

An orthodontic philosophy Interview

Françoise Flageul–Edith Lejoyeux

F. Flageul¹, E. Lejoyeux^{1,2}

¹ *Qualified Specialist in DFO*

² *Honorary 1st Grade Professor*

The interview of Dr. Gugino published in the DFO Journal dates from 1991, which was 25 years ago. You have practiced and taught the bioprogressive method throughout your career, would you say that it has undergone an “evolution”?

Effectively. Since Julien Philippe discovered the bioprogressive method in 1970, it has spread all around the world thanks to his book, *Orthodontie. Des principes et une technique* [Orthodontics. Principles and Techniques] published in 1972, and the method has undergone changes. As a growing subject, it developed and transformed.

The bioprogressive method has benefited from developments made in radiological techniques, the sophistication of data acquisition by computer science, the introduction of artificial intelligence with the algorithms of treatment proposals, new materials, but the “philosophy” has not changed because Ricketts has built a complete approach, starting from the diagnosis and finishing by fitting a retainer, which is in its DNA.

The bioprogressive method was conceived in the late fifties and finally published in 1980 in a textbook, *Bioprogressive Therapy*, with help from his associates (R.W. Bench, C.F. Gugino, J.J. Hilgers and R.J. Schulhof). This interview with Carl Gugino gave an idea of the innovations being made by the developers in 1989.

Let’s go back to that DNA that gives stability to the concept. What is it made of?

The name, chosen by the author, tells you everything: bioprogressive. It is composed of a prefix, “bio” which means alive, and a root word, “progressive” which indicates a notion of evolution in time.

What value should I assign to the choice of such a prefix?

“‘Bio’ is life, and everything that is alive will benefit from bioprogressive thought. However, our forms are not the most alive part of us, it is the functions that express life and cease at death.” (Philippe⁵)

The clinical examination becomes the fundamental element of the diagnosis.

Address for correspondence:

Françoise Flageul – 29b rue des Francs Bourgeois – 75004 Paris
E-mail: soizic.flageul@wanadoo.fr

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Beyond what can be evaluated on impressions, x-rays, and photographs, only the direct examination of the patient makes it possible to understand the dysfunctions that accompany the malocclusions.

What does the root word “progressive” imply?

Just as growth happens in children in stages, the diagnostic analysis and the therapeutic synthesis of the practitioner are organized by integrating the fourth dimension of time. The stages of this reflection follow a precise sequence modeled on the patient’s condition not only at time (T), but especially at T + 2 or 3 [years] depending on the estimated duration of treatment. The idea is to create a treatment plan for the patient as he or she will be, and not as he or she is.

“All living things are subject to time. The proper form/function adaptation must be maintained during growth, maturation, and aging.” (Philippe⁵)

Can we talk about “global orthodontics” in relation to this method? Does it have a holistic dimension?

Bioprogressive treatment ensures that each of our patients has the optimal treatment, from a functional and esthetic standpoint, rather than simply trying to conform to set standards.

The concept of harmony has therefore replaced that of biometric normality. The concept of the “seven harmonies,”² defined by their interdependence, makes it possible to view each case in an individual perspective. Conducting research on the seven harmonies is indispensable when creating a comprehensive treatment plan that takes into account all the

negative effects caused by their imbalances.

The most unique aspect of the method is the holistic nature of the diagnostic procedure.

“The treatment embraces the entire personality of the patient. Our personalities encompass us just like the circle Leonardo da Vinci drew around the Vitruvian man. It affects all of our functions, all of our faculties, all of our systems and can change our futures.” (Philippe⁶)

But doesn’t this frenzied search for individualization end up becoming an obstacle for the use of this method?

The clinical approach gives all its focus to the individualization of the objectives and to the means of treatment. It leads to therapeutic choices in the interests of overall stability, from diagnosis to medium-term and long-term follow-up.

As with any orthodontic approach, the establishment of the diagnosis follows the standard procedure: evaluation of the dental structure, skeletal evaluation, esthetic evaluation, and finally evaluation of the functional matrix.

What is peculiar to the method is the appreciation of a degree of difficulty split into three levels—low, medium, and high—which is attributed to each case. The functional envelope, the only dynamic element of the diagnosis, takes priority over those of previous evaluations. Each issue with a “high” level of difficulty delimits a problem area, and the addition of several issues with a “high” level of difficulty, may lead to necessities of compromise, which are left to the practitioner’s judgment.

Therein lies the difficulty.

