

Orthodontic Problems Associated with Allergy*

MILTON B. COHEN, M.D.
Cleveland, Ohio

Dental deformities are associated with malformations and disturbances in growth of the dental arches. These changes are variously attributed to heredity and to environmental factors. Among the most important of the latter are deficiency diseases such as scurvy and rickets and acute infections. That these conditions affect the growth of the dental arches there can be no doubt. The majority of children with dental deformity, however, do not have histories of definite disease which can explain the condition. Why then are so many children in need of the services of the orthodontist?

Those of us who study patients with clinical allergy notice a very high incidence of major orthodontic deformity in children under our care. Many of these have well marked deformities before there are sufficiently well recognized symptoms of the allergic condition to call the attention of anyone but the expert to its existence.

Study of the severe allergic shows a definite relationship between the rate of growth of the bones, including those of the face, and the periodicity and severity of the symptoms. As we become familiar with these changes it is possible to recognize them in less definite form in individuals with minor symptoms of allergy and occasionally even to predict the oncoming clinical symptoms well in advance of their appearance. These observations lead us to emphasize the importance of allergy as a cause of orthodontic deformity and to offer the following brief review of its nature and life history.

Certain individuals react in unusual ways when they come in contact with various substances. These reactions are not due to anything ordinarily poisonous in the substances themselves but to a disturbance in the cells of the affected individual. Such cells are said to be sensitized and the individual is said to be in the sensitized or allergic state.

The allergic state is, so far as is known at the present time, always acquired, although there is a definite familial trend to the disease. It is generally believed that there is a hereditary transmission of a capacity to develop allergy and that the greater the tendency, the earlier in life it will be acquired. Experiments with guinea pigs have revealed that certain allergies can be transmitted from the mother to the offspring through the placenta. This type of allergy, though familial, is congenital and not hereditary in the

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generally accepted sense. These points are emphasized because of references to similar problems in the literature in relation to the familial incidence of orthodontic deformity.

When an individual in the allergic state contacts with the substance to which he is sensitive, and that substance is in an amount he can not tolerate, a reaction occurs. This reaction is a hive. The substance producing it is known as an allergen. This hive reaction may be confined to the area of contact with the offending allergen, or it may spread to any organ or combination of organs in the body. For this reason the affected patient may have a variety of symptoms depending on the structures and functions of the parts of the body involved. The symptoms vary from a simple hive on the skin to syncope and death. The severity of the symptoms is determined by interrelations of the degree of sensitivity of the patient, the size of the dose of the allergen and the speed of its absorption.

Almost every substance with which we come in contact can be an allergen for someone. Those most frequently contacted are most likely to affect us. For this reason infants and young children are most often allergic to foods and older children and adults to air-borne substances which enter the body through the respiratory tract. Bacteria in foci of infection may also occasionally act as allergens. Because the reaction of the allergic tissues is the same to all allergens, varying only in degree, there are no characteristic symptoms to guide the clinician in searching for the allergen in a given case. His knowledge of the life history of the disease and its effects on the body structure, the history of the individual case and various types of tests afford him the clues on which he builds his theories of the causes of each case. These theories are then subjected to experimental study in which the patient ceases to contact with the suspected allergens, or his tolerance to them is raised by suitable methods. The patient's response determines the correctness or incorrectness of the theory. Such studies, like the correction of orthodontic deformities, require prolonged cooperation between the patient and the physician or dentist caring for him.

The management of the allergic patient is further complicated by the fact that not every contact with an allergen is followed by symptoms. The individual in the allergic state may contact with a dose of the offending allergen which is less than his tolerance to it. No recognizable clinical symptoms result but the patient has masked or subclinical allergy and may develop constitutional changes which are evidenced by disturbances in body form and maturity, and particularly in the growth of the face and the dental arches.

Children with allergy can be divided into large groups. In the first,

the symptoms of allergy begin to manifest themselves early in infancy. The child shows no significant variations from the normal until the third to the sixth week of life when characteristic symptoms begin to appear. The first of these are colic and regurgitation of food. The child has made contacts with the allergens up to now. Here he makes contacts with the pediatrician who attempts various modifications of the diet until he find one which is fairly agreeable. This diet, supplemented by anti-spasmodics, seems to alleviate most of the distressing symptoms and the child shows regular gains in weight. Despite the apparent control of the situation, the baby continues to be a feeding problem and, within a few weeks, eczema appears. This may vary from a mild diaper rash or slight crusting of the scalp to a universal weeping eruption. Associated with the eczema there are evidences of neurogenic instability such as general irritability, increased urination and changes in muscle tone; the troublesome gastro-intestinal symptoms persist. Cherney has referred to this type of child as the one with the "exudative diathesis." Up to this point, the symptoms are almost entirely due to food sensitivity.

