

AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Turner II, Christy G., 1989. Dentition of Watom Island, Bismarck Archipelago, Melanesia. *Records of the Australian Museum* 41(3): 293–296. [30 November 1989].

doi:10.3853/j.0067-1975.41.1989.146

ISSN 0067-1975

Published by the Australian Museum, Sydney

nature culture **discover**

Australian Museum science is freely accessible online at
www.australianmuseum.net.au/publications/
6 College Street, Sydney NSW 2010, Australia



Dentition of Watom Island, Bismarck Archipelago, Melanesia

CHRISTY G. TURNER II

Department of Anthropology, Arizona State University,
Tempe, Arizona 85287-2402 USA.

ABSTRACT. Teeth belonging to two adults excavated from the Lapita level occupation of Watom Island (ca. 2,300 years before present [YBP]) are described and compared with three large dental series from New Britain, recent Thailand, and Mokapu, Hawaii. As far as can be determined from a sample of two individuals, the Watom teeth appear to be more like those from New Britain than Thailand or Hawaii. All teeth are free of dental caries, hinting that the Watom diet was not overly dependent on sticky carbohydrate foodstuffs.

TURNER, CHRISTY G., II, 1989. Dentition of Watom Island, Bismarck Archipelago, Melanesia. *Records of the Australian Museum* 41(3): 293–296.

The current anthropological view about the origin of Polynesians recognises a link between a pottery type called Lapita ware and the first settlements in Polynesia (Howells, 1973; Green, 1979; Bellwood, 1979). This ceramic type has been found in several archaeological sites in Melanesia, suggesting that Polynesians originated from the Melanesian gene pool. However, various physical anthropological studies have shown that Polynesian skeletal and dental features are more like those of south-east Asians than Melanesians. Until recently there have been no studies on human skeletal remains found in association with Lapita ceramics. Even now, such studies are limited to a few fragmentary skeletons (Pietruszewsky, 1985, n.d.; Kirch, Swindler & Turner, 1989). Therefore, even small amounts of information are valuable in attempting to reconstruct the biological characteristics of the Lapita ware people.

Dental anthropology is proving to be a powerful adjunctive resource for biohistoric research. This is

because dental features such as incisor shovelling, cusp numbers and groove patterns are evolutionarily stable due to their polygenic inheritance. Even in very small populations, genetic drift has only a minimal effect, and major environmental shifts have almost no identifiable selective effect in blocks of time involving less than 5,000 years.

Given the theoretical importance of the Lapita-first Polynesian correspondence, and the methodological power of dental anthropology, a lengthy description of the Watom dentition is warranted.

Materials and Methods

The dentitions described and compared herein originated from 8 km wide Watom Island, located about 8 km offshore of New Britain's northern Gazelle Peninsula

Table 1. Watom Dental Morphology.

