EXTENSION OF THE TEMPOROMANDIBULAR JOINT SPACE
BY METHODS DERIVED FROM GENERAL
ORTHOPEDIC PROCEDURES

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DURING THE PAST THREE decades the dentist has widened his interest in the temporomandibular joint. In earlier days he was mainly concerned with its mechanics, but new vistas were opened in 1934 by the publication of the epoch-making articles of Goodfriend* and Costen. This was a milestone in dental history. For the first time the dental profession became aware of the painful consequences of mandibular overclosure, and coincidentally it was gifted with a new aid for suffering humanity.

In the light of present-day knowledge, it is easy to pick faults in some of Costen's contentions, but he earns our praise for heralding a new era in the treatment of nondental facial pain.

Soon after the publication of Costen's articles, numbers of dentists began testing his hypotheses. Some of their cases were dramatically successful whereas others failed. Failures are always challenging so that the dentist in practice at that time spared no effort to ferret out the solution. The training and every-day experience of the dentist make him mechanically minded. Therefore, failure to relieve pain was usually ascribed to some technical oversight, such as the incorrect assessment of the free-way space.

Then, as roentgenography was developed, the condylar relations were made visible, and when it was seen that condylar overclosure generally accompanied mandibular overclosure, the mechanistic attitude of mind seemed justified. It was taken for granted that the displaced condyles pressed on nerves in some way, and we were ingenuously confident that the pain could be relieved by the simple act of “bite-raising.” This, we told ourselves, would swing the condyles away from the inflamed parts.

We recall how we fared, in our first ventures, at treating patients suffering from the effects of condylar overclosure. Costen's articles had fired us with enthusiasm; the old feeling of helplessness had gone; at last we felt that we could do something for those sad persons. We set to work with a will and applied our new knowledge.

In his first essays into treatment by occlusal rehabilitation, it might be the lot of one practitioner to be successful, and so by his good fortune he became armored against the failures which were bound to come. His faith in the new tech-

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nique was established by his initial success. On the other hand, his discomfited colleague might labor in vain over his first cases. It was his bad luck to be introduced so unfortunately. In such a manner are converts and "doubting Thomases" made. Thenceforth, the latter listens to the glowing reports of his successful colleague with incredulity if not with skepticism.

In the pioneer days of occlusal rehabilitation, we soon learned the unhappy consequences of ill-considered "bite-raising" techniques, and then we read the articles of Tench, Mershon, and Schuyler, which drove the lesson home. Taking heed of their warnings, we strove to improve our methods for estimating the vertical dimension of the masticatory apparatus. Conscientiously, we developed more and more precise techniques for determining the height of our complete dentures. We aimed to construct dentures which would take the pressure off the temporomandibular joints; the denture had to be neither too high nor too low.

Time passed and it slowly dawned upon us that the problem of facial pain was bigger than we had thought, and that it could not be completely explained in terms of mechanics. Dentists have every reason to believe in their mechanicals. They have developed a system of oral engineering of which they can be justly proud. However, their concentration on the restorative aspects of their profession has, to some extent, blinded them to the wide implications of pain. When he suffers pain, the patient embodies all the complexity, the nobility, and the frailty of humanity, so that the compassion and the precision of the dentist is incomplete without a knowledge of biologic and psychogenic values.

**RHEUMATISM OF THE TEMPOROMANDIBULAR JOINT**

The facial pains now so familiar to us were fairly common even in pre-Costen days. The older dentist was no less puzzled than we are today. He had no choice therefore, but to entitle the disease as best he could; the condition perforce had to be labeled either "tic douloureux" or "rheumatism of the temporomandibular joint." Then, when Costen's articles appeared, these terms were set aside for a time. The dentist of the day thought that the new mechanical philosophy had outmoded the earlier diagnosis. For a transitory period, he satisfied himself that tic douloureux and temporomandibular arthrosis had no clinical entity. All pains in this part of the face were now ascribable to condylar displacement. From the objective viewpoint of today, it looks as if the pendulum of opinion is swinging; there is a realization that the truth lies somewhere between the extremes.

