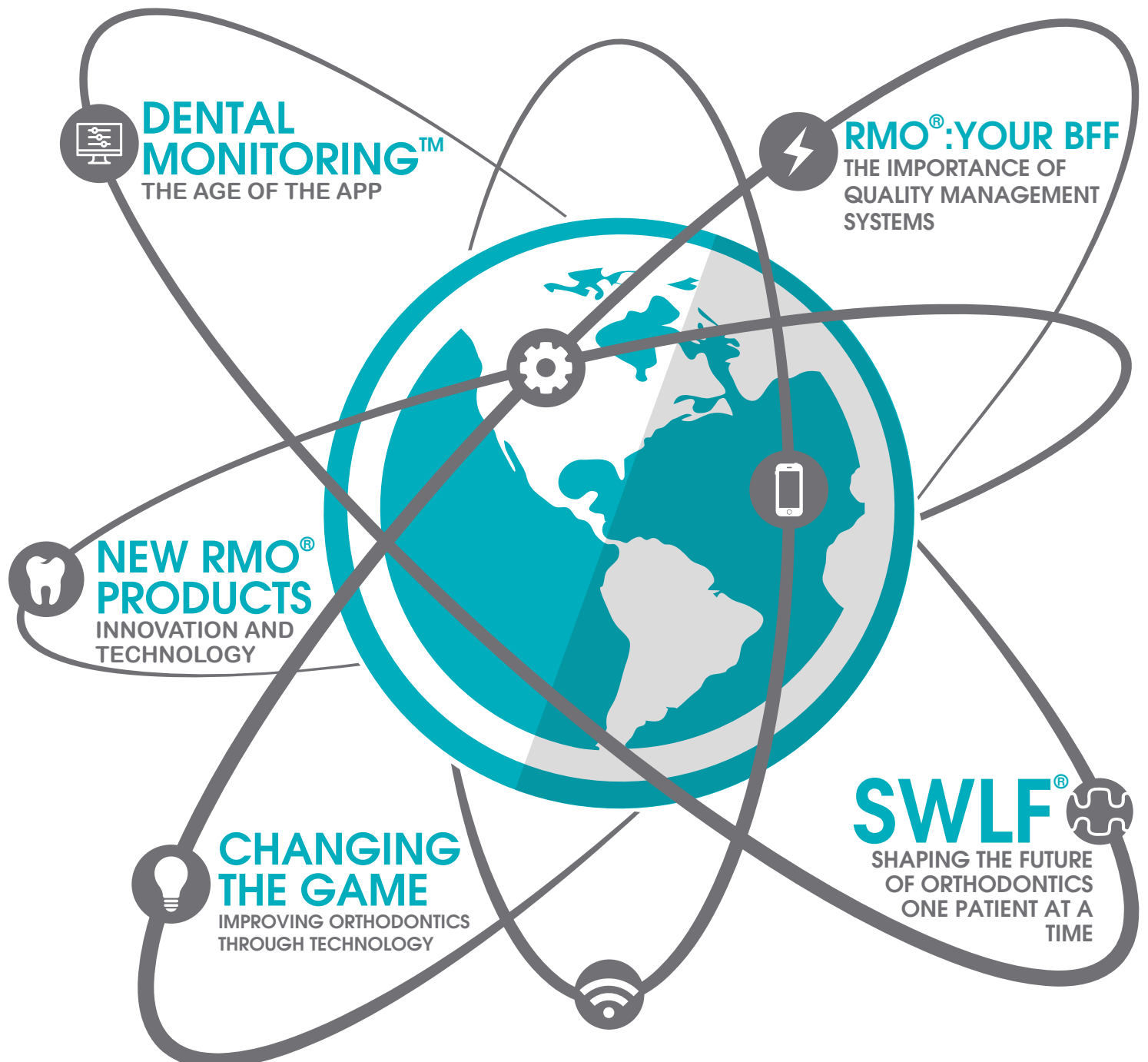


# CLINICAL REVIEW

Orthodontic

## SHAPING THE FUTURE

HOW RMO® IS APPLYING INNOVATION & TECHNOLOGY IN ORTHODONTICS



# CHANGING THE GAME

## IMPROVING ORTHODONTICS THROUGH TECHNOLOGY

It is the time of the year where excitement and enthusiasm build as we prepare to participate in our 83rd AAO. At RMO® we begin preparing for the AAO a year in advance and this year has been no different. We look forward to all of the activities that come with the Annual AAO Session.

It is AAO Annual Meeting time!

We would also like to take this opportunity to thank you for your confidence, business, trust and most of all your contribution to orthodontics. Daily we witness the quality of treatment you deliver to your patients. Thank you!

We at RMO® are always trying to deliver an easier, simpler, and better experience for both the patient and the doctor to receive and deliver the best treatment options available. This year, to continue with our technology tradition, we are partnering with the state of the art company, Dental Monitoring™, which is the world's first mobile monitoring solution in orthodontics. This game changer in Orthodontics is brought to you by RMO® in collaboration with our European partners in France! This is big benefit of being an international company for over 60 years.

The Dental Monitoring™ solution is designed to help you:

1. Control the position and treatment of your patient's teeth remotely and continuously
2. Utilize the most advanced technology available today in orthodontics
3. Work with the most common treatment plans in orthodontics today

Stop by the RMO® booth (#421) and learn about this very exciting system and enjoy the best experience on the show floor!

As we dedicate this Clinical Review to technology, I'd like to focus on yet another game changer brought to you by RMO® from Spain: the Straight Wire Low Friction technique, more commonly known as SWLF®.

SWLF® is not just a technique involving a bracket; we have attempted to incorporate all the recent technological advances in orthodontics into an extremely simple therapeutic protocol and system of biomechanics. The technological changes affecting modern orthodontics, which have led to the creation of the Straight Wire Low Friction (SWLF®) technique, are super-elastic wires, the latest generation of titanium-molybdenum wires, friction selection brackets. The SWLF® technique was created in conjunction with Dr. David Suarez many years ago. We have had a great journey together and look forward to years of working together.

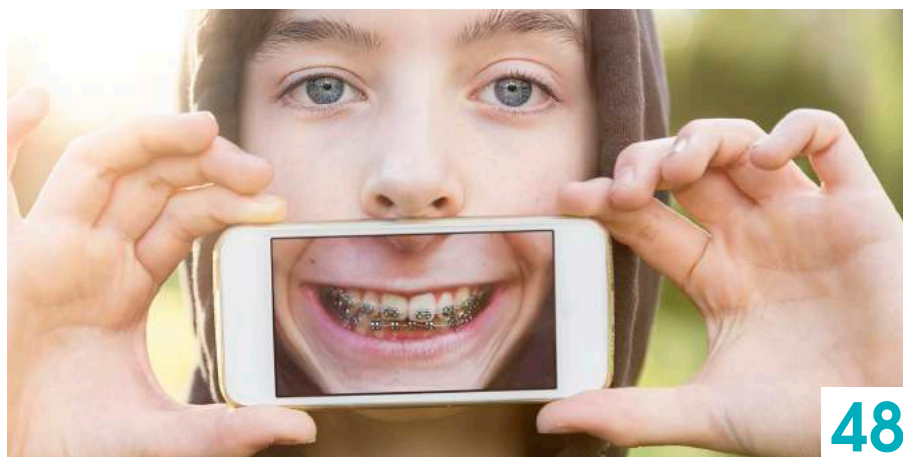
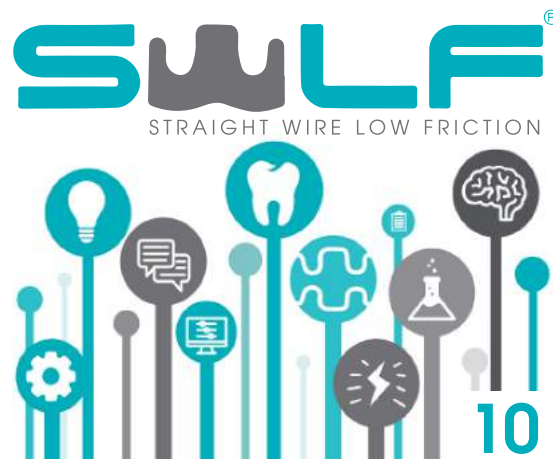
As we have spent millions of dollars to automate our factory using robotic arms and up to date machinery to prepare for the future and to be able to expand our horizons and grow all over the world, we are proud to be able to bring you the previously mentioned game changers. We at RMO® are looking forward to the upcoming AAO in Orlando as we continue to partner with the AAO in many ways. We are happy to be the proud sponsor for the International Reception again this year as well as the longest-standing exhibitor at the AAO annual session.



Tony Zakhem  
Chairman & CEO  
RMO, Inc



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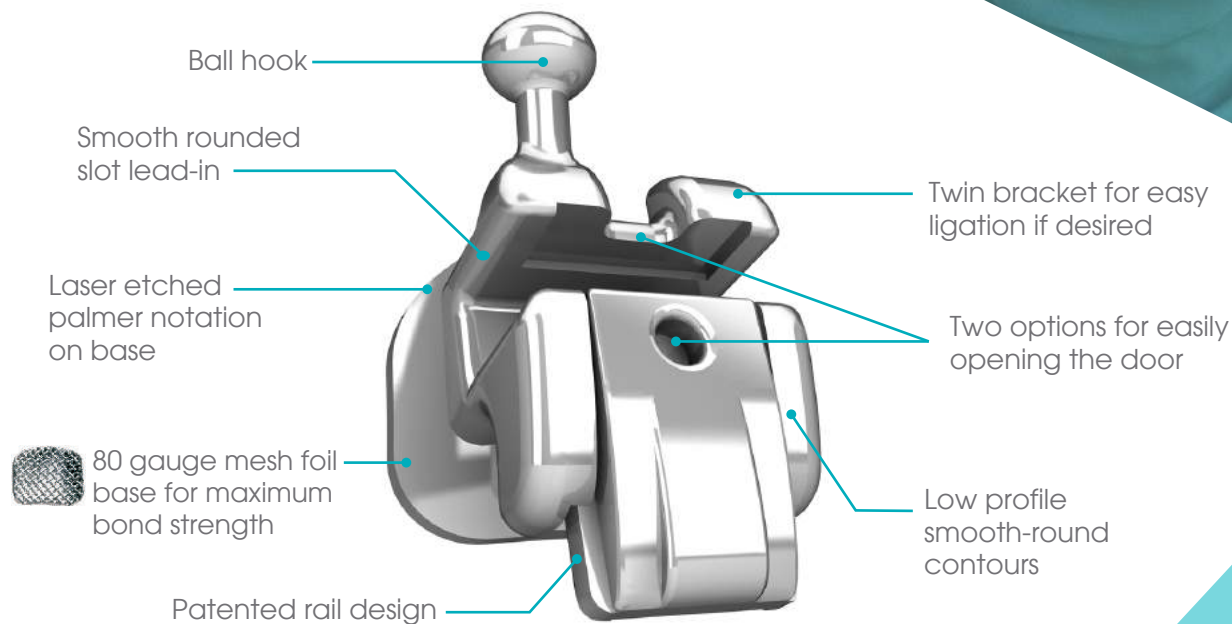
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# ALTITUDE SL™

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### BENEFITS:

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# CONTRIBUTORS



**LEON LAUB**

M.S., Ph.D.

Leon's major focus at RMO® is to advance RMO's Intellectual Property portfolio through writing or facilitating new patent applications and trademarks. Leon promotes RMO's education and teaching initiative as a lecturer at orthodontic residency programs in the U.S. and Canada. Several programs invite him back yearly to lecture on orthodontic materials (UIC, Stony Brook, Tufts, Montefiore, U of Alberta). He actively assists orthodontic residents set-up research studies and theses protocols. Leon has presented courses internationally in Europe, Asia, and Latin America. Leon's education includes: Ph.D., Materials Science & Engineering, Northwestern University; M.B.A., Colorado State University; M.S., Columbia University; B.S. New York University. He learned Dental Materials as an NSF Fellow at Northwestern University Dental School. Prior to coming to RMO®, he worked at the ADA in dental materials research and the ADA Standards Program; and held positions in dental industry at Teledyne Getz and Water Pik.



**DAVID SUAREZ  
QUINTANILLA**

D.D.S., Ph.D.

Dr. Suarez is the Director of the Department of Orthodontics at the University of Santiago de Compostela, Spain. In addition to his Graduate Specialty Degree in Orthodontics he also holds a PhD in Medicine. Dr. Suarez is the developer of the SWLF® Technique (Straight Wire Low Friction). This technique involves the principles of reduced friction, lighter force wires, clinical efficiencies and reduced treatment time. He has given many courses in Europe, the United States and Latin America. Dr. Suarez is an active member of the EOS, AAO and WFO. He is the author/co-author of 12 dental and orthodontic textbooks. He has also published numerous articles.



**LOUIS-CHARLES  
ROISIN**

M.D., Ph.D.

Dr. Louis-Charles Roisin graduated with a specialty in Dento Maxillofacial Orthopedics in 1988 in Paris. He then embarked on an unconventional, self-taught path: diploma under the supervision of Jean Delaire in Nantes, EPGET and Tweed Foundation with Alain Decker, Club TTD with Pierre Planche and the courses of Didier Fillion and Dirk Wiechmann. A former private attending physician in the maxillofacial surgery wards of the Foch, Saint Louis, Percy and Necker hospitals, he attended numerous oral & facial, and later craniofacial surgeries with Daniel Marchac. He has been a consultant in the multidisciplinary team of the Centre of Reference for Craniofacial Dysostosis and Neurosurgery at Necker hospital for 20 years. In 2008, he obtained an expert's degree in maxillofacial and oraldental health. In 2002 he became one of the first and very enthusiastic users of Invisalign. Since 2013, he has been sharing his time between his private office and clinical direction of a new project: Dental Monitoring.



# RMO®-YOUR BFF

## THE IMPORTANCE OF QUALITY MANAGEMENT SYSTEMS

BY DR. LEON LAUB

Today the English language is changing quickly, converting words to initials. RMO® has certified ALL its products to sets of initials that give the doctor assurance that RMO® products and services meet the most rigid worldwide standards. If RMO® does not certify to use certain sets of initials, its ability to sell worldwide is drastically limited.

To obtain certification requires not just paying fees, but creating a controlled manufacturing environment (Quality Management System) that documents design of new products, writes instructions for its work force on how to make products, monitors production, assures packaging and labeling are correct, and should there be a customer issue with a product – will investigate complaints and respond back to the doctor and regulatory agency with the results of its investigation.

