bekende odontologische kenmerken van de Mongoloïden ook bij de Aleoeten terug te vinden zijn.

Het Aleoetengebied, evenals dat van de Amerikaanse Indiaan en van de Oost-Groenlandse Eskimo wijkt in geringere mate af van het hypothetische basispatroon, dan dat van andere onderzochte rassen.

Een analyse omtrent de mate van versterking resp. verzwakking van de morfologische grondkenmerken der gebitselementen wijst op duidelijke verschillen tussen de bewoners van de westelijke en de oostelijke eilandengroepen en geeft steun aan de hypothese, volgens welke de bewoners van de Aleoeten bestaan uit twee verschillende geslachten.

Aleoeten-kinderen onder 10 jaar vertonen een vervroegde tanddoorbraak; ook hebben zij, vergeleken met blanke leeftijdgenoten, reeds een proportioneel grotere lichaamslengte bereikt. De gebitstoestand is bij de jeugd relatief slechter dan bij de oudere bewoners dezer eilandengroep.

Summary

The present study is an attempt to analyse comprehensively the data gathered on the dentitions of 156 Aleuts seen during an expedition to the Aleutian Islands of The Peabody Museum, Harvard University, in 1948. The findings indicate that odontologic data are a valuable supplement to scientific studies of population groups and that they may furnish the means for testing a number of hypotheses dealing with various special aspects of human biology.

Zusammenfassung

Die vorliegende Arbeit bildet einen Versuch, die, im Jahre 1948, auf einer Expedition des Peabody-Museums der Harvard Universität nach den Aleuten gesammelten Beobachtungen an Gebissen von 156 Inselbewohnern umfassend zu analysieren. Die Resultate zeigen, dass odontologische Angaben eine wertvolle Ergänzung wissenschaftlicher Studien von Bevölkerungsgruppen darstellen und dass sie auch für die Prüfung einer Anzahl Hypothesen dienen können, die sich auf mehrere spezielle Gebiete der menschlichen Biologie beziehen.

Résumé

Ce mémoire représente l'analyse systématique des observations d'ordre dentaire faites sur 156 Indigènes des Îles Aléoutiennes, lors de l'expédition organisée en 1948 par le Peabody Museum, Harvard University.

Il ressort des conclusions que le facteur odontologique est un auxiliaire précieux de l'étude rationnelle des groupes ethniques. Il se peut qu'il fournisse également le moyen de confirmer certaines hypothèses qui ont été avancées à propos de certains problèmes précis qui se posent en biologie humaine.

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Literature cited:

1. Andrews, C. L.: 1947, The story of Alaska, Caxton Printers, Caldwell, Idaho.
2. Berger, H.: 1926, Zahnärztl. Rundschau, **35** - 329.
3. Butler, P. M.: 1939, Proc. Zool. Soc. London, ser. B **109** - 1.
4. Dahlberg, A. A.: 1949, Papers on the Physical Anthropology of the American Indian, The Viking Fund, Inc., New York, 138.
5. Garn, S. M. and C. F. A. Moorrees: 1951, Child Develop., **22** - 261.
6. Hellman, M.: 1928, Proc. Am. Phylos. Soc., **67** - 157.
7. Hrdlicka, A.: 1920, Am. J. Phys. Anthrop., **3** - 429.
8. Hurme, V. O.: 1948, Child Develop., **19** - 213.
9. Laughlin, W. S.: 1949, Papers on the Physical Anthropology of the American Indian, The Viking Fund, Inc., New York, 98.
10. Mijlsberg, W. A.: 1931, Koninkl. Akad. Wetenschap, Amsterdam, Proc. Sec. Sci., **34** - 1111.
11. Moorrees, C. F. A.: 1951, J. Dent. Research, **30** - 815.
12. Moorrees, C. F. A., R. H. Osborne and E. Wilde: 1952, Am. J. Phys. Anthrop., *n.s.* **10** - 319.
13. Moorrees, C. F. A.: 1957, The Aleut Dentition, Harvard Univ. Press, Cambridge, Mass.
14. Moorrees, C. F. A., S. Ø. Thomsen, E. Jensen, and P. K. Yen: 1957, J. Dent. Research, **36** - 39.
15. National Research Council: 1948, Recommended dietary allowances (revised), Nat. Research Council Reprint and Circular Series, No. 129, Washington, D. C.
16. Nelson, C. T.: 1938, Am. J. Phys. Anthrop., **23** - 261.
17. Pedersen, P. O.: 1949, Meddelelser om Grønland, **142** - 1.
18. Seipel, C. M.: 1946, Svensk Tandläkare-Tidskr., **39** - Supplementum.
19. Selmer-Olsen, R.: 1949, Skrifter utgitt av Det Norske Videnskaps-Akademi, Oslo, I. Mat.-Naturv. Klasse, No. 3.
20. Thomsen, S.: 1955, Results of the Norwegian Scientific Expedition to Tristan da Cunha, 1937-1938, Det Norske Videnskaps-Akademi, Oslo, No. 25.
21. Yamada, E.: 1932, J. Nippon Dental Assoc., **25** - 15, 101, 177, 255, 329, 450, 528, 609, 710, 774.