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By Eugene E. T. Mavritte, D.D.S.

IN one of his essays, Dr. James Kendall Burgess is credited with having said: "Every constructive effort comprises two factors, the plan, and the execution; and every finished construction comprises two elements, the foundation and the superstructure. Since the foundation must bear the weight of the services rendered by the superstructure, it becomes the factor of imperative importance in every constructive effort, and the matter of primary concern in all of our planning."

You will note that, in the above statement, he speaks of four important requisites: "The Plan," which is dependent upon "the Foundation"; and "the Execution," which results in "the Superstructure." All of these are terms familiar to the engineer and center around mechanical problems and processes, but they are terms which should mean more to the prosthetist, from the fact that they reach beyond mere mechanical concepts. To him they embrace bio-mechanical problems and should be attacked from that standpoint. If it is essential to utilize skill and much planning in the construction of an edifice where the foundation is inanimate, then it is more essential to utilize these agencies when constructing lifeless appliances for living tissues.

Indeed, viewed in this light, one might claim that the first fundamental requisite for the construction of any restoration supplying lost organs of the mouth is a thorough knowledge of the anatomy and physiology of the structures upon which it is to be worn (i.e., the foundation).

Dr. Leon J. Brodsky, in an article published in the January 1935 issue of the Dental Cosmos, on the subject of fixed bridge work, gives expression to facts which might just as appropriately be applied to partial denture construction, when he says that fixed bridgework presupposes a knowledge of:

"1. Tooth anatomy and histologic structure. 2. Investing tissues and their reaction to imposed foreign bodies. 3. Forces of mastication and vicissitudes of occluding forces and their irregularities. 4. Typical conditions yielding normal opportunities for serviceable restorations. 5. Disorganized conditions offering a minimum of available foundation.

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6. Engineering fundamentals and mechanical forces essential in construction procedures. 7. Materials and appliances, their use in given instances and the service expected of them."

Dr. James Harrison Prothero, at a much earlier date, in his book on dental prosthesis, when considering this subject gave expression to the following statements:

"To render the most skillful service to a patient it is necessary for the dentist to know the exact conditions of the tissues and organs of the mouth in detail. Such knowledge can only be acquired by a close examination of the parts. Intelligent questioning of the patient will assist to a certain extent, but the burden of diagnosis rests upon the operator. He must be a histologist and pathologist as well, in order to recognize conditions of health and disease. No detail that has a direct, or, even a remote bearing on the dental aspect of the case in hand should escape his notice."

It is obvious then, from the foregoing statement, that before one can plan intelligently a case, or the superstructure, a thorough examination of the mouth is necessary. To do this most profitably there should be at hand a mouth mirror, probe, explorer, tongue depressor, pliers, cotton, water syringe, a small electric mouth lamp, vitality tester and some form of blunt end instrument. At the time of this examination, it is a mark of wisdom to have on hand models made from impressions of the mouth under consideration, as well as complete x-rays, and, it is suggested that these models be mounted on some type of adaptable articulator in order that occlusal relationships might be charted.

A study of these relationships can be made to a much greater advantage on the articulator, from the fact that a view of the teeth can be had from the posterior aspect, which casual observation in the mouth will not afford. This particular mounting will also enable the operator to check up on such teeth as might interfere with replacements because of exfoliation or drifting. Further, they give an index early in the planning of a case to the best place for occlusal rests, when these are indicated. Some operators utilize these models by building up their individual trays for certain technics in impression taking, as well as for tentative designing of the case.

Dr. Cummer, in his work on partial denture construction, has suggested the use of diagnostic pads on which the dentures are outlined in the flat, but Dr. Kennedy, when considering this procedure as outlined by Dr. Cummer, has the following to say. "I believe, however,

that the use of a study model is by far the more satisfactory method, as it not only gives the design of the denture in the flat, but allows us to see difficulties which might occur, due to the leaning of the teeth, excessive contours on the teeth, or hard spots which might interfere with the bars or plates which would rest on the soft tissues."

