

Studies on Physical and Mental Growth of Prematurely Born Children

Series I. Physical Development, Part 7

Somatotype for Prematurely Born Children according to WETZEL'S
Developmental Level and Leg Length-Height Ratio*

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The present paper described the results of somatotype for prematurely born children at consecutive ages from primary school to junior high school in our follow-up study. The somatotypy according to the composite assessment of WETZEL'S developmental level and leg length-height ratio was used for this study. The prematurely born children were over-represented among the inferior somatotype and under-represented among the superior somatotype when compared with the matched control group of maturely born children.

The previous papers¹⁴⁾¹¹⁾¹³⁾¹⁷⁾³⁾¹²⁾¹²⁾⁹⁾¹⁰⁾⁶⁾⁴⁾ of our follow-up study on physical and mental growth of prematurely born children throughout 9 consecutive years from the 1st grade of primary school to the 3rd year of junior high school (at ages 6 to 14 years) concluded that the prematurely born children had not reduced their handicaps in physical growth throughout 9 years when compared with the matched control group of maturely born children. Especially AIZAWA et al.⁵⁾ pointed out that the prematurely born children were more inferior in somatotypy than the mature control group. The composite assessment of weight-height ratio and leg length-height ratio was used for the somatotypy.

In the present paper, the authors attempted to assess the somatotype

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of prematurely born children according to the composite assessment of WETZEL's developmental level¹⁸⁾ and leg length-height ratio.

MATERIALS AND METHODS OF SOMATOTYPY

1) Materials

Since 1955, the department of public health to which the authors belong has conducted a nine-year follow-up study on the physical and mental development of 150 prematurely born children, and of 302 maturely born children as a matched control group. The details of the follow-up study were described in the previous papers.

2) Methods of somatotypy

In our follow-up study, the prematurely born children were inferior in substantial development of physique, assessed by WETZEL's developmental level, when compared with the mature control group. And

Table 1 Methods of somatotypy

		WETZEL's developmental level		
		stocky (A)	medium (B)	thin (C)
leg length-height ratio	>(M+S.D.) (A')	AA'	BA'	CA'
	(M±S.D.) (B')	AB'	BB'	CB'
	<(M-S.D.) (C')	AC'	BC'	CC'

- Noe: 1) In leg length-height ratio, M and S.D. respectively are mean value and standard deviation for total boys or girls at each school age.
- 2) In WETZEL's grid,
 A_2, A_3 and A_4stocky (A)
 A_1, M and B_1medium (B)
 B_2, B_3 and B_4thin (C)
- 3) the following four somatotypes are classified in the table:
 superior type: AA', BA', AB'
 inferior type: BC', CB', CC'
 moderate type: BB'
 unbalanced type: CA', AC'
 especially AA': plump type with longer leg length relative to height
 CC': short and thin type with shorter leg length relative to height

then, the deficiency in height growth for prematurely born children at ages of junior high school was considered to be caused by their deficiency in leg length growth.

Therefore, the somatotypes for these survey children by sex and by school age were classified into the four somatotypes according to the composite assessment of the developmental grade in WETZEL'S grid and in leg length-height ratio, as shown in Table 1.

RESULTS AND DISCUSSION

The results for these survey children by sex and by school age were shown in Table 2-3.

According to the sexual difference in adolescent growth spurt, there was a slight difference in the somatotypy between the male and female groups. In the somatotypy for male group, the prematurely born children at the 2nd grade of primary school and at the 2nd and 3rd years of junior high school were significantly more inferior in somatotypy than the mature group. In the somatotypy for female group, the prematurely born children at the 2nd and 6th grades of primary school and at the 3rd year of junior high school were significantly more inferior in somatotypy than the mature group.