It is the imagination and the experience that make it possible to fulfill the treatment objectives modified as per the patient's request, according to their age, the limits of their cooperation, and the technical possibilities of the practitioner, bearing in mind the end of treatment stability. So there is an intuitive part that we try to limit by objectifying the expected effects of the treatment as much as possible. The inexperienced practitioner will be uncertain regarding the decision-making process. It is always safer to rely on simpler equations, such as the Steiner method or the Tweed triangle.

Extractions have been performed less frequently over the last 20 years. Ricketts, from the outset, sought to limit the use of extractions. Is it his very elaborate diagnosis and early management of the patient leading individualized arches that have made him a leader in this field?

It is the fundamental decision to treat "beyond the teeth" and have a holistic approach more than just the use of shape memory wires, which makes it possible to decrease the number of extractions.

If one takes into account each patient as a whole, to neutralize the dysfunctions and choose the ideal arch form, if one uses the functional and mechanical resources through early treatments, one decreases the need to perform extractions, while ensuring stable results.

Determining the requirements of the expansion, selecting the appropriate tools and undertaking cross-correction is the initial step in the treatment. Mechanical expansion possibilities are

according to the results of a skeletal analysis, called "mini-frontal", which defines the parameters of the "neutral" zone and therefore the optimum arch width. Once the arch form for the treatment is chosen, the consequences of expansion on available space can be calculated.

By changing the postural and operational conditions of the musculature, functional training facilitates mechanical treatment and considerably increases the chance of stabilization, especially in the transverse dimension. It is therefore essential to the success of any treatments conducted without requiring extractions, and its implementation is the prerequisite for all treatments.

By unlocking of the functional and mechanical stresses that hinder the expression of facial growth, we have more time to catch any imbalances, thus verifying the principle: "*The earlier we start treatment, the more the face adapts to the treatment.*" Earlier treatments have always been advocated.

Why have the materials used changed very little, giving this method an "old-fashioned" feel?

The materials may seem old-fashioned.

The new self-ligating brackets are not widely used because very few manufacturers offer both the information specific to the method and the dimensions which allow us to use thin rectangular wires. The current standard of the right arches is should be 0.022" × 0.028" rather than 0.018" × 0.025". To complicate the problem, at the level of the anterior teeth, the depth of the grooves must be .030 inches, to allow the superposition of two thin wires.

The alloy used with the bioprogressive method is still Elgiloy. The blue Elgiloy wire has no equal when it comes to creating base arches and the quad-helix. It can deform, which is an advantage because it avoids producing excessive forces, which can damage the tissues. Ricketts clearly prefers a certain play between the arches achieved with a soft wire and an attachment, to leave a degree of freedom for the teeth until the end of the treatment.

The mechanics cannot be imposed on the function.

Have the mechanical devices used remained the same?

To some extent yes.

The base arch has not changed, it is the same shape and the same material. It gives the method a certain specificity, which has remained useful when segmenting the arches.

But it has ceased to be used in a systemic manner: it depends on the degree of mechanical difficulty. The dental displacements to be performed during treatment are highlighted by the alignment of the visualized treatment objective, which has become the visual treatment plan (VTP). VTP is traced in the profile view, and it provides a three-dimensional image of the future position of the mandibular teeth after incorporating the elements from the analysis of the changes to the arch shape, i.e., in the transverse direction. It defines the segmentation mode and the role of the base arch.

However, it is not useful when the Spee curve and mandibular anchorage requirements are low, and the base arch becomes necessary when the degree of difficulty increases. It is superimposed with fine, super-

elastic round wires, which change the shape of the arch in the horizontal plane as it corrects the supraclusion, modifies the available space and creates the conditions needed for the anchoring of intermaxillary tractions. Segmentation is most useful in the most complex cases.

Since 1991, how has the concept of “elastodontics” (elastic orthodontics) evolved?

The word “elastodontics” has disappeared, replaced by the therapeutic principle of elastic positioning, which is an integral part of the global bioprogressive concept. The finalization of orthodontic cases remains to be a delicate mechanical step. The elastic finishing ensures excellent results and reinforces the chances of treatment stability.

This final phase is part of a desire to perfect the occlusal function, which respects the work of functional release of the initial phases and continues the neutralization of the functional envelope.

In difficult cases of joint dysfunction where the choice of the reference mandibular position should be maintained accurately, the stretching is staged using individual models for each stage after making occlusal casts, and adds an essential element of security.

At a time when the techniques of straight arches and aligners are being used more frequently, can bioprogressive philosophy remain attractive to practitioners with satisfactory results?

This is a difficult question to answer.

It all depends on the hierarchy of principles that the practitioner decides to adopt.

