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Forensic Anthropology Population Data

Diversity of dental patterns: Application on different ages using the Brazilian National Oral Health Survey

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ABSTRACT

Methods of individual identification using human remains are widely used in forensic anthropology; however, there are few studies that use statistical methods in order to obtain a correct definition of parameters. The objectives of the study were to verify the diversity of dental patterns in the Brazilian population and analyse its application on different ages. Data from the Brazilian National Oral Health Survey were used to verify the presence and absence of dental treatment among 35,613 individuals of several age groups: 15–19, 35–44 and 65–74. Information referring to every dental element was described: higid (H), decayed (D), filled (F), missing (M) and prosthesis (P). Coincidences that were observed in pairs of homologous teeth were analysed according to clinical situation, gender and age. Ordinary findings (presented in more than 10% of pairs) and extraordinary ones (presented in less than 10% of pairs) were described. Total and conditional diversity estimates were performed. Among adolescents, H were the most frequent teeth, and the first molar teeth were the ones presenting less frequency of H. Among adults, the frequency of M teeth among females ranged from 15.17% to 71.59%, and among males they ranged from 9.00% to 87.20%. Among the elderly, M teeth were observed in the largest frequency, and anterior teeth presented fewer losses than posterior ones. M was the condition that most coincided with both sides in the elderly. In adults, some pairs of teeth presented H, but mostly pairs of teeth presented as M. Among adolescents, there was more concordance of the H component. Among male and female adolescents, we observed extraordinary findings in DMFP dental conditions in most of the teeth. Among adults, the less frequent dental condition was P, which was found in several teeth. The extraordinary findings among elderly male teeth were codes H, D, F and P; among females, they were H, D, F and P codes. The high prevalence of healthy teeth in adolescents and a high rate of edentulism in the elderly interfered with the analysis performed. However, when an estimation of diversity that corrects those distortions was used, all of the groups presented satisfactory results that were homogeneous in the performed analysis.

1. Introduction

Methods of individual identification using human remains are widely used in forensic anthropology. However, there are few studies that use statistical methods in order to obtain a correct definition of parameters [1]. The use of forensic dentistry refers to the use of dental records for positive identification or exclusion during a process of identification. Thus, it would be possible to determine whether the corpse studied belongs to a certain individual by means of comparative dental identification, when *ante* and *post mortem* dental records can be identified [2].

DNA analysis as well as the study of individual dental patterns and radiographies are used due to the large possibility of discovering extraordinary/rare findings in the population, that is, they have discriminant high value. Thus, dental patterns provide well-known instruments of comparison in human identification, which are on a similar scale to the mtDNA exam [3].

Thus, one of the greatest challenges of dental identification is having the largest number of similarities and the smallest number of discrepancies in order to obtain a positive identification in *antemortem* and *post mortem* records [4]. When dental comparisons are performed, knowledge of the clinical situation of every element is important. When discrepancies occur, they can be explained or the records can be definitely discarded as not belonging to the same individual even in the absence of radiographic records.

Keiser-Nielsen [5] explains that several factors must be considered in identification, and both quantitative and qualitative

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Table 1
The distribution of teeth according to dental condition and age group in males.