Why does RMO® choose to do this? Because at its core, RMO® has always been internationally known as the “Quality Orthodontic Company” and will give its doctors the best products and services that they expect.

Many orthodontic supply companies are happy to sell you products at low prices. But, the sale stops there. Should a doctor have questions or complaints on product design, materials, or usage – the doctor needs to find answers elsewhere. There are manufacturers overseas that sell

product in bulk to U.S. distributors that package them. These products are often not registered with the FDA; their quality and safety is questionable, but the price is right. Labeling may read: “Packaged in the U.S.,” which is a warning sign to look closer at the product. “Packaged” does NOT mean “Made in the U.S.” Wording may be similar but the product itself may not be biologically safe (it can contain heavy metals that were incorporated during processing, such as: Chromium);

**“PACKAGED DOES NOT MEAN MADE IN THE U.S.”**

biological compatibility testing usually is not done, and cleanliness of the product is questionable. Most often, these products have no traceability by their manufacturer; no production lot is recorded; and no Research & Development is behind the products. For the times when a product fails in the mouth, traceability becomes essential to protect the patient from any harm due to toxic/carcinogenic elements in the product from either its composition or manufacturing process. This information is not available.

In contrast, *RMO® certifies each of its products with the FDA.* All products that RMO® imports are also registered with the FDA. FedEx checks imports before it delivers them; without FDA registration of international products, FedEx will return the package to the sender. RMO® adheres to all import requirements, and pays duties on all imported products. RMO® labeling and packaging clearly states where a product is made, if it is not made in the U.S. When RMO® puts its name on packaging, RMO® is considered the “manufacturer” and has all the obligations and reporting requirements as if the product was internally produced.

Approximately 80% of the products offered in RMO®'s catalog are manufactured in Denver, CO. RMO® does NOT outsource its core products to other countries. Brackets, tubes, bands, pre-welds, metal appliances have been manufactured for over 80 years at its facility in downtown Denver, contributing jobs to the economy of Colorado and the U.S.

**“ RMO®'S GOAL IS TO BUILD LONG TERM RELATIONSHIPS WITH ITS DOCTORS, AND ALWAYS SUPPORT DOCTOR NEEDS AND QUESTIONS.**

To achieve this goal, RMO® invests in internal resources, both money and staff, to make the highest quality products because it considers its partnership with doctors as the only way to do business.

## FDA, GMP, ANSI, ADA

What about those initials? It starts with the FDA. The FDA has guidelines called GMP – Good Manufacturing Practices, and manufacturing companies, such as RMO®, are required to register all its products with the FDA through filing a 510(k). Evidence has to be provided to the FDA identifying specific product use, biological safety of the products, and should any adverse patient issue arise, it will be investigated and reported to the FDA. Orthodontic products are considered Medical Devices by the FDA and are subject to all the stringent requirements for a medical device.



The dental profession has been the leader in the medical devices arena, with the establishment of written standards for 100 plus products. The standards program has been a long-term collaboration between the ADA Division of Science at the ADA Headquarters (Chicago, IL) and the Standards program at the National Bureau of Standards (Washington, D.C.). The ADA now administers its standards program through ANSI, American National Standards Institute, and the standards are identified as ANSI/ADA. Manufacturer certification to ADA standards is voluntary, but doctors are aware of the value to both patient and doctor, to use only certified products.

**“ MANUFACTURER CERTIFICATION TO ADA STANDARDS IS VOLUNTARY, BUT DOCTORS ARE AWARE OF THE VALUE TO BOTH PATIENT AND DOCTOR, TO USE ONLY CERTIFIED PRODUCTS.”**

ADA Specification No. 7 Dental Wrought Gold Wire Alloy was first developed in the early 1960s, with the last reaffirmation in 1989. When the U.S. de-controlled the price of gold (around 1968) which had been \$35/ounce, very predictably, gold alloy wires were no longer price competitive. By then, RMO® was in the forefront of product innovation in orthodontics, having introduced stainless steel products (1930s) and Elgiloy® wires (1960s) as alternatives to gold. Nickel-Titanium wires found an application as orthodontic wires (1970s) and in the 1980s, Beta-Titanium wires completed the range of orthodontic wires currently used by doctors. By the 1990s, the specification for gold orthodontic wires was ancient history and there was little interest in a new ADA Specification No. 32 for Orthodontic Wires, although the standard was developed in 1989.

Around the year 2000, international interest in developing new standards for orthodontic materials arose among member countries of ISO (International Organization for Standardization). U.S. orthodontic manufacturers were concerned that if they did not have a voice in writing the new standards, they would be left with the necessity, among other outcomes, to make all new tooling for producing brackets if ISO were to require bracket slot sizes in metric units, rather than inches. Instead of .018” and .022” bracket slot sizes, brackets might be required to be sold as slot sizes of 0.46 and 0.56 mm! At the national level, a new U.S. group was formed to write orthodontic product standards, under the administration of the ADA. New standards were written for orthodontic wires, brackets & tubes, and elastomeric materials, which became ISO Specifications. Today, the ADA and ISO Specifications for orthodontic materials are identical.



## ISO & MDD

Several countries began to protect its citizens from importing inferior orthodontic products by imposing import requirements, with a major obstacle – all imports needed to meet new country certification requirements. Several countries developed their own certifications, instead of adhering to ISO Specifications. As a result, U.S. manufacturers were compelled to be certified in multiple countries or they could not sell in those markets.

In the EU, the Medical Device Directive, MDD, was issued to require all imported orthodontic products to carry the CE Mark. In Canada, Health Canada requires all orthodontic product to be registered and certified to its standards. The Pharmaceuticals and Medical Devices Agency (PMDA) certifies and monitors product safety for imported products to Japan. More countries will follow this lead.

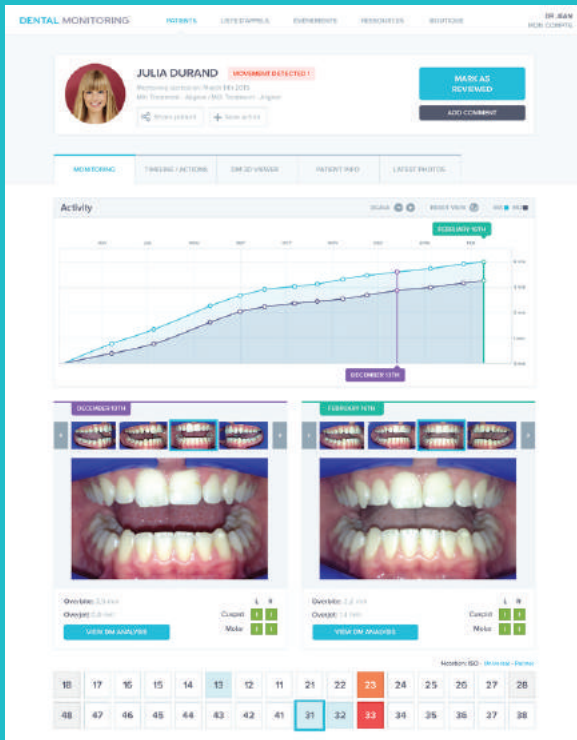
RMO holds certification in all the countries mentioned above. What is not visible to our doctors is the internal cost in personnel and fees required to certify and maintain certification for these countries. RMO is scrutinized not only by the FDA, but multi-country regulatory agencies. Typically, specific country certification follows a process to have its own country auditors travel to Denver to do an on-site audit of product manufacture which includes inspecting manufacture documentation, observation of RMO manufacturing, systems for product traceability, and packaging. Costs are paid by RMO. With multiple country audits, total costs have rapidly increased.

In contrast, orthodontic distribution companies do NOT certify products or incur these costs. The value a doctor receives as an RMO customer, is that RMO “has your back.” RMO is your partner for the long term.

**“A DOCTOR CAN BE ASSURED THAT MULTIPLE WORLDWIDE EYES HAVE SCRUTINIZED RMO’S QUALITY MANAGEMENT SYSTEM WITH THE AUDITOR’S OUTCOMES THAT RMO MANUFACTURES TO A VERY HIGH LEVEL OF PRODUCT QUALITY.”**

### You can check out RMO’s current certifications:

1. FDA QSR (Quality Systems Regulation)
2. ISO 9001:2015: Quality management systems - Requirements
3. ISO 13485:2016: Medical devices – Quality management systems – Requirements for regulatory purposes
4. EU Medical Device Directive (93/42/EEC)
5. Health Canada: Canadian Medical Devices Regulations (CDMR)
6. MHLW Ministerial Ordinance No. 169 – Standards for Manufacturing Control and Quality Control for Medical Devices and In-Vitro Diagnostic Reagents. (Japan Ministry of Health, Labor and Welfare (MHLW); Pharmaceutical and Medical Devices Agency (PMDA); Pharmaceutical Affairs Law (PAL))



## THE WORLD'S FIRST MOBILE MONITORING SOLUTION IN ORTHODONTICS

DENTAL MONITORING™ allows you to control the position and shape of your patients' teeth remotely and continuously

DENTAL MONITORING™ combines the most advanced research in machine vision with patented algorithms in order to create the first self-monitoring system in orthodontics

DENTAL MONITORING™ is designed to work with most treatment plans or post-treatment follow-ups, from regular brackets to lingual appliances or removable pre-planned aligners



## DENTAL MONITORING™



The orthodontic profession is currently being shaped, and will continue to be shaped, by changes of three different kinds: conceptual, technological and socio-economic change. With respect to conceptual changes, Evidence-Based Orthodontics (EBO) ensures that our diagnoses, treatment and clinical activities are based on proven scientific evidence rather than subjective opinions, individual experience and biased personal interpretations. EBO sets the clinical standard and represents the future of this profession. Although admittedly limited, recent advances in our knowledge of the biology of dental movement highlight the need for the forces employed in our treatments to be intermittent, light, constant and prolonged.

Many of the best-known and most widespread orthodontic techniques were invented and developed at a time when nothing

was known of the current advances in orthodontics (3D digital imaging, dental virtual reality, microimplants and TADs, new elastomeric materials, osteodistraction devices, etc.) and when the properties and behavior of shape memory wires, the first NiTi wires, were far removed from the highly effective and superelastic and thermoelastics alloys we have today.

Unlike classical nickel-titanium wires, the new Thermalloy<sup>®</sup> wires are not subject to the usual laws of physics. Deformation and load and/or force generated by the wire is independent. Furthermore, if some practitioners have kept abreast of developments concerning the new wires and how to handle them, why should we continue to use a bracket design which is over seventy years old and which limits the effectiveness of the new materials?

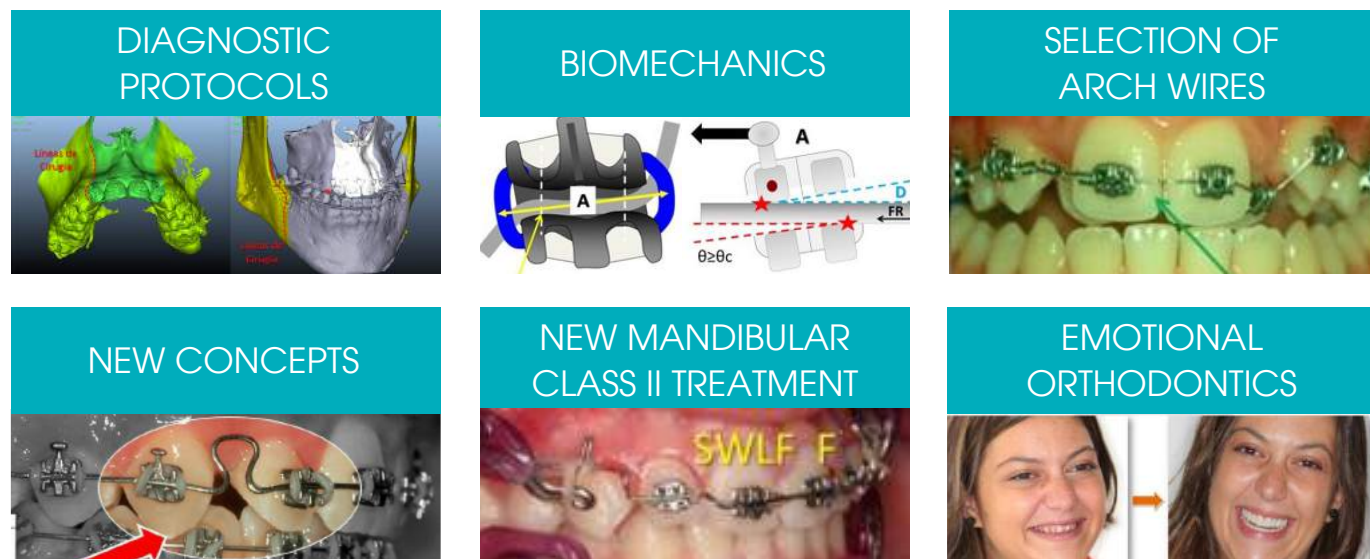


Figure 1-6

SWLF® is not just a technique involving a bracket; we have attempted to incorporate all the recent technological advances in orthodontics into an extremely simple therapeutic protocol and system of biomechanics (figures 1-6). The technological changes affecting modern orthodontics, which have led to the creation of the Straight Wire Low Friction (SWLF®) technique, are: super-elastic wires, the latest generation of titanium-molybdenum wires, friction selection brackets (we can control the friction and the sliding tooth-by-tooth) and orthodontic microimplants.

The SWLF® technique enjoys all the advantages of the traditional straight wire approach but addresses one of its main failings: static and dynamic friction. Although friction ensures occlusal stability and three-dimensional control over the root in the last stages of treatment, it is equally true that it is also the principle obstacle to dental alignment and levelling, thereby reducing the effectiveness of super-elastic wires, decreasing the potential for dental movement with these wires and, in short, complicating and prolonging our treatments. With the cooperation of Rocky Mountain Orthodontics in Denver, CO (USA) we are developing the diagnostic system, clear biomechanics and therapeutic protocols, brackets, wires, elastics, functional appliances, microimplants and other elements of the SWLF® technique.

### THE CONCEPT OF FRICTION SELECTIVE CONTROL TOOTH BY TOOTH (FSC)

Low-friction brackets are now all the rage and all the orthodontic manufacturers are racing to improve arch/bracket sliding mechanics. Many in the profession have opted for conventional

low-friction brackets, self-ligating brackets or mixed low-friction brackets. RMO® opted for the selective friction control tooth by tooth alternative with its Synergy® bracket many years ago.

When I started to use the Synergy® bracket over eight years ago, I soon realized that it was not only a low-friction bracket, but that it also had the capabilities of a conventional bracket and that simply by modifying the ligature (materials and shape) it would be possible to control friction, tooth by tooth.