Could it be that the older dentist was not far off the mark when he declared that the temporomandibular joint suffered rheumatism? However, before we immerse ourselves too deeply in this speculation we must come to an understanding as to the meaning of "rheumatism." In the first place the term is unsatisfactory. As Copeman says; "In the present state of our knowledge an exact etiological classification is often impossible, and such terms as "rheumatism" and "rheumatoid arthritis," unless more exactly defined, remain as convenient cloaks for our ignorance." Indeed, the term is seldom used by those who devote themselves to this speciality. They prefer instead to determine which of the many disorders loosely covered by the term pertains to the case in hand, rather than use the general diagnosis of "rheumatism."
However, despite its shortcomings, the word is in constant currency and probably there is no harm done, as the man-in-the-street has a fair idea of meaning. Without belittlement, it may be said that most patients like to have their illnesses identified with labels, and "rheumatism of the temporomandibular joint" is as convenient a label as any.

TRIGEMINAL NEURALGIA

We turn now to the alternative diagnosis of the pre-Costen days. If he did not call the condition "rheumatism of the temporomandibular joint," the practitioner was constrained to name it "trigeminal neuralgia," and if the pain was very severe it became "tic douloureux." Today we use these terms cautiously. For one reason, it has been found that some cases previously called tic douloureux have cleared up when treated for condylar displacement. Nevertheless, to deny the existence of tic douloureux is sheer futility, because there is undoubtedly a type of neuralgia which is nondental in origin, and which has no connection with the temporomandibular joint.

TIC DOULOUREUX

Tic douloureux remains an enigma, its pathology being unknown. Furthermore, there appears to be no genuine cure for this disease except intracranial section of the sensory root of the fifth nerve, or possibly by the new operative procedures which decompress the ganglion. The main point for the dentist is that the treatment of tic douloureux is not his responsibility. Just as soon as the diagnosis is made, the patient should be transferred to the appropriate specialist. Suffering would be prolonged unnecessarily if the dentist were to embark on occlusal rehabilitation which is doomed to failure from the start.

Conversely, some cases originally diagnosed as tic douloureux turn out to be nothing worse than the pain of condylar displacement. The pity is that the patient may be subjected to root-resection without just cause. I have been privileged to treat eight patients who have undergone resection without benefit, yet every one of these subjects responded to occlusal rehabilitation in various degrees. A heavy responsibility lies on the dental profession, therefore, to refine its differential diagnosis to the highest perfection.

PSYCHOLOGIC FACTORS

The large mass of the 780 patients suffering nondental facial pain, treated in the Temporomandibular Clinic of the Glasgow Dental Hospital during the last eight years, falls into a different category. The typical patient is female, and in many instances she demonstrates a strong psychologic overlay. To cure her face-ache is no easy task. Furthermore, she often has other pains, and it is recognized that if we can cure her face-ache she will, on occasions, develop another pain elsewhere. This is the "conversion" familiar to psychiatrists. Our patient seems "born to suffer" from one pain or another. In some cases she is the victim of

*Schorstein, J.: Killearn E.M.S. Hospital, Scotland, personal communication.
an unhappy environment, existing in a life-situation that would break most people. Needless to say, many aspects of her case are without the province of the dentist, so that this type of patient is best treated by a "professional symbiosis," rather than by a lone practitioner. She needs the combined services of say, the rheumatologist, the orthopedist, the dental specialist, and in some cases, the psychoanalyst. The medical men could tackle any extant ill-health, the dentist could treat her condylar deflection, and the psychoanalyst could probe into the genesis of the muscular hypertension which hurts her joints.

THE ANXIETY-STATE

Let us discuss a case of hypertension of the masticating muscles, and the anxiety-state which gave rise to it. The generally accepted hypothesis declares that primitive man was equipped with a body mechanism designed to give him inordinate strength when alarmed. He became alert, his heart pumped faster, and the flush of adrenalin into the blood-stream activated him for violent action; he was prepared for flight or fight. Primitive man dwelt in an environment where it was rational to behave violently and the tempestuous explosion consumed the vigor provided. Then, with the passage of time, he was no longer frightened, and his body mechanism returned to the even tenor of its ways.