At about six months of age, nasal symptoms begin. These are the first evidences of a beginning inhalant sensitivity. They manifest themselves in nasal stuffiness, nose rubbing, thumb sucking and mouth breathing, all of which, though troublesome at the time, are not considered especially harmful by either the mother or the physician. During the remainder of the first year there is a moderate increase in the severity of the nasal symptoms and the child is said to be afflicted with frequent attacks of nasopharyngitis. A diagnosis of adenoids is made sooner or later and plans are made to remove the adenoids as soon as the suitable age is reached. The eczema continues on its decline as the respiratory phase increases and, in order to combat this difficulty, the tonsils and adenoids are removed between the ages of eighteen months and two years. Presently, and particularly in the winter, a croupy cough makes its appearance. It is spasmodic in nature and is often associated with wheezing respirations and fever. This cough is frequently confused with whooping cough and the child is subjected to unnecessary quarantine. After the quarantine is lifted we find as a rule that his siblings have not contracted the highly infectious disease. The nasal symptoms continue although the cough may disappear, but soon another attack of croupy cough appears. Asthmatic bronchitis is often diagnosed at this time, but it is only when the attacks become more severe and the wheezing more pronounced that the correct diagnosis of bronchial asthma is made. Three years of age often marks the exacerbation of either the bronchial or nasal symptoms in the summer months during the pollinating seasons of the grasses or the weeds.

Our child now has seasonal hay fever. Associated with all these symp-

toms there are mild gastro-intestinal upsets. The child is a poor eater, shows definite pallor, and slight undernourishment, and has probably received by this time a variety of tonics and vitamin products. If we should examine him at this time, the significant findings might be grouped as follows:

1. Physical examination

- (a) a thin boy, short for his age, and light for his height
- (b) the skin is dry and may show slight eczema in the folds
- (c) there is a loss of muscle tone
- (d) the face is flat and narrow
- (e) the nose shows turbinate congestion
- (f) there is some orthodontic deformity
- (g) the palate is high-arched and narrow
- (h) there may be wheezing rales in the chest

2. Mental examination

- (a) he is an irritable, whiny child
- (b) he is very erratic in his behavior
- (c) hyperactive periods alternate with great fatigue
- (d) he has a short attention span.

As the school age approaches there is a gradual progression of the respiratory symptoms with a lessening of those referable to the gastro-intestinal tract. The neurogenic symptoms continue and there is erratic progress in both physical and mental development unless contact with the offending allergens is avoided by chance or by medical management: irrevocable changes in the respiratory mechanism and in the dental arches occur.

Fortunately all cases of allergy are not so severe or so continuous. The allergic of the second group has his allergy masked for a great part of his early life. He is only mildly affected with gastro-intestinal symptoms and eczema in infancy and escapes the nasal symptoms until between five to eighteen years of age, when seasonal hay fever begins. Since there is no activity in the preschool years, constitutional changes are less noticeable than in those previously described and very little is found on examination between the attacks of hay fever. As the hay fever recurs year after year seasonal asthma begins to manifest itself at the height of the hay fever season, and each year thereafter there is apt to be an extension of both the nasal and bronchial symptoms into the fall and winter months. At first the winter attacks occur at infrequent intervals with periods of complete freedom between them. Gradually the frequency of winter attacks increases and the interval between them decreases until there are practically no periods of complete freedom from nasal turgescence, morning cough and wheezing. Our patient now has perennial symptoms and since these are practically as severe as

those previously confined to the hay fever season, no seasonal exacerbation is noted. Sixty-five percent of patients presenting themselves with chronic asthma beginning in adolescence are of this type. A large number of these allergies, too, show orthodontic deformity.

Investigations of the metabolism of allergic children throw some light on the reasons for the constitutional changes which are observed. Growth is interfered with during periods of active allergy. This manifests itself first by a failure to gain in weight, later by a failure to gain in height and finally by a failure in the attainment of skeletal maturity. Associated with these growth changes there is a disturbance in mineral metabolism in which the mineral reserves in the bones are depleted. This depletion of the mineral reserves is independent of the amount of mineral or vitamin in the diet and is due to the fact that minerals, and perhaps other food substances, are poorly utilized during the active phases of allergy. This accounts for the poor muscle tone and the under-nutrition and may be related to the disturbances in growth.

Nature has arranged a coordinated schedule of growth for the human body. Various parts grow at different rates at different times. If growth is inhibited or its rate is diminished at a time when some important area, such as the face, should be growing rapidly the loss may never be made up since nature must pass on to the next part of her schedule at the pre-ordained time. It is in this manner that active allergy produces orthodontic deformities especially during the first year and between the third and sixth years of life.

Fortunately the metabolic changes just described can be arrested by control of the allergic patient. Investigations have shown that proper treatment of patients with allergy is followed by improvement in mineral utilization and by rapid increases in height, weight and maturity indices. The treatment must be begun before there is irreparable damage to the growing face if dental deformity is to be prevented.

2109 Adelbert Road