If the orthodontist believes in the protective benefits of the glued restraints, after standardizing the shape of the arches introduced as pre-formed attachments, or by the logical succession of the aligners established from a digital setup, the practitioner has no reason to turn to the bioprogressive method.

On the contrary, if practitioners think that individual variations in patients can affect treatment, that things are subject to time, and that form is a reflection of function, their eventual goal should be a stable treatment aimed at the disappearance of dysfunctions and the definition of a neutral zone of teeth position, i.e., this imaginary dental corridor of which Chateau spoke. The bioprogressive method fully meets this expectation.

The quest for the functional and esthetic optimum of each patient requires a thorough and comprehensive diagnosis that highlights his or her individual characteristics: a balance between morphological, physiological, esthetic, postural equilibrium, psychological and socioeconomic conditions. With regard to treatment success, 75% is concentrated in this initial phase, another 20% is contributed by the rest of the steps in the therapeutic plan, and the remaining 5% is due to the elastic capacity of the materials, the design, and the installation of the devices.

What about young practitioners?

Developing a bioprogressive treatment project therefore requires some experience because of the importance attached to diagnosis. The orthodontic evaluation begins with the collection of data, but because what we see depends on what we are looking for, this

vision must be taught. More essential is the interpretation of this data, which is made through the filter of previous experience: "*The new data 'activates' the acquired knowledge, even if it is erroneous*" (Lejoyeux³). The quality of the experience is therefore crucial.

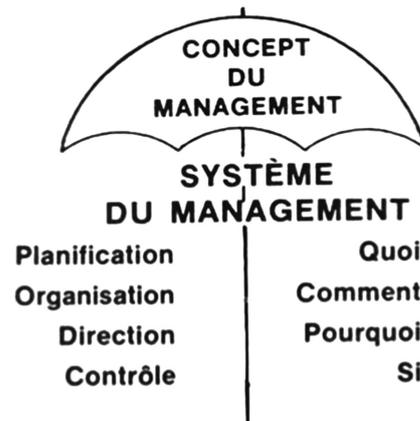
You have to have been trained to use the method. When I started my training, at Paris VII University, Julien Philippe had just created a university degree course in bioprogressive treatment and Carl Gugino gave regular courses.

Currently, this method is rarely taught in universities. The young practitioner who is dependent on the training he received will therefore need a few years of clinical experience to define his own conception of orthodontic practice.

There is a strong interest in management techniques. Can Carl Gugino with his famous "umbrella" be considered a forerunner?

Today, quality research has become a major concern in the field of health-care. "*Aim Higher*" has been the main piece of advice given by Carl Gugino since 1970.

Logic and coherence are the pillars of bioprogressive orthodontics. As a



	Decision making	Orthodontic practice
1	Define the apparent problem	Initial clinical examination
2	Gather data	Study the case
3	Find the actual problem	Establishing the diagnosis
4	Determine the solutions	Definition of the various therapeutic options
5	Choosing the best solution	Choice of treatment plan
6	Define a plan of action	Development of treatment steps
7	Evaluate results	Final evaluation

result of the transposition of the management principles whose processes are used to organize the work to be performed, to increase efficiency, and the successful functioning of the technical systems implemented. Thus, the development of an action plan involves four main features: planning, organization, direction, and control, of the what, how, why, and if.

For Carl, it has always been clear that this rigor should apply to orthodontic treatment and he has continuously promoted this kind of approach, hence the idea of “flux” in the seven diagnostic stages and in the eight steps of the treatment process that includes restraint and postrestraint. The last step in effective management is evaluation of the results. It must be exercised at each stage of the treatment process to achieve an overall assessment of the outcome, a task that simultaneously advances the quality of the treatment and the practitioner’s experience.

M. Makaremi⁴ raises the issue of an upheaval caused by the introduction of artificial intelligence into the orthodontic practice. In addition to the imaging, imprinting and printing, all three di-

mensions and, algorithms of therapeutic proposals are created according to pre-established data.

What do you expect from this, knowing that for Ricketts and Gugino the practitioner must remain master and decision maker throughout the treatment process?

The “bioprogressive method” from the outset has anticipated the use of artificial intelligence for orthodontic practice. It all began at the end of the 1960s with the Rocky Mountain Data system and continued with C. Gugino’s Zerobase[®] system in the early 1990s. The system of individualization of diagnosis, treatment planning, and management, presented in the structured form mentioned above, is conceived as an algorithm to create a personal tool, a logical basic model to meet the requirements of performance and excellence (Delamaire¹). Mastery is entirely in the hands of the practitioner, but the upheavals to be expected from the development of artificial intelligence remain unknown.

Conflict of interest: The authors declare that they have no conflict of interest.

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