Adolescent (male)[a]																
H	1211	4639	3266	5765	5769	6739	5942	5624	5600	5896	6735	5801	5756	3241	4584	1189
	(86,07)	(67,81)	(47,42)	(84,28)	(84,42)	(96,59)	(85,31)	(80,63)	(80,22)	(84,64)	(96,49)	(84,79)	(84,23)	(47,11)	(66,77)	(86,10)
D	102	1275	1390	463	434	127	574	720	730	589	136	411	454	1479	1306	81
	(7,25)	(8,64)	(20,18)	(6,77)	(6,35)	(1,82)	(8,24)	(10,32)	(10,46)	(8,46)	(1,95)	(6,01)	(6,64)	(21,50)	(19,02)	(5,87)
F	36	801	1758	502	475	69	347	498	513	367	70	481	506	1728	851	42
	(2,56)	(11,71)	(25,52)	(7,34)	(6,95)	(0,99)	(4,98)	(7,14)	(7,35)	(5,27)	(1,00)	(7,03)	(7,40)	(25,12)	(12,40)	(3,04)
M	56	121	467	105	150	38	95	116	123	104	36	143	114	426	121	66
	(3,98)	(1,77)	(6,78)	(1,54)	(2,19)	(0,54)	(1,36)	(1,66)	(1,76)	(1,49)	(0,52)	(2,09)	(1,67)	(6,19)	(1,76)	(4,78)
P	2	5	7	5	6	4	7	17	15	10	3	6	4	6	3	3
	(0,14)	(0,07)	(0,10)	(0,07)	(0,09)	(0,06)	(0,10)	(0,24)	(0,21)	(0,14)	(0,04)	(0,09)	(0,06)	(0,09)	(0,04)	(0,22)
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
H	1547	3579	2261	5871	6375	6924	6887	6858	6870	6885	6940	6391	5832	2264	3508	1541
	(84,21)	(52,21)	(32,87)	(85,71)	(92,79)	(98,82)	(98,33)	(98,04)	(98,06)	(98,26)	(99,04)	(92,96)	(85,06)	(32,90)	(51,06)	(85,04)
D	138	1768	1525	393	162	48	76	89	89	75	34	169	425	1493	1860	130
	(7,51)	(25,79)	(22,17)	(5,74)	(2,36)	(0,69)	(1,09)	(1,27)	(1,27)	(1,07)	(0,49)	(2,46)	(6,20)	(21,69)	(27,07)	(7,17)
F	70	1225	1878	454	261	21	22	36	36	33	22	237	474	1888	1225	67
	(3,81)	(17,87)	(27,30)	(6,63)	(3,80)	(0,30)	(0,31)	(0,51)	(0,51)	(0,47)	(0,31)	(3,45)	(6,91)	(27,43)	(17,83)	(3,70)
M	79	280	1207	128	69	11	16	9	8	11	8	75	121	1234	274	71
	(4,30)	(4,08)	(17,55)	(1,87)	(1,00)	(0,16)	(0,23)	(0,13)	(0,11)	(0,16)	(0,11)	(1,09)	(1,76)	(17,93)	(3,99)	(3,92)
P	3	3	8	4	3	3	3	3	3	3	3	3	4	3	3	3
	(0,16)	(0,04)	(0,12)	(0,06)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,06)	(0,04)	(0,04)	(0,17)
Adult (male)[a]																
H	1175	1063	756	1254	1341	2358	1697	1470	1446	664	2355	1283	1260	761	1081	1149
	(30,21)	(24,49)	(17,42)	(28,89)	(30,96)	(54,28)	(39,12)	(33,87)	(33,33)	(19,92)	(54,25)	(29,56)	(29,07)	(17,55)	(24,92)	(29,69)
D	467	527	424	464	431	416	434	452	490	432	370	475	427	448	509	436
	(12,01)	(12,14)	(9,77)	(10,69)	(9,95)	(9,58)	(10,00)	(10,41)	(11,29)	(12,96)	(8,52)	(10,94)	(9,85)	(10,33)	(11,73)	(11,27)
F	501	1047	939	804	734	353	543	642	621	552	388	788	835	968	1028	470