It is suggested, in making an examination of the mouth, that the lips, inasmuch as they are first encountered, be examined first. Note the color of these, look for lesions, such as fissures, cold sores, ulcers, etc. The color of the lips might point out anemia, or aid in revealing some other systematic disorders. Interest might likewise be aroused by the presence of certain of the lesions found on the lips which, through proper guidance or advice to the patient, lead to the discovery and arrest of other systematic diseases. If such lesions as cold sores or fissures are present, the operator senses from the outset that precaution must be exercised in making intra-oral examinations, so as not to cause pain by distension of the lips or pressing upon them. This particular observation offers the operator an opportunity to grow into the good graces of the patient early in the period of professional contact with him, for by applying certain ointments to these lesions, he not only aids the patient in opening his mouth without discomfort, but creates a favorable impression on the patient through this display of interest and attention to what might be termed a little thing.

As to intra-oral examination, notice first the general appearance of the mouth as to health and cleanliness. Look for calculus, non-vital pulps, periodontal inflammation and gingivitis. With the aid of the x-ray films check up on gingival and alveolar abcesses, and retained roots. With the aid of probes, determine the depth of pockets that these pictures may reveal. Continuing the examination, note any and all peculiarities of the mucous membrane, redness, discoloration and swellings, since these are usually manifestations of some irritation or diseased condition.

If teeth are carious, observe the extent to which this disease has progressed, the teeth affected, and the probable method of treatment. This point might be checked as important from the fact that the entire design of the appliance might be influenced by the condition in which the teeth are found. Upon this observation internal attachments may or may not be better utilized.

In observation of the teeth note the relationship of the teeth in the arch to each other, and to those in the opposite arch as well. Determine their forms, whether constricted at the neck, elongated or normal;

whether tissues are receded, leaving them standing more or less unsupported; whether they diverge or converge to an unusual degree; whether loss of proximate contact has occurred; also the form of the spaces where the teeth and spaces alternate.

Dr. Prothero again suggests to us that we notice the extent of abrasion on the occlusal surfaces of the teeth, since some idea can be formed of the stress exerted in masticatory effort. He says: "If the patient is past middle age and no signs of occlusal abrasion appear, as it normally should at such an age, try to discover the cause, whether due to mal-occlusion, or, to a diseased condition of the peridental membrane of one or more of the natural teeth. Tenderness of the peridental membrane, and a slight elongation of a single tooth will inhibit, or seriously impair, proper masticatory effort, sometimes for years."

It might be appropriate to conclude this chapter on mouth examination with what might be labelled "a mouth examination aphorism by Dr. Prothero," for he states that:

"In the examination of any mouth with a view to carrying out prosthetic procedures, certain things should be kept in mind by the operator.

"First, he should consider carefully what class of substitute will give the patient the best service, as indicated by the conditions in the mouth.

"Second, when the class of work indicated is not to be considered on account of expense, what other method can be followed to the best advantage.

"Third, the operator and not the patient should determine what class of work is indicated, and how it should be done."

Our mouth examination is now completed and a tentative plan for our proposed restoration conceived. Consideration should be directed next to the preparation of the mouth for the appliance. All operative procedures, such as the placing of fillings and inlays and the removal of calcareous deposits should now be completed. Useless teeth and roots should be extracted, with adequate consideration and preparation given the ridges, for the proper support of saddles. *This does not mean that ruthless cutting away of the alveolar process should be done.*

Such trimming as will afford necessary space for teeth supplied by the artificial substitute. This will be necessary particularly in cases where the patient has lost teeth in the lower jaws without replacing them, permitting exfoliation of the upper teeth with a consequent apparent downward growth of the alveolar process. Likewise such bony excrescences as will interfere with the placing of bars, necessary in

certain designs, or which will occasion undue undercuts, preventing ideal saddle support, should be chiselled or filed away.

