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Surgically accelerated orthodontics in implant treatment
By Federico Brugnami, DDS, and Alfonso Caiazzo, DDS

Abstract
Multidisciplinary treatment requires excellent communication and coordination among clinicians in a variety of fields. Although this can be difficult to achieve at first, interdisciplinary collaboration usually results in efficient treatment that patients appreciate and benefit from.

Validation of the oral-systemic health connection
By Barry L. Musikant, DDS

How does one go about becoming familiar with an avenue of health improvement that we have in the past paid little or no attention to, at least on a professional level, yet has major impact on our patient's oral health? I am referring to the nutritional status of our patients (and ourselves) and the implications it has on our general health. The central question is whether or not there is adequate validity in the quantification of our nutritional status as a measure of our health to apply it to our patients. Secondarily, but of obvious clinical importance, is whether or not the technology exists that would allow us to make quantitative measurements.

In terms of answering the first question, one of the first studies that caught my attention was Munoz et al in a paper titled, "Effects of a Nutritional Supplement on Periodontal Status," published in the May 2001 issue of Compendium. Researchers at Loma Linda University studied the impact of an antioxidant-rich oral supplement on 63 patients ranging in age from 20 to 70 years and diagnosed with gingivitis and Type II periodontal disease during a 60-day double-blind trial.

The participants were randomly assigned to two groups — the experimental group, which took two tablets each day of the proprietary blend of antioxidants, and the control group, which took a similar-looking placebo.

Results of the study showed significant improvement in the clinical parameters and measurements of gingival inflammation, bleeding on probing, pocket depth and attachment levels.

"At the 60-day evaluation point, all subjects receiving the experimental treatment had significant reduction in the gingival index, pocket depth and bleeding index." Treatment with this proprietary nutriceutical appeared to offer patients a noninvasive, systemic, adjunctive protocol to potentiate in-office therapies.

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In a second double-blind study also conducted at Loma Linda, pocket depth measurements were made in three groups of patients. The groups consisted of those who were
When appropriately coordinated, the job of each specialist can facilitate the work of the other team members. For example, orthodontists can be of considerable assistance in periodontal and prosthetic treatment. Dental alignment of the arches can facilitate periodontists’ and prosthodontists’ objectives. This is done, for example, by aligning the natural dentition, making possible a path of insertion for a prosthesis, or establishing a physiological alveolar crestal topography to facilitate periodontal surgery.

Orthodontic tooth movement can then be of substantial benefit for the patient. Many adults seeking routine restorative dentistry have misaligned teeth, which compromises either the final restorative outcome or the ability to clean the natural dentition. Orthodontic appliances have become smaller, less noticeable and easier to maintain during therapy. Invisible or lingual appliances further improve the rate of acceptance by adult patients. Many adults can now have their teeth aligned to improve their chewing function and their smiles with reduced esthetic effect during therapy.

In addition, implants have become a major part of the treatment plan for adults with missing teeth. If adjacent teeth have drifted into the edentulous area, orthodontics may be beneficial for providing adequate space for implant placement and restoration.

One of the major problems in acceptance of orthodontic treatment by adults is the length of treatment. For this reason, periodontists and oral surgeons may be helpful to the orthodontist, as they can facilitate the orthodontist’s work and thereby reduce treatment time. Endosseous implants can be used to enhance anchorage and increase movement control of orthodontically moved teeth.

Furthermore, the alveolar architecture can be reshaped with periodontally accelerated osteogenic orthodontic augmentation (PAOO) surgery to produce the regional acceleration phenomenon (RAP), resulting in a vast increase in the augmented area. This process may allow faster movement without loss of volume.

Peri-odontized acceleration of orthodontic movement, as described by Wilcko, appears particularly feasible in cases in which treatment planning requires orthodontic movement and oral or periodontal surgery. In these cases, corticotomy can be combined with wisdom tooth extraction and a regenerative technique, such as guided bone regeneration (GBR), in order to avoid multiple surgeries.

Recently some orthodontic therapies, especially the so-called low-friction therapies, have demonstrated clinically and radiographically that it is possible to expand dental arches without interfering with periodontal health, by augmenting the alveolar bone.