	(12,88)	(24,12)	(21,64)	(18,52)	(16,94)	(8,13)	(12,52)	(14,79)	(14,31)	(16,56)	(8,94)	(18,16)	(19,26)	(22,32)	(23,70)	(12,14)
M	1739	1683	2189	1787	1786	1178	1612	1704	1709	1620	1181	1754	1778	2135	1702	1811
	(44,70)	(38,78)	(50,44)	(41,17)	(41,23)	(27,12)	(37,16)	(39,26)	(39,39)	(48,59)	(27,21)	(40,41)	(41,01)	(49,24)	(39,23)	(46,80)
P	8	20	32	32	40	39	52	72	73	66	47	40	35	24	18	4
	(0,21)	(0,46)	(0,74)	(0,74)	(0,92)	(0,90)	(1,20)	(1,66)	(1,68)	(1,98)	(1,08)	(0,92)	(0,81)	(0,55)	(0,41)	(0,10)
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
H	957	610	378	1631	2466	3481	3496	3512	3536	3508	3518	2476	1685	382	608	877
	(24,65)	(14,10)	(8,75)	(37,58)	(56,73)	(80,17)	(80,66)	(80,88)	(81,46)	(80,81)	(80,97)	(57,05)	(38,81)	(8,83)	(14,05)	(22,62)
D	414	397	286	474	381	264	262	248	221	257	242	376	456	267	402	460
	(10,66)	(9,17)	(6,62)	(10,92)	(8,76)	(6,08)	(6,05)	(5,71)	(5,09)	(5,92)	(5,57	(8,66)	(10,50)	(6,17)	(9,29)	(11,86)
F	575	923	586	839	641	185	154	143	136	165	181	619	824	564	933	598
	(14,81)	(21,33)	(13,56)	(19,33)	(14,75)	(4,26)	(3,55)	(3,29)	(3,13)	(3,80)	(4,17)	(14,26)	(18,98)	(13,04)	(21,56)	(15,42)
M	1929	2381	3057	1377	842	403	416	434	441	404	391	848	1354	3097	2363	1932
	(49,69)	(55,03)	(70,76)	(31,73)	(19,37)	(9,28)	(9,60)	(10,00)	(10,16)	(9,31)	(9,00)	(19,54)	(31,18)	(71,59)	(54,60)	(49,83)
P	7	16	13	19	17	9	6	5	7	7	13	21	23	16	22	10
	(0,18)	(0,37)	(0,30)	(0,44)	(0,39)	(0,21)	(0,14)	(0,12)	(0,16)	(0,16)	(0,30)	(0,48)	(0,53)	(0,37)	(0,51)	(0,26)
Elderly (male)[a]																
H	152	178	119	182	201	359	250	253	251	261	353	207	217	141	153	123
	(7,68)	(8,61)	(5,75)	(8,78)	(9,71)	(17,34)	(12,08)	(12,24)	(12,14)	(12,63)	(17,04)	(10,00)	(10,49)	(6,81)	(7,39)	(6,20)
D	81	86	97	107	117	152	137	143	138	131	152	141	109	93	103	91
	(4,09)	(4,16)	(4,69)	(5,16)	(5,65)	(7,34)	(6,62)	(6,92)	(6,67)	(6,34)	(7,34)	(6,81)	(5,27)	(4,49)	(4,98)	(4,58)
F	42	90	70	58	58	45	57	49	53	52	39	61	59	75	88	39
	(2,12)	(4,35)	(3,38)	(2,80)	(2,80)	(2,17)	(2,75)	(2,37)	(2,56)	(2,52)	(1,88)	(2,95)	(2,85)	(3,62)	(4,25)	(1,96)
M	1704	1704	1778	1715	1685	1496	1602	1609	1614	1613	1512	1651	1679	1751	1718	1731
	(86,10)	(82,40)	(85,89)	(82,73)	(81,44)	(72,27)	(77,43)	(77,84)	(78,05)	(78,04)	(73,01)	(79,72)	(81,15)	(84,59)	(83,04)	(87,20)
P	0	10	6	11	8	18	23	13	12	10	15	11	5	10	7	1
	(0,00)	(0,48)	(0,29)	(0,53)	(0,39)	(0,87)	(1,11)	(0,63)	(0,58)	(0,48)	(0,72)	(0,53)	(0,24)	(0,48)	(0,34)	(0,05)