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RELATIONS BETWEEN SCROTUM AND PENIS AND BASIC BODY DIMENSIONS IN CHILDREN'S AGE

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Only some authors in world literature devoted their interest to the mutual relations of some characters of penis and other corporal characteristics.

In 1899 already, H. Loeb tried to find out whether there existed some relation between the individual parts of penis and whether these were in some dependence on other somatic characters. R. L. Dickinson (1949) came, on basis of a thorough analysis of the Loeb's data, to the opinion that there was but a small interdependence between the individual dimensions on penis. In addition, these dimensions do not show — so contended Dickinson — any important dependence on the body height. In 1907, G. A. Piersol supposed that penis had no greater dependence on the overall corporeal growth than any other organ of the body. Principally the same conclusion was reached at by C. S. Ford and F. A. Beach in 1953.

E. Loth (1931) stated on basis of the K. Stojanowski's research (1925) that there were some racial variations in the shape of penis. Stojanowski himself knew four possible types in the shape of penis dependent on the constitution.

In his paper dated 1964, R. Fischer found a linear dependence of the length of penis on the body height. The relation of the two marks is positive, but the correlation coefficient calculated does not reach the value of 0.5 which K. Hrubý (1961) considers as a limit of any practical importance of relations while calculating correlations.

During our research of external male genital in child's age for practical purposes of plastic surgery we tried, inter alia, to determine mutual relations between some metric marks of penis and scrotum as well as their dependence on some other somatic characters. The results of our research are contained in the present paper.

MATERIAL AND METHOD

Our research of the external parts of the male genitals was carried out — as we already stated — for practical purposes of plastic surgery. It took place in 1966 and 1967 in Prague. During our research we examined 400 boys since their birth until the age of 6 years in eight different groups of age. In the category of newly born and younger children we were in a great number of cases unable to measure the circumference of the glans penis (along the corona glandis). Therefore, the mutual relation between the length and the circumference of the glans penis could be examined only with 67 individuals.

Ten older boys had erection during the examination. They had, therefore, to be excluded from the set of individuals investigated in which the length of the penis and the overall length of the penis was involved. The number of cases reaches here the figure of 390.

All length dimensions were measured with the aid of a shiftable gauge on the facies urethralis penis. Circumferences were measured by means of a medical tape gauge; both in the following way:

1) length of the glans penis — between the top of the glans penis and sulcus coronarius;

2) circumference of the glans penis — by application of the tape gauge to the corona glandis;

3, length of the membrum penis — from the sulcus coronarius to the penoscrotal furrow;

4) circumference of the membrum penis — in the half of its length;

5) length of penis — from the top of the glans to the penoscrotal furrow. The length has to be the sum of the length of the glans and the membrum penis;

6) vertical arch of the scrotum — by free application of the tape gauge to the raphe scroti from the penoscrotal furrow to perineum;

7) circumference of scrotum — along the skin of scrotum attached to perineum and to the pubic area.

Apart from these and other dimensions of the external genitals, we further examined:

8) body height according to R. Martin (R. Martin — K. Saller, 1957). In order to measure the height, we used standardized wall tape gauges made of paper, currently in use in our Institute during our research work;

9) body weight. To determine it we used suckling scales and spring treat-balances of Czechoslovak production. Prior to each daily examination, the accuracy of said scales and balances was newly verified;

10) normal circumference of chest according to R. Martin.

Of the values of body height, weight and normal chest circumference obtained, we calculated for each individual the Pignet-Vervaek and Quetelet-Bouchard indices;

11) Pignet-Vervaek index =

$$\frac{\text{(body weigt + chest circumference . 100}}{\text{body height}}$$

12) Quetelet-Bouchard index =

$$\frac{\text{(body weight) . 10}}{\text{body height}}$$

We examined mutual interrelations and interdependence of the respective couples of characters as shown in our tables. When determining correlations we used, in case of linear dependence the correlation coefficient (r) for our calculations. We also indicate the average error (s_r) in respect of the correlation coefficients. Where the mutual relation of characters was not linear, we used for our calculations the so called correlation ratios (η_{xy}, η_{yx}).

ANALYSIS OF RELATIONS

In a majority of cases the dependence between the marks examined was not linear. Therefore correlation ratio had to be used in order to determine its value (see Table No. 1).

It is apparent on hand of this table that the length and circumference of the glans penis are approximately in a medium high, positive relation. With an increase in the length also an increase in the circumference of the glans penis takes place.