All areas of residual infection, disclosed through the aid of the x-rays, should be removed, and hypertrophied growths, particularly common in some types of periodontal diseases, should be exercised and the edges of tissues coaptated in such a manner that there will be a medium amount of submucous tissue after healing has taken place, thereby affording a more favorable condition for saddle rests.

Of vital importance under this phase of our discourse is the preparation of certain teeth for occlusal rests, if indicated. As outlined by Dr. W. E. Cummer, "The general form of both surface and occlusal rests should be approximately horizontal at the point of entry at the marginal ridge, and following the sulcus, should curve rootwise at least half its length, so as to direct the resulting loads from mastication along the long axis of the natural tooth upon which it rests." Care should be taken to have at least 16-gauge clearance at this point. It will be noted that in "open occlusion," which allows ample space for occlusal rests, this type of preparation will not be necessary in as much as surface occlusal rests are used. One precaution is suggested against the use of these rests: *they should be avoided in mouths where any predisposition to caries is shown.* In such cases a better procedure would be to restore these teeth with inlays, or similar restorations, making provision in these for occlusal rests.

In the design of any partial restoration there are certain general objectives which one should ever bear in mind if he expects to obtain maximum success, and I think Dr. W. E. Cummer has given us a key to the whole situation in the following outline:

"A. For the health of the oral cavity,
   1. Greatest possible conservation of tooth tissue,
      a. By minimizing, as far as possible, the cutting of tooth tissue,
      b. By non-interference with gingival, or other oral parts, which under periodic professional observation, and ordinary precautions, should insure immunity from caries or periodontal disease from this source,
   2. Skeleton design, leaving uncovered as much of the mucosa as possible where indicated.

B. For the comfort and convenience of the patient,
   1. Minimum bulk of appliances consistent with masticating efficiency,
   2. Minimum cost, therefore available for a larger number of patients,

3. Ease of cleaning, both of remaining teeth and artificial denture,
4. Ease of adding artificial teeth, to replace natural ones which may be lost unavoidably subsequent to fitting of the restoration.

C. For the attending dentist,
1. Minimum cutting of tooth tissue, minimum chair time, service for a larger clientele,
2. Definite and simple system of design readily adaptable to all combinations of teeth missing and present,
3. Construction within the handicraft of the average dentist serving the average clientele,
4. Construction within the handicraft of the average laboratory assistant serving the average dentist,
5. The utilization, as far as possible, of stock materials, equipment and appliances."

One might say that this outline sets forth the ideal, or that which one attempts to embody in his superstructure for the common interest of all concerned, but there are certain fundamentals which might be presented as specific and indispensible when considering partial denture design, particularly from the standpoint of function. Due consideration must be given to conditions which affect saddle design and clasp selection.

It might be said when considering saddle design, whether of gold, vitallium, iconium, vulcanite, or any other base material, that any part of the denture which rubs or presses on the gingival margin not only rides upon and irritates this margin, but also holds food in solid or dissolved form upon the surfaces of the teeth involved, at which area, the least possible resistance to caries is offered.

This design of saddle, or base, is necessarily influenced by the condition of the mucosa upon which it rests. A soft type of mucosa, coupled with heavy occlusion, requires a design covering considerable surface area or continuous base, and not a skeleton type. In situations where natural teeth occlude with artificial teeth, the saddle area for the artificial teeth should be proportionately larger, to compensate for this greater power of mastication that the natural teeth are capable of exerting. If this situation is not effectively met with through saddle design there will be a trauma administered to the underlying tissue, resulting in a rapid bone resorption with the consequent production of a soft yielding tissue which makes denture stability almost impossible.

There are further situations where the position of the fulcrum line will determine the extent of saddle area, as in class one cases, (Dr.

Kennedy's classification), where the saddles are bilateral and lie posterior to the attached teeth. The nearer the approach of this fulcrum line to the anterior aspect of the mouth the greater should be the saddle area, in order that the force of adhesion might be better utilized as an aid in retention.