Unlike low-friction self-ligating brackets, which are excellent during alignment but of limited use for dental control in the torque and finishing stages (in my experience it is not easy to finish cases with self-ligating brackets), the Synergy® bracket allowed us to obtain friction (with elastic or metallic ligatures placed conventionally or in a figure eight) when the treatment requires excellent tooth control. Remember that the friction, during orthodontic treatment, is not bad in itself. In many cases we need friction to move the teeth!

The Synergy® bracket has all the advantages and ease of use of a traditional straight wire twin bracket (the orthodontist who has been using other brackets does not need to familiarize himself/herself with a “different” bracket when changing to Synergy®), but it does add certain new ingenious design features which provide three fundamental clinical improvements by enabling:

## 1 Maximum Sliding In The Initial Stages Of Treatment With Superelastic Wires

The Synergy® system has 3 pairs of tie-wings rather than 2. The sides of the central tie-wings are raised in such a manner that when the ligature is applied solely in the center, the contact between the wire and the ligature is minimal or non-existent, thus reducing friction almost to zero and optimizing the effect of the superelastic wires. Numerous studies have demonstrated that alignment with superelastic arch wires in a case with pronounced irregularity is much swifter and effective with low-friction brackets such as Synergy® than traditional single or twin brackets (figures 7-10).

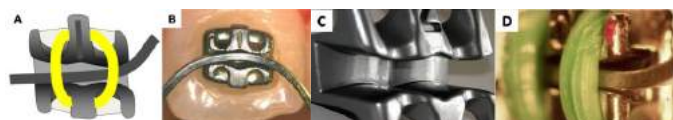


Figure 7

## 2 Early Use Of Rectangular Archwires

One of the problems caused by use of traditional brackets, which have slots ending in 90° angles, is the biomechanical difficulty of inserting rectangular wires at the beginning of treatments and the need to employ “laceback” or “tieback” ligatures to achieve distal movement of the canines (in many techniques the use of “laceback” ligatures depends on the design limitations of the classical straight wire brackets rather than the limitations of the biology of orthodontic dental movement).

The Synergy® brackets provide an ingenious response to these difficulties, with rounded arch slot openings to allow for quick insertion of the superelastic rectangular arch wires and making “tieback” ligatures obsolete in the process. Slots which are rounded both on the floor and at the ends avoid the adverse effects of the early insertion of rectangular arch wires, Synergy® presents simple, but very ingenious new design features that improve the biomechanical effectiveness of the wires, and shorten and simplify treatment, given that less wires, less chair time and less visits are needed.

There are also other self-ligating low friction brackets with similar characteristics to Synergy®, but for me, they are more difficult to handle. They are too bulky, pliers and special instruments are necessary for their handling, on occasions the cap can break, the colorful ligatures which children like so much cannot be put into place without losing part of their biomechanical effectiveness. Also traditional SL brackets cost four times more and the patient does not like to pay more for metallic brackets.

## 3 Individual "Tooth By Tooth" Control Of Tooth Movement And Anchorage

The main advantage of the Synergy® bracket over other low-friction brackets, whether standard or self-ligating, is the ability to control dental movement and anchorage tooth by tooth only by changing the ligature (figures 8-10).

### We Can Basically Ligate In Three Ways

- **In the center "C".** To achieve maximum sliding and maximum tooth movement. We ligate in this way when we require maximum displacement: in initial phases of alignment with round or rectangular superelastic wires, for distalizing canines or lateral sectors etc. (figure 8).

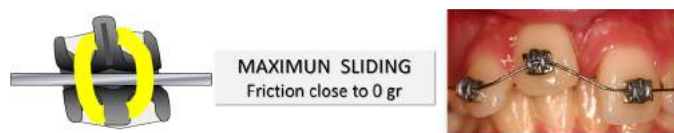


Figure 8

- **Standard "O".** We ligate the corner wings just like a conventional twin bracket, thus achieving maximum control of rotations and a medium amount of sliding. The friction created by contact between the ligature and wire will aid in the degree of tooth movement. We use the low friction ligatures when we need, low friction and control of the rotations at the same time (figure 9).



Figure 9

- **In a figure of '8'.** In this particular case, we produce close wire-ligature-slot contact, thus obtaining total expression of the wire on the bracket and maximum control of the root. Thus, we ligate the teeth where we want to have perfect control over the three planes, where we need to maintain or recuperate torque and/or we want to obtain tooth anchorage through friction (figure 10).

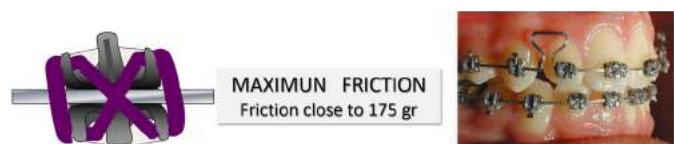


Figure 10

# CLINICAL CASE I (figures 11-16)

BEFORE



Figure 11

AFTER



Figure 12

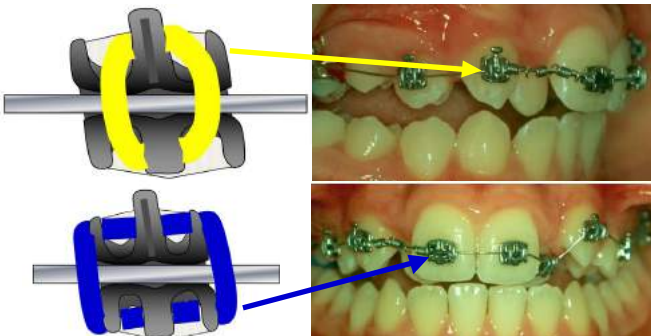


Figure 13



Figure 14

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NO PERIODONTAL P.				
ALIGNMENT	IRREGULARITY			
	HIGH	Copper Nickel-Titanium	.014 RD A07820	.014 RD A07830
		Thermal Plus NiTi	.015 RD E02072	.015 RD E02073
	MEDIUM	Thermal Plus NiTi	.017 RD E02074	.017 RD E02075
	LOW	Thermal NiTi	.017 x .025 E02012	.017 x .025 E02013
LEVELING				
LEVELING	DEEP BITE			
	NORMAL	Thermal NiTi	.019 x .025 E02014	.019 x .025 E02015
	≥ 2/3	Curve of Spee NiTi + Post Elastics	.017 x .025 E02022	.017 x .025 E02023
OPEN BITE		Curve of Spee NiTi + Ant Elastics	.017 x .025 E02022	.017 x .025 E02023
		Thermal NiTi + Microimplants	.019 x .025 E02014	.019 x .025 E02015
FINISHING	AGE			
	Vertical Intercuspitation Occlusal Engage	Braided S.S.	.019 x .025 E02042	.019 x .025 E02043
	1st, 2nd, 3rd, Order Bends	Finishing SWLF Beta III Titanium	.019 x .025 E02052	.019 x .025 E02053
SPACE CLOSING	SPACE CLOSURE			
	Maximum Anchorage + Vertical Control of Incisors	Fast Closing Beta III Titanium Loops	.019 x .025 E02054 (38mm) E02056 (42mm) E02058 (46mm)	.019 x .025 E02055 (24mm) E02057 (26mm) E02059 (30mm)
	Low/Medium Anchorage	Stainless Steel + Crimpable Hooks	.019 x .025 E02034	.019 x .025 E02035

Figure 15

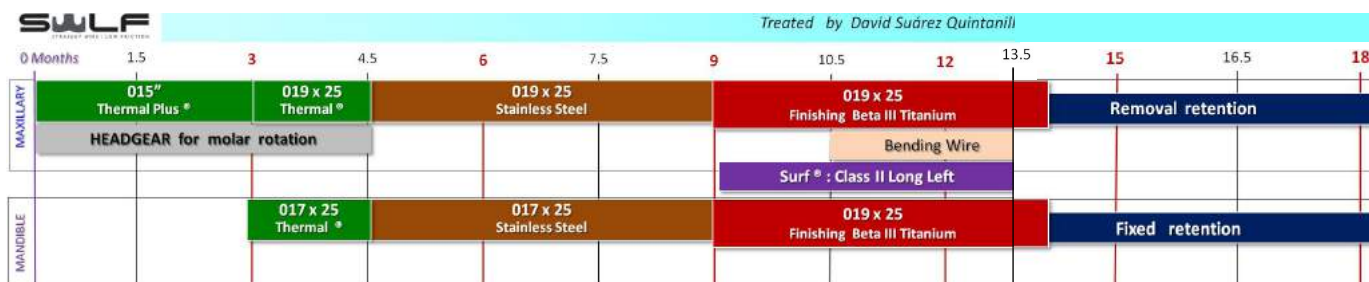


Figure 16

## PRESCRIPTION

With the benefit of hindsight, since the initial Andrews prescription, we are aware that the only novelty in many of the earlier techniques was a small, clinically insignificant, variation in angulation and/or torque. The SWLF® technique would not have merited any attention if it had solely offered yet one more prescription. Although we believe that pre-adjusted brackets help to simplify treatment, we do not feel that small variations in the average in/out, tipping and torque figures, are determining factors when choosing one technique over another.

The scientific literature we have consulted in respect to prescriptions confirms our views and reveals that many of these prescriptions are little more than marketing exercises. Small modifications of a few degrees, particularly when the largest caliber wires used by the majority of practitioners are those which still allow for a considerable degree of free space on the inside of the slot (.017" x .025" in a .018" slot and .019" x .025" in a .022" slot), have no noticeable clinical effect at the end of treatment.

The evident commercial side to prescriptions (their use to differentiate the brackets of one author from those of another) will be clear to the practitioner who analyzes the 'torque in play' between a 'thick' .019" x .025" wire in a .022" slot. The freedom of movement (the degree to which the wire is able to turn on itself within the bracket) is over 20°! Are a few degrees variation in an incisor so important?

Isn't a significant part of the 'battle of the prescriptions' a question of marketing rather than science? Is there such a great difference in the outcomes between one prescription and another? Which has most bearing on the outcome; a few degrees of torque or dental anatomy and the variations between each individual patient and each malocclusion?

We have used these simple and clear ideas as the basis for a prescription which aims to approximate itself to the average values in the most popular prescriptions while leaving the canines and incisors with standard values (figures 17-18). We believe it is important to overcorrect the torque in the upper central incisors (17°) due to their tendency to lose torque during retraction with thick rectangular arch wires. In relation with the Roth prescription we have reduced the overcorrection of the torque and rotation of molars and the inclination of the upper canine by up to 8°; where the use of conventional brackets means that distal shift of the canine is less likely than with SWLF®.

The same philosophy has led us to opt for the standard prescription in the lower incisors, where negative radicular torque of only a few degrees can create undesirable contact between the fine roots of the incisors with the thick cortical vestibular and give rise in certain patients with little inserted gingiva or an unfavourable periodontal biotype to radicular reabsorption and/or gingival recession.

	TEETH	ANGUL	TORQUE
MAXILLARY	11 / 21	3°	17°
	12 / 22	9°	8°
	13 / 23	8°	0°
	14 - 15 / 24 - 25	0°	-7° / 0°
	16 - 26 / 17 - 27		-14°
MANDIBULAR	31 - 32 / 41 - 42	0°	0° / - 6°
	33 / 43	0°	0°
	34 - 35 / 44 - 45	0°	-17°
	36 - 46		-25°
	37 - 47		-20°

Figure 17

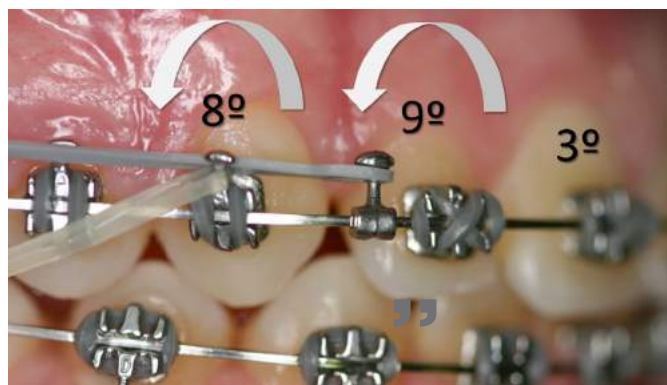


Figure 18

Modifying lower incisor torque is very often more the wish of the orthodontist than a clinical reality; which frequently comes up against the limitations imposed by the gingiva and/or the cortical bone. One of the most fascinating aspects of orthodontics is that no two patients, or their mouths, are ever the same. Practitioners are aware that the values given by the distinct prescriptions are no more than approximations to the ideal and individual prescription for each of our patients, with the result that when we reach the stage of finishing and detailing the occlusion, we have to 'individualize' our prescription with some 1st, 2nd and 3rd order bends in the arch wire.

For this purpose we recommend the use of Beta Titanium III as final arch wires. Beta Titanium III allows us to create bends inside the mouth, without removing the arch wire, in order to make our prescription more precise and tailored to the patient.

## BIOMECHANICAL ADVANTAGES OF THE NEW SWLF WIRES

The team of engineers at RMO® Denver has developed new high-tech arch wires for the SWLF® technique, particularly for the alignment stages (Thermoelastic wires) and the finishing and detailing stage (Beta Titanium III Wires). We made use of the

traditional stainless steel RMO® wires for the finishing and detailing stage and NiTi arch wires using the curve of Spee for levelling. We have also added new .015" and .017" caliber wires which are better adapted to the requirements of alignment, both for .018" and .022" slots.

The new Thermal NiTi SWLF® wire is characterized by a high degree of elasticity and the generation of very light forces, independent of the amount of arch wire deformation. The patient's intraoral temperature aids the phase change (from martensite to austenite and vice versa).

The new thermal NiTi SWLF® wires produce light, constant and prolonged forces, they optimize dental movement during the initial alignment process and allow the patient's best arch shape to 'express itself' through the stimulus it gives to the formation of alveolar bone. Figures 19-22 represent a patient with both upper canines included in the maxillary bone, we treated her with Wilson 3D Quadhelix and Thermal SWLF® wires. We use .019" x .025" stainless steel to control the negative torque of the canines.

