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A Bayesian approach to age estimation from cranial suture closure in Japanese people

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Abstract Although cranial suture closure has been utilized for age estimation, this method is thought to be not entirely reliable because of considerable variations in suture closure. The Bayesian approach was thought to be one solution for providing a more accurate estimation of age at death (Lucy *et al.*, 1985). The purpose of this study is to investigate suture closures on skulls, examine the relationship between these sutures and age at death, and represent a new age estimation method with these sutures based on Bayes' theorem proposed by Lucy *et al.* (1995). After examining 41 sites of sutures in 274 skulls of Japanese people, it was found that 5 vault sutures ("1: Mid-lambdoid", "4: Anterior sagittal," "5: Bregma," "6: Mid-coronal," "7: Pterion"), 3 facial sutures ("18: Inner Mid-sphenofrontal," "29: Anterior median palatine," "35: Medial sphenopalatine"), and all endocranial sutures ("38: Inner mid-coronal," "39: Inner bregma," "40: Inner mid-sagital," "41: Inner lambda") show a strong relationship with the age at death. And this paper presents a new method of age estimation based on the Bayesian theorem.
Key words: Age estimation, cranial suture, Bayes' theorem, Japanese

Introduction

The estimation of age at death is an important part of physical and forensic anthropology. In practice, it often happens that only a skull is preserved and available for age estimation. There is thus a practical need to create a better method for age estimation from only a skull. Cranial suture closure has been utilized for estimating the age-at-death since the sixteenth century (Meindl and Lovejoy, 1985). However, aging estimation methods based on sutures were thought to be less reliable than other methods such as pubic symphysis because there are considerable variations in the timing of closure (Mckern and Stewart, 1957; Krogman, 1962; Buikstra and Uberaker, 1994). As Lovejoy *et al.* (1985) have pointed out, Meindl and Lovejoy's method of estimating age at death from ectocranial suture closure was not as accurate as the aging method from auricular surface and functional dental wear, and revised pubic system, and is useful when other criteria are not available or when used in conjunction with other systems.

Beside sutures on cranial vaults, there are some researchs on age change and age estimation based on facial suture closure (Sakuma, 1956; Dorandeu, 2006; Alesbury *et al.*, 2013; Mann *et al.*, 1991; Sakaue and Adachi, 2007). These researches indicated that some craniofacial sutures showed age-related changes and are suitable for age estimation. However, there is no research investigating the age progression of closure of many sutures on a whole skull in a coherent scoring system comparing the scores between sutures for a better estimation of age.

Lucy *et al.* (1995) presented an age estimation method for an individual based upon the application of Bayes' theorem to categorical data. The Bayesian approach was thought to be one of the better solution for estimation of age at death because none of the assumptions inherent in conventional regression techniques is required by the Bayesian approach (Lucy *et al.*, 1985). The

Bayesian theory indicates that the posterior probability is proportional to the prior probability multiplied by the likelihood.

$$P(Age_i|Suture)=\frac{P(Suture|Age_i)\times P(Age_i)}{\sum P(Suture|Age_j)\times P(Age_j)} \quad (1)$$

"$P(Age_i)$" means the *Prior probability* as the probability of the individual who falls into the age category *i*. "$P(Suture \mid Age_i)$" means the *Likelihood* as the conditional probability of being a particular suture category conditional on being a particular age category *i*. "$P(Age_i \mid Suture)$" means the *Posterior probability* as the probability of being a particular age category *i* conditional on being a particular suture category. "*j*" refers to all of *i*"s.

If several categories were utilized, Equation 1 can be expressed as:

$$P(Age_i|Suture_1,Suture_2,\cdots Suture_n)=$$
$$\frac{P(Suture_1,Suture_2,\cdots Suture_n|Age_i)\times P(Age_i)}{\sum P(Suture_1,Suture_2,\cdots Suture_n|Age_j)\times P(Age_j)} \quad (2)$$

By assuming conditional independence of suture categories given the age category, Equation 2 can be written as Lucy *et al.* (1995) have shown;

$$P(Age_i|Suture_1,Suture_2,\cdots Suture_n)=$$
$$\frac{P(Suture_1|Age_i)\times P(Suture_2|Age_i)\cdots P(Suture_n|Age_i)\times P(Age_i)}{\sum P(Suture_1|Age_j)\times(Suture_2|Age_j),\cdots(Suture_n|Age_j)\times P(Age_j)} \quad (3)$$

After a number of variables are evaluated, the posterior probability for distribution of age categories of an individual is calculated with Equation 3. The only assumption of this method is that all suture closures are conditionally independent given the age (Lucy *et al.*, 1995). This method seems to be effective for integrating several results yielded from some independent method for age estimation that sometimes become disparate or contradictory.

The purpose of this study is to investigate the closure of many craniofacial sutures on the skulls of recently deceased Japanese people with a known age at death based on a coherent evaluation system, to examine the relationship between these sutures and age at death, and to represent a new age estimation method with these sutures using Bayes' theorem.

Materials and methods

The total samples of Japanese skulls with known age at death and sex reached up to 274 skulls of Japanese stored at the University Museum at the University of Tokyo, the Graduate School of Medicine at Chiba University. Table 1 and Figure 1 show the age distribution of these samples. The samples consist of 205 males and 69 females, ranging in age at death from 16–83 years of age, with a mean age at death of 42.3 years and standard deviation of 15.9 years. Because of the small size of female samples, males and females were analyzed together in this study. Four skulls showing the symptoms of craniosynostosis or so-called "lapsed union" (Krogman, 1962) were included in these samples.

To assess suture closures, the scoring method created by Meindl and Lovejoy (1985) was utilized in this study. This is the method of scoring the suture closure on a scale of 0 (Open), 1 (Minimal closure, which ranges from a single bony bridge across the suture to about 50% synostosis), 2 (Significant closure, which means there is a marked degree of closure but some portion is still not completely fused), and 4 (Complete obliteration) (Meindl and Lovejoy, 1985). The 41

Table 1. Age and sex distribution of 274 skulls in this study

Age group	Female	Male	Total	(p)
under 20	0	11	11	(0.040)
20–24	10	22	32	(0.117)
25–29	9	20	29	(0.106)
30–34	7	21	28	(0.102)
35–39	3	22	25	(0.091)
40–44	8	23	31	(0.113)
45–49	5	27	32	(0.117)
50–54	6	24	30	(0.109)
55–59	4	7	11	(0.040)
60–64	7	7	14	(0.051)
65–69	3	8	11	(0.040)
over 70	7	13	20	(0.073)
Total	69	205	274	(1.000)

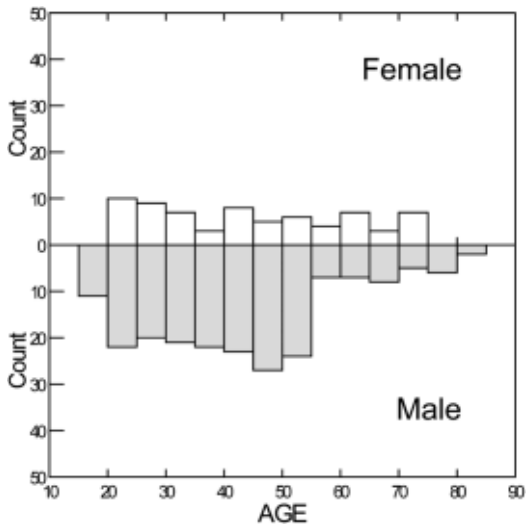

Fig. 1. Age distribution of the recent Japanese samples in this study.

sites of sutures in each skull were examined (Table 2 and Figure 2). The 1 cm lengths of a suture around each site shown in Table 2 were macroscopically inspected for scoring.

