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CORRELATION BETWEEN TOOTH WIDTH, WIDTH OF THE HEAD, LENGTH OF THE HEAD, AND STATURE

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Correlations between a number of anthropological measurements have been established by several investigators. *Lindegård* (1953) for example, found correlation between a number of measurements, such as stature and radius length ($r = +0.64^{**}$), stature and tibia length ($r = +0.78^{**}$), tibia length and hand length ($r = +0.50^{**}$). *Lundström & Lysell* (1953) found a correlation between the width of the upper dental arch at the first molars and the facial width (bizygomatic width) ($r = +0.46^{**}$). *Björk* (1954) found a correlation between the total sum of the tooth widths in the upper jaw and the tibia length ($r = +0.31^{**}$).

The purpose of the present investigation was to determine if there is any correlation between tooth width and stature, tooth width and width of the head, and tooth width and length of the head.

MATERIAL AND METHOD

110 conscripts at Kungl. Svea Ingeniörsregemente were used in the investigation. The average age of the subjects was 20.2 years. The age varied between 18.8 and 22.8 years except for two subjects who were 23.4 and 26.1 years old when the investigation was carried out.

For determining the tooth width, measurements were made of the right central incisor and the right canine in the upper jaw (1+ and 3+)*). By a sliding gauge ad modum *Lundström* (1948) the measurements could be taken directly in the mouth with an accuracy of ± 0.1 mm.

The stature was measured with an accuracy of ± 5 mm. Width of the head and length of the head were measured with a spreading caliper ad modum *Martin* (1957). The width of the head was measured between euryon on both sides (greatest width of the head) and the length of the head between opisthocranion and metopion (greatest length of the head).

Mean, standard error of the mean, and standard deviation were determined for all measurement. On different occasions the observer made double determinations on 20 subjects in order to determine the error of the method**).

The correlation coefficient was determined for:

Sum of the widths of 1+ and 3+	— stature
" " " "	— length of the head
" " " "	— width of the head
Width of the head	— length of the head

The correlation coefficients found were tested by *Student's* "t"-test.

RESULTS

The results are given in Table 1, in which the means, the standard error of the means, the standard deviations, and the errors of method of the previously mentioned anthropological measurements are recorded.

Table 2 shows the correlation coefficients and corresponding t-values. There is a low correlation between the width of the

*) In seven cases the measurements were made on +3 instead of on 3+ and in one case on +1 instead of on 1+ because 3+ and 1+ had artificial crowns or fillings.

According to the Haderup dental stenography + indicates the upper jaw, — the lower jaw. If the sign is placed to the right of the figure, the right tooth is indicated and vice versa.

**) $s = \sqrt{\frac{\Sigma d^2}{2n}}$

Table 1

Mean value, $\bar{x}$, standard deviation, s, and error of the method in mm for tooth width, length of the head and width of the head and in cm for stature according to the present author's and other authors' investigations on Swedish material.

	Present investigation			Earlier investigations
	$\bar{x} \pm \varepsilon_{\bar{x}}$	s	Error of the method	$\bar{x} \pm \varepsilon_{\bar{x}}$
1 +	8.7 + 0.05	0.6	0.07	8.7 ± 0.04 *(Lundström)* 8.8 ± 0.03 *(Seipel)*
3 +	8.0 ± 0 04	0 4	0.07	7.8 ± 0.03 *(Lundström)* 8.1 ± 0.02 *(Seipel)*
Σ 1 + and 3 +	16.7 ± 0 08	0.8	0 11	
Stature	177.7 ± 0.6	6.3	0.5	175.6 ± 0.5 *(Lindegård)* 176.7*)
Length of the head	191.3 ± 0.6	6.4	0.7	196 0 ± 0.5 *(Lindegård)*
Width of the head	150.3 ± 0.5	5.6	0.8	150.9 ± 0 4 *(Lindegård)*

*) Average stature of 58,445 conscripts born in 1942 (measured in 1960).

Table 2

The correlation coefficient, r, and t-value for estimated correlations.

	Present investigation		*Lindegård*
	r	t	r
Σ 1+ and 3+ — stature	−0.005		
Σ 1+ and 3+ — length of the head	+0.004		
Σ 1+ and 3+ — width of the head	+0.195	2.12*	
Width of the head — length of the head	+0.246	2.64**	+0.24**

head and the sum of the tooth widths of the right central incisors and the right canines in the upper jaw ($r = +0.20^{*}$) and also between the width of the head and the length of the head ($r = +0.25^{**}$).