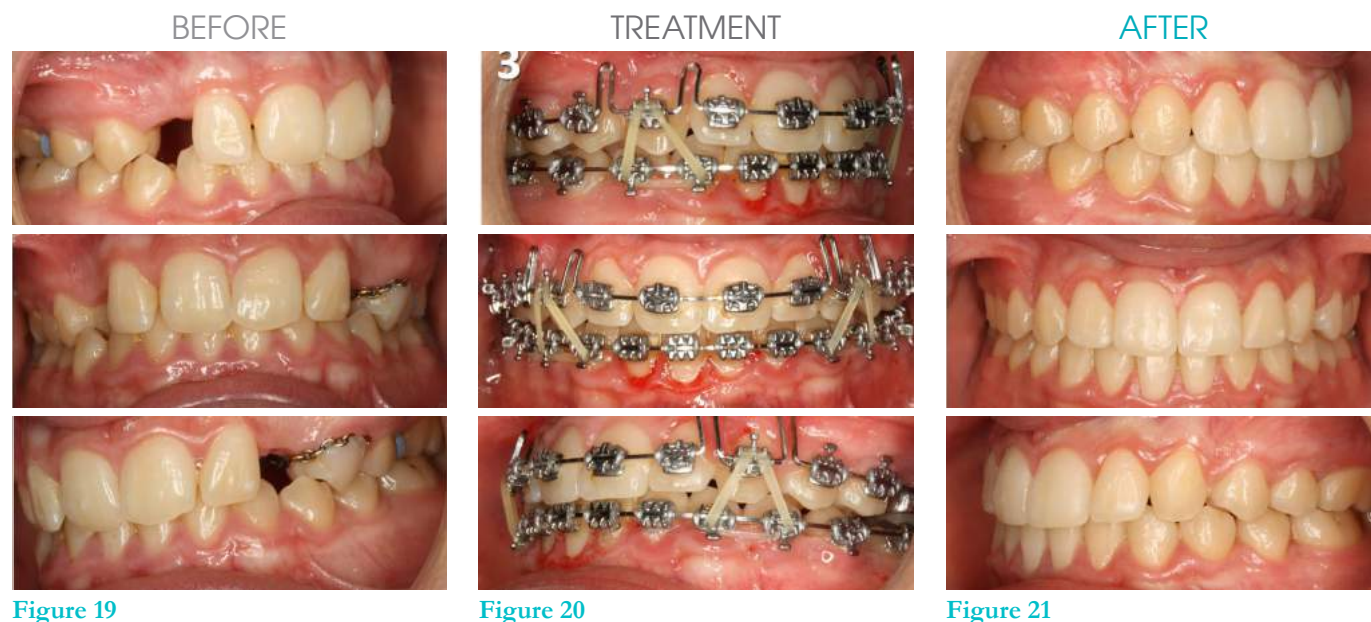


Figure 19

Figure 20

Figure 21

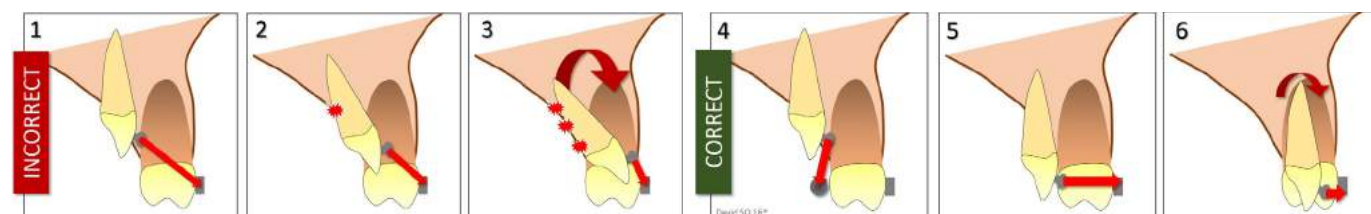
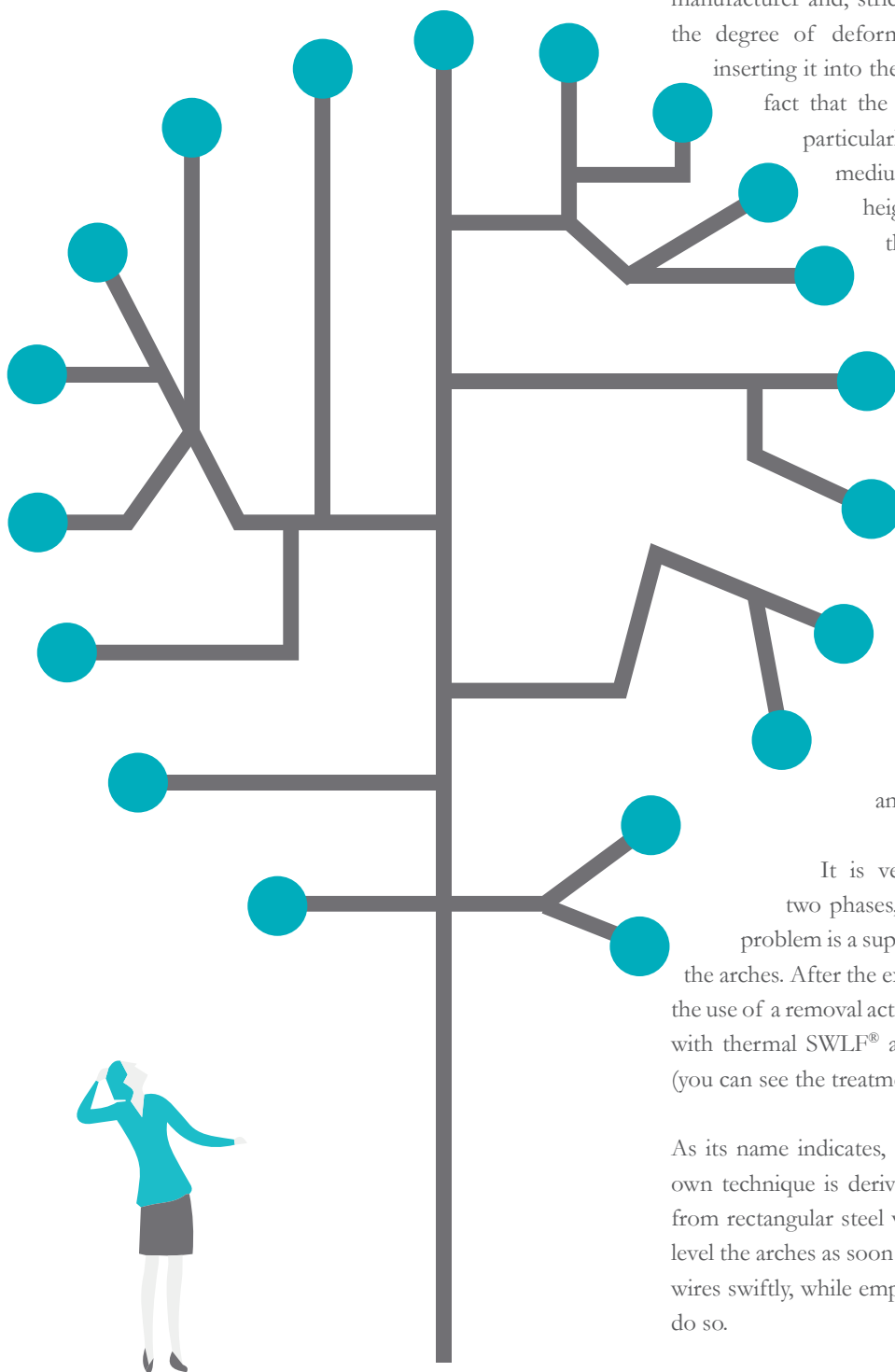


Figure 22



In the Thermal NiTi SWLF<sup>®</sup>, the force is predetermined by the manufacturer and, strictly speaking, remains the same whatever the degree of deformation applied to the arch wire when inserting it into the brackets in order to align the teeth. The fact that the forces are predetermined and constant, particularly when they are located in the light to medium band (between 50 and 100 grams), heightens the effect of dental movement on the physiological force levels and prevents the creation of intense forces in the case of particularly uneven arches.

One practical effect is the ability to create severe deflections in the arch wire, as when aligning canines in high vestibular position, without generating the excessive, even iatrogenic forces formerly produced by traditional NiTi wire, which obeyed Hooke's Law and generated huge forces when deformed, creating a risk of periodontal necrosis, ankylosis and/or root resorption and loss of anchorage and stability in neighbouring teeth.

It is very important to divide treatment into two phases, in figures 23 and 25, the patient's main problem is a supernumerary tooth and the lack of space in the arches. After the extraction of the supernumerary tooth and the use of a removal active plate, and after a rest period, we started with thermal SWLF<sup>®</sup> arch wires, finishing with Orthostripping (you can see the treatment and the results in figure 24).

As its name indicates, the edgewise technique, from which our own technique is derived, draws its principal therapeutic effect from rectangular steel wires. As a result, our aim is to align and level the arches as soon as possible in order to arrive at these arch wires swiftly, while employing the minimum number of wires to do so.

As the new rectangular superwires come in varying pre-set force levels, we can clinically reduce the number of prior round arch wires (we do not see why it should be necessary to use square arch wires). As a result, in most of our treatments we reach .019" x .025" stainless steel arch wires in a .022" slot after the use of just one or two prior arch wires.

**“ THE FACT THAT THE FORCES ARE PREDETERMINED AND CONSTANT, PARTICULARLY WHEN THEY ARE LOCATED IN THE LIGHT TO MEDIUM BAND, HEIGHTENS THE EFFECT OF DENTAL MOVEMENT.**

# CLINICAL CASE II (figures 23-29)

BEFORE



Figure 23

AFTER



Figure 24



Figure 25

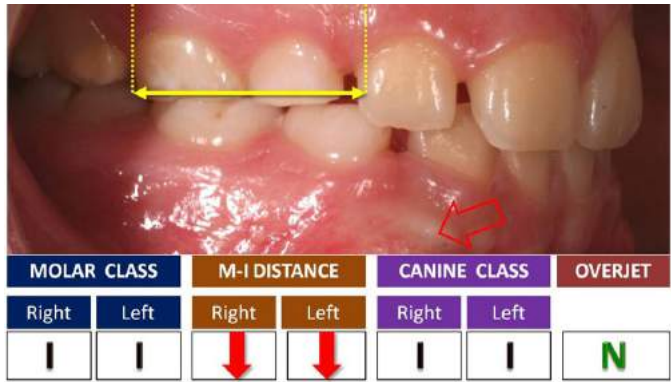


Figure 26

TREATMENT



Figure 27



Figure 28



Figure 29

The new wires have a longer average activation period than traditional NiTi arch wires. We are therefore obliged to amend our practice of seeing patients once a month in order to change arch wires and ligatures, and to allow the wires to act and express the prescription for 6 to 8 weeks. The properties of thermo-elastic wires alter in response to the change in temperature from the austenite to martensite phase.

Given that intraoral temperature is a constant, at 36.5° celcius, the metallurgical industry is conducting research into new wires capable of precise adjustment of their phase change to this constant working temperature. Differential heat treatment also enables one single wire of uniform caliber to contain distinct levels of elasticity/rigidity in the anterior-incisor, premolar and posterior molar regions, which brings us yet closer to E.H. Angle's dream of one single wire for the whole treatment process.

We use the SWLF® Beta Titanium III wire in the finishing phase. It is a titanium-molybdenum wire with the best elastic properties among nickel-titanium wires and the conformation ability of steel. This is the ideal wire for final detailing of the occlusion and is highly effective when combined with short and strong elastics and the special SWLF® step pliers (for 0.5 and 1.0 mm) for intraoral correction of small defects in first, second and third order compensations when we are concluding the treatment.

It is very important to maintain the control of the arch form, figure 33 represents this very well. The patient has Brodie syndrome, a bilateral scissor bite (figure 30), we change the arch form (figure 34) and you can see the results (figure 31) and the follow up, years later (figure 32).

Ligatures, elastic chains and elastic modules play an extremely important role in this technique, and some of these items, as with the new crimpable hooks and pliers system, have been specifically designed by RMO®. When the Synergy® bracket is ligated in the center, and also in the conventional position, it is advisable to use special low-friction ligatures in order to control rotations. The SWLF® technique is excellent at producing light forces, for example moving the upper incisor of figures 35-37. RMO® has developed some excellent low-friction ligatures coated with a polymeric film which increases their ability, compared to conventional ligatures, to slide when they come into contact with saliva. We employ RMO's Energy Chain™ for closing adjacent spaces and the new elastic SWLF® modules for 'remote' traction, e.g. from the canines or posts in .019" x .025" closing loop arches. We feel that modules are more hygienic as well as effective and provide us with a greater degree of control over the force applied.

At the current time, we are designing a new traction system for space closure achieved either conventionally or in combination with TADs, based on elastic modules, superelastic springs and new crimpable hooks.