In order to confirm the relationship between age and scores of suture closure, the Spearman rank correlation tests and the one-way Analysis of Variance (one-way ANOVA) with the Tukey HSD post-hoc tests were carried out on each variable in order to explain the pair comparison between scores.

All statistical analyses were performed by SYSTAT 13 (Systat software Inc., 2009). After all probabilities were calculated with SYSTAT 13, the Bayesian procedure was carried out using Excel 2010 (Microsoft Co., 2010).

Results and Discussion

Although the Japanese skulls used for this analysis allowed for very good observation, there were some skulls with breakages on the medial thin wall of orbits, which made it impossible to evaluate the scores of the 3 sutures "20: Mid-frontoethmoidal" in 6 individuals, "21: Mid-ethmoidomaxillary" in 6 individuals, and "22: Ethmoidolacrimal" in 27 individuals respectively. Thus, it can be said that these sutures were not effective for age estimation in practice.

Table 3 shows Spearman's correlation coefficients between an age and each variable. Almost all variables were positively correlated with an age except for "11: Asterion" and "12: Temporal." Some traits indicated a high coefficient of over 0.5 as "1: Mid-lambdoid," "4: Anterior sagittal," "5: Bregma," "6: Mid-coronal," "7: Pterion," "18: Inner Mid-sphenofrontal," "20: Mid-frontoethmoidal," "22: Ethmoidolacrimal," "29: Anterior median palatine," "35: Medial sphenopalatine," "38: Inner mid-coronal," "39: Inner bregma," "40: Inner mid-sagital," and "41:Inner lambda." These results coincide with previous studies (Meindl and Lovejoy, 1985; Sakuma, 1956; Galera *et al.*, 1998). Especially, the endocranial sutures tend to show a stronger relationship with age at death.

Table 4 shows the mean age and standard deviation of each score and the results of one-way ANOVA with Tukey's HSD tests. As in the results of Spearman's correlation test, the P values of the one-way ANOVA of "11: Asterion," "12: Temporal," and "16: Inner frontozygomatic" deny the null hypothesis that the data from all scores are drawn from populations with identical means, which means these traits are not good for age estimation. The results of the Tukey's HSD tests indicate that there are no variables that have significant differences in all pairs of adjacent scores, which suggests that the age distribution of each suture score tends to overlap, and which makes it difficult to estimate the age at death by only the mean ages of scores. The age range of the scores in "36: Sphenooccipital" indicates that the sphenooccipital synchondrosis was obliterated before the age of 21 at the most. As White *et al.* (2011) have noted, this junction is particularly useful in age estimation even in Japanese skulls. Furthermore, the numbers of score 1 were biased as 238 (86.9%) of "9: Inferior sphenotemporal", 246 (89.8%) of "10: Superior sphenotemporal", 264 (96.4%) of "15: Outer frontozygomaic", 240 (87.6%) of "23: Frontomaxillary", and 249 (90.9%) of "24: Frontonasal". These results indicate that these sutures tend not to be obliterated

Table 2. Definition of the suture sites

No.	Name	Definition
1	: Mid-lambdoid	Midpoint of the left lambdoid suture
2	: Lambda	Intersection of the sagittal and the lambdoid sutures
3	: Obelion	The point of the sagittal suture on a level with the parietal foramina (Obelion)
4	: Anterior sagittal	One third distance form bregama on the sagittal suture
5	: Bregma	Intersection of the sagittal and the coronal suture (Bregma)
6	: Mid-coronal	Midpoint of the left coronal suture
7	: Pterion	The point where the parietosphenoid suture meets the frontal suture (Pterion)
8	: Sphenofrontal	Midpoint of the left sphenofrontal suture
9	: Inferior sphenotemporal	Intersection of the left sphenotemporal suture and a line between articular tubercles of the temporomandibular joint
10	: Superior sphenotemporal	The point on the left sphenotemporal suture lying 2 cm below junction with the left parietal suture
11	: Asterion	Intersection of the left lambdoid and the occipitomastoid sutures (Asterion)
12	: Temporal	The top point of the left squamous suture
13	: Temporozygomatic	Midpoint (actually, entire length) of the left temporozygomatic suture
14	: Mid-sphenomaxillary	Midpoint of the left sphenomaxillary suture
15	: Outer frontozygomaic	Outer Midpoint (actually, entire length) of the left frontozygomatic suture
16	: Inner frontozygomatic	Inner Midpoint (sometimes, entire length) of the left frontozygomatic suture running on intraorbial wall
17	: Mid-sphenozygomatic	Midpoint of the left sphenozygomatic suture
18	: Inner Mid-sphenofrontal	Midpoint of the left sphenofrontal suture running on inner wall of orbit
19	: Inner sphenofrontal on lesser wing	The point on the left sphenofrontal suture in lesser wing of sphenoid and above the optic canalon
20	: Mid-frontoethmoidal	Midpoint of the left frontoethmoidal suture on inner wall of orbit
21	: Mid-ethmoidomaxillary	Midpoint of the left ethmoidomaxillary suture on inner wall of orbit
22	: Ethmoidolacrimal	Midpoint (sometimes, entire length) of the left ethmoidolacrimal suture on inner wall of orbit
23	: Frontomaxillary	Midpoint (actually, entire length) of the left frontomaxillary suture
24	: Frontonasal	Midpoint (actually, entire length) of the left frontonasal suture
25	: Mid-internasal	Midpoint of the internasal suture
26	: Mid-nasomaxillary	Midpoint of the left nasomaxillary suture
27	: Mid-zygomaticomaxillary	Midpoint of the left zygomaticomaxillary suture only on outer surface of facial cranium
28	: Intermaxillary	The entire length of the intermaxillary suture on outer surface
29	: Anterior median palatine	The entire length of the median palatine suture between the lowest point on maxilla body in sagittal plane (Alveolare) and incisive foramen
30	: Incisive	The entire length of the left incisive suture
31	: Mid-median palatine	Midpoint of the median palatine suture between the incisive foramen and the transverse palatine suture
32	: Posterior median palatine	The entire length of the median palatine suture on the palatine bones
33	: Transverse palatine	Midpoint of the transverse palatine suture
34	: Transverse palatine in Foramen	The entire length of the transverse palatine suture around the greater palatine foramina
35	: Medial sphenopalatine	The entire length of the suture between the palatine bone and medial plate of sphenoid at the bottom of pterygoid fossa
36	: Sphenooccipital	the entire length of the Spenooccipital synchondrosis
37	: Occipitomastoid	Midpoint of the occipitomastoid suture
38	: Inner mid-coronal	Midpoint of the left coronal suture endocranially
39	: Inner bregma	Intersection of the sagittal and the coronal suture endocranially
40	: Inner mid-sagital	Midpoint of the sagittal suture endocranially
41	: Inner lambda	Intersection of the sagittal and the lambdoid suture endocranially