On the contrary, sophisticated man, although endowed with an identical body mechanism, does not employ it in the manner intended. It is evoked just as frequently, because the world has witnessed no diminution in frightening or frustrating situations. In other words, his physiologic response to alarm is not greatly different from that of his ancestor, but present-day convention does not encourage him to fight or flee every time his feelings are hurt. He must learn to bottle up his emotion. His muscles are energized like those of his forefather, but they are not given the grace of consummation. This is a fair digest of the so-called anxiety-state which is so much discussed in the literature of modern medicine. Psychiatrists and rheumatologists are of the opinion that muscle tension induced by emotional disturbance can lead to osteoarthritis, especially if there is a special predisposition to that disease. It is probably true to say that the temporomandibular joint is no exception to this general rule.

Bauer* states that osteoarthritis is a symptom of neuromuscular tension in which reflex hypertonus compresses the joint surfaces with degenerative consequences. The point to note is that dentists who intend to specialize in this field will need to shift the focus of their thoughts from the periphery towards the center, to take in the complete picture. Temporomandibular pain may be the localized expression of a generalized physical or mental disturbance. We must appreciate that an infinite variety of causes, such as financial worries, marital discontent, lack of attainment, anemia, or other systematic illness, may precipitate a neural unrest which manifests itself in the muscle tension. Finally, the weakest link in the chain gives.

It is a reasonable thesis that the temporomandibular joint may have a special predisposition to pain by reason of its integration with a masticating apparatus which is degenerating phylogenetically. Furthermore, the human mouth looms large in the emotional make-up of the subject. It is well known that an inordinate
amount of brain tissue is allotted to the functions and sensations of the mouth, especially in the child. It is within the bounds of possibility that a roughly executed extraction, for example, may leave an emotional scar, which, no matter how it is suppressed, may lay the foundations for a face-ache in adult life. Whatever the reason, nondental facial pain is often difficult to treat and, in many instances, the dental specialist would do well to consult his medical colleagues.

**Hypertonicity of Muscles**

The new science of electromyography has produced substantiating evidence that hypertonicity of muscles can cause pain. Wramner reports that in arthritic persons, hypertonicity persists after voluntary relaxation of the muscles actuating the joint. The essential point here is that a patient may be under the impression that her muscles are completely relaxed, whereas in actual fact, some of the motor-units in her muscles may still be spastic, with sufficient energy in them to record as spike-patterns on the electromyogram.

Spasticity in the masticating muscles may be self-evident, or it may be so subtle that it cannot be discerned clinically. Advanced cases could be designated as trismus. The accompanying pain may be severe but, in mild cases, the jaw is merely stiff and the pain negligible. In many instances, neuralgia may be severe, although there is no trace of stiffness, and the presence of spasticity can only be proved by electromyography. Nevertheless, many observers believe that neurally propagated muscle tension is an important predisposing factor, lying dormant until it is flared up by some trauma such as condylar displacement.

It may be said that the specialist in this field sooner or later learns to recognize a characteristic type of patient. The odds are that the patient is female; although her muscles as a whole are slim, they may nevertheless be tense. Whether or not she is anemic, she is often easily fatigued. She is sometimes living in a strained life-situation. She bruises easily. Her circulation is poor; her hands and feet are cold and clammy; she feels the cold unduly. Indeed, this may well be the reason for her disposition to rheumatism; she cannot keep herself warm enough to prevent her muscles from being chilled. While she is much given to nasal colds, she seems to escape the more serious acute diseases, so that she lives to a ripe old age. Congenital asthma is sometimes her lot, and skin conditions are not unknown.

Some of these patients complain of a burning mucous membrane, sometimes in the tongue, in the gums, or in the palate. Dentists should be wary about diagnosing "acrylic resin allergy" in these patients, because often it will be found that the "burning mouth syndrome" antedates the denture. An interesting feature is that rheumatic pains can occur in other parts of the body concurrently with the face-ache.