Maxilla	No. 3		No. 6			No. 3		No. 6	
	R	L	R	L		R	L	R	L
I1 Winging	3	3	3	3	P1 Enamel extension	0		0	0
I1 Shovel	1		1	1	P2 Enamel extension	0		0	0
I2 Shovel	1		1	1	M1 Enamel extension	0		0	0
I1 Double-shovel	0		1	0	M2 Enamel extension	0	0		0
I2 Double-shovel	0		0	0	M3 Enamel extension		0	0	0
I1 Interrup.groove	0		0	0	I1 Root number	1		1	1
I2 Interrup.groove	0		0	0	I2 Root number				
I1 Tuberculum dent.	0		0	0	C Root number			1	1
I2 Tuberculum dent.	0		0	1	P1 Root number	2		1	
C Mesial ridge			0	0	P2 Root number				
P1 Mes./dist. cusps			0	0	M1 Root number	3		3	3
P2 Mes./dist. cusps			0	0	M2 Root number	3	3		3
P1 Uto-Aztec	0		0	0	M3 Root number		1	1	
M1 Metacone	5		5	5	I1 Radical number				
M2 Metacone	5	5	4	4	I2 Radical number				
M3 Metacone		3.5	3.5	3.5	C Radical number			2	
M1 Hypocone	4		4	4	P1 Radical number				
M2 Hypocone	3.5	3.5		2	P2 Radical number				
M3 Hypocone		0	0	0	M1 Radical number			7	
M1 Cusp 5			0	0	M2 Radical number				
M2 Cusp 5	0	2		0	M3 Radical number			4	
M3 Cusp 5		0	0	0	I2 Peg/reduced	0		R	R
M1 Carabelli					I2 Congenital absent	0	0	0	0
M2 Carabelli	0			0	M3 Peg/reduced	0	0	0	0
M3 Carabelli		0	0	0	M3 Congenital absent	0	0	0	0
M1 Parastyle	0		0	0	P2 Congenital absent	0	0	0	0
M2 Parastyle	0	0		0	P1 Odontome				0
M3 Parastyle		0	0	0	P2 Odontome			0	0
Mandible									
I1 Shovel			0	0	P1 Enamel extension		0	0	0
P1 Lingual cusp form			A	A	P2 Enamel extension	0	0	0	0
P2 Lingual cusp form	3	3	A	A	M1 Enamel extension	0	0	0	0
M1 Groove pattern	Y	Y	Y	Y	M2 Enamel extension	0	0	1	0
M2 Groove pattern	+	X	+	+	M3 Enamel extension	0	0	0	0
M3 Groove pattern	X	X	X	X	I1 Root number		1		
M1 Cusp number			5	5	I2 Root number		1		
M2 Cusp number	>4	>4	4	4	C Root number	1	1		
M3 Cusp number	4	5	5	5	P1 Root number	1	1		
M1 Deflect. wrinkle					P2 Root number				
M2 Deflect. wrinkle				0	M1 Root number	2	2	2	2
M3 Deflect. wrinkle	0	0	0	0	M2 Root number	2		2	2
M1 C1-C2 crest					M3 Root number				
M2 C1-C2 crest	0	0	0	0	I1 Radical number				
M3 C1-C2 crest	0	0	0	0	I2 Radical number				
M1 Protostylid	0	0	0	0	C Radical number				
M2 Protostylid	0	0	0	0	P1 Radical number		2		
M3 Protostylid	0	0	0	0	M1 Radical number				
M1 Cusp 5					M2 Radical number				
M2 Cusp 5			0	0	M3 Radical number				
M3 Cusp 5	0	5	3	3	P1 Tomes root		0		
M1 Cusp 6			0	0	P1 Odontome			0	0
M2 Cusp 6			0	0	P2 Odontome			0	0
M3 Cusp 6	0	0	0	0	I1 Congenital absent	0	0	0	0
M1 Cusp 7	0	0	0	0	P2 Congenital absent	0	0	0	0
M2 Cusp 7	0	0	0	0	M3 Congenital absent	0	0	0	0
M3 Cusp 7	0	0	0	0	M3 Torsomolar angle			0	0

(ca. 4°S, 152°E). The skeleton from burial 3 was excavated by J. Specht (1968), and that from burial 6 by R.C. Green & D. Anson (1987). Their antiquity is about 2,100 to 2,500 YBP. Other aspects of these skeletons have been studied by P. Houghton & M. Pietruszewsky (this volume).

All of the 64 possible teeth were preserved. They are moderately worn suggesting young to middle-aged adults at time of death. The very large teeth of skeleton 3 suggests a male, the slightly smaller teeth of skeleton 6 are less definitive, but possibly a male also. The amount of tooth wear points to both individuals having been about 30 to 50 years old at the time of their deaths. Neither individual had any dental caries, antemortem tooth loss, or alveolar abscessing, but periodontal disease was severe in 3 and medium in 6 (ranking defined in Turner, 1979). The absence of caries and the presence of moderate to severe periodontal disease is much more often the oral health signature of hunting, gathering and fishing economies than those based on agriculture with its cariogenic sticky carbohydrate foodstuffs (Turner, 1979).

While neither individual had any tooth modification such as filing, incising or intentional staining, the labial surfaces of the upper and lower incisors of skeleton 6 evidenced fine horizontal polishing striations and cleaning. There are

no interproximal toothpick grooves. Perhaps both individuals practiced some form of oral hygiene since tartar accumulations were minor. Tartar deposits are often heavy in agricultural populations.