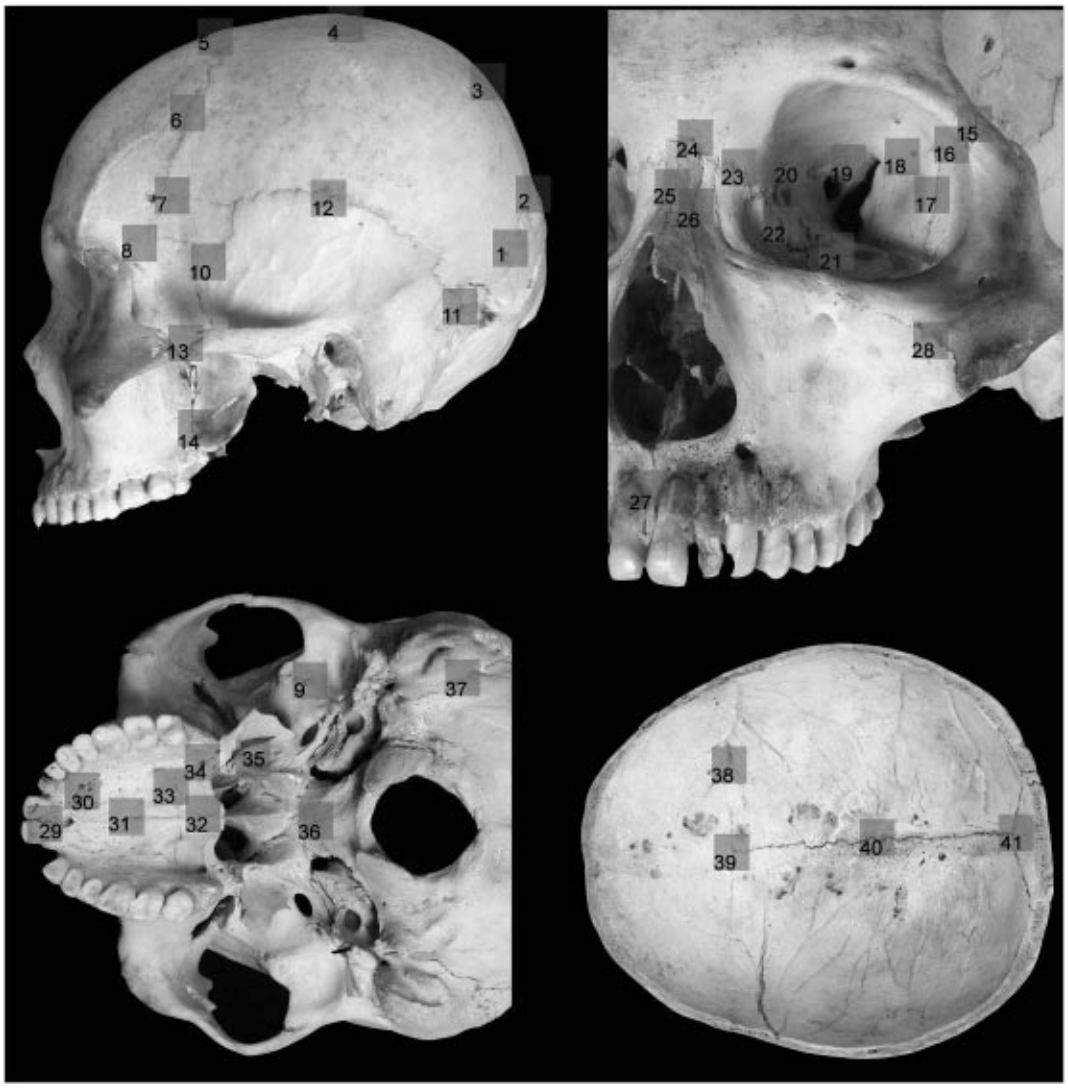

Fig. 2. The sites of sutures examined in this study.

in Japanese people, and it can be said that these sutures might not be good for age estimation.

Table 5 shows the probability distribution of each score among each age group. These data are necessary for calculating likelihood in the Bayesian theorem. For example, it was assumed that there was a person who had the following scores; score 0 for "1: Mid-lambdoid", score 1 for "4: Anterior sagittal", score 1 for "5: Bregma", score 2 for "6: Mid-coronal", and score 3 for "7: Pterion". The suitable value for calculating the likelihood can be obtained from Table 5. If the probability of this person belonging to the "45–49 age group" were to be known, the probability of a score of 0 for "1: Mid-lambdoid" among the 45–49 age group is 0.406, the probability of a score of 1 for "4: Anterior sagittal" is 0.500, the probability of a score of 1 for "5: Bregma" is 0.344, the probability of a score of 2 for 6: Mid-coronal" is 0.188, and the probability of a score of 3 for "7: Pterion" is 0.375 respectively form Table 5. Thus, the likelihood is calculated as

Table 3. Spearman' correlation coefficiences between scores of sutures and age at death

