

A NOTE TO THE DETERMINATION OF THE AGE OF CHILDREN IN SKELETAL MATERIAL

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K URČOVÁNÍ STAŘÍ DĚTÍ NA KOSTROVÉM MATERIÁLU.

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Recently many of older anthropological methods have been revised and refined. The problems of the age determination of adults have been re-examined by several authors, e. g. J. Nemeskéri and his collaborators in Hungary. The exact age determination is of decisive significance for demographical conclusions and is not without importance for the race analysis of the population.

Much less attention has been devoted to the prehistorical skeletal remains of children. The age determination by teeth is considered exact enough and therefore no new methods have been looked for. In typological studies children are used to be eliminated because of the restricted possibilities of race diagnostics. It was only professor Grimm's Anthropological Institute in Berlin that started to examine systematically the problems of biological development on the prehistorical children material. H. Lorenz-Römer published an article about the teeth and jaws of 13 neolithic and 2 older skulls found in central Germany.

On the vast prehistorical cemetery in Výchapy-Opatovce (south-west Slovakia) a lot of children remains in the age of 0 to 14 years (infans I. and II.) have been discovered. 46 of these remains are guaranteed to belong to the early bronze age (approx. 1700–1600 B. C.) In 24 of these remains the fragments of skulls with teeth in situ remained preserved and besides that also the whole diaphyses of one to seven long bones. This materials offered the possibility for the experiment of confronting the age determination of these children both by the status of teeth eruption and by the length of diaphyses of the long bones. The first method is well known and usually applied. My study is based on the tables of K. Měšťan and J. Miksa. As clinical eruption was considered the status when the edge or the top of a tooth reached at least the half of the height of other crowns. On the other hand the age reconstruction based on the length of diaphyses in children is not common in anthropology. For a long time no tables of the length of diaphyses in relation to the height of the body and to the age have been available. The Toldt's table (quot. J. Reinsberg, p. 859) hitherto used in forensic medicine is more than unsatisfactory. The table derived from the extrapolated curve of Stewart (quot. G. Olivier, p. 259) shows only the relationship between the length of the diaphysis of the femur and the body height. J. Heřt from the Anatomical Institute in Plzeň, prepares growth tables of the long bones diaphyses in relation to the age.

However, detailed tables of F. Schmidt and A. Künle, can be found in the roentgenological literature; they give the possibility to determine the body height and the age by means of the length of diaphysis of each of six long bones of the limbs. Besides the mean value the tables indicate the whole range of variation. The tables were worked out by x-ray measurement taking the largest distance between the proximal and distal epiphyseal line. I quote: „*Endpunkte der Messungen bilden die äußersten Begrenzungen der präparatorischen Verkalkungszonen, die Epiphysenkerne sind also in die Maße nicht miteinbezogen.*“ In conformity with this statement I have measured in the skeletal material the largest distance between both ends of diaphyses.

In a control group of 23 individuals between 14 to 20 years (juvenis) the status of the eruption of the third molar has been fixed in relation to the age determined by epiphyseal union of the long bones according to the tables of L. Borovanský and O. Hněvkovský.

The results of confronting the age determination by means of the above mentioned methods are best to be seen from the graph. The individuals are put on the abscissa chronologically by „teeth age“ (full columns). The cases of the same „teeth age“ are arranged according to the age determined by the length of the long bones diaphyses (empty columns – horizontal lines in the middle indicating the mean age, the whole area indicating the range of variation).