Spasticity of the masticating muscles can, of course, be ascribed to causes other than psychogenic and traumatic. It is well known that the impaction of a lower third molar tooth can cause a spasm. Badly administered inferior dental block anesthesia may also cause trismus. In this article, we refer only to the nondental types of spasms. The most intense case of this order within our ex-
Experience was a lady of 60 years of age whose right-side masticating muscles had spasmed almost every day for years. The pain was agonizing, and her edentulous ridges were clamped so tightly that they could not have been pried apart. The characteristic attack usually passed off within five hours. The jaw would then relax completely and the pain would cease. It is pleasant to report that this patient has had neither pain nor muscular spasm for two and one-half years.

Fig. 1.—Laminagrams of the temporomandibular joints. The upper pair depicts the right and left joints with the mandible closed. The lower pair shows the joints with the jaw extended. The condyles have not translated much.

Condyles cannot translate freely if the temporalis muscles have spasmed. Fig. 1 represents such a case. Each temporomandibular joint has been radiographed twice in this figure. The upper pictures depict the right and left joints in the closed position, and the lower pictures show the condyles when the mandible opened. It will be seen that the condyles have not shifted much despite the extent of the opening. The action in this case could be described as a hinge-movement without condylar translation.
The patient whose joints are seen in Fig. 1 had endured a severe bilateral neuralgia for four months. The pain simulated tic douloureux in intensity and quality. His trouble had been started by the extraction of teeth under general anesthesia. We had a natural suspicion, therefore, that the jaw had been temporarily dislocated by the mouth gag. However, an assurance was given by his dentist that the condyle had never left the fossa. By a happy coincidence, this patient's pain disappeared together with the restriction of the condylar movement, shortly after his first visit to us; translation returned although no treatment was given.

Spasm of the masticating muscles cannot be a common cause in cases where translation ceases. Spasm is not likely to continue for years. We have investigated a number of patients with this anomaly. They have been radiographed periodically, seeking evidence of recovery of condylar translation. The general impression remains that once a condyle is fixed, it is fixed for all time. As aforementioned, the exception is the joint which has been traumatized by sudden force. Inflammatory effusion and protective muscle spasm can hamper free condylar translation, but recovery normally takes place if genuine rest is provided.

**FIBROSITIC ADHESIONS**

Needless to say, it is pure conjecture to claim that fibrositic adhesions are to be found in the temporomandibular joint in these cases where the laminagram shows loss of translation. However, as experience accumulates, definite information will be provided. There is a gathering opinion that the condition can be caused by repetitive microtraumata, and it is a reasonable conjecture that the rheumatic diathesis plays a part in rendering the patient susceptible to this form of injury. Fig. 2 shows the type of joint where it is vain to anticipate self-improvement. This figure consists of four laminagrams, each joint is depicted in the closed and open positions. Comparison of the joints shows that the left condyle is immobilized, while the right translates normally. It is easy to recognize this condition clinically without recourse to roentgenography (Fig. 3).

This disorder is more common than is generally realized and needless to say, it occurs in various degrees. Sometimes both condyles lose the power to translate, and the patient opens her jaw by "tucking in her chin" on an intercondylar hinge-axis. Then there is another type where the condyle on one side is immobilized while the contralateral condyle translates normally. Sometimes both condyles can translate, but one is stiff, whereas the other is free. In another type, one condyle may not shift while the contralateral condyle translates excessively, almost to the point of dislocation. Probably this excessive movement is a subconscious endeavor on the part of the subject to compensate for the sluggishness of the stiff condyle; that is, the patient tries to separate the incisors as much as formerly. Sometimes in straight opening of the mandible, the condyles do not translate synchronistically, one condyle leading the other. The timing may be out although the terminal points of condylar excursion may be similar.

It is interesting to note that when facial pain accompanies this anomaly, it does not necessarily follow that it occurs on the side with the greater pathology. We have encountered patients who have no pain in the hinging side, but who ache
in the other. The explanation may be that the hinging side does not move sufficiently to become painful, whereas the opposite side is strained by the unnatural action. The situation is not unlike that which occasionally follows arthrodesis of the hip-joints. The operation which fixes the joint for all time takes away the movement which caused pain, but the previously normal side begins to ache.

Fig. 2.—Although the patient tried hard, she could not shift her left condyle.