## CLINICAL CASE III (figures 30-34)

BEFORE



Figure 30

AFTER



Figure 31

FOLLOW UP



Figure 32



Figure 33

TREATMENT



Figure 34

## CLINICAL CASE IV (figures 35-37)

BEFORE



Figure 35



AFTER



Figure 36



TREATMENT



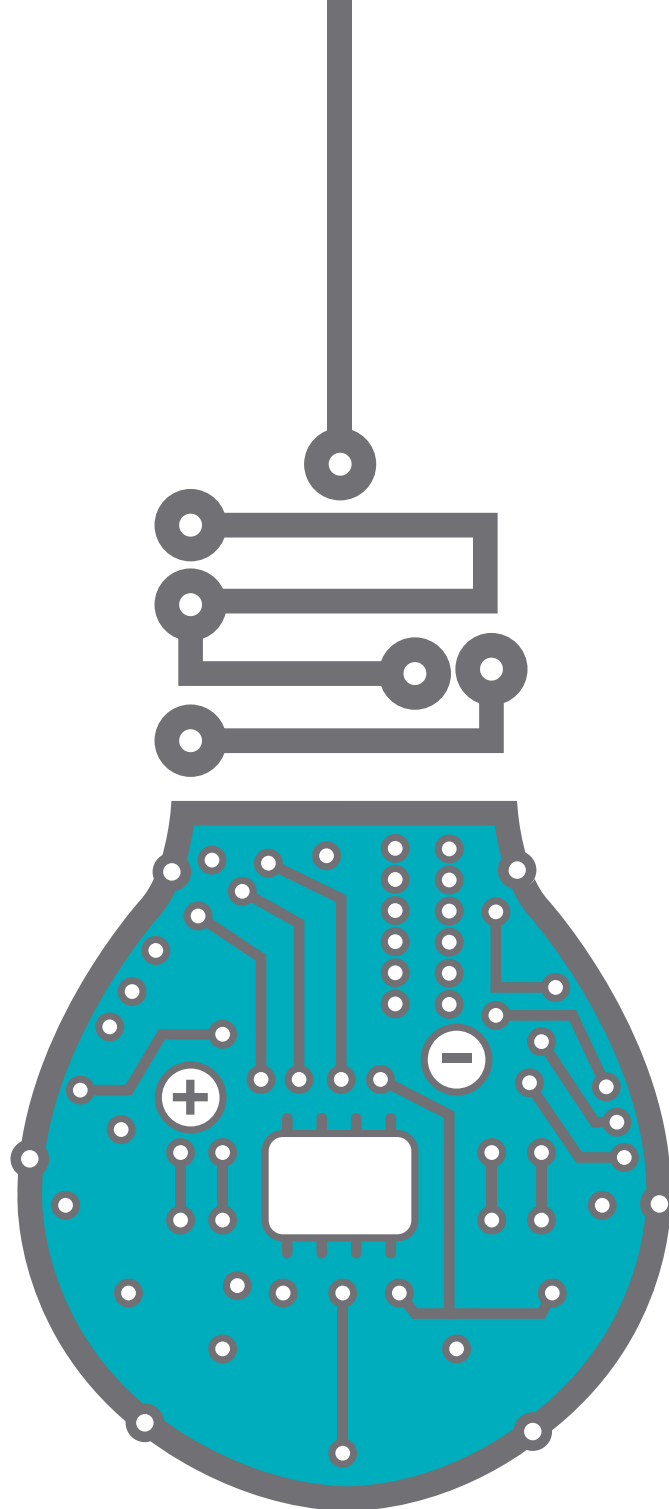
Figure 37

## SELECTION OF PROPER ARCH WIRES IN THE DIFFERENT PHASES OF TREATMENT

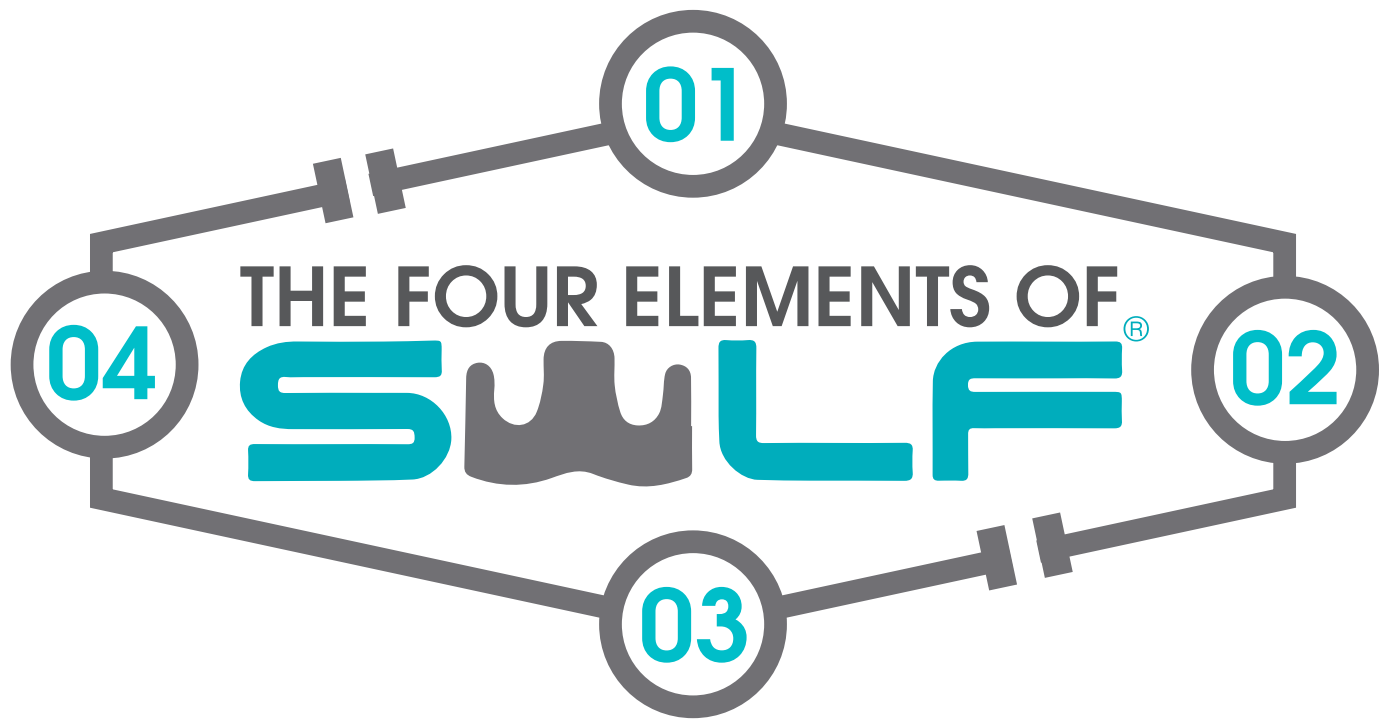
There is a Chinese proverb which states, “Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.” When teaching staff in training courses or introducing students to a specific technique, instructors are often prone to hand out fish rather than teach students to fish. This leads to teachers choosing wires as if from a recipe, which is highly unsatisfactory given that there is no incentive to change to new wires and clinical advancement is blocked. The criteria we use to choose wires is simple and ready to embrace the developments which orthodontic manufacturers will undoubtedly produce in the future. One of the keys to achieving a high degree of clinical effectiveness in orthodontics, i.e. quick treatments with only a few short visits, is the appropriate selection and use of the arch wires. We should use a small number of high quality wires which are able to generate light, constant forces over long periods. The new alloys allow us to reduce the number of wires used in the different stages of treatment.

The choice of arch wires must be practical and versatile, and cannot simply be a recipe which becomes obsolete upon the invention of new and better alloys. On the other hand, it is not an easy or realistic task to program each and every one of the arch wires to be used in a specific treatment from the very beginning. In the SWLF® technique, we have decided to select the preformed arch wires at each phase or stage of treatment independently, having regard to clearly established criteria which are nevertheless open to the diagnostic skill of individual practitioners. After completing each stage, and before commencing the next, we will assess the results achieved thus far and, of great importance, we will ask ourselves whether or not we could achieve more and improved results with the arch wires the patients already have inside their mouths. We should not be in a rush to change arch wires. We must be able to ‘squeeze’ the most out of the new super elastic wires used by this technique.

It should not be forgotten that in the SWLF® technique the way in which the ligatures are used with Synergy® (at the center, conventionally, in a figure of eight, etc.) opens up new possibilities in comparison with other techniques. It is not always necessary to complete all the stages; sometimes the malocclusion might not require levelling (where the overbite and the Curve of Spee in the arches are normal) or space closure. It is not unusual with the SWLF® technique to complete many treatments with two arch wires per arch.



**“ WE SHOULD NOT BE IN A RUSH TO CHANGE ARCH WIRES. WE MUST BE ABLE TO ‘SQUEEZE’ THE MOST OUT OF THE NEW SUPER ELASTIC WIRES USED BY THIS TECHNIQUE.**



## ① ALIGNMENT

### Aims

- Initial periodontal awakening with light forces.
- Crown alignment and straightening control of rotation.
- Dentoalveolar expansion and development.
- Expression of the optimum arch form for this patient.

### Selection criteria

- Irregularity index is the sum of the distances between points of contact of adjacent teeth. The higher the index (high irregularity), the greater the elasticity and the lower the caliber required of the initial alignment arch wire. When irregularity is low, we can commence treatment, thanks to the design of the Synergy® bracket's slot with its rounded ends, with the ligature in the center and with the use of rectangular wires. It must be considered whether the irregularity is localized or generalized.
- Skeletal-dental discrepancy (SDD) or crowding.

### Arch wires

- We require super elastic wires that generate light, constant and prolonged forces. We use the THERMAL NITI, a nickel-titanium thermoelastic wire with shape memory which undergoes a reversible process upon changing phase (austenite phase to martensite phase) as a result of the patient's intraoral temperature. THERMAL NITI is offered in a range of new calibers (.013" , .015" and .017"). The caliber is chosen in accordance with the slot (.018" or .022"), the irregularity index and the SDD.

### Clinical details



- How to ligate. In general, all teeth are initially ligated in the center tie wing to avoid friction and thereby guarantee maximum sliding. On teeth furthest away from the arch we recommend using steel ligatures. As the wire is thermoelastic we cool it to ease insertion. Care should be taken to ensure that the wire remains 'unimpeded', i.e., that it can slide smoothly when we pull on it from behind the tube. If appropriate, at a second appointment, with the same arch, now reactivated, we recommend ligating in the conventional manner to control rotations.



- When to ligate distally. In general, when we do not wish to see a marked increase in the arch length, we recommend ligating the wire distally (either by burning it at the ends or bending it with special pliers). In general, we ligate distally in upper and lower Class I cases with biprotrusion, only on the upper distal in Classes II/1 and solely on the lower distal in Class III.

- Allow the wire to "express" itself. THERMAL NITI is an excellent wire and needs time to take effect. Allow it to act over 6 to 8 weeks before assessing its effects. THERMAL NITI can be 'reactivated' by removing it from the mouth and expanding it with by facilitating its phase transformation. In many cases with dental collapse, we combine our NiTi expansion wires (.014" CuNiTi or .015"-.017" SWLF® Thermaloy®) with functional appliances, like buccal shields, to control the muscles of the Tomes corridor (Figures 38 to 44).

# CLINICAL CASE V (figures 38-44)

BEFORE

AFTER



Figure 38



Figure 39

TREATMENT



Figure 40



Figure 41

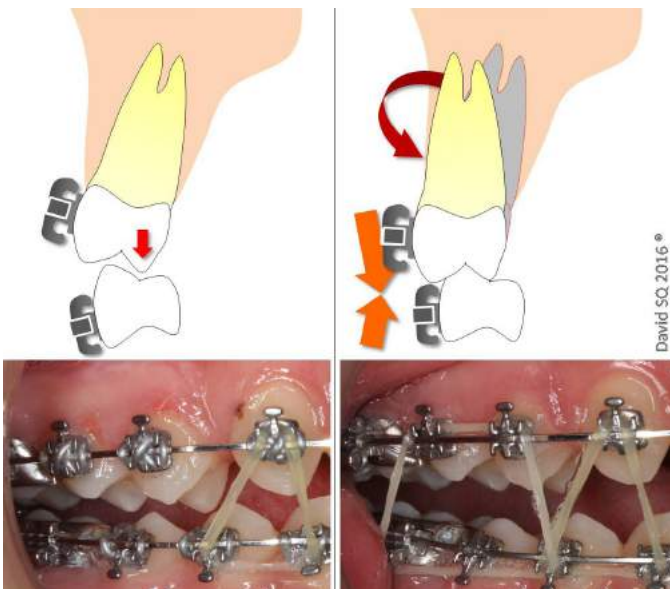


Figure 42

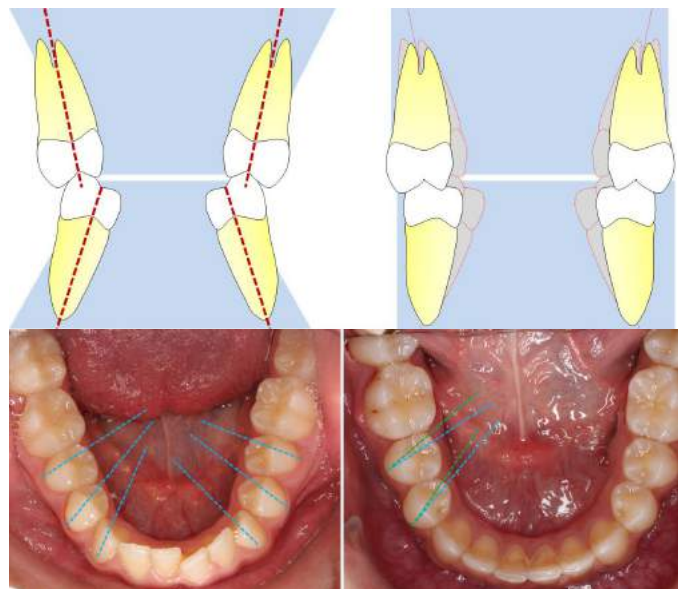


Figure 43

## 2 LEVELING

### Aims

- To correct vertical problems.
- To correct the curve of Spee in each arch.
- To correct increased or decreased overbite according to the facial biotype and the growth tendency.

### Selection criteria

- In patients with increased overbite ( $>2/3$ ) we must evaluate the degree of dental-gingival exposure with posed smile, the facial biotype and the lower facial height. In general, we use NiTi Curve of Spee arch wires in order to intrude incisors and extrude molars. We use posterior elastics to increase posterior extrusion in patients with limited gingival exposure, brachyfacial patients and those with a diminished lower third.
- Where patients have OPEN BITE ( $< 1/3$ ) and to simplify the biomechanics, we use the same arch wires but with anterior elastics (strong and short) for 14 hours per day. This achieves a posterior intrusion vector which strengthens the action of the other intrusion mechanisms (Palatine Bar, High Pull Traction, etc.). In many patients with severe open bite and posterior vertical excess we prefer to combine the NiTi Curve of Spee (in a reverse way) with mini-implants at the level of the molars.

### Arch wires

- For mixed dentition we employ the traditional Elgiloy® Utility Arches by R.M. Ricketts. For permanent dentition we use nickel-titanium preformed Curve of Spee arch wires. We differentiate the biomechanics of incisor intrusion and molar extrusion from that of incisor extrusion and molar intrusion by the differential use of elastics (figures 44-46).

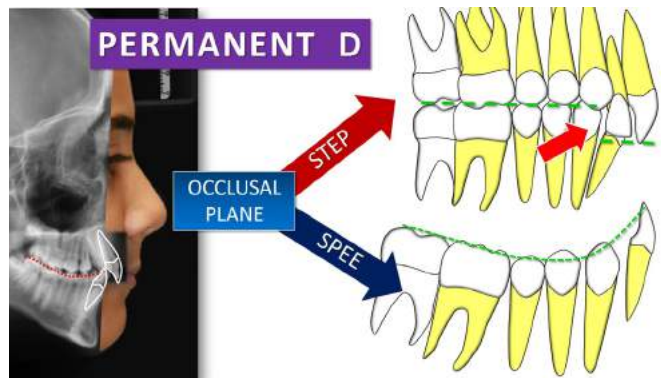


Figure 45

### Clinical Details

- We recommend that the decision as to which wire and biomechanics we intend to use in levelling should be delayed until after initial alignment, as the initial alignment and expansion notably modifies overbite and the vertical relationships. The use of an apparatus to distalize molars (coil-spring with crimpable hooks, Wilson® 3D® Maxillary Bimetric Distalizing Arch, HP Spring-Gear® or Ortoflex- Pendulum) improves the incisal relationship in patients with increased overbite.
- It is essential to determine the origin of the overbite or open bite and its distinct components (excessive anterior intrusion/extrusion or excessive posterior intrusion/extrusion). The degree of dento-gingival exposure, the facial biotype and the growth tendency are three elements to be kept very much in mind. Open bite usually requires a different and more precise diagnosis than is the case with overbite and occasionally requires more complex biomechanics which are beyond the scope of the issues discussed here.