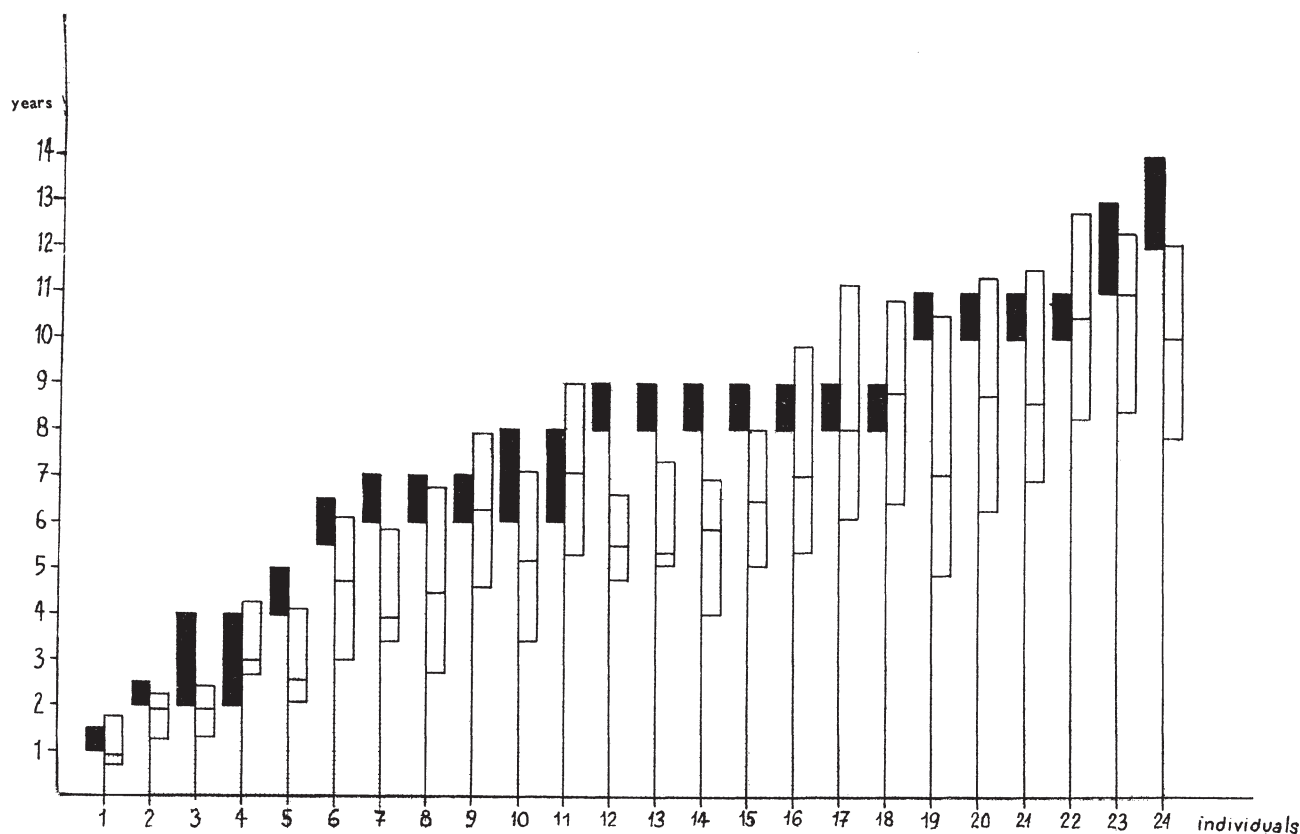
The „teeth age“ is evidently less variable than the „diaphyses age“. The range of variation of the latter is considerable and increases with the advancing age. It includes both the sex differences and the individual differences in the growing process of various bones. Individuals with the same „teeth age“ can have considerably different values of the „diaphyses age“. It is striking that in most cases (18, i. e. 75 %) the mean age and the range, determined by diaphyses, are clearly less than the values of the „teeth age“. Only in 6 cases both methods of determination are in conformity. This fact is still more obvious if we compare the age means of the whole set. The average of the „teeth age“ is 7,5 years, the average of the only 6 years, the difference being 1,5 years, i. e. 20 % „diaphyses age“. The minimums are in average 6,9 years in „teeth age“ and 4,6 years in „diaphyses age“, the maximums 8,1 and 7,9 years respectively.