Melsen et al.5 confirmed what was previously suggested, that the tooth will move with the bone and not in bone, especially when light orthodontic forces are applied. Dehiscence and fenestration, which are difficult to diagnose preoperatively, may represent a limitation of this technique. Because the tooth will move with the periodontium, in cases in which the periodontium is not present, we might create recession and attachment loss.6 A recent study on modern American skulls found that a dehiscence was present in 40.4 percent of the skulls, and a fenestration was present in 61.6 percent of skulls.15 If this data is translated in clinical treatment, it may mean that potentially at least 50 percent of orthodontic patients undergoing expanding movement could be at risk of gingival recession and periodontal damage. It would be advisable, then, to introduce routine 3-D X-rays into the orthodontic practice.

Fig. 2: Six months after surgery, one osteointegrated implant (BIOMET 3i) in the augmented area is placed. A regeneration of the bony fenestration on tooth #42 was also evident, while the control #44 remained unchanged.

Fig. 3: Appropriate implant placement requires orthodontic movement.

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The cone-beam examination, with a reduced dose of radiation compared with the fan beam (CT scan) and better definition,16 could be used routinely in those patients with a thin, scalloped periodontium, where the risk of post-operative recessions is higher. The PAOO technique has been found not only to be predictable in solving dehiscence and fenestration above the roots,17 but also to produce a noticeable change in the cephalometric analysis of points A and B.17 With the PAOO technique, the patient needs to be seen routinely for changing the wires, as the teeth movements are much faster than in regular orthodontic treatment. The use of segmental corticotomy (applied only to the teeth that have to move more than the others) can dramatically change the relationship amongst groups of teeth.18 This has to be kept in mind because it may require changes in distributing the anchorage by the orthodontist. The teeth in the area of surgery will be moving much faster than the other teeth.

Conclusions

When the treatment plan requires orthodontic movement and oral or periodontal surgery, corticotomy can be combined with a wisdom tooth extraction and/or a regenerative technique, such as GBR, in order to avoid multiple surgeries and to optimize the final outcome for the patient.

Another indication is for instances in which the risk of creating root dehiscence in patients with thin periodontium is very high even with slow orthodontic movement and light forces applied. Root recession can be present even without clinical manifestation of gingival recession. An efficient multidisciplinary approach to a complex case may result in a faster and better treatment. The PAOO technique can be used for faster dental movement, to treat and prevent periodontal problems and to regenerate ridge defects, allowing implant placement.

Editorial note: A list of references is available from the publisher.

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limited to the nutritional supplements, those who had scaling and root planning and those who had local antibiotics added to their scaling and root planning procedures. At 30 days, the pocket depth and gingival index were measured for the three groups with those receiving the nutritional supplements without any further treatment showing a significantly reduced pocket depth compared to the two other groups.

Double-blind studies represent the highest form of proof in evidence-based research and the conclusions must include the following:

1. The proper nutritional supplements improve the health status of the periodontium.
2. The improvement must be systemic in nature since no local remedies were applied and where they were applied in the two other groups the results were not as successful.
3. Given the systemic improvement in what we traditionally treat as a local problem, we have to assume that the local manifestation of a compromised periodontium is at least in part caused by systemic conditions.
4. We must consider the probability that many diseases are at least partially exacerbated if not caused by a lack of proper nutrition.

In addition to the two studies presented here, there are literally hundreds of other studies showing the effect of nutritional status on health as it relates to macular degeneration, diabetes, cancer, heart disease, lung disease as well as the general state of aging.

While much of this is known, there is little compliance among the general population to take the necessary blood tests to determine one’s nutritional status. One can know what the proper thing is to do, but for a large segment of the population, avoiding needles will trump the common sense of drawing blood.

And, as a result, we remain uninformed.

Today, however, technology allows the nutritional status of a patient to be determined non-invasively in less than 90 seconds using a blue laser light directed at the skin in the hand. This technology, called Raman spectroscopy, led to the development of the biophotonic scanner that accurately measures the carotenoids in the skin.

Carotenoids have been shown to be a measure of nutritional health from a plethora of studies. Carotenoids are an accurate reflection of a patient’s overall antioxidant status, and antioxidants have, in turn, been shown to be the protectors of our organs on both the cellular and DNA level.