TABLE 1

Correlation ratios of the characters penis — scrotum — basic body dimensions

Character	n	η_{xy}	η_{yx}
length of the glans penis-circumference of the glans penis	67	0,517	0,566
length of the glans penis—lenght of the membrum penis	390	0,771	0,851
length of the membrum penis—circumference of the membrum penis	390	0,697	0,758
length of the penis—body height	390	0,196	0,281
length of penis—body weight	390	0,195	0,100
length of penis—vertical arch of scrotum	390	0,211	0,255
length of penis—Pignet-Vervaek index	390	0,194	0,113
circumference of scrotum-vertical arch of scrotum	400	0,574	0,537
circumference of srotum-circumference of membrum penis	390	0,623	0,571

Still greater positive dependence exists between the length and the circumference of the membrum penis. Here we are fully authorized to speak of a high dependence, since the two correlation ratios reach values in the neighbourhood of 0,7.

A high correlation — the highest in our analysis of relations was reached by the mutual dependence between the length of the glans penis and the membrum penis. The longer is the membrum penis of an individual the longer is also his glans. The relation applies, of course, also in the opposite sense. To a certain extent, it may be justified logically. The two cases concern longitudinal parts of penis which are mutually connected and the growth of which may be influenced by the same stimulus.

The values of the two lengths measured with individuals grouped in the higher age categories contribute to this results to a larger extent. With younger individuals whose overall length of penis is relatively small the ratio of the length of membrum and glans is not always the same. Given the overall length of the penis, the glans may be shorter, equal to, or even longer than the membrum penis.

A length of glans penis equal to the length of membrum penis was found in 10,8 per cent. cases. The largest number of such ratio was found with newly born children. A longer glans penis than the membrum penis was found in 19,7 per cent. The membrum of the remaining individuals was longer than their glans penis.

The correlation ratios of the four other dependences (length of penis — body height; length of penis — body weight; length of penis — vertical arch of scrotum; length of penis — Pignet-Vervaek index) shown in Table No. 1, evidence by their value only the very low mutual interdependence, even if this interdependence is possitive. Significantly, the couples of dimensions examined contain always as one dimension the length of the penis. The relations, obtained by our calculations, show that probably the length of penis is not dependent on any somatic dimension apart from dimensions on the penis itself.

Our findings render unjustified some unpublished opinions, according to which there is some dependence between the length of the penis and the body height. The length of penis is not at all dependent, or is dependent to a very small extent indeed, on the body height in the period from 0 to 6 years of age. This conclusion may be applied with a great probability even to higher age.

An approximately medium high dependence, which of course can be of practical importance already, was calculated in respect of the circumference and the vertical arch (length of raphe) of the scrotum, and in respect of the circumference of scrotum and the circumference of membrum penis. Both these two dimensions are very interesting. They show that there is some interdependence of main dimensions on the scrotum — in the same way as on the penis — and that there is also some interdependence between the circumference of the two portions of the external genital.

As was already stated, the correlated dimensions which showed linear dependences, are indicated in Table No. 2.

TABLE 2

Correlation coefficients of the dimensions of penis—basic body dimensions

Marks	n	$r \pm 3.s_r$
length of penis—Quetelet-Bouchard index	390	0,566 ± 3.0,041
length of penis—circumference of penis	390	0,589 ± 3.0,016
circumference of membrum penis—chest circumference	390	0,733 ± 3.0,033

The overall length of penis has a medium high, possitive relation to the circumference of membrum penis and to the Quetelet-Bouchard index. With an increase in the circumference of the membrum penis and the increasing number of centimeters of body height per one kilogram of body weight, the overall length of the penis increases, too.

A surprising result was obtained while calculating the correlation coefficient between the circumference of the membrum penis and the normal chest circumference. The dependence of the two dimensions is very high and positive as in all other cases. Since our set is sufficiently numerous, we can consider the result obtained as justified. Therefore, it may be stated that the larger is the normal circumference of chest of 0 to 6 years old boys, the larger is the circumference of their membrum penis.

In our opinion, it would be highly interesting to check the results obtained, i.e. the said interdependence, on hand of grown up population.

CONCLUSION

The following conclusions may be drawn of the analysis of the main metric characters of the external genital in their mutual relations and relations to some other somatic dimensions:

1) a high correlation was found between the length and circumference of the membrum penis, between the length of the glans and the membrum penis and — which surprises us — between the circumference of the membrum penis and the normal chest circumference.

2) All other dimensions are but of medium or even low values. In all cases the dependence found is a positive one.

3) Only a very low dependence exists between the body height and the length of penis. This corresponds to the findings of Dickinson (1949). With a smaller group, R. Fischer (1964) calculated a somewhat higher dependence ($r = +0{,}446$), but in principle even this dependence is a trifling one.

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