One will find that there are also conditions where overload of mucosa will occur when saddles of too small area are placed upon it. This is particularly true where short saddles are used to carry one or two teeth without occlusal rests or stops.

Concerning this matter, I think we have to agree once more with Dr. Kennedy, who states, "Many men take excellent impressions and make beautiful pieces of work which fail, because the wrong kind of attachments are used, wrong teeth selected to clasp, or, because the saddles are improperly designed." *One of the most important details of technic is saddle design.*

Next is the subject of indirect retention, and it is hardly possible to separate the two. The subject of clasps can be treated separately but it has an intimate relationship to the designing of saddles.

Dr. Cummer, it is said, is credited with advancing the idea of indirect retention which Dr. Kennedy states has revolutionized the designing of partial dentures. Indirect retention, according to him, gives us stability of the plate portion of the denture, without regard to correlation of the occlusion. The best correlation of the occlusion will have no effect if the base on which the teeth are set does not have inherent stability. This stability must be gained, first, by the proper method of taking impressions, with the object of preventing side to side rocking when the mandible is in lateral excursions. Secondly, indirect retention is used mainly to prevent the forward and backward rocking of the denture.

In order that indirect retention might be better understood it might be well to illustrate, by using as an example one of the class one lower cases, or lingual bar cases, where the bicuspids are present. Measuring from the front of the bar to the posterior edge of the plate, the clasps are approximately in the center of the denture and any force applied to the end of the saddle will cause the denture to begin rotating about the clasps. Nothing can prevent the saddle from settling to the extent of the compressibility of the tissues, when stress is applied to them, but when this force is released the muscular attachments around the edges of the saddles will cause the plate to rise from the ridges,

the bar in the front will dip downwards, and if it is close to the tissue, will irritate it.

If the clasps hold tightly during this action, the teeth to which they are attached take up these strains, and loosen in time. Dr. Cummer, in his effort to offset this, conceived the idea of running what he termed a "finger" forward, resting against one or two teeth, anterior to the clasps. In the lower jaw a cuspid was the tooth of choice for this rest and in the upper jaw a cuspid or central incisor. The finger is adjusted in such a manner, that when the saddles are resting firmly on the ridges, there is a slight pressure upon the teeth, which prevents the plate from jumping up and down. As pointed out, this does not overcome the compressibility of the tissues, but it does prevent food from packing under it, and at the same time overcomes the tendency for flabby muscles at the edge of the saddles to be caught under the denture and pinched.

Dr. J. W. Beach of Buffalo has carried us a step further in this idea of indirect retention, when he conceived the idea of making these arms continuous, running from one side of the denture to the other, using fine wire to be bent readily around the contours of the teeth. These had the added advantage of preventing a side to side motion of the plate, which is more important than preventing forward and backward motion when it comes to loosening teeth. This type of case had one great disadvantage: the patients very frequently bent these wire rests out of place.

Dr. Woodworth, who at the time was Dr. Beach's associate, came to the rescue in eliminating this evil, by casting these wires, and calling them "continuous clasps." This procedure did away with the disadvantage of bending the loops out of position, but let us hear what one authority has to say concerning this cast arrangement.

"I would advise no one to make continuous clasps by the casting process, as they are not sufficiently flexible to allow for the normal tooth movement, and they produce erosion on the teeth, just as the cast clasps do." Dr. Kennedy, however, as so many critics today when condemning the "New Deal," did not leave us hanging in the mid-air by criticizing our best efforts and condemning them without offering a way out. He offers the following suggestion: "These objections are entirely overcome when the clasps are constructed of pure gold, using clasp wire soldered to it for strength, and the minimum quantity of solder of a high karat, which allows flexibility."

It can be truthfully said that with these ideas the designs of den-

tures, with more of the surface of the palate exposed, were greatly improved. This gives more comfort to the patient and changes the denture from an orthodontic appliance into a retaining appliance, preventing the individual teeth from moving out of their normal alignment.