Basically, our degenerative aging process is thought to result from an accumulation of damage done to our DNA and cells by the continuous attacks of free radicals (reactive oxygen species). They are called free radicals because they are missing an electron in their outer shell and will attack any other atom or molecule to get one, damaging (oxidizing) it in the process. Antioxidants, as the name suggests, prevent this oxidation by contributing electrons to these free radicals, neutralizing their destructive behavior in the process. Now, life is a balance. We do produce many of our own antioxidants, but not all. Some must come from exogenous sources such as fruits and vegetables.

Many of these antioxidants come from the various highly colored fruits we eat, such as carrots, red and yellow peppers, and the greater their concentration in our blood, the more protection they offer both as antioxidants in their own right, but also as protectors of the endogenous antioxidants we produce ourselves.

To sum up, at this point we have strong correlation between one’s nutritional status and the level of carotenoids in our skin as measured by the biophotonic scanner. We also now have a tool that we can use to determine whether or not the supplements we may be taking are effective. How many of us have taken one nutritional supplement after another without a clue to their effectiveness and then we just switch to another supplement that garners attention in the news or simply drop what we had been taking?

I will tell you from personal experience that one can be quite cavalier about one’s nutritional status until you take the scanner test and get a low score. Knowing the correlation between low antioxidant levels and the increased propensity for degenerative diseases to express themselves, it is logical that most of us would want to change that status as quickly as possible.
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rapidly as possible, especially after we have passed the stage where we still think we are immortal. It is unlikely that most of us have the discipline to instantaneously make a major change in diet and lifestyle. More likely to produce the sought-after results is the use of supplements as recommended by the nutritional company that developed the scanner to aid us in attaining a better nutritional status, one that can be measured periodically by the same biophotonic scanner that told us of our deficiencies.

That is exactly the route I have taken, and during the past three months, my nutritional score has tripled. I am still not where I want to be, but I am on a road that shows continuous progress. Of equal importance, the biophotonic scanner is a motivator for maintaining good nutritional status. I have also noticed that over time, at least with me, it is a tool that produces behavioral modifications. I find myself eating more fruit and vegetables, less fried food and consuming far less sugar. So far, each time I have been scanned, my scores have gone up.

We all wear several hats in the course of our lives. One hat I wear in addition to being an endodontist is a producer of innovative dental products, particularly in the field of endodontics. However, I cannot help but see the advantages to any dental practice that would incorporate the biophotonic scanner as an initial means of determining the nutritional status of their patients. If you see a patient who displays periodontal disease and that patient correlates with a low nutritional score, both you and the patient will gain from a regimen of supplements that research has clearly shown to improve these conditions even without local therapy being initiated.

As an added motivator, research has clearly shown that damage to the same gene can adversely affect one’s periodontal state as well as one’s cardiac health. With the knowledge that free radicals damage the genes comprising our DNA, we may be doing much more for the patient than we realize. We are certainly doing no harm.

Data has shown that our patients are far more likely to visit us than a physician. It has also been stated that more than 90 percent of the diseases that affect us display oral signs and symptoms. We can take advantage of the technological advances that now allow us to determine our patients’ level of antioxidants to make recommendations to them for an improvement of their nutritional status and to monitor them for the improvements that are sure to come.

There is so much more to this story, but if this short article stirs some interest in you, please contact Victoria Reina at vreina@edsdental.com for more information and, if so desired, a biophotonic scan for yourself. That’s where it started for me, and I want to extend these benefits to as many people as possible. I hope every dentist who reads this article sees the great possibilities for doing good, both for your patients and yourself.

Fig. 2: Scores from the biophotonic scanner. An optimal reading begins at 40,000.

About the author

Dr. Barry Lee Musikant is a member of the American Dental Association, American Association of Endodontists, Academy of General Dentistry, The Dental Society of N.Y., First District Dental Society, Academy of Oral Medicine, Alpha Omega Dental Fraternity and the American Society of Dental Aesthetics. He is also a fellow of the American College of Dentistry (FACD). As a partner in the largest endodontic practice in Manhattan, Musikant’s 55-plus years of practice experience have established him as one of the top authorities in endodontics.

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