### Clinical Cases:

- Clinical Case VI: Figures 47-52
- Clinical Case VII: Figures 53-56
- Clinical Case VIII: Figures 57-61



Figure 44

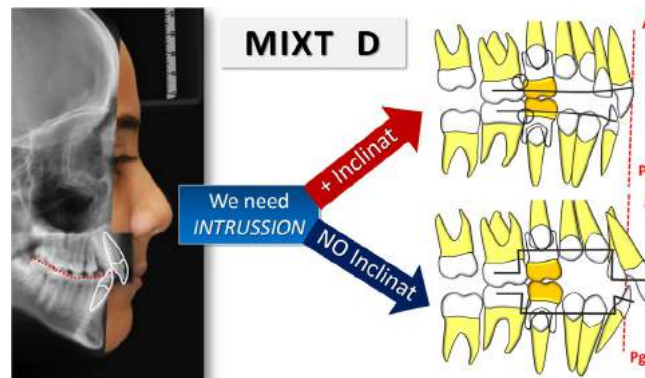


Figure 46

# CLINICAL CASE VI (figures 47-52)

BEFORE



Figure 47

AFTER



Figure 48

TREATMENT

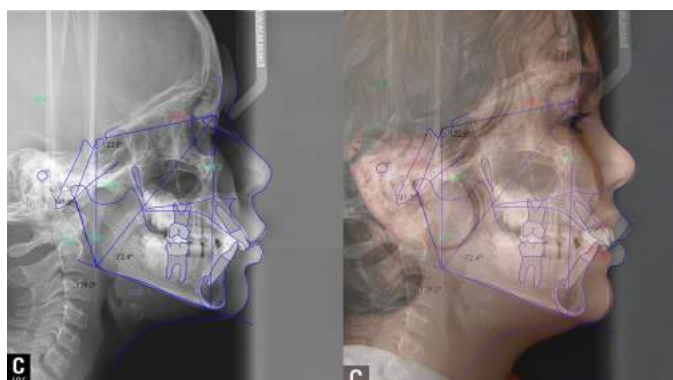


Figure 49

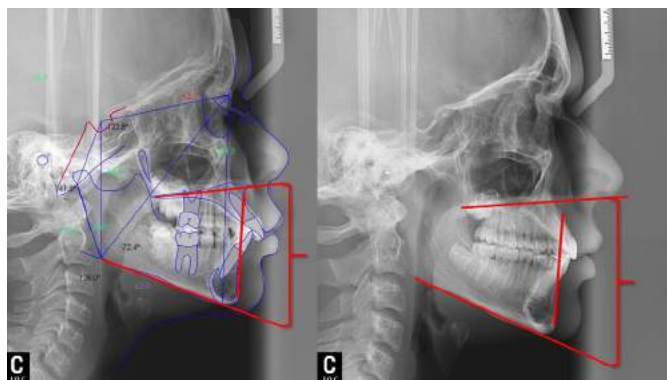


Figure 50



Figure 51



Figure 52

# CLINICAL CASE VII (figures 53-56)

BEFORE



Figure 53

AFTER



Figure 54

TREATMENT



Figure 55



Figure 56

# CLINICAL CASE VIII (figures 57-61)

BEFORE

AFTER



Figure 57

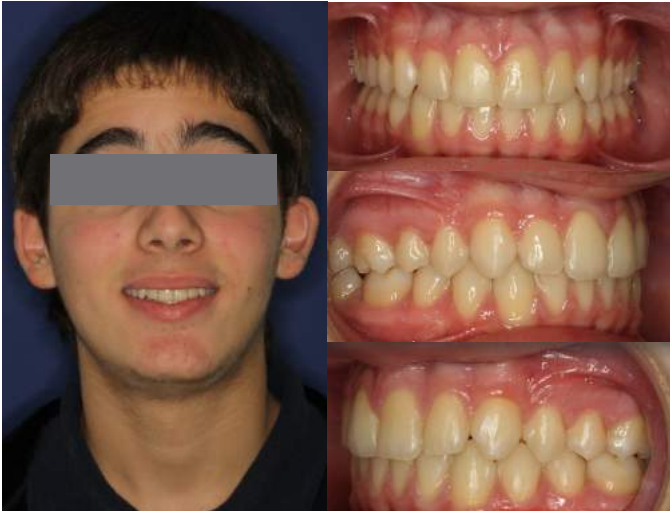


Figure 58

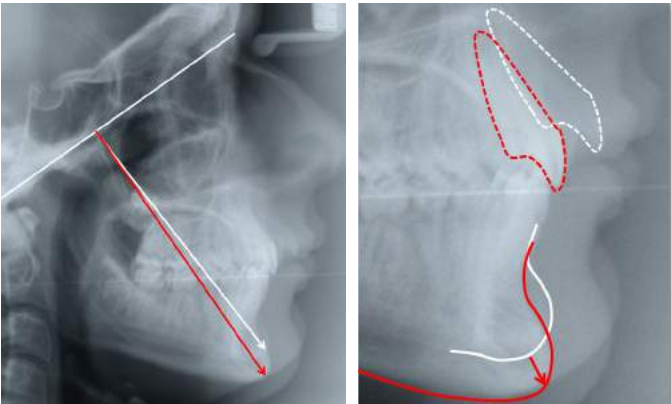


Figure 59

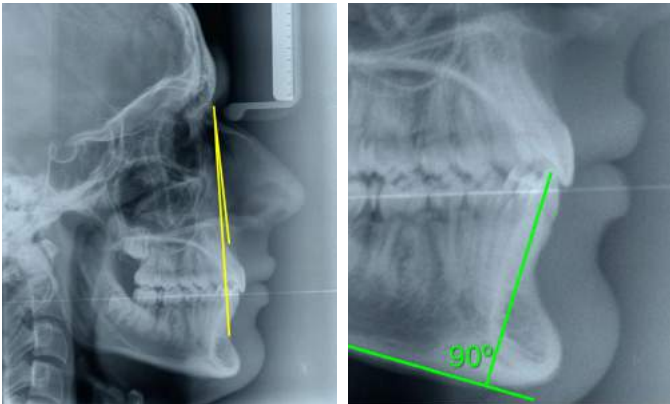


Figure 60

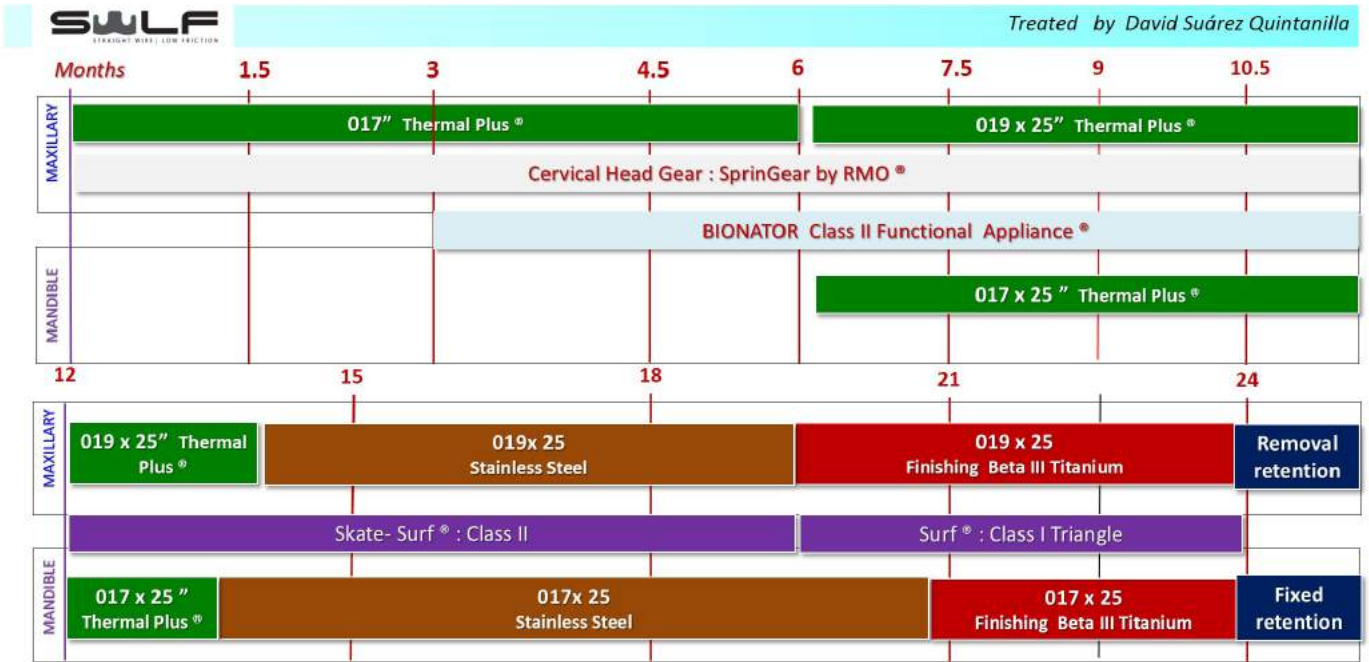


Figure 61



# ENERGY CHAIN™

Outperforms all other elastic chains

Move teeth rapidly and efficiently with RMO's Energy Chain™

RMO's Energy Chain™ is the proven leader among all brands of elastic chain. Numerous universities and clinical researchers have shown that RMO's Energy Chain™ outperforms virtually all other elastic chains available.

## BENEFITS:

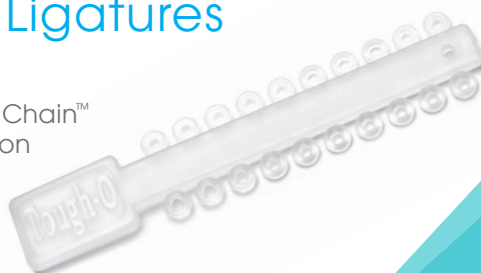
- Patented formula provides light continuous force for weeks
- Independently tested and clinically proven performance can reduce appointment intervals and save valuable chair time
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Synergistic Solutions for Progressive Orthodontics®

### 3 SPACE CLOSURE

#### Aims

- Close the gaps generated by expansion, distalization procedures and extractions in the optimal manner and sequence in view of the final objectives in the case in question.
- Achieve optimal points of interdental contact with sufficiently paralleled roots and good periodontal health.

#### Selection criteria

- One of the aims of the SWLF® technique is to encourage the development of the shape of the patient's potential arch and to avoid extractions whenever possible. As in other Low Friction techniques the SWLF® technique drastically reduces the number of extractions thanks to the effectiveness of thermal NiTi for initial expansion (light and intermittent forces stimulate the growth of the alveolar bone) in conjunction with the use of Functional Appliances (functional intermittent forces), the 3D control and distalization of molars and Orthostripping. Many of the spaces we have to close are those previously achieved by molar distalization techniques. The combination of the Synergy® bracket with steel rectangular arch wire and hooks from which to obtain traction with chains, modules or springs provides surprisingly good results in respect of space closure. We designed a new kind of multipurpose crimpable hook that we use to distalize molars and open or close the space.

#### Arch wires

- Rectangular stainless steel arch wires onto which we intraorally place hooks, have been specially designed for the SWLF® technique by means of special pliers. We are introducing the new Fast Closing “T” loops in Beta II Titanium for patients with large overjet and deep bite (figure 62).

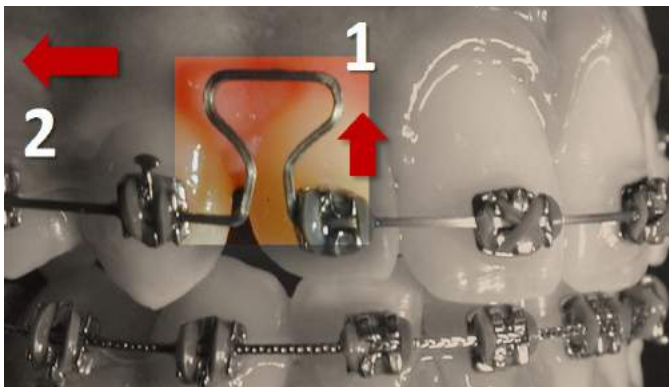


Figure 62

#### Clinical Details

- One of the traditional problems of the straight wire technique is the difficulty of closing spaces with sliding mechanics. SWLF® resolves the difficulty by improving the system by which the brackets slide along the arch wire and vice versa.
- The intraoral positioning of hooks is simpler and more versatile than the purchase of a large stock of arches with pre-soldered hooks. With the SWLF® technique, the clinician can place the crimpable hooks in accordance with the location and number of spaces to be closed and the preferred level of control of anchorage. In some cases, the hooks may be placed asymmetrically (e.g. in order to correct midline problems) or be used as stops on the arch. Intramaxillary and intermaxillary elastic elements may be fitted to the hooks. This system, which has been widely covered in orthodontic literature, is simple to use, very ergonomic and is clinically very efficient.
- It is important to know how to ligate each of the brackets at this stage: normally in a figure of eight on the incisors and in the center on canines and premolars. The hook is most frequently placed distally on the laterals. This is very important in the lower arch of Class II Treatments.
- One of the most important elements of our therapeutic philosophy is the new approach to the mandibular Class II malocclusions. In our protocol we combine, at the same time and in the same phases of treatment, functional and fixed appliances. Normally we start with the alignment of the incisors (with brackets and thermal wires) and upper molar control (quadhelix, head gear, palatal bar, etc.) and just after, and at the same time, we place a functional appliance (like Ortoflex Class II® by Santiago G Ferrón, Frankel Regulator, Bionator or Twin Block) that the patient uses only during the night and at home. With the functional appliance we are “jumping the bite” and afterwards, we use short and heavy intermaxillary Class II elastics to engage, and fit, the occlusion. Now, the dental occlusion is the “new” functional appliance, so we have a lot of time to stimulate the growth of the mandible. We don't have research about this idea, but we have a lot of clinical cases with very good results. You can see our excellent results with this technique in two clinical cases:

Clinical Case VIII : Figure 63-70

Clinical Case IX : Figure 71-74.