While considering saddle design and indirect retention, it might be well to evaluate some of the recent concepts concerning the designing of palatal bars, since they are, in some cases, necessarily parts of the denture base. The idea of running the palatal bar straight across the mouth from one saddle to the other in the average case is not considered good technic, in as much as the bar in this location disturbs the tongue and prevents the proper articulation of sounds.

Dr. Kennedy tells us that the outline for the palatal bar should start at the location of the first and second molar teeth, and run backward, in a nice flowing line, opposite the third molar and across the mouth at the junction of the hard and soft palates. It should rest upon the soft tissue to allow for setting. Many men object to this in their bars, but do not hesitate to run the posterior borders of their full upper dentures farther back than this. In fact, the bar should cross the mouth on exactly the same line that the "post-damming" does in an upper full denture, and if any settling does take place, the edges of the bar settle into the tissue sufficiently to be lost, and are not felt by the tongue. Dr. Kennedy further strengthens this statement by the following declaration, "I have never had one of these bars cut, if it were placed in the proper position, but I have had numerous ones make sore spots when they have crossed hard areas."

Our next consideration will be that of clasps. Under this item some of the things of fundamental importance will be, the most suitable type to use in the average case; the location of these in the design of the case, in respect to the individual teeth as well as for balance or stability of the denture. Under this heading too, might be considered their application in regard to the support of the case, from the standpoint of load, on the teeth utilized.

There are fully a hundred different designs of clasps, some with a little wing here, or a spur there; some with a single wire and some with a double wire; some of the flat plate; some of flat plate cut in the form of loops; cast clasps of different forms, and wrought clasps lined with pure gold or platinum; clasps with all sorts of stress breaking attachments. The inventor of each of these claims that his is a panacea for all ills, but when they are all sorted out and brought

down to the last analysis, the one that probably brings the greatest satisfaction is the round wire clasp with sufficient spring to allow it to go slightly cervical to the height of contour of the tooth without undue strain upon the tooth. The rounded surface of the wire gives it the least amount of friction and the least surface contact for good retention. The clasp which encircles the tooth should cover a little more than half its circumference.

As to location in regard to a single tooth, if it is a round wire clasp, it should rest just cervical to the height of contour. If a half round wire clasp is used, it should rest just upon the height of contour and extend slightly gumwards. If a flat plate clasp is used, one half should be cervical to the height of contour and one half occlusal to that area of the tooth.

This rule lends itself amicably to the case of individual teeth, or where all teeth clasped are parallel to one another and distinctly bell shaped; but, where there are two teeth to be clasped which lean toward, or away from one another, and clasps are placed over the height of contour, a condition would probably result where one would be able neither to introduce the appliance, nor, remove it.

The problem of determining just where and how clasps should be attached to dentures, in relation to the inclinations of teeth clasped, caused considerable concern until Dr. A. J. Fortunati conceived the idea of a mechanical device for charting correct clasp outlines. It was at a clinic in Boston, in 1918, that he showed a method of using a bridge parallelometer, in connection with a round graphite rod for tracing the guide lines for clasps. Out of this presentation grew the J. M. Ney clasp surveyor. The instrument is, in effect, the application of a self-evident principle of geometry; that by bringing a vertical plane into opposition with the convex surface of the teeth to be clasped, the exact position of the height of contour in relation to that vetrical plane can be accurately determined and charted. The vertical plane will coincide with the path along which the clasps will tend to seat themselves on the teeth, and the line charted upon the teeth will be the guide lines for designing the clasps.

