# THE GENETIC CHARACTERISTICS OF SOUTH-MORAVIAN TWINS

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*A total of 400 DZ and 76 MZ twin pairs were studied for: maternal age, in which no significant differences were found; birth order, which was significantly higher in DZ twins; weight at birth; frequency of ABO blood-group phenotypes, where no significant differences were found; and, lastly, frequency of twinning in relatives, where there was significantly higher occurrence, namely in siblings of probands.*

The 287,000 infants born in 1960-1970 in the South Moravian Region included 1888 living twin pairs. This corresponds to a frequency of 0.67%, or, one pair of twins per 150 children. According to Weinberg's rule this should refer to 39.1% of MZ twins and 60.9% of DZ twins. The same-sexed pairs included boys in 53.4%, girls in 46.6%, i.e., the sex ratio amounted to 110:100 (in normal births it is 106 : 100).

Only 10 years ago each 100 live births included 1 birth of twins in our country. The only explanation of this frequency change appears to be the decrease in number of children in a family which nowadays is 1.8.

Of the 476 pairs of twins examined in detail 400 were DZ and 76 MZ. The zygosity was estimated on the basis of agreement in several blood groups, dermatologlyphics, and heterogeneity of amylases.

Using the standard methods, ABO, Rh, MN, and P blood-group systems were examined in all twin pairs; a smaller sample also included Ss, Kell-Cellano and $Fy^a$. The similarity of dermatoglyphs was compared by means of the method by Orczykowska-Swiatkowska (1963). The examination of amylases was carried out by Kamaryt et al. (1970) and Laxova and Kamaryt (1970), both on the polymorphism of this enzyme and on the activity levels of estimated isoamylases. All pairs in whom the estimation of zygosity was not accurate enough were not included in this study.

With regard to the etiology of DZ twinning, the authors mention maternal age, on one hand, and on the other, the fact that the number of twin births increases wirth the number of pregnancies. Our material markedly shows this increase from the third pregnancy, the predominance of births of DZ twins is most distinct in the fourth and further pregnancies. (See Figure).

The difference between MZ twin pairs and controls, not mentioned in the literature, may be explained by the fact that our sample consists of twin pairs hospitalized, with the consent of their parents, in our institute for one week for the purpose of being examined in detail, and that the parents' decision might be influenced by the number of children in

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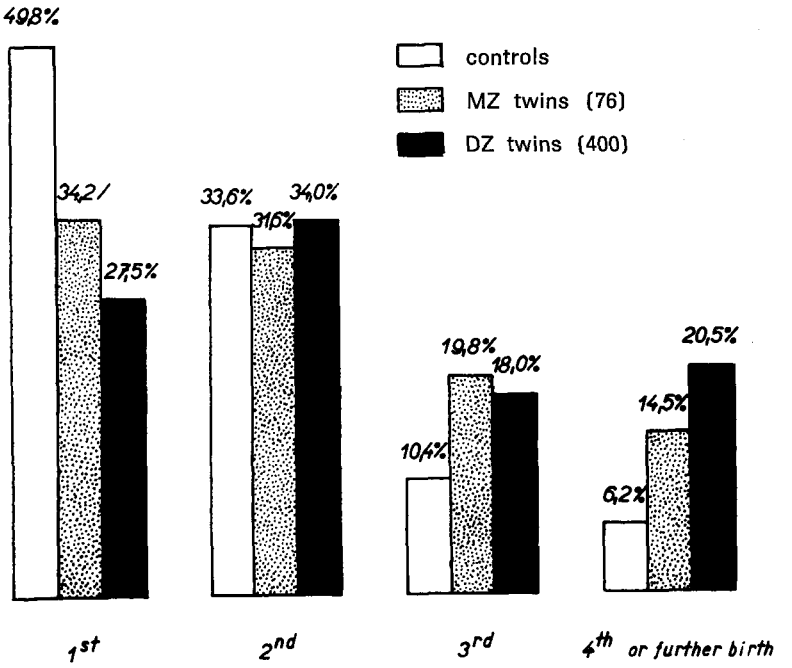


Fig. 1. Twinning and birth order

the family. Also, however, the difference between MZ and DZ twins is statistically highly significant — DZ twins being more frequent from the fourth and further pregnancies. For the estimation of maternal age at the delivery of twins, no adequate control sample is at our disposal. Between MZ and DZ twins, however, no significant difference was found, neither in the general estimation nor in making correction to birth order.

The Table shows mean maternal age ($\bar{X}$), standard error ($\sigma$), and median ($\tilde{X}$), according to the parity and zygosity of probands.

In addition to the number of births, also genetic factors influence the frequency of twin births, especially in DZ twins. Among 662 siblings of DZ twins, there were 620 singletons and 21 pairs of twins (instead of the expected 4 pairs). The 126 siblings of MZ twins included 2 pairs of twins. Parents of MZ twins could not be estimated due to their small number.

Among 400 mothers of DZ twins, 8 descended from twins (the expected value is 2.7, the difference being statistically significant), and so it was with fathers in 5 cases (the expected value is 2.7, the difference being not yet statistically significant).

In estimating birth weight we were comparing the sample of 23 pairs of MZ and 69 pairs of DZ twins of the same sex. The sex ratio in both samples was the same, 14 boys: 9 girls. We were not able to find out if the birth weight of DZ twins, on average, was higher than that of MZ twins (Corney et al. 1972).

Also the variance between pairs is practically the same in MZ and DZ twins. The vari-

Table. *Twinning and Maternal Age*

| Birth order | MZ twins | | | DZ twins | | |
|---|---|---|---|---|---|---|
| | $\bar{X}$ | σ | $\tilde{X}$ | $\bar{X}$ | σ | $\tilde{X}$ |
| 1st | 23.4 | 3.6 | 22 | 24.5 | 4.3 | 24 |
| 2nd | 28.5 | 5.1 | 27 | 27.2 | 4.0 | 27 |
| 3rd | 30.4 | 6.1 | 28.5 | 29.9 | 4.1 | 30 |
| 4th further | 32.6 | 6.1 | 31.5 | 32.4 | 4.6 | 32 |
| Total | 27.7 | 6.0 | 27 | 28.5 | 5.0 | 28 |

ance within pairs is, however, significantly higher in DZ twins ($F$ test significant on 1% level).

A total of 50 pairs of MZ twins and all their parents, 308 pairs of DZ twins and 229 of their mothers and 245 of their fathers, were tested for ABO blood group using the standard method.

In comparing the frequencies of ABO phenotypes in twins with the frequency in our population, we found a significantly higher B frequency in MZ twins and the same finding was observed in the gene frequency. In DZ twins no significant difference was found and also the differences in phenotype and genotype frequencies in parents of both MZ and DZ twins were not significant.

Knowing the mating types in parents of all followed-up MZ twins, we calculated the expected phenotype and gene frequencies specific for our sample. Using this correction we saw no significant difference either in the phenotype or the gene frequencies.

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