## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>The evolution of the concept</td>
<td>4</td>
</tr>
<tr>
<td>The development of the system</td>
<td>5</td>
</tr>
<tr>
<td>The treatment method in 2015</td>
<td>6, 7</td>
</tr>
<tr>
<td>What is System 4.0?</td>
<td>8</td>
</tr>
<tr>
<td>What’s new?</td>
<td>8</td>
</tr>
<tr>
<td>The courses</td>
<td>9</td>
</tr>
<tr>
<td>The 2-year program</td>
<td>9</td>
</tr>
<tr>
<td>For postgraduates</td>
<td>9</td>
</tr>
<tr>
<td>Making the switch</td>
<td>10</td>
</tr>
<tr>
<td>Enjoying orthodontics</td>
<td>10</td>
</tr>
<tr>
<td>The literature</td>
<td>11</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>11</td>
</tr>
<tr>
<td>Information</td>
<td>12</td>
</tr>
</tbody>
</table>

**SYSTEM 4.0™**

A **global concept and an effective treatment system**
(by orthodontists for orthodontists)
Nel mezzo del cammin di nostra vita
Mi ritrovai per una selva oscura,
Ché la diritta via era smarrita.
... E quindì uscimmo a riveder le stella.

In the middle of the journey of our life
I found myself in a dark wood,
For I had lost the right path.
... And so we came forth,
and once again beheld the stars.

Dante Alighieri: Divine Comedy
The orthodontic specialty was changed for ever by the release of the Andrews SWA in the 1970s. The new preadjusted edgewise brackets were widely used, and it soon became clear that they were here to stay. This brought the possibility to create an ‘ideal’ treatment system, developed as a combination of the best treatment mechanics and ideal bracket specifications – a system which would emerge as the logical choice for a generation of orthodontists around the world.

It became the goal of Dr. Richard McLaughlin and myself to develop such a system – an effective treatment method which could be used by orthodontists across the world. The project started in the 1980s, and involved many hundreds of treated cases. Eventually, in the 1990s the key features of the treatment method were defined with a series of published papers and books.

Subsequently, the system became established as a proven, respected treatment method – a logical choice for orthodontists and orthodontic departments. This information document is a personal record of these exciting years and it defines our treatment system as it stands in 2015, after further development and improvement.

I hope you enjoy reading it.

John Bennett
The evolution of the concept

There have been four stages in the evolution of the treatment method:

• The treatment mechanics
• The bracket design and specification
• Defining the system into MBT™
• Refining the concept into System 4.0™

1980 – 1989 The treatment mechanics years
This period saw the development of light continuous forces and sliding mechanics, taking full advantage of Andrews’ standard preadjusted brackets. The new mechanics were described in a series of papers, the first appearing in 1989. Three years later these papers formed the basis for our first book – ‘Orthodontic Treatment Mechanics and the Preadjusted Appliance’ – which explained the mechanics in much more detail and included a selection of treated cases.

This first book introduced sliding mechanics, group movement, lacebacks, bendbacks, and other aspects of treatment mechanics which form the basis of today’s technique.

1990 – 1996 The bracket design years
This was the era of bracket redesign, developing a range of brackets ideally suited to the new mechanics. New bracket specifications were introduced in 1997, which would retain all the advantages of the SWA, and serve as a better match for our mechanics. This involved less tip, more torque control, and many detailing refinements.

Also, versatility was recommended, which simplified mechanics in a broad range of treatment situations, and reduced stock levels.

Without doubt, 1997 remains an important year in the story. At the AAO meeting in Philadelphia, our second book ‘Orthodontic Management of the Dentition with the Preadjusted Appliance’ was released (page 11). It recommended bracket specifications which have stood the test of time, and continue to be effective 18 years later.