The cause of the difference between the both methods can be due in the first place to the methodical fault in evaluating the measured values of the length of long bones diaphyses by means of tables resulting from the x-ray measurement. In view of divergence of the rays in soft tissues we have to admit the possibility of such a case. I assume, however, that this fault does not effect the whole amount of difference. Secondly, the lower age determined by diaphyses can result from shorter length of bones in population with lower body height than in the actual high-grown population of Central Europe. But the preliminary calculation of the body height of adult men from Výčapy-Opatovce shows the range 155–190 cm according to the Manouvrier's tables and 165–183 cm by Breitingner's tables. In the mean the set reaches the height about 170 cm, which is not far from the mean of recent Czech men. In the third place some part of the difference between the both methods mentioned above might be caused by a different harmony of the growth process and development of the early bronze age population compared with the present conditions.

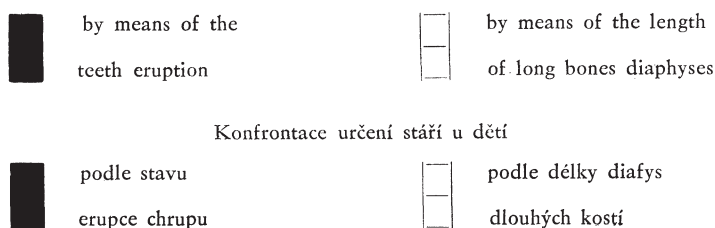
To promote this possibility I bring the result of the study of third molar eruption in a control group of young people from the same population. The third

permanent molar was not erupted in 4 individuals between 14 and 15 years, the age being determined by the epiphyseal union of long bones. On the other hand in 14 individuals out of 19 between 17 and 20 years, i. e. 74%, the molars were erupted. In two individuals the molars were just in eruption and only in three cases the molars were still missing. If compared with the contemporary situation we can rather conclude in favour of a much earlier eruption of the third molar – roughly about 1 to 4 years – than a delayed epiphyseal union. It is more natural as well to assume that in the early bronze age the teeth eruption could have preceeded the growth of long bones than vice versa. The jaws were larger than today in neolit, as revealed by Lorenz-Römer. They increased more between 6–8 years and consequently they exceeded the growth curve of recent bones and maintained this predominance even in full age. By this the eruption of teeth might have been eased and quickened.

There seems to be earlier eruption of teeth in children of the early bronze age. This would be a new argument for the supposition that *Homo sapiens* is changing during the period of his existence. But the results can be considered only as preliminary. It is necessary to examine the valuability of using the tables of



The Confrontation of the Age Determination of Children



Konfrontace určení stáří u dětí

Schmidt and Künle in osteological research by means of recent anatomical material, where the body height and age are known. This is one of the new attempts aspiring to penetrate into the hitherto unsolved problems of biological development of the prehistorical child.

SOUHRN:

Na materiálu pozůstatků 24 dětí ze starobronzového pohřebiště ve Východní-Opatovci na jihozápadním Slovensku, u nichž se zachoval in situ chrup a celé diafysy dlouhých kostí, bylo zkonfrontováno určení stáří podle stavu prořezávání chrupu (tabulky K. Měšťana a J. Miksy) a podle délek diafys dlouhých kostí (rentgenologické tabulky F. Schmidta a A. Künleho). Ve většině případů (75%) bylo stáří určené podle diafys nižší než stáří podle chrupu. Průměrné stáří souboru podle chrupu činilo 7 $\frac{1}{2}$ roku, podle diafys 6 let. Příčinou rozdílu mohla být metodická odchylnost použitých tabulek a zčásti i jiná harmonie vývojově biologických procesů pravěké populace ve srovnání se současností. U kontrolní skupiny 23 mladistvých byl stanoven stav erupce třetí stoličky ve vztahu k věku, určenému podle srůstu epifys dlouhých kostí (tabulky L. Borovanského a O. Hněvkovského). I zde byla zjištěna časnější erupce, protože 74% jedinců ve stáří 17–20 let již mělo třetí stoličky prořezány. Zdá se, že ještě v době bronzové mohlo prořezávání chrupu předbíhat růst a vývoj dlouhých kostí. Výsledek je však jen předběžný a vyžaduje dalšího prověření.

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