1	Mid-lambdoid	*0.505*
2	Lambda	*0.469*
3	Obelion	*0.470*
4	Anterior sagittal	*0.510*
5	Bregma	*0.502*
6	Mid-coronal	*0.533*
7	Pterion	*0.512*
8	Sphenofrontal	*0.426*
9	Inferior sphenotemporal	*0.191*
10	Superior sphenotemporal	*0.239*
11	Asterion	0.117
12	Temporal	− 0.047
13	Temporozygomatic	*0.376*
14	Mid-sphenomaxillary	*0.441*
15	Outer frontozygomaic	*0.149*
16	Inner frontozygomatic	*0.127*
17	Mid-sphenozygomatic	*0.362*
18	Inner Mid-sphenofrontal	*0.525*
19	Inner sphenofrontal on lesser wing	*0.380*
20	Mid-frontoethmoidal	*0.507*
21	Mid-ethmoidomaxillary	*0.425*
22	Ethmoidolacrimal	*0.557*
23	Frontomaxillary	*0.279*
24	Frontonasal	*0.125*
25	Mid-internasal	*0.395*
26	Mid-nasomaxillary	*0.360*
27	Mid-zygomaticomaxillary	*0.301*
28	Intermaxillary	*0.342*
29	Anterior median palatine	*0.584*
30	Incisive	*0.440*
31	Mid-median palatine	*0.434*
32	Posterior median palatine	*0.386*
33	Transverse palatine	*0.426*
34	Transverse palatine in Foramen	*0.399*
35	Medial sphenopalatine	*0.528*
36	Sphenooccipital	*0.313*
37	Occipitomastoid	*0.351*
38	Inner mid-coronal	*0.636*
39	Inner bregma	*0.658*
40	Inner mid-sagital	*0.617*
41	Inner lambda	*0.579*

The Italic number means statistically significant at 5% level. The under bar means the coefficience over 0.5

follows; $0.406 \times 0.500 \times 0.344 \times 0.188 \times 0.375 = 0.004909515$. The numerator of Equation 3 is also calculated as the probability of the reference sample in the 45–49 age group from Table 1 of 0.117 multiplied by the likelihood; $0.004909515 \times 0.117 = 0.000573382$. In order to calculate the denominator of Equation 3, this procedure is repeated for each age group, and the probabilities of all age groups are summed up as 0.001163698. After 0.000573382 is divided by 0.001163698, the posterior probability of this individual belonging to the 45–49 age group is calculated as 0.493. This means that there is 49.3% confidence that the individual is between 45 and 49 years of age. After this process is repeated for all age groups, the posterior probability distribution of this individual is calculated as Table 6.

It can be said that the age estimation of this individual ranges between 30 and 64 years of age at 98.7% confidence, and 49.3% of the 45–49 age group as the highest probability among all age groups. With this method, it is possible to estimate the age at death only by one score of a suture. However, it is strongly recommended to use the sutures that have a relatively high correlation with the age at death and that show age change. In this study, the better choice for age estimation is 11 sutures of "1:Mid-lambdoid," "4: Anterior sagittal," "5: Bregma," "6: Mid-coronal," "7: Pterion," "18: Inner Mid-sphenofrontal," "29: Anterior median palatine," "35: Medial sphenopalatine," "38: Inner mid-coronal," "39: Inner bregma," "40: Inner mid-sagital," and "41: Inner lambda."

Population and sexual difference were ignored in this study because of sample size. As Ley *et al.* (1994) have indicated, there may be interpopulational and sexual differences in the rates of suture closure. Care must be taken when applying the method of this study to any other group. In practice, the application of this age estimation by hand calculation is too complicated. Thus, the application was made in Microsoft Excel 2010, which calculates the probability distribution by only the input of suture(s) scores. Please contact me by e-mail if you are interested.

Table 4. Basic statistics of each score on all sutures and results of one way ANOVA.

	0					1					2					3				p value in ANOVA
	N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX	
1：Mid-lambdoid	126	34.0	13.7	16–76	≪	87	46.7	13.5	19–81	＜	25	55.0	13.9	34–83		36	51.8	14.5	20–78	0.000
2：Lambda	103	33.2	14.7	16–76	≪	76	45.4	12.2	19–75		51	47.5	15.2	18–83		44	52.2	14.5	26–78	0.000
3：Obelion	80	30.3	12.6	16–76	≪	80	45.3	14.1	21–81		45	47.4	12.8	27–76		69	49.3	15.5	18–83	0.000
4：Anterior sagittal	84	29.9	12.3	16–76	≪	88	45.9	11.8	18–81		47	46.1	14.8	21–75		55	52.1	15.9	19–83	0.000
5：Bregma	134	34.5	13.5	16–76	≪	65	47.1	13.4	34–81		39	48.4	15.3	20–77		36	55.6	13.6	19–83	0.000
6：Mid-coronal	122	33.4	13.3	16–76	≪	96	47.3	14.2	17–83		23	51.3	15.7	26–78		33	54.0	11.3	35–72	0.000
7：Pterion	117	33.6	11.7	16–68		21	38.6	16.9	17–76	＜	47	47.9	15.1	17–83		89	51.6	14.5	19–81	0.000
8：Sphenofrontal	128	36.4	14.5	16–83		52	41.0	14.2	19–76		22	44.6	14.8	17–75		72	52.8	14.3	21–81	0.000
9：Inferior sphenotemporal	238	41.0	15.4	16–78		21	47.0	18.1	18–83		5	58.8	12.3	39–70		10	52.9	14.8	30–71	0.004
10：Superior sphenotemporal	246	40.9	15.3	16–83	≪	13	55.6	17.1	22–76		6	58.3	17.1	27–72		9	48.8	12.3	30–68	0.000
11：Asterion	261	41.8	15.7	16–83		8	55.1	15.5	37–76		4	50.3	19.3	34–78		1	30.0	—		0.067
12：Temporal	273	42.3	15.9	16–83		—	—	—			—	—	—			1	30.0	—		0.439
13：Temporozygomatic	195	38.4	14.2	16–78	＜	27	47.0	16.8	18–81		11	48.5	12.1	32–70		41	55.6	15.6	19–83	0.000
14：Mid-sphenomaxillary	145	36.0	14.2	16–76	＜	40	43.9	13.6	22–74		20	51.5	13.1	22–72		69	51.7	15.1	19–83	0.000