1997 – 2001 Defining the treatment system
From 1997 the recommended treatment mechanics from the first book could be used with the brackets specified in the second book, and hundreds more cases were evaluated during the subsequent four years. After this, the landmark Systemized Orthodontic Treatment Mechanics was published, which is known as Book 3 (page 11). It defined the mechanics as they were in 2001 and described the full MBT™ method of treatment at that time.

2001 – 2015 Refining and improving the concept
This has been an era of refinement, and it can best be described as ‘Keeping the best and improving the rest’. New ideas and products were evaluated as they appeared. Some had advantages, and they were incorporated into the treatment method, as described on page eight. Others were discarded, because it was found they did not work well with the mechanics.

There was a move to indirect bonding, and a new focus on the need for bracket accuracy and placement. For improved facial assessment, a limited version of the Arnett cephalometric analysis was recommended, which involved 14 key measurements. More attention was given to post treatment management. As with other aspects of orthodontic care, an organized and systematic approach was developed for this, to minimize relapse, and avoid patient or parent disappointment. This clear protocol helps practice efficiency, and reduces the need for extra and preventable visits during retention.
A treatment system developed by orthodontists for orthodontists

The early years

Dickens wrote ‘it was the best of times, it was the worst of times’ and looking back this could be said about orthodontics in the 1970s and 80s.

Orthodontists were enthusiastic about the preadjusted edgewise brackets, but continued to use traditional edgewise mechanics and heavy force levels. Unwanted changes were seen, such as loss of anchorage and the infamous ‘rollercoaster’ effect. As the speciality struggled to resolve these issues, attempts were made to correct the problems by introducing a wider range of brackets with extra tip, torque and rotation control – the so-called ‘extraction’ or ‘translation’ series of brackets. Some of these were grouped together as the Roth appliance.

In the 1980s it became clear to Dr. McLaughlin and myself that light continuous forces with sliding mechanics worked well with the new preadjusted brackets. This approach was most effective with unmodified SWA brackets, and the extra features of ‘extraction’ series or ‘Roth’ series were a disadvantage. For example, when using ideal sliding mechanics and light forces the tip of 13° or even 15° in the upper canine brackets (compared with the 8° research findings) added to the problems. Extra tip required more anchorage, and tended to leave the canine and premolar roots too close together. It was clear that we needed to perfect the mechanics and then go back and re-design the brackets.

We concentrated on treatment mechanics, and started publishing our findings in 1989. We were mainly working with the basic SWA brackets, and we found that modifications could be made to complement our mechanics. These derived from the extra tip (over and above the research findings) which had been designed into the original SWA, and from the poor ability of the edgewise bracket to deliver torque control.

By the mid 1990s we had resolved the mechanics issues. It was time to create a whole new bracket system and we chose to work with 3M Unitek, who made the big commitment to design and manufacture the brackets. Special mention should go to Val Szwajkowski, because he shared our vision and helped to drive the project through at this time. Without his support it is doubtful if we would have a fully developed system today. The brackets were designed and properly tested between 1995 and 1997. They were released in May 1997, and the MBT™ brackets soon became an important trademark of 3M Unitek.

Bracket performance and positioning

With the arrival of preadjusted edgewise, orthodontic outcome no longer depended on wire bending. Instead, it was all about brackets. To achieve optimal results there was a requirement for accurate bracket manufacture and ideal bracket positioning.

In the early 2000s our goals were being fulfilled. Things looked good for a few years, but unfortunately they were soon to change. We had developed the mechanics using high quality milled brackets in the 1990s, but as the specialty moved to midsize, metal injection moulded (MIM) brackets, we found we were doing more wire bending, particularly for torque and in-out. Despite our best efforts, the smaller MIM brackets did not perform optimally in our hands, and good results were harder to achieve.

For a while there was an upsurge of interest in self ligating brackets, and like many orthodontists, we evaluated them, but we found that they did not work well with our recommended mechanics and the disadvantages outweighed any possible advantages.

