MALOCCLUSION AS A CAUSE OF PAIN IN THE TEMPOROMANDIBULAR JOINT

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At the present time, considerable importance is attached to abnormalities of the temporomandibular joint, especially as they apply to the symptoms of pain referred over the branches of the fifth nerve. These symptoms include tinnitus, deafness, a chronic catarrhal otitis media, glossodynia, xerostomia, eczema of the auditory canal, and vertigo. It is a moot question how often these symptoms are referable to abnormality of this joint.

In the last two decades, considerable investigation has been carried out on the problem of malocclusion from the anatomical, clinical, and histological standpoints. Wright[1] in 1920 and Monson[2] in 1921 presented papers showing the rôle of adjustment of the dental bite in the treatment of deafness. Kirk[3] demonstrated the anthropological basis of these findings and produced mathematical proof that trauma of the ear could result from the stress of abnormal dental occlusion. Prentiss[4], Maves[5], Goodfriend[6], Cryer[7], and most recently Costen[8] have contributed to the establishment of a syndrome associated with temporomandibular dyscrasia.

Joint disease in the absence of symptoms is a well-recognized entity. Redfern in 1850 first observed this and stated that joint diseases at times progress until complete destruction of the cartilage has resulted without the patient being aware of any abnormality. On the other hand, these same types of disease may cause violent pain and irritation. The symptoms supposed to indicate disease in the cartilage are closely allied with those produced by affections of the bone. Politzer in 1878 observed that the anterior wall of the bony auditory meatus was often pierced, showing a round or oval orifice.

A detailed discussion of the anatomy and symptomatology of this articular dyscrasia will not be presented here but an attempt will be made to correlate the existing dental and clinical findings with abnormalities of the joints and to discuss briefly the problems involved in dental reconstruction.

Goodfriend[6] has estimated the incidence of abnormalities of occlusion in a group of men from 20 to 30 years of age to be approximately 55 per cent. In cases of loss of hearing, 11.4 per cent occurred in the presence of normal occlusion, while with abnormalities of occlusion this figure was increased to 13.3 per cent. Costen[8] has stated that symptoms of disease of the ear predominate in edentulous mouths. When pain is present, the cases fall into the class of malocclusion re-

sulting from loss of molar support on one side only or malocclusion sufficient to produce destruction of one or both temporomandibular articulations.

In a survey of the histories of 854 patients of varying ages seen in the Dental Department, it was found that 725, or 84 per cent, showed a definite masticating deficiency with loss of one or more of the posterior teeth and no replacement. This may be of more significance in the general ill health of the patient than in temporomandibular abnormalities only. Of these 725 patients, 406 or 56 per cent showed clinical evidence of loss of vertical dimension as evidenced by too closely approximating posterior ridges and fanned out, markedly traumatized, or abraided anterior teeth. Of this group of 406 patients, 55 per cent had clinical signs of abnormalities of the joint, 14 per cent of which were of such a nature that the subjective symptoms had caused the patient to seek relief. The remaining 41 per cent were classified as passive, the patient being unaware of the existence of clinical evidence of joint dyscrasia and experiencing no real discomfort. The symptoms were usually mild subluxation or a cracking sensation, tinnitus, or slight tenderness to pressure. Of the remainder of the 406 patients with deficient masticating function and loss of vertical dimension of the jaws, 181 or 44 per cent were apparently free from symptoms.

In the next grouping, 319 or 37 per cent of the total number of patients showed deficiency in masticating function with no clinical evidence of loss of vertical relationship of the jaws. It was found that 30 per cent of this group exhibited temporomandibular dyscrasias of which 3.7 per cent were active, 26 per cent passive, and 70 per cent showed no symptoms.

A third group consisting of 48 patients, or 5.6 per cent of the total, were found to have no deficiency in masticating function but some evidence of loss of vertical dimension. Many in this group were patients whose missing teeth had been replaced by mechanical measures—so-called cases of compensation. Of this group, 33.3 per cent had symptoms of temporomandibular abnormality, 4 per cent of which were classified as acute, 29 per cent as passive, and 66-2/3 per cent produced no apparent symptoms.

A fourth group in which there was no deficiency in masticating function and no loss of vertical dimension was found to consist of 7.9 per cent of the total (68 patients). Three patients or 4.4 per cent had active symptoms. Two of these were cases of compensation, 12 or 17 per cent had passive symptoms, and 78.6 per cent had no symptoms.

A fifth group was comprised of 13 patients exhibiting no deficiency of masticating function and no loss of vertical dimension, but with

marked malocclusion of the teeth as evidenced by malposition and improper cusp digitation. Of these, 53 per cent had symptoms of temporomandibular abnormality and 46 per cent had no symptoms.

A summary of these figures shows that they agree with Goodfriend's observation[6] that the incidence of abnormality of the temporomandibular joint increases with the rising incidence of abnormality of occlusion. Loss of teeth with subsequent loss of vertical dimension as well as malocclusion tends to produce these abnormalities. It may be said that approximately 50 of every 100 individuals suffer demonstrable loss of vertical dimension with deficiency in masticating function. Of these 50, more than one-half will exhibit abnormality of the temporomandibular joint to some degree and, of these, 14 will seek medical or dental relief.

In the presence of malocclusion, regardless of the fact that there is no existing deficiency of masticating function and that there may or may not be loss of vertical dimension, the chances are about equal that there will be some evidence of a temporomandibular abnormality. In this group, there are many patients who state that the condition has apparently been of lifetime duration. To these, however, the condition is usually one of persistent annoyance and not painful sequence. It has been my observation, and this agrees with that of Costen[8], that those patients with edentulous mouths complain more of symptoms with reference to the ear while those with pain usually have missing teeth on one side only, loss of vertical dimension, and malocclusion.