Fig. 3.—Clinical appearance of a patient with one condyle “seized-up.”
ABNORMAL CONDYLAR BEHAVIOR

The whole subject of abnormal condylar behavior is beset with difficulty and more research is needed, considering the vast numbers who endure face-ache. In the present state of our knowledge, we should be cautious of jumping to conclusions. We must confess that, so far, we are uncertain as to the ideal condylar movement for any given individual, nor have we any proper knowledge of the link between orthodontic classification and condylar action. Furthermore, despite the research which has been done on occlusion and mandibular function, the data has not yet been related significantly to facial pain. The main difficulty, of course, is that we cannot "see into the joint."

It is evident that specialists other than dental should include themselves in the study. If fibrosic adhesions can accompany facial pain, then it is clear that the dentist should share his problems with medical colleagues. For example, the orthopedist and the rheumatologist may cooperate fruitfully. This does not mean that the dentist should pass the patient out of his care; in many instances that would be quite wrong. The dental profession has been assiduous in studying the temporomandibular joint although mostly its mechanics. Nevertheless, the dentist has something to offer; he may be able to serve usefully, having at his disposal various techniques which can influence the joint.

LAMINAGRAPHIC STUDIES

In future phases of temporomandibular research, we may learn what changes can be wrought in the structure and function of the joint by therapeutic procedures. Laminographic studies may teach us more of the physiology and function of this part. So far, we have gathered a fair knowledge of the correct and incorrect resting positions of the condyles, but we have a long way to go. In addition, the dental profession has experimented empirically with occlusion-adjusting appliances, not without success. Many devices have been used to improve the resting position of the condyles, including temporary splints, cast metal overlays, partial dentures, complete dentures, crowns, bridges, and onlays. All have been used to improve condylar relations. However, the day of empiricism is bound to pass. We will require to know, for example, just where we place the condyles when registering the occlusion.

It is within the bounds of possibility that the problem is less involved than it would appear at first sight. Perhaps we have bemused ourselves by concentrating too much on the mechanics of occlusion with all their undoubted complexity; maybe we have plumbed this subject to unnecessary depths while overlooking the linkage between generalized joint disease and temporomandibular pain.

ORTHOPEDIC PROCEDURES

Nearly 100 years ago, the orthopedic pioneers, Hugh Owen Thomas and John Hilton, enunciated basic procedures for treating inflamed joints. Although they did not deal specifically with the temporomandibular joint, there is no reason why it should be excluded. Those worthy men declared that an inflamed joint should be treated in accordance with three essential principles: (1) rest, (2) immobilization, and (3) traction. They stated that a painful joint is not properly
rested unless it is brought into a physiologic position; that is, flexor or extensor muscles should be neither taut nor flaccid. In many cases, splinting is necessary to overcome the abnormal muscle spasm. The modern counterpart of Thomas’s splint is the “weight and pulley” for applying traction to a joint (Fig. 4)." 

Strange to say, the application of traction to a joint for the purpose of relieving pain is not mentioned much in orthopedic literature. This is an oversight explained by the fact that the procedure is so commonplace that nobody writes about it. An eminent orthopedist* says: “It is well known that a pain in a joint can be relieved by the application of extension to keep the joint surfaces apart. This is such an old-standing procedure that you are not likely to find any reference to it in the literature. For example, we routinely apply traction for an inflammatory lesion of the knee joint, and this almost without exception produces striking relief of pain.”

![Weight Extension.

Fig. 4.—Extension of the knee-joint for the relief of pain. The same principle can be applied to the temporomandibular joint.]

THE RESILIENT SPLINT

Adverting to the temporomandibular joint, the question arises: How can traction be applied to the mandible so that the joint-space is opened up? Obviously, we cannot extend the joint by hanging weights on the chin. The answer seems to be found in a resilient type of intraoral splint which gently opens the joint-space. 

I deliberately aim to stretch the masticating muscles with these splints, gently and progressively, until they become relaxed under working conditions, that is, with the splint removed. Perhaps the word “stretch” is a misnomer; it is probably true that the muscles are not stretched at all. Maybe we restore a shortened muscle to its proper resting length.