	0					1					2					3				p value in ANOVA
	N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX	
15：Outer frontozygomaic	264	41.7	15.6	16–83		6	54.8	16.3	36–70		3	66.3	9.5	57–76		1	30.0	—		0.008
16：Inner frontozygomatic	156	40.6	16.1	16–83		90	44.5	15.4	17–78		21	45.3	15.2	21–72		7	42.6	15.3	19–63	0.228
17：Mid-sphenozygomatic	146	37.7	15.8	16–76	≪	81	44.4	13.4	19–81		29	48.7	14.6	30–83		18	58.8	11.7	30–78	0.000
18：Inner Mid-sphenofrontal	87	32.2	14.2	16–76	≪	52	40.0	13.5	19–83		22	44.1	11.2	25–67		113	50.7	14.1	19–83	0.000
19：Inner sphenofrontal on lesser wing	186	38.6	15.8	16–83		29	46.0	13.1	18–72		10	42.2	9.8	27–53		49	53.9	12.2	28–81	0.000
20：Mid-frontoethmoidal	125	34.2	13.8	16–76		16	42.1	11.6	22–65		33	36.4	14.2	23–77		94	51.6	13.9	19–83	0.000
21：Mid-ethmoidomaxillary	161	36.8	14.6	16–76	≪	43	48.7	14.1	18–83		22	52.4	15.6	31–77		42	50.7	13.1	19–78	0.000
22：Ethmoidolacrimal	61	31.4	14.5	17–76		16	35.8	12.7	19–60		26	37.3	11.2	20–58	≪	144	50.0	13.7	19–83	0.000
23：Frontomaxillary	240	40.5	15.0	16–83	≪	17	54.2	16.8	23–77		10	54.7	18.7	19–75		7	56.4	13.7	38–78	0.000
24：Frontonasal	249	41.6	15.5	16–83		19	44.8	17.0	19–76	＜	3	72.0	7.9	63–78		3	53.3	18.1	34–70	0.004
25：Mid-internasal	133	35.9	15.7	16–83	≪	104	48.3	12.5	26–81		34	47.7	16.1	17–76		3	53.7	21.8	36–78	0.000
26：Mid-nasomaxillary	163	37.8	15.2	16–78	≪	96	48.1	14.8	17–83		15	53.2	12.4	34–72		0	—	—		0.000
27：Mid-zygomaticomaxillary	150	38.3	14.9	16–76	＜	61	44.6	16.7	17–83		25	46.3	15.1	23–77		38	51.7	13.4	31–78	0.000
28：Intermaxillary	95	36.7	14.6	16–73	＜	134	42.3	15.3	17–83		17	51.6	14.4	30–75		28	55.3	13.5	29–77	0.000

	0					1					2					3				p value in ANOVA
	N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX		N	Mean	S.D.	MIN–MAX	
29：Anterior median palatine	86	31.4	11.4	16–64	≪	88	40.6	13.6	18–72		20	46.9	15.6	24–76		80	54.7	13.1	30–83	0.000
30：Incisive	5	22.4	11.0	16–42		13	27.9	7.9	18–43		105	36.7	13.7	17–83	≪	151	48.0	15.2	17–81	0.009
31：Mid-median palatine	151	36.3	14.6	16–72	≪	85	48.2	14.6	19–83		24	50.7	12.4	34–76		14	55.9	14.0	31–75	0.000
32：Posterior median palatine	55	30.9	13.3	16–71	≪	38	40.8	16.3	20–72		25	41.9	15.7	19–81		156	46.7	14.6	19–83	0.000
33：Transverse palatine	165	36.9	14.3	16–83	≪	71	49.3	15.6	19–78		22	54.0	12.6	35–81		16	50.4	12.4	31–71	0.000
34：Transverse palatine in Foramen	118	35.5	14.4	16–77		13	41.2	12.3	23–63		10	43.5	19.3	18–76		133	48.3	14.8	19–83	0.000
35：Medial sphenopalatine	84	32.4	13.8	16–71		57	37.7	12.0	20–72	≪	57	48.2	13.9	22–78		76	52.1	14.2	19–83	0.000
36：Sphenooccipital	5	18.2	1.9	16–21		3	19.7	1.5	17–20		2	18.5	2.1	18–21		264	43.2	15.4	17–83	0.000
37：Occipitomastoid	187	38.4	15.2	16–83	≪	41	50.2	14.1	22–81		10	56.1	11.8	38–70		36	49.3	14.7	27–77	0.000
38：Inner mid-coronal	65	26.6	10.3	16–76		17	30.4	6.4	20–43	≪	39	43.7	10.7	23–68	＜	153	49.8	13.9	19–83	0.000
39：Inner bregma	66	27.5	10.1	16–76		32	32.9	10.3	18–61	≪	29	43.3	12.5	20–68	＜	147	50.7	13.4	19–83	0.000
40：Inner mid-sagital	67	27.3	9.9	16–76	≪	33	36.0	13.2	21–65	≪	75	46.4	13.5	18–83		99	51.3	13.3	23–81	0.000
41：Inner lambda	97	31.0	13.1	16–76	≪	37	42.7	12.2	21–68		52	45.8	11.1	20–75	＜	88	52.4	14.4	19–83	0.000

“＜” and “≪” mean the results of the Tukey's HSD test and “＜” means $p<0.05$ and “≪” means $p<0.01$ respectively.

Table 5. Probability distribution of each score among each age group in all sigtes of sutures.

age groups	1 : Mid-lambdoid				2 : Lambda				3 : Obelion				4 : Anterior sagittal			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.909	0.091	0.000	0.000	0.818	0.091	0.091	0.000	0.818	0.000	0.000	0.182	0.818	0.000	0.091	0.091
20–24	0.906	0.063	0.000	0.031	0.813	0.094	0.094	0.000	0.719	0.188	0.000	0.094	0.813	0.094	0.063	0.031
25–29	0.862	0.138	0.000	0.000	0.828	0.069	0.034	0.069	0.690	0.138	0.138	0.034	0.690	0.138	0.103	0.069
30–34	0.536	0.357	0.036	0.071	0.464	0.357	0.143	0.036	0.321	0.464	0.107	0.107	0.429	0.321	0.179	0.071
35–39	0.320	0.400	0.080	0.200	0.160	0.240	0.320	0.280	0.080	0.200	0.320	0.400	0.080	0.360	0.200	0.360
40–44	0.258	0.516	0.097	0.129	0.194	0.484	0.129	0.194	0.226	0.387	0.194	0.194	0.161	0.484	0.258	0.097
45–49	0.406	0.344	0.094	0.156	0.125	0.375	0.281	0.219	0.125	0.344	0.125	0.406	0.125	0.500	0.125	0.250
50–54	0.233	0.400	0.200	0.167	0.167	0.467	0.233	0.133	0.067	0.400	0.233	0.300	0.100	0.500	0.200	0.200
55–59	0.182	0.364	0.091	0.364	0.182	0.182	0.273	0.364	0.000	0.182	0.273	0.545	0.000	0.273	0.182	0.545
60–64	0.286	0.357	0.214	0.143	0.286	0.286	0.286	0.143	0.000	0.357	0.429	0.214	0.000	0.429	0.357	0.214
65–69	0.364	0.455	0.182	0.000	0.273	0.364	0.182	0.182	0.273	0.455	0.182	0.091	0.000	0.545	0.364	0.091
over 70	0.050	0.350	0.200	0.400	0.150	0.150	0.250	0.450	0.050	0.250	0.100	0.600	0.150	0.100	0.100	0.650