Dental reconstruction in these cases is not so simple as it would seem. For this reason, proper verification of the diagnosis, based on clinical restorative measures, is relatively infrequent. Dr. Costen[8] has stated that *failure* to relieve the symptoms has been *consistent* when, in the effort to open the bite, the condyle was brought to rest upon the articular eminence, impinging on the part of both bony structures where erosion most often occurs. The mechanical aspects are quite difficult. It is still a matter of trial and error to correct the true vertical dimension of the jaws with the construction of splints to the posterior areas, using the relation of the front teeth as a guide.

No consideration, so far as I am aware, has been given to the great distress occasioned to the patient on the first few days after the splints have been inserted for the purpose of increasing the vertical plane. This discomfort is similar to that caused by a high filling which everyone has experienced at some time.

Then too, when the posterior teeth are missing, extensive stress placed on this region causes in some cases a more rapid resorption of bone in this area which is particularly true where teeth were lost through pyorrhea alveolaris. Most prosthodontists feel that these cases of

posterior extension where the anterior teeth are present should be managed in the following manner. The anterior teeth should be built up into proper balance occlusion to afford a resting position and to equalize the stress. This necessitates crowns made of baked porcelain on each of the anterior teeth or the alternative of sacrificing either the upper or lower teeth, preferably both, so that the replacements may be fixed in equilibrium. Thus, the masticating function is distributed equally over a wider surface to prevent any abnormal resorption to a particular area which will produce not only a recurrence of joint symptoms but ill-adaptation of the appliances with malfunction of those appliances. With the loss of teeth and subsequent drifting and tipping of the adjacent teeth, an excessive pressure on these latter teeth often causes a localized pain, due to the fact that the stress is not delivered along the long axis of the tooth. This is a factor that must be taken into consideration in the reconstruction process of the mouth. Again, many of the tipped teeth contain deep restorations approximating the pulp and may contain a degenerating pulp. The question of whether removal or retention is indicated is often most difficult to decide. These are the problems confronting the dentist. To work them out successfully demands careful study, a degree of experimentation, a material cost, and patience. The time consumed, the effort, and the mechanical ingenuity of the operator must be compensated for. The successful termination of such cases is, therefore, an expensive and prolonged procedure. The patient must return frequently for rechecks, adjustments, and repairs. On the part of the patient it requires complete cooperation and infinite patience. After the hurdle of the invariable period of discomfort has been passed, if the optimum restoration has been secured, reflex pains and other symptoms are definitely relieved. Recently, a patient was seen who stated that he could not keep the lower denture out of the mouth for any length of time because of the almost immediate return of neuralgia associated with a left temporomandibular articulation. Often, I have been told that a patient wears his appliances at night because of the comfort they give for, if taken out, an uncomfortable night will surely follow.

In summarizing, Goodfriend states that the causes of articular dysfunction are many, the order of their importance being (1) loss and excessive wear of the teeth; (2) malocclusion and anomalies of bite; (3) disequalibrium of masticating stresses; (4) direct injury to the joint; (5) inflammation of the teeth, tonsils, and ears; (6) nutritional disturbances; and (7) systemic disease.

The rationale of treatment is based on the fact that the mandibular articulation will undergo functional adaptation which is well illustrated during eruption of a tooth and recognized by Wolf's law. The treatment is essentially that of repositioning the mandible and reconstructing

the basic dental curve of occlusion or balance in order to establish a normal articular relationship to relieve intra-articular pressure and eliminate occlusal trauma. This should follow eradication of dental infection and irritants. Rest of the repositioned joint is essential for minimizing the postoperative discomfort, and certainly systemic factors must not be overlooked. All this embodies the utmost patience and cooperation from the patient, considerable expense, and a long duration of time.

References

1. Wright, W. H.: Deafness as influenced by malposition of the jaws, J. Nat. Dent. A., 7:979-992, (December) 1920.
2. Monson, G. S.: Impaired function as a result of closed bite, J. Am. Dent. A., 8:833-839, (October) 1921.
3. Kirk, E. C.: Standard for cranial study in relation to dentures, Dental Cosmos, 71:297-299, (March) 1929.
   A study of the dynamics involved in the evolution of the human dentures in the relation of centric occlusion, Dental Cosmos, 72:631-643, (June) 1930.
4. Prentiss, H. J.: A preliminary report upon the temporomandibular articulation in the human type, Dental Cosmos, 60:505-514, (June) 1918.
   Regional anatomy, emphasizing mandibular movements with special reference to full denture construction, J. Am. Dent. A., 10:1085-1099, (December) 1923.
5. Maves, T. W.: Repositioning of mandible relative to temporomandibular joint, correcting cases of subarthrosis and dysarthrosis, J. Am. Dent. A., 22:763-784, (May) 1935.
6. Goodfriend, D. J.: The rôle of dental factors in the cause and treatment of ear symptoms and disease, Dental Cosmos, 78:1292-1310, (December) 1936.
   Symptomatology and treatment of abnormalities of the mandibular articulation, Dental Cosmos, 75:947-957, (October) 1933.
   Abnormalities of mandibular articulation, J. Am. Dent. A., 21:204-218, (February) 1934.
   Dysarthrosis and subarthrosis of the mandibular articulation, Dental Cosmos, 74:523-535, (June) 1932.
7. Cryer, M. H.: Internal Anatomy of the Face, 2 ed. Philadelphia and New York, Lea and Febiger, 1916.
8. Costen, J. B.: Some features of mandibular articulation as it pertains to medical diagnosis, especially in otolarynology, J. Am. Dent. A., 24:1507-1511, (September) 1937.
   Neuralgias and ear symptoms associated with disturbed function of temporomandibular joint, J.A.M.A., 107:252-255, (July 25) 1936.