I have treated several hundred patients suffering nondenital facial pain on the assumption that they present orthopedic problems; that is, I believe that their pains, reflected though they may be, are essentially pains caused by “compressed menisci,” “pinched synovia,” “stretched ligaments,” and “disturbed muscle function.”

*Mr. Roland Barnes: Western Infirmary, Glasgow, personal communication.
These patients are advised strongly to protect themselves from cold draughts on the face and ears, because there is ample evidence that the incidence of pain rises with the advent of piercing winds. The therapeutie value of warmth is explained to these patients. Routinely, we examine their dentitions or their dentures for signs of functional malocclusion. Their temporomandibular joints are investigated for condylar aberration: Does the condyle translate too far forward or too far back; does it come off its correct pathway at any part of its excursion? If condylar displacement is discovered, laminagraphy is used to ensure that the splint has actually repositioned the condyle to best advantage. However, I believe that the most important part of the procedure consists in carefully stretching the overtense muscles so as to produce relaxation.

Fig. 5.—Resilient plastic splints for extending the temporomandibular space. One splint with a flat occluding surface can be worn separately in the first stages of traction. When the muscles have relaxed somewhat, both can be worn.

The masticating muscles must not be stretched indeterminately; a careful technique must be followed. The resting position of the mandible must be assessed as best it can, and the splint built up to fill the interocclusal clearance. Bearing in mind the fact that a muscle cannot be stretched abruptly, the splint should be raised no higher than is the practice in complete denture procedures. This decides the vertical dimension of the first stage of the treatment, i.e., an interocclusal clearance of 2 mm. should be arranged. After this splint has been worn for a few weeks, the occlusal vertical dimension is increased to a height which eliminates all interocclusal clearance. After the passage of a further few weeks, the occlusal vertical dimension is increased 2 mm., thus beginning the restoration of the muscles to their true resting length.

The splints usually have flat occluding surfaces (Fig. 5), but there is one occasion for a monobloc, which is made by anchoring the upper and lower flat occluding surfaces together. The monobloc is particularly useful when one condyle is
displaced horizontally, i.e., where prolonged cusp-interference has twisted the mandible forward on one side and backward on the other. First, the cusp-interference is eliminated, and then the jaw straightened up by a correctly oriented monobloc.

Our patients are instructed not to wear the splints continuously during muscle adjustment, because a muscle kept overlong in tension will accumulate painful waste-products of metabolism. As the splint becomes acceptable to the patient, it is worn for longer periods, obviously during sleep. Occasionally, a temporary denture is supplied to reinforce the action of the splint. In cases where existing complete dentures show excessive interocclusal clearance, and by reason of the fact that the soft splints cannot be used for chewing, it might well be that all the benefit derived at night from the resilient splint, is undone during the day while masticating is done with a defective denture. I emphasize that such a denture is "temporary." A final denture cannot be contemplated until the mandibular relations have settled into proper adjustment. The whole procedure may seem overelaborate, but there is no alternative for these sad patients who are often at the end of their tether.

For many years, our temporary splints have been made of a resilient material.* This plastic should be processed in dry heat at 150° C. to bring out its best elastic properties and maximum strength. The material is kind to tender edentulous ridges, and it snaps into undercuts where natural teeth are present.

LIMITATIONS OF TREATMENT

It would be wrong of me to leave the reader with the impression that success will always attend these procedures. It is no exaggeration to say that the most difficult dental patients are those who suffer nondental facial pain accompanied by tender edentulous ridges. On occasions they come to us demoralized by years of pain, and skeptical about the ability of a dentist to help them. They regard themselves properly as ill persons. It is psychologically wrong to let this type of patient think that the simple expedient of a new denture will cure her ailment. It is true that in some cases it will, but the patient should be made to understand that she is a victim of a painful derangement of the temporomandibular joint, which the dentist is competent to treat in conjunction with his medical colleagues.

The most trying patient is the one who is uncooperative and clamorous for quick results. While success occasionally comes quickly, it is unreasonable to expect a cure in a few weeks if suffering has been endured for years. (We have encountered numerous patients who have had face-ache off and on for long periods of years, and in several cases over 20 years.) Strange to say, long-standing victims of facial pain are easier to deal with than those in their first pangs; they are more resigned to a therapy which is sometimes slow in producing benefit.