Table 2 Somatotypy for the survey male children (%)

school ages		somatotypes				total	x ² -test df=2	
		superior	inferior	moderate	unbalanced			
primary school (grade)	2nd	premature mature	5(9.7) 17(16.8)	19(36.5) 17(16.8)	26(50.0) 66(65.5)	2(3.8) 1(0.9)	52(100.0) 101(")	x ² =7.698 0.01<P<0.05
	3rd	premature mature	7(12.7) 15(16.1)	14(25.5) 25(26.9)	31(56.4) 51(54.3)	3(5.4) 2(2.2)	55(") 93(")	x ² =0.471 0.07<P<0.80
	4th	premature mature	6(11.5) 23(22.6)	15(28.8) 29(28.4)	29(55.8) 47(46.1)	2(3.9) 3(2.9)	52(") 102(")	x ² =2.950 0.20<P<0.30
	5th	premature mature	4(7.0) 16(15.0)	19(33.3) 42(39.2)	31(54.4) 46(43.0)	3(5.3) 3(2.8)	57(") 107(")	x ² =3.704 0.10<P<0.20
	6th	premature mature	5(8.9) 13(12.2)	20(35.8) 37(34.6)	28(50.0) 53(49.5)	3(5.3) 4(3.7)	56(") 107(")	x ² =0.399 0.80<P<0.90
junior high school (year)	1st	premature mature	4(7.0) 15(14.0)	24(42.1) 33(30.9)	23(40.4) 50(46.9)	6(10.5) 9(8.4)	57(") 107(")	x ² =3.087 0.20<P<0.30
	2nd	premature mature	3(5.3) 17(15.9)	28(50.0) 34(31.8)	24(42.7) 42(39.3)	1(1.8) 14(13.1)	56(") 107(")	x ² =6.999 0.01<P<0.05
	3rd	premature mature	7(12.3) 20(18.7)	26(45.6) 30(28.0)	21(36.8) 40(37.4)	3(5.3) 17(15.9)	57(") 107(")	x ² =5.192 0.05<P<0.10

- Note: 1) the measurement of leg length was carried out for 8 years from the 2nd grade of primary school to the 3rd year of junior high school.
2) the children in moderate type and in unbalanced type were grouped together for chi-square test.

Table 3 Somatotypy for the survey female children (%)

school ages		somatotypes					total	x ² -test df=2
		superior	inferior	moderate	unbalanced			
primary school (grade)	2nd	Premature mature	4(6.2) 17(13.2)	18(27.7) 23(17.8)	40(61.5) 80(62.0)	3(4.6) 9(7.0)	65(100.0) 129(")	x ² =8.153 0.01<P<0.05
	3rd	premature mature	6(9.2) 12(10.3)	27(41.5) 34(29.0)	30(46.2) 66(56.4)	2(3.1) 5(4.3)	65(") 117(")	x ² =2.964 0.20<P<0.30
	4th	premature mature	6(8.7) 16(12.8)	30(43.5) 37(29.6)	28(40.6) 61(51.1)	5(7.3) 8(6.5)	69(") 125(")	x ² =3.924 0.10<P<0.20
	5th	premature mature	4(5.6) 8(6.0)	40(56.4) 55(41.0)	24(33.8) 63(47.0)	3(4.2) 8(6.0)	71(") 134(")	x ² =4.505 0.10<P<0.20
	6th	premature mature	4(5.7) 21(15.6)	37(52.9) 53(39.3)	26(37.1) 54(40.0)	3(4.3) 7(5.7)	70(") 135(")	x ² =5.740 0.05<P<0.10
junior high school (year)	1st	premature mature	3(4.2) 18(13.3)	30(42.3) 47(34.8)	29(40.8) 52(38.6)	9(12.7) 18(13.3)	71(") 135(")	x ² =4.474 0.10<P<0.20
	2nd	premature mature	15(21.1) 37(27.4)	22(31.0) 29(21.5)	28(39.4) 54(40.0)	6(8.5) 15(11.1)	71(") 135(")	x ² =2.525 0.50<P<0.30
	3rd	premature mature	16(22.6) 48(35.6)	19(26.7) 22(16.3)	31(43.7) 48(35.5)	5(7.0) 17(12.6)	71(") 135(")	x ² =5.127 0.05<P<0.10

In comparison with the prematurely born children the maturely born children were sampled as a matched control group in our follow-up study, so the results of the survey children, bringing together the male and female groups, were shown in Figure 1.