Neither individual has a rocker jaw, although 6 has what I refer to as 'almost' rocker.

Dental Morphology

Table 1 lists all of the major dental variants identifiable in each individual. The scoring of these variants and expression follow the ASU dental anthropology system (Turner, 1979; n.d.a). Table 2 compares the 16 most important traits in Watom, Mokapu, recent Thai and New Britain teeth. Comparing frequencies, Watom is most like the Thai for two traits, most like Mokapu for four traits, and most like New Britain for nine traits.

Table 3 provides multivariate inter-group Mean Measures of Divergence values based on the values in Table 2. The various negative MMDs are not statistically significant, whereas the positive values are. Although this MMD comparison fails to identify which group is most

Table 2. Key dental traits in Watom and comparative series.

Trait	Dichotomisation		Watom	Mokapu	Recent Thai	New Britain
UI1	Winging (1/1-4)	%	0.0	22.9	28.6	25.0
		n	(0/2)	(38/166)	(20/70)	(28/112)
UI1	Shovel (3-6/0-6)	%	0.0	23.5	31.1	9.3
		n	(0/2)	(39/166)	(23/74)	(10/108)
UI1	Double-shovel (+/0,+)	%	0.0	26.3	25.4	3.7
		n	(0/2)	(45/171)	(15/59)	(4/107)
UM2	Hypocone (2-5/0-5)	%	100.0	93.3	89.7	92.7
		n	(2/2)	(182/195)	(96/107)	(166/179)
UM3	Parastyle (1-4/0-4)	%	0.0	5.2	5.2	5.7
		n	(0/2)	(6/115)	(4/77)	(7/123)
UM1	Enamel ext. (2-3/0-3)	%	0.0	20.5	35.8	4.7
		n	(0/2)	(42/205)	(39/109)	(7/150)
UP1	One root (1/1-3)	%	50.0	60.8	67.3	48.8
		n	(1/2)	(104/171)	(72/107)	(61/125)
UM2	Three roots (3-4/1-4)	%	100.0	45.8	80.9	86.3
		n	(2/2)	(76/166)	(72/89)	(120/139)
UM3	Peg/reduce/cong.abs. (PRC/normal,PRC)	%	0.0	(34.5)	(18.7)	(16.7)
		n	(0/2)	(69/200)	(24/128)	(26/156)
LP2	>1 lingual cusp (2-3/1-3)	%	50.0	82.9	73.7	91.5
		n	(1/2)	(150/181)	(73/99)	(140/153)
LM2	Y groove pattern (Y/Y,+,X)	%	0.0	15.0	19.1	25.4
		n	(0/2)	(28/186)	(21/110)	(46/181)
LM2	Four cusps (4/4-6)	%	50.0	35.2	19.0	51.8
		n	(1/2)	(62/176)	(19/100)	(88/170)
LM1	Protostylid (1-7/0-7)	%	0.0	16.3	26.8	21.2
		n	(0/2)	(30/184)	(26/97)	(40/189)
LM1	Cusp 7 (1-4/0-4)	%	0.0	7.9	3.8	13.0
		n	(0/2)	(15/190)	(4/104)	(25/192)
LM1	Three roots (3/1-3)	%	0.0	12.0	11.3	4.5
		n	(0/2)	(22/184)	(15/133)	(7/155)
LM2	One root (1/1-3)	%	0.0	30.0	28.7	2.0
		n	(0/2)	(51/170)	(37/129)	(3/149)

U denotes upper jaw; L, lower jaw

Table 3. Mean measures of divergence.

	Mokapu	Recent Thai	New Britain
Watom	-.064	-.116	-.124
Mokapu		.056	.172
Recent Thai			.185

similar to Watom, it is evident that Mokapu dentition is almost three times more like that of the Thai than like New Britain teeth.

