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FACE FACTS

A Clinical Study of Dento-Facial Deformities

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NUMEROUS, accurate investigations have conclusively demonstrated that in many communities 97 percent of the population is affected by decay of the teeth. In fact "it is now universally admitted that dental caries is the most prevalent of all diseases, that its numerical incidence is largely proportionate to the state of civilization to which a particular race has attained."

Deformities of the teeth, face and jaws are also very common (probably averaging as high as 50 percent), though the available statistics are too fragmentary to warrant final conclusions. "It is scarcely necessary to point out that the presence of such deformities interferes considerably with the exercise of the function of the teeth, and leads also to the development of other diseases."

The significance, therefore, of *normal dental function*, its influence upon jaw-growth and facial development during childhood, its relation to the health and well-being of the race, can hardly be overestimated. The dental axiom: *only a normal mouth can perform normal functions*, constitutes a tenet of a creed we were long in formulating, but one which is now quite generally accepted. And by a *normal mouth* we mean a mouth *free from deformity*, as well as from disease.

One of the most common complications of malocclusion of the teeth is a marked distortion of the facial lines. Frequently it is the only symptom which induces parents to seek a cure for their child's affliction.

In his "*Expression of the Emotions in Man and Animals*" Darwin demonstrated the unity of the races, and anatomical science has provided us with a fairly accurate description of normal facial development in the individual; but a critical analysis of *abnormal facial types* has hardly begun. A review of the

old literature is a fruitless task, because most of it is devoid of exact methods of investigation. Physiognomic research is largely a record of false conclusions, due perhaps to its too close association with phrenology. Krukenberg remarks that its scientific study began in earnest only ten years ago, and that it is still in its infancy. It therefore seems eminently worth while to attempt a presentation of a certain group of facts with which orthodontists are more or less familiar, but which have not yet gained that wide acknowledgment which their importance merits.

I. NORMAL VARIATIONS OF THE HEAD-FORM.

The human body, with its varied beauty of organization, is one of the most complex structures in nature. Normal variations of its form have long been considered worthy of serious study, and since Darwin's day they have been

Fig. 1.—Evolution of the Profile. (a) Infancy; (b) Maturity; (c) Senility.

pursued with a renewed earnestness. Blumenbach, Camper and Prichard were the pioneers in the study of the relation of the teeth and jaws to the facial lines of man.

This phase of scientific inquiry now forms an important division of *anthropology* where, in common with other elaborate methods of classification, it is termed *anthropometry*, the science of human measurements. The comparative study of the skull comprises a subdivision termed *craniometry*. When the measurements are taken from the living head it is termed *cephalometry*. Numerous methods for measuring human features have thus been proposed, and some of them have been sufficiently standardized to win universal acceptance.

In comparing a number of skulls even the beginner experiences little difficulty in detecting differences of shape. "The form of the head is for all racial purposes best measured by what is technically known as the *cephalic index* (Fig. 2). This is simply the breadth of the head above the ears expressed in percentage of its length from forehead to back. Assuming that this length is 100, the width is

expressed as a fraction of it. As the head becomes proportionately broader—that is, more fully rounded viewed from the top down—this cephalic index increases. When it rises above 80, the head is called *brachycephalic*; when it falls

Fig. 2.—Cephalic Index. (a) Negro, index 70, dolichocephalic; (b) European, index 80, mesocephalic; (c) Samoyed, index 85, brachycephalic. (After Tyler.)

Fig. 3.—Gnathic Index. (a) Prognathic; (b) Mesognathic; (c) Orthognathic. (After Flower.)

below 75, the term *dolichocephalic* is applied to it. Indexes between 75 and 80 are characterized as *mesocephalic*."

Variations in the form of the palate, classified by Turner into *dolichuronic*, *mesuronic* and *brachyuronic*, are also recognized, as well as variations due to

differences of development in the muscles of mastication. The latter may frequently be recognized in the (a) changeable position of the temporal ridge, (b) the differences in width of the rami of Europeans when compared with those of aborigines, (c) the varying degrees of parallelism of the borders of the rami, and (d) the outward and inward everted angles of the lower jaw, which affect the width of the lower part of the face.

Fig. 4. Variations in the relative positions of the lower third molars.

Fig. 5.—Normal Variations of Alignment. (a) U-shaped; (b) Parabolic; (c) Hyperbolic; (d) Elliptic. (After Broca.)

II. NORMAL VARIATIONS OF DENTITION.

The history of the teeth, as explained by comparative odontology with the aid of fossil remains, is one of the most complete as well as interesting narratives which science has ever told; very few departments of knowledge can present a section of the past quite so completely. But like many other organs of the body, the teeth have not escaped the enervating influences which our changing diet and modes of life through centuries of time have imposed.

Swiss, Basle. Index 64.

Norwegian, Aamot. Index 75.

German, Baden. Index 83.

Hungarian, Thorda. Index 88.5.

Lapp, Scandinavia. Index 94.

French, Savoy. Index 96.

Fig. 6.—Illustrating the relation between face-form and head-form. (After Ripley.)

With the aid of Flower's *gnathic index* we are able to determine the relative projection of the teeth and lower part of the face, and to classify the races of mankind into the three groups: *prognathic*, *mesognathic* and *orthognathic* (Fig. 3). This variation is also noticed in the relative position of the lower

Fig. 7.—Facial Index. (a) Negro; (b) Caucasian. (After Camper.)

Fig. 8.—Prominent chin, with normal denture.

Fig. 9.—Straight chin, with normal denture.