DENTIST-PATIENT RELATIONSHIP

The relationship between the dentist and his patient is of great importance. Without discounting the value of the assistance of his medical colleagues, it is true that the dentist must shoulder the major portion of the treatment. It is the dentist

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*Poly-vinyl chloride.
who fits and services the temporary splints and the final dentures. The treatment period can be awkward due to relapses and, indeed, to an occasional worsening of the pain. Sometimes the patient is in the depths of despair. The dentist must give hope and assurance to the patient and must sustain her in courage. He must establish a rapport from the beginning, and bear himself with confidence. While it is impossible to guarantee a complete cure to any given patient, nonetheless the proportion of success is high if the original differential diagnosis is correct.

In our clinic, the dentist regards himself as a unit on a treatment team. The neurologist and the physician take charge of any existing systemic illness and are prepared to direct the patient to an aurologist, or to an eye specialist, or elsewhere, if necessary. The task of the dentist is to fabricate intra-oral orthopedic appliances which satisfy the basic principles: (1) Rest—the mandible, the condyles, and the entire masticating apparatus are rested in the physiologic rest position, (2) Immobilization—by using a “head-harness and chin-sling,” together with the intra-oral splint, the jaw is immobilized, (3) Traction—the resiliency of the splint, combined with 2 mm. of increased occlusal vertical dimension, applies the necessary traction.

The magnitude of the problem has yet to be appreciated by the professions and by the public. The victims of facial pain are more common than is generally realized. The unhappiness caused by this disease is by no means confined to the patient herself; family life has been ruined by it. There is irrefutable proof that, to some extent, face-ache ties up with the anxiety-state, although this is not the whole story. We have reason to believe, therefore, that the condition will become more and more common as civilization becomes more complicated. The dental profession must be prepared to tackle the problem. A new type of dental specialist will arise, who will equip himself with the broad knowledge required to deal with this complicated disorder.

We have learned much about nondental facial pain, but there are large gaps in our knowledge which remain to be filled. The dental profession should not hesitate to pool its experience with workers in the same field who have their own contribution to make.

The dentist has every reason to be proud of his craftsmanship, but it could be argued that he has developed his mechanical and artistic skill at the cost of neglect of available knowledge. He has a limited view of sophisticated man in his ecologic background. The cult of precision, however commendable, should not be confined to the inside of the mouth. Our obsession with mechanics has, to some extent, secluded us from the biologic and psychogenic aspects of nondental face-ache.

The dentist has contributed much to the study of pain in the masticating apparatus and, in his modest way, he solves many problems as a daily routine. Indeed, he excels so much in relieving pain that the public has come to expect invariable success. However, the nondental face-aches need new thinking. We have approached the problem of face-ache with our thoughts dominated by mechanical experience, developed in isolation from other specialists in the same field, who are equally isolated from our knowledge.
QUESTIONS

Have we overstressed the importance of occlusion as a responsible factor in nondental facial pain? Have we immersed ourselves so deeply in a study of the minutiae of functional occlusion that we have bogged down and cannot advance any further along that line? Is it not opportune to take up a new pattern of thought? Is it not the case that the dentist has stumbled (perhaps quite independently) on occlusal-reconstruction as a therapeutic measure, totally unaware that the essential principle, namely “traction” has been known to orthopedists for generations, although in less complicated form?

SUMMARY

Mandibular overclosures or cusp-interference may displace the condyles, but this is usually painless except in persons with a rheumatic diathesis. Temporomandibular arthritis is likened to similar pains in other parts of the body. Neuromuscular propagated muscular hypertension and its association with facial pain is discussed. Nondental face-ache involves an infinite number of factors which call for the cooperation of medical specialists, among whom the orthopedist is an important figure.

The opinion is expressed that the dental profession has paid unnecessary attention to the fine detail of function occlusion in treating temporomandibular joint disease, while overlooking the accumulated experience of the general orthopedist.

REFERENCES