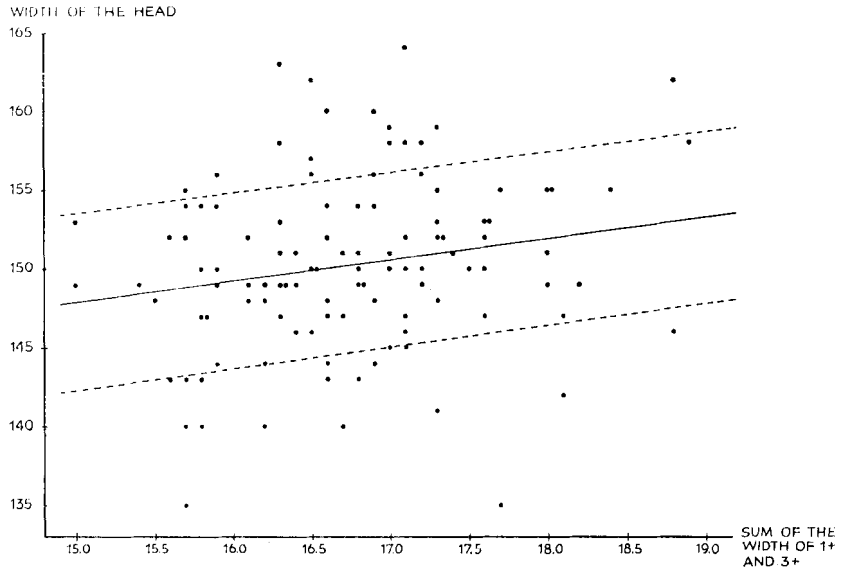

Fig. 1. Scattergram showing the relationship between sum of the tooth widths and width of the head.

Solid line = regression line. Dotted lines = ± 1s.

Fig. 1 is a scattergram showing the relationship between the sum of the tooth widths of the right upper central incisors and the right upper canines and the width of the head.

DISCUSSION

In the present investigation the width of the right incisor and the canine in the upper jaw were measured for determining the tooth width. According to *Seipel* (1946), the width of an individual tooth or group of teeth can, however, be considered to represent the total sum of the tooth widths. *Selmer-Olsen* (1949) has also found that there is a very high degree of correlation between the dimensions of the individual teeth.

According to *Mc Kern & Stewart* (1957), the growth in stature is not completed before the age of 27. Since the growth in stature is insignificant after 18—20 years of age, for practical reasons the data in the present investigation were collected from conscripts. The growth of the cranium seems to be completed at the age of 18 (*Bertillon,* quoted by *Martin*).

As the stature, according to *Backman* (1923), varies during the day, measurements were taken in the morning.

The factors measured in the present investigation completely correspond to results recorded in other investigations on Swedish material (Tables 1 and 2).

According to *Lindegård & Björk* rather strong correlation was found between stature and tibia length ($r = +0.78^{**}$) and a low correlation between tibia length and tooth width ($r = +0.31^{**}$). A higher correlation than the one found by these authors ($r = -0.005$) could have been expected between stature and tooth width. From a genetic point of view it would be remarkable if there were no connection between stature and the size of the teeth. Investigations on larger material could perhaps show a higher correlation between the variables.

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SUMMARY

The authors' investigation concerning the correlation between tooth width, stature, width of the head, and length of the head was made on 110 conscripts with an average age of 20.2 years.

The widths of 1+ and 3+ were measured directly in the mouth with a sliding gauge and the width and length of the head with a spreading caliper.

No correlation could be demonstrated between tooth width and stature or between tooth width and length of the head. A low correlation, significant at the 5 per cent level, was found between tooth width and width of the head ($r = +0.2^{*}$).

RÉSUMÉ

CORRÉLATION ENTRE LARGEUR DES DENTS, LA TAILLE DE L'INDIVIDU, ET LA LARGEUR ET LA LONGUEUR DE LA TÊTE

Les recherches des auteurs, sur la corrélation entre la largeur des dents, la taille de l'individu, et la largeur et la longueur de la tête ont porté sur 110 jeunes soldats, dont l'âge moyen était de 20.2 ans.

La largeur de 1+ et de 3+ a été mesurée directement dans la bouche, à l'aide d'une jauge réglable. La largeur et la longueur de la tête ont été obtenues à l'aide d'un calibre extensible.

Aucune corrélation n'a pu être établie entre la largeur des dents d'un côté, la taille et la longueur de la tête de l'autre. On a trouvé une faible corrélation valable à 5 %, entre la largeur des dents et celle de la tête ($r = +0.2^*$).

ZUSAMMENFASSUNG

ZUSAMMENHANG ZWISCHEN ZAHNBREITEN, KÖRPERLÄNGE, KOPFLÄNGE UND KOPFBREITE

Die Untersuchungen der Verfasser über den Zusammenhang zwischen Zahnbreiten, Körperlänge, Kopflänge und Kopfbreite wurden an einem Material von 110 Soldaten mit einem Durchschnittsalter von 20.2 Jahren ausgeführt.

Die Zahnbreiten von 1+ und 3+ wurden im Munde mit einer Schublehre gemessen, die Kopfbreite und die Kopflänge mit einem Tasterzirkel.

Zwischen Zahnbreite und Körperlänge sowie zwischen Zahnbreite und Kopflänge konnte keine Korrelation nachgewiesen werden. Jedoch zwischen Zahnbreite und Kopfbreite wurde eine geringe Korrelation ($r = +0.2^*$) bei 5 %-iger Signifikanz gefunden.

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