age groups	5 : Bregma				6 : Mid-coronal				7 : Pterion				8 : Sphenofrontal			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.909	0.091	0.000	0.000	0.909	0.091	0.000	0.000	0.636	0.182	0.091	0.091	0.727	0.091	0.182	0.000
20–24	0.906	0.031	0.063	0.000	0.906	0.094	0.000	0.000	0.719	0.125	0.094	0.063	0.688	0.219	0.000	0.094
25–29	0.828	0.069	0.103	0.000	0.793	0.172	0.034	0.000	0.793	0.103	0.034	0.069	0.690	0.241	0.034	0.034
30–34	0.571	0.250	0.107	0.071	0.500	0.429	0.071	0.000	0.714	0.036	0.071	0.179	0.679	0.143	0.071	0.107
35–39	0.240	0.400	0.200	0.160	0.360	0.360	0.120	0.160	0.280	0.040	0.240	0.440	0.400	0.160	0.160	0.280
40–44	0.645	0.226	0.097	0.032	0.516	0.323	0.065	0.097	0.516	0.032	0.226	0.226	0.548	0.194	0.065	0.194
45–49	0.313	0.344	0.125	0.219	0.156	0.500	0.188	0.156	0.313	0.125	0.188	0.375	0.375	0.219	0.094	0.313
50–54	0.333	0.333	0.200	0.133	0.267	0.500	0.033	0.200	0.200	0.067	0.267	0.467	0.267	0.300	0.067	0.367
55–59	0.000	0.364	0.182	0.455	0.000	0.545	0.000	0.455	0.000	0.091	0.273	0.636	0.091	0.182	0.273	0.455
60–64	0.214	0.214	0.357	0.214	0.214	0.357	0.214	0.214	0.214	0.000	0.143	0.643	0.214	0.143	0.071	0.571
65–69	0.273	0.455	0.182	0.091	0.273	0.545	0.000	0.182	0.182	0.091	0.273	0.455	0.273	0.091	0.091	0.545
over 70	0.150	0.200	0.200	0.450	0.100	0.400	0.250	0.250	0.000	0.050	0.250	0.700	0.250	0.100	0.050	0.600

age groups	9 : Inferior sphenotemporal				10 : Superior sphenotemporal				11 : Asterion				12 : Temporal			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.727	0.273	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
20–24	1.000	0.000	0.000	0.000	0.969	0.031	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
25–29	1.000	0.000	0.000	0.000	0.966	0.000	0.034	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
30–34	0.964	0.000	0.000	0.036	0.929	0.036	0.000	0.036	0.929	0.000	0.036	0.036	0.964	0.000	0.000	0.036
35–39	0.680	0.200	0.040	0.080	0.920	0.040	0.000	0.040	0.920	0.080	0.000	0.000	1.000	0.000	0.000	0.000
40–44	0.968	0.032	0.000	0.000	0.935	0.032	0.000	0.032	0.968	0.000	0.032	0.000	1.000	0.000	0.000	0.000
45–49	0.844	0.125	0.000	0.031	0.938	0.000	0.000	0.063	0.906	0.063	0.031	0.000	1.000	0.000	0.000	0.000
50–54	0.867	0.100	0.000	0.033	0.933	0.033	0.033	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
55–59	0.818	0.000	0.091	0.091	0.455	0.182	0.091	0.273	0.909	0.091	0.000	0.000	1.000	0.000	0.000	0.000
60–64	0.786	0.071	0.071	0.071	0.929	0.071	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
65–69	0.636	0.182	0.091	0.091	0.727	0.182	0.000	0.091	0.909	0.091	0.000	0.000	1.000	0.000	0.000	0.000
over 70	0.750	0.100	0.050	0.100	0.700	0.150	0.150	0.000	0.850	0.100	0.050	0.000	1.000	0.000	0.000	0.000

age groups	13 : Temporozygomatic				14 : Mid-sphenomaxillary				15 : Outer frontozygomaic				16 : Inner frontozygomatic			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.818	0.091	0.000	0.091	0.909	0.000	0.000	0.091	1.000	0.000	0.000	0.000	0.636	0.273	0.000	0.091
20–24	0.969	0.031	0.000	0.000	0.875	0.063	0.031	0.031	1.000	0.000	0.000	0.000	0.719	0.250	0.031	0.000
25–29	0.897	0.069	0.000	0.034	0.862	0.103	0.000	0.034	1.000	0.000	0.000	0.000	0.655	0.276	0.069	0.000
30–34	0.786	0.107	0.036	0.071	0.500	0.214	0.036	0.250	0.964	0.000	0.000	0.036	0.679	0.250	0.036	0.036
35–39	0.640	0.080	0.120	0.160	0.440	0.320	0.040	0.200	0.920	0.080	0.000	0.000	0.520	0.200	0.240	0.040
40–44	0.774	0.194	0.000	0.032	0.613	0.097	0.065	0.226	1.000	0.000	0.000	0.000	0.387	0.484	0.097	0.032
45–49	0.750	0.000	0.063	0.188	0.375	0.094	0.156	0.375	0.969	0.031	0.000	0.000	0.531	0.438	0.000	0.031
50–54	0.667	0.133	0.067	0.133	0.400	0.233	0.100	0.267	1.000	0.000	0.000	0.000	0.600	0.333	0.067	0.000
55–59	0.636	0.000	0.091	0.273	0.182	0.273	0.182	0.364	0.909	0.000	0.091	0.000	0.455	0.273	0.182	0.091
60–64	0.429	0.214	0.071	0.286	0.214	0.071	0.143	0.571	1.000	0.000	0.000	0.000	0.571	0.357	0.000	0.071
65–69	0.455	0.182	0.000	0.364	0.545	0.091	0.000	0.364	0.818	0.091	0.091	0.000	0.545	0.273	0.182	0.000
over 70	0.250	0.150	0.050	0.550	0.150	0.150	0.150	0.550	0.850	0.100	0.050	0.000	0.450	0.450	0.100	0.000