Fig. 10.—Receding chin, with normal denture.

third molars (Fig. 4). With the *dental index* we can determine the "relation of the size of the teeth to that of the skull" and get the three classes termed: *microdont*, *mesodont* and *megadont*.

The noted French anthropologist, Broca, long ago called attention to the normal variations of alignment of the teeth, and suggested the four types: *hyperbolic*, *parabolic*, *elliptic* and *U-shaped* (Fig. 5).

Dr. J. Leon Williams, in a paper read before the National Dental Association in 1910, called our attention to the fact that the width of the maxillary dental arch followed closely the width and length of the zygomatic arches.

Fig. 11.—Principal features in the face, the relations of which may be altered by orthodontic treatment. Front view. (a) mentolabial sulcus, (b) angle (angulus oris), (c) upper lip, (d) cheek (bucca), (e) nasolabial sulcus, (f) tip (apex nasi), (g) base (basis nasi), (h) frontal eminence, (i) root (radix nasi), (j) dorsum (dorsum nasi), (k) ala (ala nasi), (l) nostril (nares), (m) philtrum, (n) aperture (rima oris), (o) lower lip, (p) chin (mentum).

III. NORMAL FACIAL TYPES.

It is a matter of ordinary observation that every face presents lineaments of character which stamp it with individuality; probably no other part of the human body shows so marked a tendency to variate in features and contour. Under normal conditions, the various elements of the face frequently combine in so harmonious a manner that the whole reveals a striking symmetry.

In his work on "The Races of Europe," Professor Ripley adopts the rule: "long head, oval face; short head and round face. In proportion as the head becomes broader back of the temples, the face appears relatively shorter (Fig. 6). Only a few examples of widespread disharmonism as it is called, between head and face are known. Among these are the Greenland Eskimos, notwith-

standing the fact that they are almost the longest-headed race known. The Aborigines of Tasmania are also *disharmonic* to a like degree, most other peoples of the earth showing an agreement between facial proportions and those of the head which is sufficiently close to suggest a relation of cause and effect. In Europe, disharmonism is very infrequent among the living populations. At times disharmonism arises in mixed types, the product of a cross between a broad and a long-headed race, wherein the one element contributes the head-form while the other persists rather in the facial proportions. Such combinations are apt to occur among the Swiss, lying as they do at the ethnic crossroads of the continent."

A widely used method of measurement applicable to the profile is that sug-

Fig. 12.—Principal features of the face. Side view. (a) Mentolabial sulcus, (b) angle (angulus oris), (c) upper lip, (d) cheek (bucca), (e) nasolabial sulcus, (f) tip (apex nasi), (g) base (basis nasi), (h) frontal eminence, (i) root (radix nasi), (k) ala (ala nasi), (l) nostril (nares), (m) philtrum, (n) aperture (rima oris), (o) lower lip, (p) chin (mentum).

gested by the Dutch anatomist, Peter Camper, and technically known as the *facial angle*. "This gave an angle of about 20° for a dog, 85° for an Australian black, 95° for a European, and the Greeks used an angle of 100° or more to express their ideal of beauty and of intellectual power" (Fig. 7).

Deviations of form in the bony structure of the chin (which is closely related to the teeth and largely influenced by their growth) are naturally of compelling interest to the orthodontist. The normal variations of form of the symphyseal angle result in the three types known as the *prominent*, *straight* and *receding chin*. These are frequently associated with a normal, as well as abnormal, denture. When a prominent, or receding, chin is found as a complica-

tion of malocclusion, the orthodontist finds himself confronted with one of the most difficult problems with which he has to deal (Figs. 8, 9, and 10).

Normal variations of form in the muscles of the lips, cheek and tongue are also recognized, as well as deviations in the size of the oral aperture, termed *microstomia* and *macrostomia*. The relation of the lip line to the occlusal plane of the teeth varies considerably, and it is also a matter of common knowledge that so prominent a feature of the face as the nose varies greatly in size and form, even within normal limits. Again, no two beings have eyes that are alike, for these, too, vary greatly in their color, size and position.

The principal features of the face which are the special concern of the orthodontist are shown in Figs. 11 and 12. The relative place which each of these features ought to occupy constitutes the student's first object of study. Having secured in his mind the position and form of each part, he comes to the second problem, viz., *The rearrangement of malplaced and malformed parts* in the faces of his patients. That this can frequently be done is one of the many notable achievements of the modern art of orthodontics.

(To be continued.)

THE TEETH AS FACTORS IN THE ECONOMY OF THE ANIMAL KINGDOM

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THE conviction has often been forced on those engaged in the practice of orthodontia that the majority of individuals seeking the service of an orthodontist for the treatment of malocclusion in children do so with the idea of improving the facial beauty of the child. It is very seldom that the orthodontist is called on to correct a case of malocclusion for the purpose of increasing the masticating efficiency of the teeth. It is also true that the majority of people who seek the service of a dentist do so for the purpose of alleviating pain instead of increasing the masticating efficiency of the dental apparatus. In fact, those who are engaged in the construction of crowns and bridges are often compelled to have a long argument with the patient in regard to the necessity of having a bridge inserted before the patient will consent to have such work done. In other words, the majority of people who engage the service of the dentist or orthodontist do so with the idea of being relieved of pain by the one or having something done by the other which will increase their facial beauty. This idea is entirely wrong, for the aim of all dental operations, whether of an orthodontic or other character should be to increase the masticating efficiency of the dental apparatus. While it is apparent to every one practicing orthodontia or dentistry that teeth in malocclusion do not perform their function as well as when in normal occlusion, nevertheless it is probable that few people have considered the important factor the teeth have played in