In view of the fact that modern technic in clasp construction calls for clasps with occlusal rests, and, the teeth in most cases bear the brunt of the load in masticating, no discussion on this subject would be complete without a consideration of the pericementum, subjacent bone, and the factor of "overload." That this appreciation is by no means a new one will be evidenced by an article written by Dr. Wil-

liam H. Steele in 1896. This article is well worth our consideration here, not only for its historical value, but because of its practical significance. Despite the fact that the article is entitled, "Use and Abuse of Bridgework," much is said in it that might be well injected into the consideration of our present day partial denture work. The article reads as follows:

"The force which teeth have to resist when doing only their natural amount of work is the force capable of being exerted, by the muscles of the lower jaw in its different movements during the process of mastication. This force has never been accurately measured, and there is no probability that it will ever be satisfactorily determined since there are too many conditions involved. The force, of course, is greatest when the jaw is acting in its natural positions. Dr. Hans Block of Germany gives the minimum force at 300 pounds, the maximum at 500 pounds. The late Dr. J. J. R. Patrick gave it at 65 to 85 pounds. There is a wide field for guessing between these two estimates, but, for the purpose of illustration, we will take 210 pounds as the average. This, divided by 14 gives 15 pounds as the pressure each tooth would have to sustain, providing the teeth are all perfect, and they articulate so that each tooth sustains its full and equal share of the work, which is very seldom the case. Now let a bridge be placed in the mouth carrying the fourteen upper teeth, using the two cuspids and right and left second molars as piers. What is the result? We are forcing these four teeth to do the work of fourteen and sustain the whole force of the lower jaw in every movement of mastication, equal to a pressure of 52½ pounds on each tooth.

Again, take a bridge on one side of the mouth, supplying the two bicuspids and first molar, and anchored to the second molar by a full crown, and to the cuspid by an open-faced crown. In this case two teeth apparently have to do the work of five, but really do the work of ten, since most people who have a bridge of this kind use but one side of the mouth in mastication.

In the case of the first bridge mentioned, biting on the section between the cuspid and molar has a tendency to produce motion, the cuspid acting as a fulcrum; in fact, any bridge with a central pier is liable to pivot on that pier, as it is almost impossible to set a bridge so that both terminal piers shall be equally rigid. The second bridge is open to the same objections; the whole force of the jaws is often thrown on the middle of the bridge, causing the open-faced crown to give, this being the weakest point, and throwing the whole strain on the posterior terminal anchorage.

It is an impossibility to place a bridge of any knid in the mouth without forcing the teeth to which it is anchored to do a large amount of unnatural work, and the ratio increases with every tooth added to the bridge. As a natural consequence the permanence and usefulness of the bridge decreases in the same ratio.

It is an undisputed fact, that to overwork and abuse any organ of the body continually is a transgression of nature's laws which will not be tolerated. The penalty for this is the appearance of disease, and, it must be borne in mind that the teeth are no exception to this rule. The unnatural strain, pressure, overwork, and motion to which they are subjected when used as piers for a bridge causes inflammation, absorption, and ultimate loss of the teeth. The indiscriminate use, or I might say abuse, of bridgework is working a great deal of harm and is creating a strong prejudice against it in the minds of the people, which would not be the case if it were confined to its legitimate field."

So ends Dr. Steele's article, but "the melody" of that last paragraph lingers on as a pointing finger of condemnation at some of our practices even today. One need not despair however, as long as the germ of destruction is still within focus, and we find that it is in focus today, for Dr. Turner, in his recent text-book on dental prosthesis, has given us some very helpful information bearing on this same subject of overload.

He states that, "Based upon clinical observation extended over many decades, it may be assumed that, among the posterior six teeth, the teeth at the end of an enclosed space, (with natural teeth at both ends of the space caused by two missing teeth,) will support, without overload, a bridge retaining these teeth, assuming that occlusion and other details of the replacement are up to standard. From this it is assumed, that spaces of one, or two, and under favoralbe circumstances, three missing teeth may carry root supported restorations; meaning in partial denture service that occlusal rests of the most suitable type are indicated at each end of the partial denture restoring the teeth in this space."