Table 5. Continued

age groups	17 : Mid-sphenozygomatic				18 : Inner Mid-sphenofrontal				19 : Inner sphenofrontal on lesser wing				20 : Mid-frontoethmoidal			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.909	0.091	0.000	0.000	0.818	0.091	0.000	0.091	0.909	0.091	0.000	0.000	0.909	0.000	0.000	0.091
20–24	0.844	0.156	0.000	0.000	0.719	0.219	0.000	0.063	0.969	0.031	0.000	0.000	0.875	0.063	0.063	0.000
25–29	0.793	0.207	0.000	0.000	0.655	0.172	0.103	0.069	0.897	0.034	0.034	0.034	0.793	0.000	0.069	0.138
30–34	0.571	0.286	0.107	0.036	0.393	0.250	0.036	0.321	0.821	0.071	0.036	0.071	0.607	0.036	0.107	0.250
35–39	0.400	0.280	0.320	0.000	0.080	0.240	0.160	0.520	0.640	0.160	0.040	0.160	0.360	0.160	0.080	0.400
40–44	0.355	0.516	0.129	0.000	0.226	0.258	0.129	0.387	0.645	0.129	0.129	0.097	0.323	0.097	0.226	0.355
45–49	0.500	0.406	0.000	0.094	0.219	0.219	0.063	0.500	0.531	0.156	0.063	0.250	0.375	0.063	0.125	0.438
50–54	0.333	0.367	0.233	0.067	0.100	0.167	0.133	0.600	0.467	0.200	0.000	0.333	0.233	0.067	0.200	0.500
55–59	0.364	0.273	0.091	0.273	0.000	0.091	0.182	0.727	0.636	0.091	0.000	0.273	0.273	0.091	0.182	0.455
60–64	0.571	0.214	0.000	0.214	0.143	0.071	0.071	0.714	0.357	0.071	0.071	0.500	0.214	0.000	0.000	0.786
65–69	0.273	0.364	0.182	0.182	0.000	0.182	0.091	0.727	0.455	0.000	0.000	0.545	0.182	0.091	0.182	0.545
over 70	0.400	0.200	0.200	0.200	0.200	0.100	0.000	0.700	0.600	0.150	0.000	0.250	0.150	0.000	0.150	0.700

age groups	21 : Mid-ethmoidomaxillary				22 : Ethmoidolacrimal				23 : Frontomaxillary				24 : Frontonasal			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.818	0.091	0.000	0.091	0.727	0.182	0.000	0.091	0.909	0.000	0.091	0.000	0.909	0.091	0.000	0.000
20–24	0.969	0.031	0.000	0.000	0.750	0.063	0.125	0.063	0.969	0.031	0.000	0.000	0.969	0.031	0.000	0.000
25–29	0.931	0.069	0.000	0.000	0.655	0.103	0.172	0.069	0.966	0.034	0.000	0.000	0.931	0.069	0.000	0.000
30–34	0.679	0.107	0.071	0.143	0.321	0.036	0.107	0.536	0.929	0.036	0.036	0.000	0.857	0.107	0.000	0.036
35–39	0.440	0.200	0.160	0.200	0.120	0.120	0.080	0.680	0.920	0.040	0.000	0.040	0.960	0.040	0.000	0.000
40–44	0.613	0.129	0.097	0.161	0.097	0.065	0.129	0.710	1.000	0.000	0.000	0.000	0.968	0.032	0.000	0.000
45–49	0.500	0.313	0.031	0.156	0.063	0.188	0.125	0.625	0.844	0.063	0.031	0.063	0.906	0.094	0.000	0.000
50–54	0.367	0.233	0.100	0.300	0.100	0.033	0.100	0.767	0.833	0.100	0.067	0.000	0.967	0.033	0.000	0.000
55–59	0.545	0.091	0.000	0.364	0.091	0.091	0.091	0.727	0.818	0.091	0.000	0.091	0.727	0.182	0.000	0.091
60–64	0.357	0.143	0.214	0.286	0.143	0.071	0.000	0.786	0.786	0.071	0.071	0.071	0.857	0.071	0.071	0.000
65–69	0.273	0.545	0.091	0.091	0.182	0.000	0.000	0.818	0.636	0.182	0.091	0.091	0.909	0.091	0.000	0.000
over 70	0.300	0.150	0.250	0.300	0.050	0.000	0.050	0.900	0.600	0.200	0.150	0.050	0.750	0.100	0.100	0.050

age groups	25 : Mid-internasal				26 : Mid-nasomaxillary				27 : Mid-zygomaticomaxillary				28 : Intermaxillary			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.818	0.000	0.182	0.000	0.727	0.273	0.000	0.000	0.818	0.182	0.000	0.000	0.636	0.364	0.000	0.000
20–24	0.969	0.000	0.031	0.000	0.938	0.063	0.000	0.000	0.813	0.156	0.031	0.000	0.500	0.500	0.000	0.000
25–29	0.793	0.138	0.069	0.000	0.862	0.138	0.000	0.000	0.621	0.310	0.069	0.000	0.552	0.414	0.000	0.034
30–34	0.464	0.393	0.143	0.000	0.714	0.250	0.036	0.000	0.714	0.071	0.107	0.107	0.464	0.500	0.036	0.000
35–39	0.480	0.400	0.080	0.040	0.600	0.320	0.080	0.000	0.440	0.120	0.160	0.280	0.160	0.560	0.160	0.120
40–44	0.355	0.581	0.065	0.000	0.516	0.452	0.032	0.000	0.452	0.387	0.097	0.065	0.323	0.613	0.032	0.032
45–49	0.219	0.594	0.156	0.031	0.406	0.563	0.031	0.000	0.469	0.250	0.094	0.188	0.250	0.469	0.094	0.188
50–54	0.333	0.500	0.167	0.000	0.400	0.500	0.100	0.000	0.533	0.267	0.033	0.167	0.267	0.567	0.033	0.133
55–59	0.364	0.455	0.182	0.000	0.455	0.455	0.091	0.000	0.273	0.091	0.273	0.364	0.364	0.364	0.182	0.091
60–64	0.143	0.643	0.214	0.000	0.500	0.214	0.286	0.000	0.571	0.143	0.000	0.286	0.357	0.286	0.000	0.357
65–69	0.364	0.455	0.182	0.000	0.545	0.455	0.000	0.000	0.636	0.000	0.273	0.091	0.182	0.545	0.182	0.091
over 70	0.350	0.400	0.200	0.050	0.300	0.600	0.100	0.000	0.150	0.450	0.100	0.300	0.100	0.450	0.150	0.300