By 2009 we had moved to indirect bonding for precise positioning, but we needed better, more accurate brackets, to achieve good results with minimal wire bending. We wanted to go back to milled production, and chose to work with Opal Orthodontics. This forward looking company was manufacturing milled brackets by computer numerical control, or CNC, and we felt that this system (Avex™) would prove to be an advantage. These top quality brackets deliver the performance we needed and we continue to recommend them after five years of evaluation and refinement.
The treatment method in 2015

A high quality and versatile range of brackets to meet all clinical needs

A reliable and accurate bracket placement system
Arch wire quality, with clear information on arch form and sequencing

Detailed recommendations on all aspects of force levels
What is System 4.0?
It’s a global concept and an effective treatment method. It is the latest version of the treatment method of Drs. McLaughlin and Bennett, including all the advances in the last 12 years.

What’s new?
Over the past 12 years there have been many improvements in the treatment method, and some of the more important advances are discussed below.

Brackets
With the arrival of the preadjusted era, wire bending skill became less important. Instead, good orthodontics depended more on top quality brackets and accurate bracket positioning. Our mechanics were developed using milled brackets, and with System 4.0 we have gone back to using milled Avex™ brackets for greater accuracy. In the 2000s midsize MIM brackets were used, and self ligating types were tried, but we found they did not work ideally with the recommended mechanics, either due to size or accuracy factors (Cash AC, Good SA, Curtis RV, McDonald F. 2004 An evaluation of slot size in orthodontic brackets – are standards as expected? Angle Orthod. 74: 450-453).

Bonding
For precision in bracket positioning we moved to indirect bonding more than seven years ago, and it was a good decision. It has many advantages beyond the accuracy issues, and the latest materials and light curing methods have made the whole process easier.

Prescription
The bracket prescription is more accurately expressed since we reverted to milled brackets, and this is bringing improved treatment outcomes. Torque is easier to control, and in-out is no longer an issue.

White spot lesions
A different bonding technique is being used, to reduce or eliminate enamel decalcification. The whole labial surface of each tooth is etched and then a layer of Opal Seal™ is applied.

Crown form and enamel reshaping
System 4.0 makes greater use of interproximal enamel reduction (IPR) than in the past. It is an important treatment option to deal with crowding in orthodontics, particularly in adult cases, and when correctly performed, it is a safe procedure. The new book has essential guidelines for IPR, including recommendations on the amount of enamel which may be safely removed.

Arch form
The arch form protocol is unchanged. A standard ovoid, tapered, or square form is selected and used in the early stages of treatment. Then an individual arch form (IAF) is made for each patient, and used for the rest of the treatment. The shape of the standard ovoid, tapered, and square wires is unchanged in the anterior part, but has been improved a little in the posterior area.

Arch wire quality
An improved quality of heat activated nickel titanium (HANT) wires is now used, with fewer inconsistencies. The new steel ‘working’ .019/.025 rectangular wires, with increased spring temper, bring better standards of control for overbite, torque, and arch form, and they are diamond drawn for a smooth finish. They also have more comfortable ball hooks for patients.

Post treatment management
The latest book has a full chapter on this, and a distinction is made between ‘relapse’ and ‘post treatment change’. A retention protocol is recommended with a range of options to deal with any post treatment changes, according to the needs of the case.
The courses
Our international courses serve two purposes. Firstly, they use treated cases to pass on new ideas and show the ease of the mechanics. Secondly, through the courses we are able to keep in touch with colleagues. We receive feedback and suggestions about how System 4.0 is working for them. This helps in the development of the concept, and we gratefully acknowledge the contributions from orthodontic colleagues around the world.

Courses at all levels are available, and this image shows a group of 200 orthodontists and postgraduate students attending a Dr. Bennett program in Madrid, May 2014.

In July 2012 and July 2014 ‘Global User Meetings’ were held for an invited group of System 4.0 teachers and leaders of thinking. They provided a platform for the exchange of views and to ensure consistency of the message, and the support of Opal is gratefully acknowledged.