Finally, we can ask what is the probability of obtaining the trait frequencies listed for each group in Table 1. The probabilities will be the product of multiplying the frequencies of each trait in a group. Reciprocals are used for all groups where Watom trait frequencies are zero. The probability of getting exactly the Mokapu trait frequencies is 0.0066; Thai, 0.0045; New Britain, 0.0434; and Watom, 0.125. Comparing these probability values, we see that Watom is more similar to New Britain than Mokapu or Thailand.

The dentitions of the two Watom crania are more similar to teeth from New Britain than to teeth of recent Thai or late prehistoric Hawaiians. Insofar as a sample of two individuals can be trusted to represent a population, the Watom dentition suggest that the Lapita wares found on this small island were associated with Melanesians. Given the nearness of Watom to New Britain, this finding is reassuring in the sense that we would expect Watom teeth to be most like those of the larger and more heavily populated New Britain. Only on small islands far away from larger ones might we expect to find Lapita ceramics associated with non-Melanesian dentitions and skeletal features if Lapita and ancestral Polynesians were moving rapidly out of South-east Asia into Melanesia. Such seems to have happened on the northern edge of the Bismarck Archipelago where a small sample of teeth from the Mussau Islands is slightly more like teeth of South-east Asia than Melanesia (Kirch, Swindler & Turner, 1989). Finally, if one chooses to accept the small Watom sample as representative of this island's prehistoric population, and if the recent finding by P. Kirch (1988) is verified elsewhere that Lapita ware shows no developmental sequence in the Mussau Islands, and therefore must have had its origin in South-east Asia as others have suggested, then it would appear that at least some of the Lapita pottery found on Watom represents direct or indirect trade activity with non-Melanesians. This suggestion could not be taken seriously if based only on the Watom and Mussau teeth. However, when all Polynesia is considered, it is quite reasonable, because teeth of all Polynesian groups are significantly more like those of south-east Asians than like

Melanesians (Table 2; Turner n.d.b).

ACKNOWLEDGMENTS. I am very grateful to Roger C. Green for the opportunity to examine the Watom dentition. This paper was prepared while Fellow-in-residence at the Museum of Northern Arizona, Flagstaff, summer, 1988.

References

- Bellwood, P., 1979. 'Man's Conquest of the Pacific.' Oxford University Press, New York.
- Green, R.C., 1979. Lapita. pp. 27-60. In (J.D. Jennings, ed.). The Prehistory of Polynesia. Harvard University Press, Cambridge.
- Green, R.C. & D. Anson, 1987. The Lapita site of Watom: New evidence from excavations in 1985. *Man and Culture in Oceania* 3 (Special Issue): 121-131.
- Howells, W.W., 1973. The Pacific Islanders. Charles Scribner's Sons, New York.
- Kirch, P.V., 1988. The Talepakemalai Lapita site and Oceanic prehistory. *National Geographic Research* 4(3): 328-342.
- Kirch, P.V., D.R. Swindler & C.G. Turner II, 1989. Human skeletal and dental remains from Lapita sites (1600-500 B.C.) in the Mussau Islands, Melanesia. *American Journal of Physical Anthropology* 79(1): 63-76.
- Pietrusewsky, M., 1985. The earliest Lapita skeleton from the Pacific: A multivariate analysis of a mandible fragment from Natunuku, Fiji. *Journal of the Polynesian Society* 94: 389-414.
- Pietrusewsky, M., n.d. Craniometric variation in Micronesia and the Pacific: A multivariate study. Paper presented at the Micronesian Archaeological Conference, Guam, September, 1987.
- Specht, J., 1968. Preliminary report of excavations on Watom Island. *Journal of the Polynesian Society* 77(2): 117-134.
- Turner, C.G. II, 1979. Dental anthropological indications of agriculture among the Jomon people of central Japan. X. Peopling of the Pacific. *American Journal of Physical Anthropology* 51(4): 619-635.
- Turner, C.G. II, n.d.a. ASU dental anthropology system. Scoring procedures for key morphological traits of the permanent dentition. Mimeograph (available on request).
- Turner, C.G. II, n.d.b. Out of SE Asia: Dentition and the peopling of the Pacific Basin and adjoining areas. Paper prepared for Circum-Pacific Prehistory Conference, Seattle, August, 1989.

Accepted August 14, 1989