Review of Current Literature

Dental Decay As An Indicator of A Dietary Fault

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A report is made of three groups of children observed for 12 to 15 months after birth. Group I consisted of 64 children fed a diet that had a neutral acid-base balance. Group II had a diet that showed from 6 to 10 cc. excess alkali. Group III showed an excess of alkali from 40 to 45 cc.

It is interesting to note that with respect to height and weight, the children on diet III (the higher alkali) showed a distinguishable superiority over the other two. With respect to the dental lesions, which the authors in this paper choose to call dental decay, the children fed the alkali excess diet were relatively free from the condition (4 per cent of the teeth being effected) as compared with the other groups (group I, 46 per cent and group II, 50 per cent).

The authors' conclusions are given below;

1. Excessive dental decay is an indicator of a gross dietary fault.

2. Odontoclasia (a type of decay of deciduous teeth) is associated with a high infant mortality and morbidity.

3. A diet in which the carbohydrates, with an acid residue, are replaced by alkaline starches and a small amount of vegetables, gives added results in the prevention of the dental defects and apparently helps to lower the rate of infant mortality and morbidity.

H. J. N.

On the Motion of Growth

NORMAN C. WETZEL

In a series of seven brief papers published in The Proceedings of the Society of Experimental Biology and Medicine, Norman C. Wetzel of the department of pediatrics at Western Reserve University has presented a new and interesting approach to the problem of growth. In place of studying the subject from the standpoint of clinical observation of change as recorded by such mechanical devices as measuration, photography, and X-ray, Dr. Wetzel has considered growth, from a dynamic point of view, an exchange in terms of energy. He has developed a mathematical equation which, when solved by substituting values obtained from clinical and laboratorial experiments, bears a striking correlation to the results reported by reliable investigators. His work also reveals a very close relationship between growth and heat production. The theoretical results determined by his formula, with respect to basal metabolic rates obtained by clinical observation, is deserving of careful attention.

In the first article, "Introduction of the Energetics of Growth and Metabolism," the author lists three important requirements for growth. 1. Suitable contact with an appropriate source of energy. 2. Agreeable accommodations in immediate surroundings for daughter cells. 3. Proper adaptation with respect to subsidiary physical conditions (temperature).

He also mentions three factors of energy from the original source (divisions in which energy is transformed in growth). 1. Internal work of growth (daughter cells). 2. External growth (dissipation of energy, synthesis, etc.). 3. Work of maintenance (cell nutrition). In this first paper a mathematical formula is presented.

In the second of the series, "Human Growth In Weight from Early Fetal to Adult Life," Wetzel develops an equation in terms of the unit of weight and accounts for the balance of forces (or energy) in the particular fractions or growth elements as developed from a dynamic point of view. Then, using values derived by experiment and solving the equation, a table for average human (prenatal and postnatal) weight is supplied that agrees almost identically with reliable clinical observations as determined and recorded by other investigators.

In the third article, "The Determination of P and the Energetics of Human Basal Metabolism," the author has developed, in a somewhat similar manner, an equation for the rate of heat production per unit of weight under 'basal' conditions. And, here again, the theoretical curves developed by this formula are in striking agreement with the experimental recorded observations of other independent trustworthy investigators.

The fourth essay, "Further Analysis of Energetics of Heat Production With Special Reference to Basal Metabolism During Prolonged Human Fasting," is devoted to the development of an equation for the computation of the curve for heat production in both human and animal fasting. This agrees with the experimental data tabulated by Benedict.

In number five of the series, "Rate of Loss in Weight for Minimum Metabolism," Wetzel confirms the theoretical constant rate of heat production at which the body reserves would be conserved to the utmost, by comparison with reports of several cases of observed prolonged fasting.

In the sixth paper, "Energetics of Bacterial Growth and Heat Production," it is interesting to note that the applications of the equations of motion, previously developed for theoretical computation of human growth and heat production, were found to be applicable to growth of unicellular organisms. The equations developed from the data on "Bacterial Growth," by Bayne-Jones and Rees (J. Bact. 17; 123, 1929), were found to be sufficiently comprehensive and accurate for this purpose, and the calculations for both numbers of bacteria and the total heat production, theoretically determined by Wetzel, agree almost absolutely with the recorded observations.

The last of the series, "Fundamental Relations and Quantities of Growth and Metabolism", furnishes something of a summary and elaboration of certain details of foregoing papers. Wetzel considers growth a change rather than an exclusive increase in size,—"a change in mass per unit mass." He gives the following as the law of growth: "cellular reduplication, once initiated, will continue at a uniform rate in its state of motion until acted upon to change that state." He exemplifies this law with growth of bacterial colonies. It is his feeling, however, that two amendments should be made to the foregoing law. One to account for "Natural" decline of all finite growth and by this he means the decrease in rate of growth which occurs in spite of favorable conditions for reduplication; and two, a modification to account for inertial effects frequently exhibited in the phenomenon of growth. That is, growth does not start with a great momentum and continue. It may start from zero or less than zero (an initial loss). A table also is given ir this article which is a synopsis of the fundamental quantities appearing ir the equations of growth and metabolism.

H. J. N

A Histological Study of the Anatomic Structures Forming the Oral Cavity

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It appears that the material to be found in the present day text book: dealing with this subject, has been obtained from four methods of investi gation, grouped loosely as follows: (1) Anatomic specimens; (2) Dry bone specimens; (3) Frozen sections through heads of infants; and (4) histo· logical sections of animal material. The author analyzes and points ou some of the disadvantages of these methods of approach to the subject For his study he has used histological sections of human material. Twenty seven individuals were used, twenty of them two years and under. Abou 10,000 serial sections were made in four different planes.

Thirty-five sections are used for illustration and quite fully described The work is intended primarily for the oral surgeon who operates in the region of developing teeth of infants. It is, however, enlightening to the student of growth and development.

It is of particular interest to note the change in relationship betweer the deciduous teeth and the germs of their permanent successors. The most undifferentiated tooth germ shown is that of the maxillary seconc bicuspid of the newborn. It lies occlusally to the lingual cusps of the deciduous second molar and is in the soft tissue, unprotected by bone. A change in relationship takes place so that by the third year it lies gin givally to the roots of the deciduous molar. A similar change in relation ship is shown to take place in the development of the incisors.

In regard to increase in alveolar height the author says, "In studying frontal sections through the region of the deciduous molars at differen ages, one is impressed with the rapid increase in the height of the maxilla during the first year of life. At birth the vertical dimension of the upper ja is very short. The germs of the deciduous molars occupy most of the vertical space between the maxillary ridge and the floor of the orbit. At the age of three or four months, the total height of the upper jaw is almost double that at birth."

"In horizontal sections through the entire jaw of a child who died eighteen days after birth, the most striking feature is the very crowded arrangement and overlapping position of the deciduous germs. The permanent lateral incisors lie on the lingual side of the deciduous central incisors and the deciduous cuspids. The latter, in turn, overlap the mesial portion of the first deciduous molars. This histologic picture is decidedly different from most of the previous illustrations of the jaws of new-born children."

Attention is also called to muscular attachments, particularly the buccinator, the deep muscle fibers of the lip and the nasalis.

W. B. D.