The postgraduate student
Today’s orthodontic students face a busy two or three year training period, and most programs teach a variety of treatment methods, to give a broad historical background to treatment mechanics.

However, when the time comes to go into practice at the end of training, there comes a need to follow a reliable, well established and fully documented approach. Choosing an effective and well proven system will make the day-to-day practice environment easier and more enjoyable.

The detailed information in our earlier books, and the recent release of Book 4, Fundamentals of Orthodontic Treatment Mechanics, provide clear guidance during the training period. This in turn brings clinical confidence. Later, when starting in practice, System 4.0 becomes a logical choice for many newly qualified orthodontists. It is versatile, effective, easy to use, and globally recognized. It stands alone as the only fully documented treatment system for the preadjusted appliance.

The two-year program
Dr. McLaughlin’s popular two-year program is held in San Diego, and consists of six sessions (three per year) over a two year period www.mclaughlince.com. It teaches an accurate and efficient approach to patient care using diagnostics, treatment, and case management, and is intended for certified orthodontists who want to extend their knowledge of McLaughlin–Bennett System 4.0 to a high level. Each session lasts 3-4 days and includes a case presentation, discussion, and a hands-on segment.

For more information, please contact Jason McFarland
Email: Jmcfarland@opalortho.com

Early in 2015 an all-new and expanded facility will be opened at Dr. McLaughlin’s new practice in San Diego, to accommodate more orthodontists and to meet the increasing demand for this advanced program.
Making the switch

It is normally easy to upgrade a practice or a department from the earlier MBT™ into System 4.0™, and usually everything goes smoothly. Reading the latest book is helpful for all clinical personnel, because it contains loads of practical information to help with the switch.

System 4.0 is fully developed, so it is recommended to follow the exact treatment philosophy, avoiding modifications for a couple of years at least.

The system is not complicated, and is designed to be delegated within the legal limitations concerning the use of assistants. Routine arch wire changes, and items such as lacebacks, bend backs and tiebacks can be easily and reliably carried out by supervised auxiliary personnel, with minimal scope for error. Ample published information is available on all aspects of treatment mechanics, and this can be used for training new personnel. Making the switch normally brings an improved and more systemized approach to clinical treatment.

We continue to favor the .022 slot. Many orthodontists who are using the .018 slot, decide to go to .022 when they switch into the System 4.0, thereby getting a double benefit.

Enacting orthodontics

Dr. McLaughlin and I believe it should be a pleasure to provide orthodontic care. It is an achievable goal to have a well-ordered and professional working environment, cruising through treatment sessions in an unhurried manner, and with consistently good results.

This may sound like a dream, but we maintain it is possible, and there are requirements in three areas:

• First, there is a need to have an organized and well managed practice.

• Second, the record taking and treatment planning has to provide correct treatment plans for both tooth alignment and facial aesthetics.

• Third, a well-tried and effective system of treatment mechanics is needed, using high quality brackets, to deliver the planned result.

We believe there is sufficient published information available for a newcomer to use the method successfully, based on the information in our new book and the two earlier volumes. Orthodontists are well known as free thinking individuals, who like to make changes and improvements, but as previously mentioned, we caution that it is recommended to practice the technique as described for the first two or three years, without introducing changes, because many years of development and trial and error have gone into the treatment method, with almost all options being evaluated along the way.

Interestingly, the latest book includes transfer cases, on the basis that it is part of good orthodontic practice to be able to manage these patients well, and much can be learned from them.

The System 4.0 treatment approach is fully explained in 'Fundamentals of Orthodontic Treatment Mechanics' and the text is supported by a series of stage by stage treated cases. As well as defining the philosophy, many recent developments are included, and topics which were not fully explained previously, such as Case Settling and Post-treatment Management, are given entire chapters.

There were requests to produce this new material as a digital publication, but we decided on a conventional printed book. Digital sources are useful for quick access to pieces of information, but the traditional printed format has a certain gravitas, and is more appropriate for serious study of a treatment philosophy.