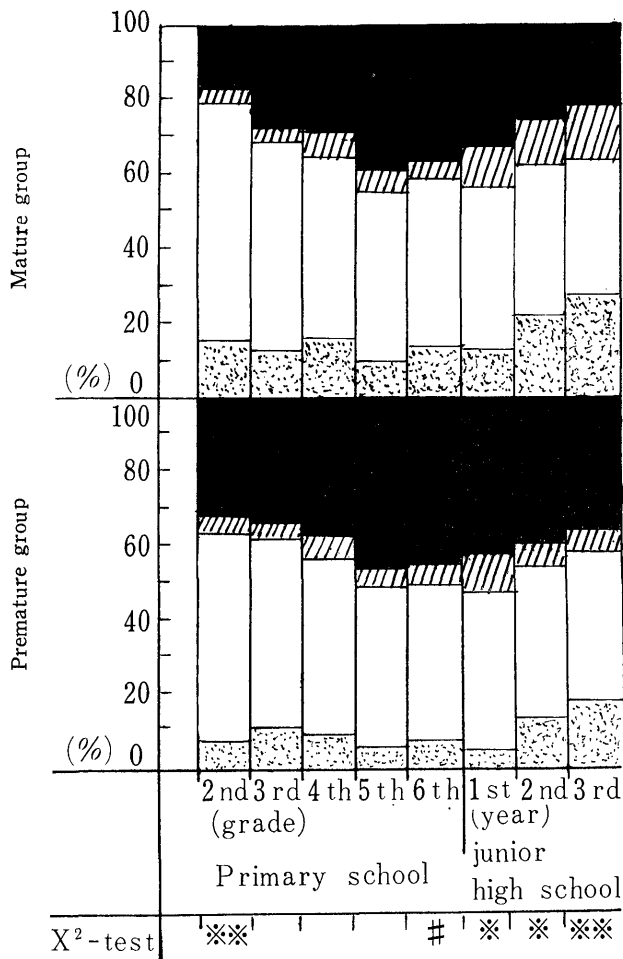
The prematurely born children at the 2nd grade of primary school and at the school ages from the 6th grade of primary school to the 3rd year of junior high school were significantly more inferior in somatotypy when compared with the matched control group of maturely born children. Moreover, the percentage of inferior somatotype in the mature group distinctly decreased for the school ages from the 6th grade of primary school to the 3rd year of junior high school, but such tendency was obscure in the percentage distribution of somatotypes for the premature group.

These results also confirmed the handicaps of prematurely born children in somatotypy. And then, such handicaps were considered to be partly caused by the deficiency in leg length growth for the premature group at ages from 10 to 14 years.

In the study on physique of Danish and Japanese school children, SAWADA¹⁵⁾ reported that Danish school children are more slender than Japanese. Judging from the findings reported by SAWADA, the above-mentioned results in somatotypy for prematurely born children seemed to be worth notice.

CAPPER⁷⁾ reported the following conclusion with regard to the physical development of the immature infants: the majority of the immature infants belong to a definite type, namely, the asthenic type. SCHWINN¹⁶⁾

Fig. 1 Percentage distribution of somatotypes for survey children



Note : (1) stippled bar : superior somatotype
 open bar : moderate //
 hached bar : unbalanced //
 shaded bar : inferior //

(2) x²-test
 ※※.....p<0.01, ※.....0.01<p<0.05,
 #0.05<p<0.10

and DRILLIEN⁸⁾ also described the backwardness in gaining in height and in weight for prematurely born children.

The results of our present paper, describing the somatotype of prematurely born children, seemed to support these findings.

SUMMARY

The present paper, describing the somatotype of prematurely born children in our follow-up study, concluded that the prematurely born

children at consecutive ages from primary school to junior high school (at ages from 7 to 14 years) had not reduced their handicaps in somatotypy when compared with the matched control group of maturely born children.

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