Laminated Arch Technique - A Progress Report

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The mechanics of treatment is the objective approach to the correction of malocclusion. It is the applied therapeutics, the prescription specific to the malady. It is, necessarily, by virtue of the complexity of the prescription a serious, painstaking mechanical process which requires of the operator a high degree of skill to fulfill the requirements which have in recent years become a scientifically exacting and demanding set of objectives.

It was relatively simple twenty-five years ago when our concept of treatment was to alter the arch form, level off the occlusal plane, and reposition the maxillary units into harmonious cuspal relation with the mandibular teeth and then let nature take its course.

Now we have progressed to the point where we set our sights much higher and we have a prescription to fill which demands that we relate all of the teeth and the bony processes in which they are imbedded to the cranial structure of the head. Dr. Angle had insisted that normal occlusion was this very thing, but our prescription did not specifically make this demand because our therapeutics simply could not measure up to the requirements and our diagnostic equipment was not adequate to give us specific information to point out clearly the deviations from the normal.

The information was actually there if one were to examine the patient carefully. There were men who could make an accurate appraisal of the deviations without our modern cephalometrics, but they limited their own possibilities by not having a set of standards and a detailed graphic report on what they saw.

Actually the mechanisms used in treatment today, by and large, have not improved significantly in the last twenty years. Manufacturers now provide us with appliance assemblies formerly devised by the individual orthodontist. In this manner the entire profession is benefited. These accessories and the whole equipment armamentarium save us many hours of time and enable any competent operator to set up an appliance which will look respectable and do the job if properly directed.

We should progress towards better mechanics even though our present appliances perform well. The gasoline piston engine has been for sixty years a great boon to transportation and, although it is adequate, it will probably be replaced by the turbine engine or something better. The point I wish to propose is that our basic treatment instrument, the archwire itself, may be wrong in principle whether it is round, oval, rectangular or square. It does not have the resilient qualities in the bulk which are required for manipulation. It is easily formed by hand and simple to apply but it does a very clumsy job in the fine, delicate force control expected of it when seated in slots with a thousandth of an inch tolerance deviating off line from its axis. When we reduce the dimensions below .021x.025 we encounter difficulties in forming the wires without torque and

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the bracket slots become so small it is hard to see the relation of wire to bracket. This has been tried and offered to the profession but has never been popular.

Laminated arches, I believe, are the answer until we find something better. By using the rectangular archwires, each one-half the thickness of those in common use, we have the same dimensioned wire to which we are accustomed but with properties which allow far greater resiliency and thus prolonged extension of force without initial shock for the tissues. The archwires no longer need be formed by the operator but are made on dies by the manufacturer in various sizes. No soldering operations are necessary. Closely adapted tube-stops, hooks and coil springs are in the assembly of the fabricated arches and can be moved to required position and set if desired by compressing with an instrument and moved again and reset if space demands.

After fifteen years of experience with these wires I have settled upon a standard dimension of .021x.025 or two wires .0105x.025. This gives adequate strength with arch form, good resilient action and is large enough to manipulate without eye strain. The second order bends, though rarely used with angulated brackets, and torque are applied with a square plier S.S. White #142 with a .022 square slot. Two of these pliers are used where anterior torque is indicated. Because the archwire, split horizontally, does not have great strength vertically in such required action as depressing the anteriors, we exaggerate the bends or contours. Laminated wires split vertically have great strength in this direction but have shortcomings in their resilient action in the bracket slots and a weakness in a lateral force. Their virtue is somewhat limited for our particular requirements. Because of the experience of limited success with these arches and conclusive evidence presented by Dr. Cecil Steiner in his paper on "Power Storage", I have reverted to the split edgewise type. Exaggerated torque bends fit into the anterior bracket slots so easily that one feels immediately the lack of faith in the ability of the arch to perform the required root action. Not only does it perform well, but also when the arch is removed, the torque is still present in the wire and has not been dissipated as is common with the solid arch.

Because of its great extension of force fewer arch changes are required. There does not seem to be the tendency for overexpansion in the finishing archwire that we encounter in the heavy rectangular solid wire.

In the space closure operations of extraction cases it is particularly advantageous. Either the long Bull type loop or the rounded loop may be used[2]. The long loop as employed by Dr. William Thompson and a modified long loop of Dr. Max Fogel both produce excellent results in their hands. I prefer the round loop or safety pin type because it has greater strength and does not have the weakness that right angle bends impart. This is used largely for root movement of the cuspid, the crowns of these teeth having previously been tipped distally[3]. Even though the brackets are angulated we apply this archwire to the premolars and cuspids with the inverted loop in the center of the extraction space and the section anterior to the loop at a 45° angle to the posterior portion. The anterior section is not applied to the centrals and laterals at this time but is far gingival to these teeth until seated in the cuspid brackets. The loop itself is not used primarily for closing the crown interspace, but is only an

auxiliary to the small coil springs, one in front of the molar stop and one mesial to the cuspid, because at this point not much closure is necessary, it having been accomplished previously with the loop lingual archwire during the preliminary Class III stage. This stage, an important phase of the treatment plan, is very simple and effective. The lingual wire is first applied passively while we are waiting for maxillary stabilized anchorage. After this anchorage has been set up with the side loop sections and stabilizing plate, Class III force is directed against the key loops mesial to the cuspids. The molars are tipped distally in a very short time and they are followed by the cuspids and bicuspids. Even the anteriors begin to follow them. At this point, approximately six to eight weeks, the lingual wire is cut away, the bicuspid and cuspid bands are placed, and we are ready for the laminated loop archwire which will move the cuspid root faster than anything I have seen in operation. After condensation of the lower arch the second molars are banded with angulated tubes. The first molars still have their tubes which are left on. Because of the resiliency of this arch the new laminated finishing wire is placed and can be threaded quite easily through the tandem tubes. This helps substantially in supporting mandibular anchorage. I have been quite surprised at the stability of a laminated wire which is weakest in the vertical direction when called upon to support an anchorage unit to which heavy elastics are applied in the Class II stage. I must admit that my fears led me to believe that the last molar would elevate and thus I felt bound to change at this point to a heavy .021x.028 wire. This I found to be erroneous. Because of the proximity of the last two molars and the short arch section exposed between them it was not affected by the pull of the elastics. If anything were to be affected it would have to be the short section of the wire distal to the last molar, and this was too short to be of any consequence. Also the root actions between cuspids and bicuspids continue to function by virtue of the resilient force exerted by the straight laminated wire passing through the angulated brackets on these teeth.

In conclusion I would like to say that those of us who are using these arches are very enthusiastic about their performance. Now that they are available for all without a technician to prepare them I hope more of you avail yourselves of the pleasure which I am quite sure that you will derive. The ease with which they are seated in the brackets relieves the tension from our work. The patients are happy because they do not experience the shock of heavy abrupt forces. Lingual root torque of the anteriors which can be a difficult operation and a painful one is, I am sure, much more easily accomplished. The feel of these arches when one first starts to use them is so strange and flimsy that it is quite unbelievable that they would do so much. For this reason do not be discouraged. Be philosophical—just wait and watch. Nothing seems to happen, then after a few weeks things begin to blossom and unfold, and everything that you put into the mechanism and commanded it to perform will be there.

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