An illustration is given in this chapter of the text for estimating the capabilities of natural teeth at each end of an empty space in supporting loads, eliminating inhibited muscle traction and auxiliary mucosa support. It shows various combinations of two, three and four teeth under the load of three, four, five, and six masticating surfaces. Where a number in the dividend represents the number of masticating surfaces, and a number in the divisor, the teeth bearing the load, it is supposed that any combination of these groups where the quotient equals 2 is a safe load for the teeth carrying an appliance. In fact 2.5 is estimated as a possible overload for a borderline case.

On this basis, it will be seen that, such combinations as a masticating surface of three teeth carried by two natural teeth, a masticating surface of four teeth carried by two natural teeth, a masticating surface

of four teeth carried by three natural teeth, a masticating surface of five teeth carried by three natural teeth, a masticating surface of six teeth carried by three natural teeth, etc. are all cases within a safe load range, whereas a masticating surface of six teeth carried by two natural teeth would be classed as an overload. In general it is claimed that the remaining natural posterior teeth, if sufficient in number, in favorable position, and adequately supported by healthy bony tissue, may be given, (in addition to the load which they normally carry), an additional load up to, (and in some cases beyond) the load that they naturally carry.

While considering this problem of load, it might be well to refer to certain conditions which often present, and which figure prominently in any consideration of the type of attachment to be used. Whereas the principle to be outlined will be applicable to the average composite denture, the situation might be better comprehended if we center our attention once more on the lingual bar type case, or an upper case having a similar distribution of teeth.

If the teeth which are to be clasped are molars, strong biscuspids, or cuspids, and are in an alignment, parallel with one another, almost any type of clasp or attachment will give satisfaction for a considerable number of years.

If the ridges are hard on both sides of the mouth the flat plate clasps, or round, or half-round wire clasps made with lugs, are indicated. The flexibility of these clasps acts as a stress-breaker, provided occlusal lugs are used in connection with them.

On the other hand if the ridges are soft on one, or both sides, consideration must be given as to what will happen under biting stresses, and attachments used which will best meet the conditions. If the patient chews on one side of the mouth and the ridge is soft, the saddle is bound to be depressed, so that a form of movable attachment on the clasp will be indicated.

If the ridge is soft, all the way back, the entire saddle will be compressed downwards, and an attachment which permits of an up and down sliding motion will be required, while the clasp, or whatever stabilizing attachment is used, remains firm on the tooth.

If the ridge is hard close to the attached tooth, and soft in the posterior region, there will be an uneven tipping of the saddle, and the attachment used must be of a type which combines the hinge motion together with the slide motion. If the ridge on the opposite side of the mouth is hard, mastication on the side which is soft will

cause the saddle to have a slight lateral motion, and here, an attachment of a type which allows a slight rotation must be used.

In cases where the entire ridge is soft, the slide type of attachment must be used, combined with one which allows movements of the saddle from side to side. Again, if the ridge is hard near the attachment and soft posteriorly, a hinge type must be used, as on the opposite side.

Thus it can be seen readily that, in relation to the softness or hardness of the ridges, numerous different movements of the saddles must be considered and compensated for, by using the type of attachment, which will permit of these movements, without placing undue strain on the teeth to which they are attached.

There is indeed, much more, that could be brought to your attention on this subject, but I fear, I have already administered too much for a first dose. (The better policy being to permit the patient to develop a tolerance for the drug first). In the light of all that has been said, however, it would appear that an approach to the proper diagnosis and design of any partial denture can only be arrived at through a thorough knowledge and appreciation of conditions which are actually present in the mouth under consideration.

I close with this charge to you as teachers and practitioners of the profession of dentistry: Lift the partial denture from the gutter to which it has been relegated by ill conceived plans and poorly executed construction, to a plane of high respect and appreciation, by the utilization of such practical knowledge and procedures as I have endeavored to indicate to you.

The time is August 4, 5, 6 and 7, the place is Cincinnati, Ohio, the occasion is the annual meeting of the National Dental Association.