If patients are to be well served in the future, there will be a need for guidelines in orthodontics. System 4.0 is based on years of experience, and endless trial and error. It attempts to introduce necessary basic guidelines for those new to the specialty, and it is hoped this will not be seen as presumptuous.

The series of three books may be read as ground rules for high quality care in orthodontics, and together they offer an essential information source for those seeking to provide the best orthodontic care. Above all, for the idealist in orthodontic training, they are intended to offer a pathway to ‘doing it right’.

This is summed up in the preface to the new book, which comments ‘If you want to rise above the level of mediocrity in orthodontics, these three books are for you, young colleagues.’
The literature

‘Orthodontic Management of the Dentition with the Preadjusted Appliance’
Known as ‘Book 2’ this was first published by Isis Medical Media Ltd. in 1997 in English and six other languages, but these editions are now out of print. Demand has continued for this important text, which covers the day-to-day management of the dentition, and fortunately it was re-published by Mosby in 2001, only in English, with minor corrections and a new index. The authors regard Book 2 and Book 3 (below) as being of equal importance to those using the treatment system.

- English ISBN 0723432651
- Many other editions

‘Systemized Orthodontic Treatment Mechanics’
Published by Mosby in 2001 (www.elsevier.com)
Known as ‘Book 3’ this described the earlier MBT version of the treatment system, and it included a range of treated cases, showing step by step stages.

- Chinese ISBN 7-5433-1024-4
- English ISBN 072343171X
- German ISBN 3437055208
- Italian ISBN 88-85294-01-4
- Japanese ISBN 4-86034-801-X
- Korean ISBN 8986730715
- Polish ISBN 83-88063-68-5
- Portuguese ISBN 85-7404-058-4
- Spanish ISBN 84-8174-598-7
- Other editions

‘Fundamentals of Orthodontic Treatment Mechanics’
Published by LeGrande in 2014. ‘Book 4’ is the definitive statement of the treatment system as it stands in 2015. It shows important recent developments and updates earlier work, with references to the previous texts.

- Chinese In preparation
- Italian In preparation
- Japanese In preparation
- Korean In preparation
- Polish by Grand Ortho June 2014
- Romanian by Dental Focus November 2014
- Spanish In preparation
- Turkish In preparation

Acknowledgements and Copyright
During the development of System 4.0 many individuals have been involved, and regrettably it is not possible to mention all by name. An important part was played by the assistants and staff in the practices in San Diego and London, and special mention should go to Patty Knecht and Laura Plante. The entire team at Opal has shown real commitment and expertise for which we are most grateful, and our thanks go to Jane Rose and her colleagues at Direct Approach for the design of this publication. This entire document is covered by international copyright and may not be used or reproduced in any form without the written permission of the authors.

Copyright © John Bennett and Richard McLaughlin 2015.
INFORMATION

The System 4.0 treatment approach is fully explained in Fundamentals of Orthodontic Treatment Mechanics. This book brings everything up to date. It describes important recent developments, and at the same time clarifies and updates earlier work, with references to previous texts.

It is a valuable resource for orthodontists seeking a systemized and structured approach to top quality orthodontic care.

Available from Amazon.com and Opal.

Topics include:

- Treatment goals updated
- An effective, proven treatment method
- Bracket design for tooth control
- Versatility in treatment mechanics
- Improving accuracy at the setup
- Understanding arch wire sequencing
- Anchorage control from start to finish
- Reducing white spot lesions (WSLs)
- Improving outcome in non extraction cases
- The role of IPR in resolving crowding
- Better results with ‘progress review’
- Second premolar extractions – new mechanics
- Techniques for settling the case
- A new chapter on post treatment management.

PRODUCT INFORMATION

The brackets, arch wires, and other materials recommended for System 4.0™ were developed by Opal Orthodontics and are available from

www.opalorthodontics.com

U.S.A       1.888.863.5883
International  +1.760.300.9764
Europe        +49 (0) 2203 3592234