

THE ORTHOGRAM

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INTRODUCTION

Over the past few years, there have been several innovations in orthodontic diagnosis and treatment. These new developments often change the way certain orthodontic problems might be handled from the standpoint of treatment timing as well as technique. Therefore, it is of some benefit for the family dentist to become aware of these concepts in order to best advise his patients on the timing and treatment options available to them for their orthodontic problems.

After attending several seminars over the past few years, I have felt it would be nice to find a way to share some of these new ideas with my colleagues who I have worked with from time to time. This is how I had the idea of issuing a newsletter to share information which could benefit you and your patients rather than you having to spend so much time finding good courses or searching the orthodontic literature.

This endeavor cannot be a complete success, however, without your feedback and comments to guide me in selecting areas of greatest interest. I already have some ideas on several topics but would like to hear from you on new ideas and also if you think such a project will be of any value to you. I would like to discuss the bionator appliance in this first issue.

THE BIONATOR APPLIANCE

The bionator, developed by Balters, is a functional jaw orthopedic appliance. Its primary purpose is to stimulate growth of a deficient mandible, but it can also stimulate alveolar growth in deep overbite cases, gain space in moderately crowded cases in mixed dentition, as well as correction of open bite cases in mixed dentition. Similar in design to the activator but much less bulky, the bionator can be worn day and night except during meals. Studies have shown greater orthopedic effect on the growing jaws with full time wear, whereas part time wear results primarily in dental change. Therefore, full time use of the bionator makes possible the improvement of deformed faces and jaw structure in the growing child that was previously not possible with the use of fixed appliances or part time orthopedic devices.

The best time to begin treatment with the bionator is age 8 - 11 but some

benefits have been seen as late as age 30. Most of the change seen in adults is tooth movement, but there have been some claims of jaw remodeling also. Cooperation is usually best in pre-teenagers but the appliance will still provide orthopedic benefits into the late teens with good wear. Patients younger than age 8 usually are not mature enough to handle the appliance, but even if they were, there is little advantage in beginning too early. The appliance can accomplish its purpose in one to two years and there is adequate growth potential at age 8 - 11 to reach most treatment goals. Usually the appliance is worn part time once the goals are attained until the next treatment phase, so starting too early merely prolongs this period of partial wear. The bionator is used for most skeletal Class II correction involving a deficient mandible (80%) but is not the appliance of choice in a true maxillary protrusion. In those cases, headgear is still best for retarding maxillary growth and intruding those over-erupted incisors that cause a “gummy” smile. Also cases with extreme crowding or narrow maxillas must have those conditions corrected before the bionator is used.

The most responsive problem to bionator wear is the skeletal Class II with a deficient lower facial height and a deep overbite. The appliance is designed with an anterior bite plane so the posterior teeth are free to erupt to increase lower facial height. The bionator can also treat open bite Class II's by designing the bite plane between the posterior teeth, freeing the anteriors to erupt. Tongue spurs are sometimes used to keep the tongue away from the incisors. If the vertical relationships are correct to begin with, the bite plane can extend between all teeth to maintain the bite. This control of the vertical dimension is one of the chief advantages of this appliance.

The bionator is thought to stimulate bony change by posturing the mandible forward so the incisors are about end to end. This stretches the lateral pterygoid muscles which activate a mechanism in the growth centers of the jaw to lengthen the jaw to restore equilibrium in the muscles. This is the same mechanism that normally keeps the jaws coordinated so the teeth occlude and intercusate. Unfortunately this mechanism is sometimes satisfied with a Class II instead of a Class I relationship so the jaw must be artificially stimulated to restore the normal occlusion.

Because of differences in genetic growth potential as well as tongue and lip posture and the level of growth hormone, the bionator responds better on some patients than it does on others. There may be seen large differences in the rate of change as well as location of change. Some patients exhibit more tooth movement while others may get more change in bony remodeling in various locations or by

condylar development. Most all patients get a good occlusal change but there is more variation in profile results, depending on wearing time as well as the previously mentioned factors.

One of the most amazing things about the bionator is how well patients accept them and wear them. Cooperation failures are less than 5% with most patients wearing the appliance 21 - 23 hours a day. Most adjustments involve keeping the labial bow clear of the teeth and correct trimming of posterior segments to guide maxillary posterior teeth to erupt distally and mandibular posterior teeth mesially. There are few wore spots with this appliance and little breakage if the appliance is properly constructed and cared for. The average change in overjet is one millimeter per month with more change usually in the first month. Full time wear requires an average of nine to twelve months then is reduced to half time until the permanent teeth are erupted. A second phase of treatment is usually necessary at that time with fixed appliances to correctly position the teeth. This can usually be done in a year or less unless extractions are necessary, which is seldom the case.

The bionator looks like an upper Hawley retainer with the palate removed and a lower retainer attached to it. There is a wire loop across the palate (coffin spring) which allows expansion and serves to attract the tongue toward the palate. The labial bow shouldn't touch the teeth because overjet correction should result more from growth than from tooth movement. Clasps can be added to upper molars for stability but the appliance should fit loosely, requiring muscle function to keep it in place (hence the name, functional appliance). Most bionators have a midline screw which is activated primarily to stimulate posterior tooth eruption. One variation of the bionator called the "orthopedic corrector" also has two side screws which can be activated to advance the mandible an additional amount. This stretches the pterygoids again, causing another spurt of growth. Research has shown that several smaller advances of 4 - 5 mm are more effective in obtaining the growth response than one big one, especially in older patients.

One interesting use of the bionator is treatment of TMJ patients. The bionator acts as a splint to relieve the joint by changing function and some believe it can help recapture an "anterior dislocated disc." I don't know about that, but I have seen some adults reduce their centric slide without surgery and there is some argument that there is some appositional bone changes to remodel the fossae and/or the condyle. I still feel strongly in treating to centric relation occlusion because that has proven itself over a long time, so these adult cases are not left in a forward position.

Since the bionator is primarily an orthopedic appliance and not a tooth moving appliance, most cases will need additional treatment to obtain a satisfactory occlusion. Typically a treated bionator case will have an almost end to end incisor relationship and an over corrected Class I molar relationship. There is often some spacing in the maxillary posterior segments due to distal tooth movement and there also may be an open bite in the posterior areas where the mandible has advanced forward and is hitting on the over erupted incisors. These posterior teeth are sometimes slow in erupting but present no long term problem. The bicuspids and cuspids sometimes erupt in a rotated position so all these problems should be corrected by a short period of full banded treatment to obtain a good functional occlusion.

I hope this information about the bionator will be helpful to you. Other topics will be forthcoming, probably at odd intervals and for an undermined amount of time (until subject matter runs out). This is my small way of saying thank you for extending your trust and generosity in allowing me to work with your patients. Again, please let me hear from you on topics of interest for future newsletters or any other feedback you care to give.