# CLINICAL CASE IX (figures 63-70)

BEFORE

AFTER

FOLLOW UP



Figure 63

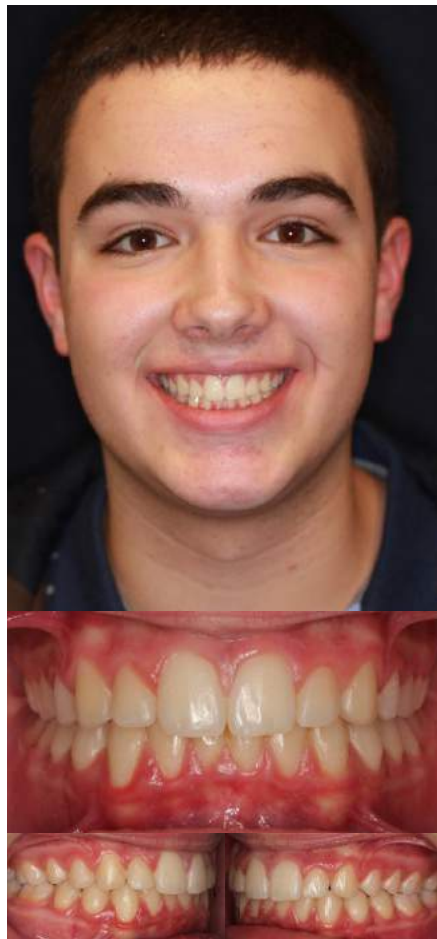


Figure 64



Figure 65

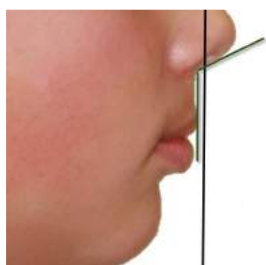


Figure 66



Figure 67



Figure 68

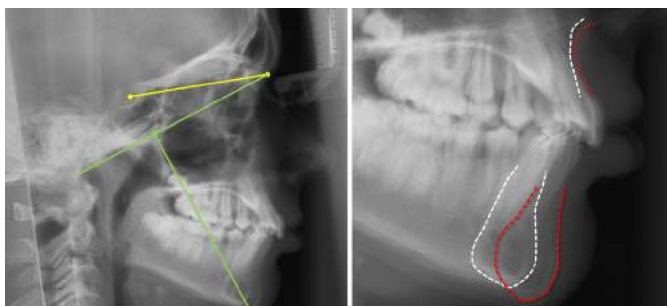


Figure 69



Figure 70

# CLINICAL CASE X (figures 71-74)

BEFORE

AFTER



Figure 71



Figure 72



Figure 73

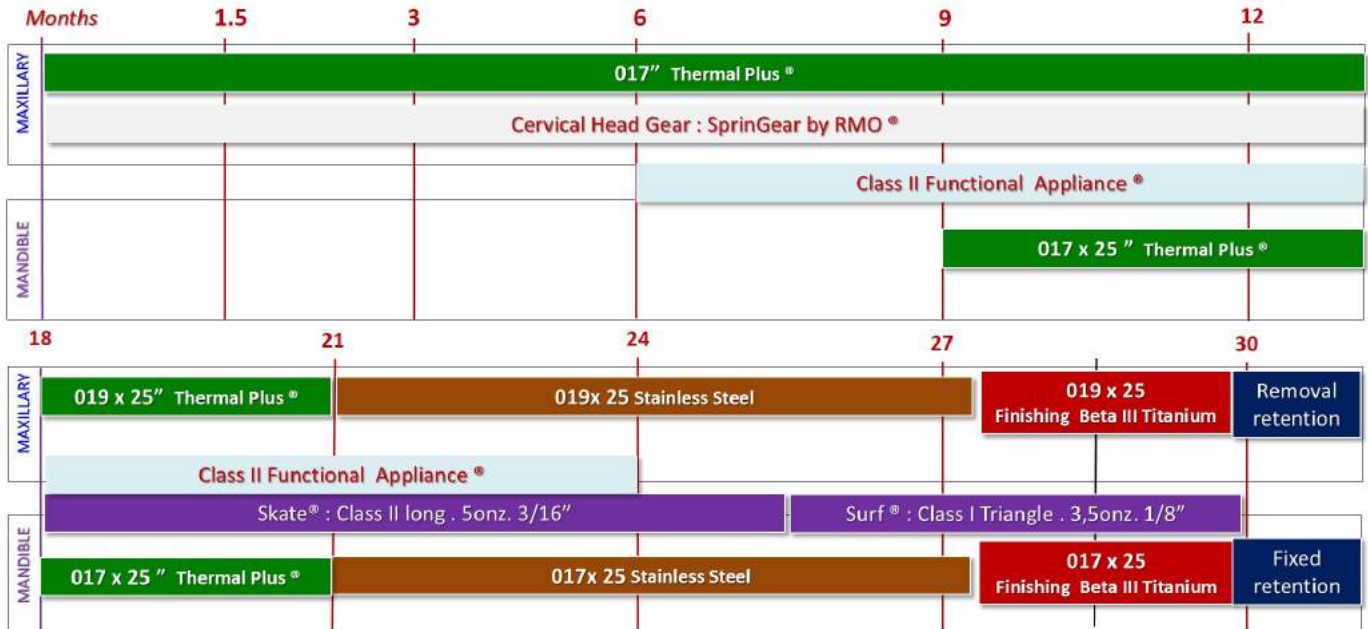


Figure 74

## 4 FINISHING

### Aims

- To consolidate the results achieved in the previous therapeutic stages.
- To close spaces completely, parallel the roots and control radicular torque.
- To correct all the positional anomalies of the teeth and to establish definitive points of contact.
- Detailing and final intercuspitation should be as close as possible to the ideal occlusion.

### Selection Criteria

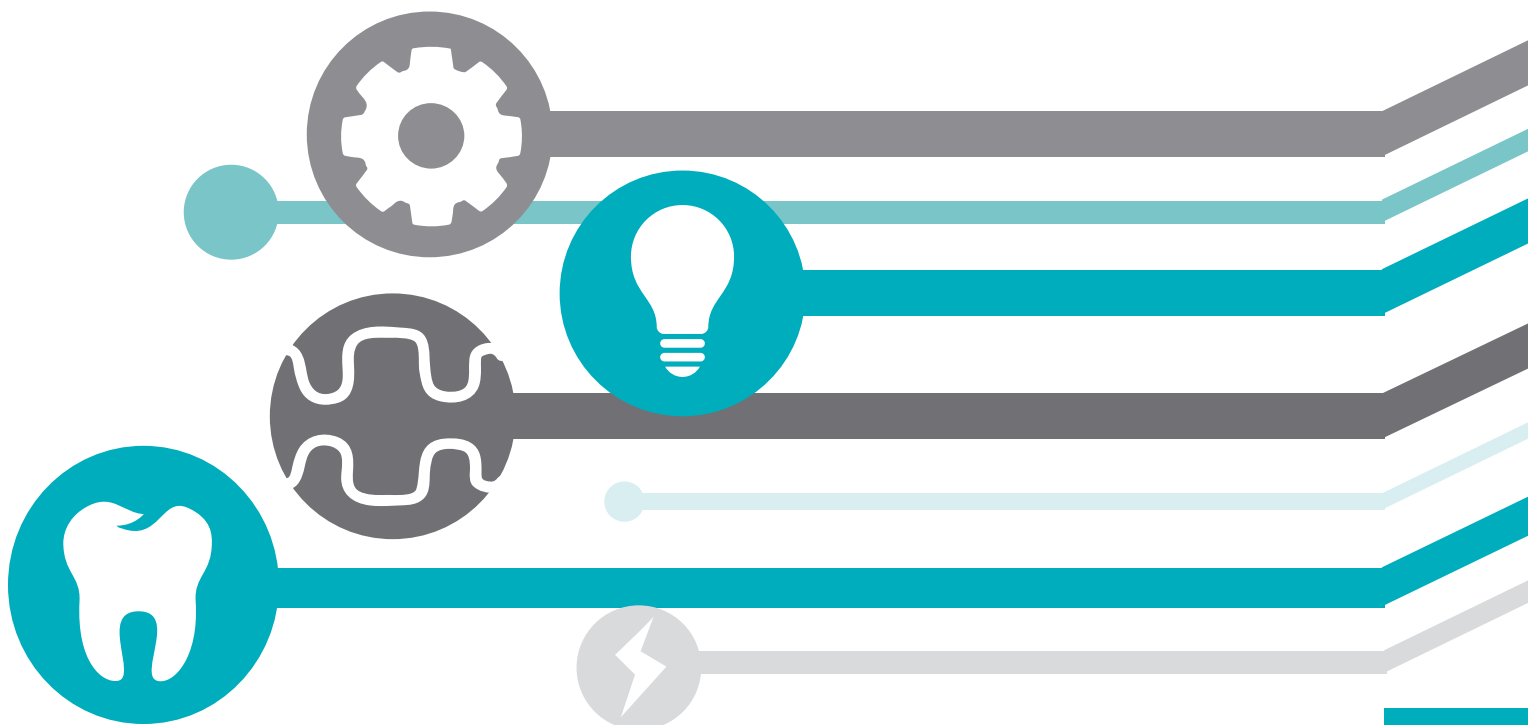
- The arch wire of choice for final detailing of the occlusion is undoubtedly Beta Titanium III, a cutting-edge high-tech wire which combines the best of nickel-titanium and steel. The wire allows for bends and final compensation corrections without removing the wire from the brackets and, somewhat surprisingly, without causing discomfort to the patient. Although we could routinely use it at this particular stage, we actually use it when we require a range of final detailing steps (in-set and off-set correction, inclinations and vertical problems) or we wish to retain torque and the patient's biology hinders the finishing process (periodontal patients, combined treatments, etc).
- As a second choice, in very favorable circumstances, we employ stainless steel 8-strand braided arch wires.

### Arch wires

- Beta Titanium III arch wires, a high quality titanium-molybdenum alloy specifically created for the SWLF® technique.
- Stainless steel 8-strand braided arch wires, as an alternative to the above.

### Clinical Details

- It is the final detailing and finishing which distinguishes one orthodontist from another. Mistakes at this stage of the treatment cannot be disguised and are clearly noticeable to the patient, and to other practitioners. Some of the time we have saved by using the SWLF® technique for alignment and space closure must be spent on final detailing.
- It should be considered whether or not the patient or malocclusion tend towards natural intercuspitation in order to decide which type of archwire to use (braided when the answer is 'yes' and Beta Titanium III when the answer is 'no' and there is still a lot of 'work' to do).
- We must combine intraoral detailing with ample use of short and strong elastics which help to settle the occlusion. If necessary, and the requirements of the anterior and posterior groups are quite distinct, we can cut the upper arch into three segments and apply elastics differently.
- For final posterior occlusal settlement in the last two months of treatment, we recommend using the 'free' wire, i.e., ligated at the center on the premolar and canine premolars.



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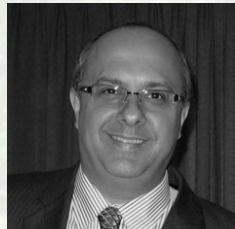
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Anyone who has registered for Module 2 of Package A will be automatically register to this package (Advanced Course).

### Course Objectives

The participant will receive the basic knowledge to perform Bioprogressive Therapy Philosophy possibilities in their practices. Theory and Practice (Laboratory) classes will be given. At the end of the full program the participant will be able to diagnose and deliver a treatment plan according to the Bioprogressive Therapy Principles. Customize each treatment and choose the appropriate mechanics to each case, Sectional, Segmented or Straight Wires. Additional Techniques will be taught (MEAW).

### Certification

A joint certificate from the Foundation for Modern Bioprogressive Orthodontics and the Department of Orthodontics, University of Illinois at Chicago, will be awarded to the participant at the completion of the two-module or advanced course .

**FOR MORE INFORMATION AND TO REGISTER VISIT:**  
**[ce.bioprogressive.org/Register-Now](http://ce.bioprogressive.org/Register-Now)**

# RAPID PALATAL EXPANDERS (RPE)

## PRE-BENT RAPID PALATAL EXPANDER



Longstanding reliability and performance for any lab application. Arms pre-bent to precise anatomical angulation for ease of adaptation and fabrication.

### BENEFITS:

- Saves valuable device fabrication time
- Anatomical angulation allows for precise fit for every patient

## MICRO RAPID PALATAL EXPANDER



Uniform expansion with substantially smaller body than competing expanders. It features longer arms providing additional anterior support and stability to the patient. The Micro Expander can also be used for mandible expansion.

### BENEFITS:

- 50% smaller than competing RPE's
- Increased versatility and adaptation
- Can be used for mandible expansion applications

## ORTHOGONAL RAPID PALATAL EXPANDER



Orthogonal Rapid Palatal Expander Ideal for smaller or narrow palate applications. Orthogonal arms allow fabrication of devices with limited dimensions while maintaining comfort in size and stability. Orthogonal position of arms allow optimal positioning and adaptation to narrow palates.

### BENEFITS:

- Ideal for small or narrow palate devices
- Reduces overall size of the device



**WITH DR. DAVID SUAREZ  
QUINTANILLA** D.D.S., Ph.D.

---

A LEADER IN MODERN  
ORTHODONTICS



**Q:** Tell us a little about yourself and your background in orthodontics.

**A:** My name is David Suarez Quintanilla, I am 54, and I am the Chairman of the Department of Orthodontics at the University of Santiago de Compostela, Spain. I am a doctor of medicine and surgery, specializing in Dentistry and Orthodontics. I have dedicated my life, in addition to my 5 children, to orthodontics and was fortunate in presiding over the European Orthodontic Society and am a member of the Royal Academy of Medicine and Surgery of Galicia. More than 15 years ago I launched the Masters of Orthodontics at the University of Santiago de Compostela (USC) and am currently the director of research in orthodontics and dentofacial growth in the USC (figure 1).



Figure 1

I have practiced orthodontics exclusively for over 25 years and treated more than 5000 patients, mostly with the SWLF® technique. Throughout my career I have used different types of devices and systems and I know all major contemporary fixed techniques, their advantages and limitations. About 15 years ago I began to develop a therapeutic philosophy with protocols for diagnosis and treatment in order to improve the standardization of procedures for clinical orthodontists in training.

With the help of the RMO® engineers for over 10 years, I incorporated one of the best and most efficient combinations of brackets and wires existing in the market, the Synergy® bracket and the Thermalloy® and Beta III Titanium wires, supported by numerous scientific papers into my clinic.