age groups	29 : Anterior median palatine				30 : Incisive				31 : Mid-median palatine				32 : Posterior median palatine			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.727	0.273	0.000	0.000	0.364	0.091	0.364	0.182	0.909	0.091	0.000	0.000	0.727	0.000	0.091	0.182
20–24	0.750	0.219	0.031	0.000	0.000	0.156	0.563	0.281	0.906	0.094	0.000	0.000	0.406	0.250	0.031	0.313
25–29	0.552	0.414	0.034	0.000	0.000	0.103	0.586	0.310	0.862	0.138	0.000	0.000	0.414	0.172	0.207	0.207
30–34	0.393	0.393	0.071	0.143	0.000	0.036	0.571	0.393	0.714	0.214	0.036	0.036	0.357	0.143	0.036	0.464
35–39	0.160	0.400	0.120	0.320	0.000	0.080	0.280	0.640	0.440	0.360	0.160	0.040	0.000	0.040	0.080	0.880
40–44	0.226	0.387	0.129	0.258	0.032	0.032	0.484	0.452	0.484	0.355	0.129	0.032	0.097	0.194	0.097	0.613
45–49	0.281	0.375	0.063	0.281	0.000	0.000	0.313	0.688	0.281	0.500	0.125	0.094	0.125	0.031	0.125	0.719
50–54	0.167	0.367	0.033	0.433	0.000	0.000	0.300	0.700	0.400	0.433	0.133	0.033	0.033	0.133	0.133	0.700
55–59	0.000	0.091	0.091	0.818	0.000	0.000	0.182	0.818	0.636	0.364	0.000	0.000	0.000	0.182	0.091	0.727
60–64	0.143	0.071	0.071	0.714	0.000	0.000	0.143	0.857	0.357	0.357	0.143	0.143	0.143	0.143	0.000	0.714
65–69	0.000	0.364	0.091	0.545	0.000	0.000	0.182	0.818	0.455	0.182	0.273	0.091	0.091	0.364	0.000	0.545
over 70	0.000	0.200	0.150	0.650	0.000	0.000	0.150	0.850	0.150	0.550	0.100	0.200	0.050	0.050	0.100	0.800

Table 5. Continued

age groups	33 : Transverse palatine				34 : Transverse palatine in Foramen				35 : Medial sphenopalatine				36 : Sphenooccipital			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	0.909	0.091	0.000	0.000	0.818	0.000	0.091	0.091	0.909	0.000	0.000	0.091	0.364	0.091	0.091	0.455
20–24	0.813	0.188	0.000	0.000	0.750	0.031	0.031	0.188	0.688	0.219	0.063	0.031	0.031	0.063	0.031	0.875
25–29	0.931	0.069	0.000	0.000	0.655	0.069	0.069	0.207	0.552	0.310	0.103	0.034	0.000	0.000	0.000	1.000
30–34	0.821	0.143	0.000	0.036	0.464	0.071	0.000	0.464	0.321	0.357	0.071	0.250	0.000	0.000	0.000	1.000
35–39	0.640	0.200	0.080	0.080	0.400	0.040	0.000	0.560	0.120	0.320	0.320	0.240	0.000	0.000	0.000	1.000
40–44	0.484	0.258	0.161	0.097	0.419	0.065	0.065	0.452	0.290	0.226	0.323	0.161	0.000	0.000	0.000	1.000
45–49	0.594	0.313	0.031	0.063	0.313	0.063	0.000	0.625	0.125	0.156	0.281	0.438	0.000	0.000	0.000	1.000
50–54	0.433	0.367	0.100	0.100	0.300	0.033	0.000	0.667	0.133	0.233	0.233	0.400	0.000	0.000	0.000	1.000
55–59	0.182	0.455	0.273	0.091	0.182	0.091	0.182	0.545	0.091	0.182	0.364	0.364	0.000	0.000	0.000	1.000
60–64	0.286	0.429	0.286	0.000	0.214	0.071	0.000	0.714	0.143	0.000	0.286	0.571	0.000	0.000	0.000	1.000
65–69	0.364	0.364	0.091	0.182	0.182	0.000	0.091	0.727	0.273	0.091	0.182	0.455	0.000	0.000	0.000	1.000
over 70	0.300	0.450	0.150	0.100	0.200	0.000	0.050	0.750	0.050	0.050	0.300	0.600	0.000	0.000	0.000	1.000

age groups	37 : Occipitomastoid				38 : Inner mid-coronal				39 : Inner bregma				40 : Inner mid-sagital			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**
under 20	1.000	0.000	0.000	0.000	0.909	0.000	0.000	0.091	0.818	0.091	0.000	0.091	0.818	0.000	0.182	0.000
20–24	0.938	0.063	0.000	0.000	0.750	0.063	0.063	0.125	0.719	0.125	0.094	0.063	0.688	0.219	0.031	0.063
25–29	0.897	0.069	0.000	0.034	0.655	0.241	0.069	0.034	0.621	0.345	0.034	0.000	0.724	0.207	0.069	0.000
30–34	0.714	0.071	0.000	0.214	0.179	0.179	0.179	0.464	0.214	0.286	0.143	0.357	0.214	0.286	0.286	0.214
35–39	0.760	0.000	0.040	0.200	0.040	0.040	0.120	0.800	0.080	0.000	0.120	0.800	0.080	0.000	0.400	0.520
40–44	0.645	0.226	0.032	0.097	0.065	0.065	0.226	0.645	0.097	0.129	0.161	0.613	0.097	0.097	0.419	0.387
45–49	0.625	0.188	0.031	0.156	0.031	0.000	0.313	0.656	0.094	0.094	0.125	0.688	0.031	0.094	0.438	0.438
50–54	0.533	0.300	0.067	0.100	0.033	0.000	0.233	0.733	0.033	0.033	0.167	0.767	0.067	0.067	0.267	0.600
55–59	0.545	0.273	0.000	0.182	0.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.091	0.273	0.636
60–64	0.214	0.286	0.143	0.357	0.071	0.000	0.071	0.857	0.000	0.071	0.214	0.714	0.000	0.143	0.286	0.571
65–69	0.636	0.182	0.091	0.091	0.000	0.000	0.182	0.818	0.000	0.000	0.091	0.909	0.000	0.091	0.545	0.364
over 70	0.450	0.200	0.100	0.250	0.050	0.000	0.000	0.950	0.050	0.000	0.000	0.950	0.050	0.000	0.200	0.750

age groups	41 : Inner lambda			
	0	**1**	**2**	**3**
under 20	0.909	0.000	0.000	0.091
20–24	0.875	0.063	0.031	0.031
25–29	0.862	0.103	0.034	0.000
30–34	0.357	0.250	0.143	0.250
35–39	0.160	0.160	0.320	0.360
40–44	0.161	0.129	0.387	0.323
45–49	0.188	0.188	0.281	0.344
50–54	0.067	0.167	0.233	0.533
55–59	0.091	0.182	0.364	0.364
60–64	0.143	0.143	0.143	0.571
65–69	0.182	0.182	0.273	0.364
over 70	0.100	0.000	0.050	0.850

Table 6. Probabilitty distribution of the examplified individual in text.

Age group	Likelihood × Prior probabilities	$P(Age_1 \mid Suture_1, Suture_2, \ldots Suture_n)$
under 20	0	0.000
20–24	0	0.000
25–29	2.06414E-06	0.002
30–34	5.61117E-05	0.048
35–39	0.000221989	0.191
40–44	4.64779E-05	0.040
45–49	0.000573382	0.493
50–54	6.62269E-05	0.057
55–59	0	0.000
60–64	0.000184673	0.159
65–69	0	0.000
over 70	1.27733E-05	0.011
sum	0.001163698	

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