**Q:** How do you see the present and the future of Orthodontics?

**A:** You only have to walk through the incredible and huge commercial exhibition of the American Association of Orthodontists to be aware of the technological changes that our specialty is undergoing. I think that our practice is going to undergo an authentic paradigm shift, a revolution, during the next five years, because of the definitive clinical introduction of three-dimensional imaging and virtual reality.

I don't have the slightest doubt that the intraoral scanner will go on to take a central place in our offices, and that it will form the basis for a large part of the diagnostics and therapeutic planning. Stereo lithographics files (STL) are going to allow remote diagnostics, and treatment planning centers will be of great importance (figures 2-3). Little or nothing will remain in 2020 of the dedicated orthodontist who, with his polished and shining plaster models and classic 2D cephalometrics, bends his back and his wires as he attempts to resolve the majority of his patients' malocclusions.



Figure 2

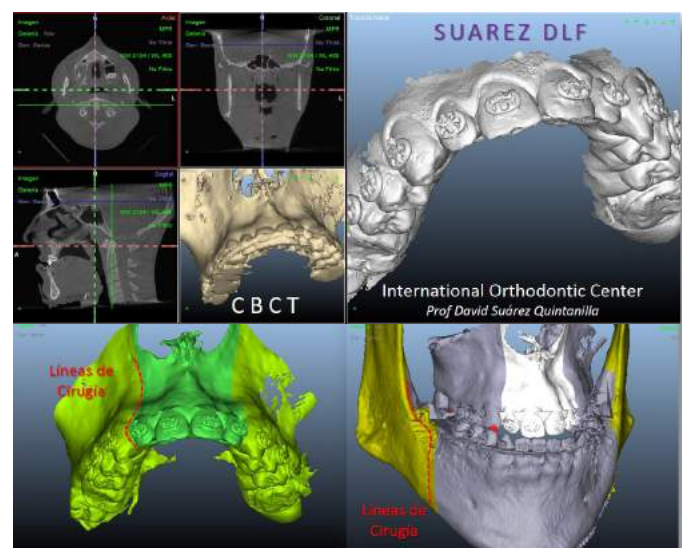


Figure 3

The new orthodontist has to be an expert in 3D imaging, virtual reality and the digital treatment of images, and combine the classic ideas of management and marketing with new concepts of interconnectivity with the patient, neuromarketing and emotional orthodontics. The classical orthodontist understands that his principal objective is the treatment of malocclusions; the new orthodontist understands that his principal objective is clinical success, achieved through the happiness that his patients feel in having a new smile.

Orthodontics has to open its sphere of action to other pathologies, such as the prevention and treatment of the problems of TMJ or Obstructive Sleep Apnea syndrome, as well as a more integrated smile design. (figure 4)

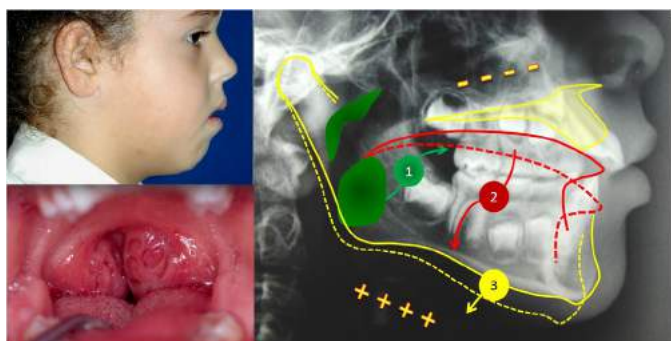


Figure 4

**Q:** In the future, what kind of devices and techniques will be used the most?

**A:** The three main groups of devices and techniques will continue to be: the plastic aligners, multi-bracket fixed appliances and the functional appliances. The world of plastic aligners is going to grow exponentially due to the improvement of the software for the 3D planning, virtual simulation, 3D printing and the memory shape polymers; capable of deforming during insertion in the mouth and then recovering their original form.

Advances in the research of polymers and nanotechnology are going to improve the efficiency of the aligners and also perhaps robotics and magnets, but in particular the electronic (AcceleDent, Aerodentis, etc.) and the microsurgery (micro-cortectomies) that are incorporated into these systems to increase their efficiency. The improved efficiency of aligners is going to increase the demand for all types of treatment in orthodontics. Regarding brackets and wires, the industry will continue to develop new alloys, such as the GUMMETAL® (figure 5).

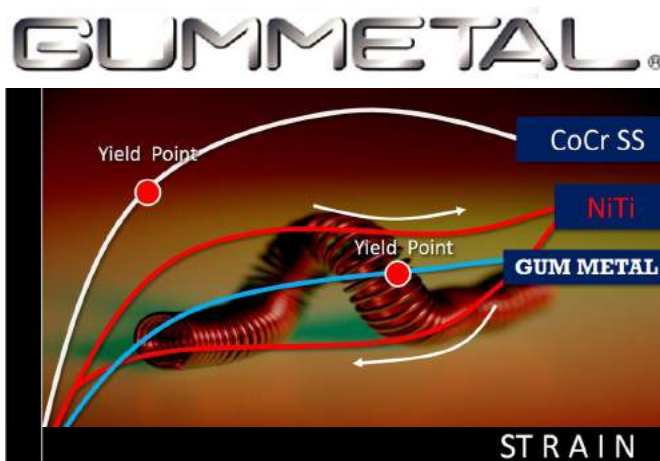


Figure 5

In this regard, Rocky Mountain Morita Corporation®, has launched on the market the new alloys of GUMMETAL®, that combine the elasticity of the alignment wires with an incredible capacity to be bent. We think that the experimental and clinical tests that we have performed open a new horizon, by reducing and simplifying the number of archwires needed for the treatment. For example, we can align, level, and finish the case, making multiple intraoral compensation bends, with the same arch. I hope the use of GUMMETAL® will represent a new advance in our SWLF® technique in the coming years.\*

I think that the current fashion of trying to do the complete treatment in permanent dentition with only brackets and wires, will pass, as all fashions do, and we will return to starting many of our treatments in mixed dentition and incorporating and combining the functional appliances with the fixed. The simplicity and high efficiency of the Quadhelix 3D by Wilson, or the Utility Arch by R.M. Ricketts are indisputable in my opinion, and help to prevent or simplify future treatments to the permanent teeth. I am convinced that the orthopedic and functional appliances are also going to undergo a new impulse and that the orthodontic community will realize the importance of the treatments in mixed dentition with this type of equipment.

One of the characteristics of the success in the treatment of Class II malocclusions with retrognathic mandible using the SWLF® technique, is the simultaneous combination of multi-bracket fixed appliances and functional appliances. We have eliminated the previous orthopedic phase, to combine and concentrate all-in-one, significantly reducing the need for patient cooperation and the length of the treatment, and obtaining results that would be impossible to achieve with only brackets, archwires and intermaxillary Class II elastics. (figures 6-9)

\*GUMMETAL® is currently only available in Japan through RMMC®



Figure 6



Figure 7



Figure 8



Figure 9



**Q:** Will there be increasingly less use of brackets and wires? What is their future?

**A:** Orthodontics a dental specialty with a favorable outlook, due to its increasing popularity and acceptance in adults. I think there is going to be a stratification and differentiation of the patients. The aligners and invisible braces are going to increase the number of adult patients prepared to undergo an orthodontic treatment. It is evident that these, especially those whose malocclusions or dental problems aren't especially serious, are going to opt for aesthetic and/or invisible systems. However, we must not forget that in spite of the progresses of plastic aligners and even the lingual systems, or appliances CAD/CAM, the traditional orthodontic multibracket with the latest generation alloys, continues to be the best option, or at least the most efficient, for children, adolescents and adults with complex malocclusions.

The new designs of brackets, in combination with the new thermoelastic alloys, have substantially reduced the duration of

our treatments and continue to offer an optimum control of orthodontic tooth movement. Some adults may also opt for the traditional or aesthetic brackets, but only when the treatment period is short. Today, that is possible thanks to the very high efficiency of the new bracket designs and the super-elastic wires. Perhaps this is the moment, in the light of scientific evidence, to examine the true advantages of the new designs of brackets and wires, and to separate these from the propaganda.

We need protocols of selection and handling for the new brackets and wires, and new biomechanics better adapted to their evident clinical advantages. From a technological point of view, new types of brackets will continue to be developed, with simpler and more ergonomic designs, adapted to the properties of the new wires. The more traditional orthodontic techniques, based on the Classic Straight Wire, need to be urgently adapted to the new technological advances.





**Q:** In today's market, various techniques exist that promise faster, more efficient orthodontics without extractions. What would you say to a young orthodontist who was thinking about the technique to choose for their practice?

**A:** The skills in orthodontics can be divided into two major groups: those that are common to every professional and form the core of our specialty, and another group of skills, that are more variable and subject to technological developments. Without a doubt, the Evidence-Based Treatment has meant a paradigm shift in our field and led us to abandon some of our concepts or techniques because they lacked the necessary scientific backing. In other cases, they have been reaffirmed (thinking for example, in the association between Rapid Maxillary Expansion and the Facial Mask, the control of friction, the association of retrognathia with sleep apnea syndrome, or in microimplants).

We are in a moment of crisis and paradigm shift; as the philosopher of science T. Kuhn would say, and we need to re-evaluate our concepts and techniques in the light of the scientific evidence. Furthermore, the pressure of the orthodontic industry on the professional is enormous and it is not easy to distinguish between clinical reality and pure propaganda.

Naturally, the SWLF® technique has, as others do, its own brackets, wires, microimplants and accessories, but perhaps the biggest difference with many other techniques, resides in the clarity of purpose, the concept of emotional orthodontics, the important role of neuromarketing in the clinic's success, and something that I think is very important: the creation of numerous protocols, that are clear and easy to apply and guide the professional, step

by step, towards clinical success. It is true that the use of brackets, like Synergy®, for the selective control of friction, tooth by tooth, the new super and thermoelastic alloys, the sequenced Orthostripping® and the SWLF® microimplants, have meant a drastic reduction in the need to perform extractions, but we don't believe that indiscriminate over-expansion and lack of respect for the limits of tooth movement, that others seem to defend, is an option that guarantees the health of our patients' smile in the long term.

We don't want to become known, as others are, for the "three R" Technique" (recession, reabsorption and relapse). But just as we don't share, in any way, the policies of indiscriminate dental expansion, we also believe that you should use the most modern technologies to favor the maximum development of the alveolar process.

A very important concept in orthodontics is efficiency; obtaining the best results with the minimum effort, time and materials. I think, in all sincerity, that the clarity of our protocols help the clinician to choose the easiest and most straightforward path to clinical success, to the satisfaction of both the patient and the professional.

Furthermore, the Synergy® bracket has a similar cost to the traditional brackets, but has a series of undeniable biomechanical advantages derived from the special design of its three wings and slot with rounded corners. Simply changing the placement of the ligatures we can achieve ranges of friction from almost 0 to more than 200 grams.

The special, unique slot design, allows us to introduce flexible rectangular archwires of .019" x .025" a few weeks after treatment start. The combination of these elements increase the efficiency of the treatments with SWLF®. You can see different clinical cases (figures 10-12).

I would say to the young orthodontist that he/she should review the principal and latest scientific articles on bracket design and friction and the advantages and clinical limitations between one and the other. This way they would see how Synergy® and our SWLF® Technique have important scientific backing (figures 13-15).



Figure 10



Figure 11



Figure 12

**Q:** What importance do microimplants and orthostripping have in the SWLF® technique?

**A:** The SWLF® technique was one of the first to incorporate and produce a protocol for the use of microimplants. We use the Dual-Top RMO® range, which offers the important advantage of the button and bracket head design, being self-tapping and self-drilling and being manufactured with surgical grade titanium alloy. I cannot comprehend orthodontics without the use of temporary anchorage devices (TADs) both for their ease of use, safety, versatility, economy and professional differentiation. I use them both to maintain and lose anchorage

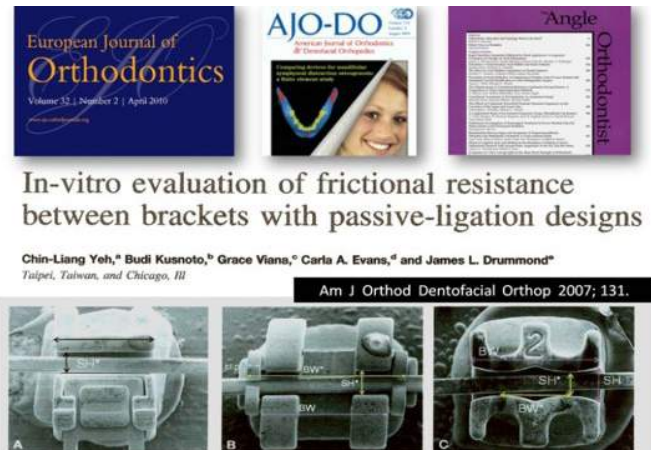


Figure 13

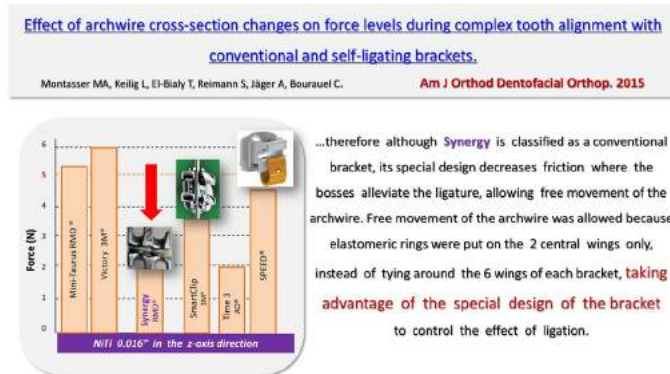


Figure 14



Figure 15

and they are highly useful for vertical dental control in adults (intrusion of incisors and molars) as well as when combined with intermaxillary elastics (without affecting the arch where the microimplants are placed). In some cases, they allow us to apply biomechanics that were unthinkable years ago, especially in adults, and in others to reduce treatment time. We believe in their orthopedic possibilities in children, but we need more and better research in this respect. I think that the microimplants represent an orthopedic alternative, particularly in open bites, or orthognathic surgery. You can see different clinical cases in figures 16-20.

Mechanical orthostripping with files of increasing thickness (Intensive®) is an excellent option in adults to avoid extractions and give the teeth the desired morphology and size: We can easily obtain, and with no future risk for the enamel (in the form of decalcification or increased sensitivity), up to 6 mm (canine and incisor area) and 8 mm (if premolars are included). The amount, however, greatly depends on the dental size and morphology.



Figure 16



Figure 17



Figure 18



Figure 19



Figure 20



**THE SWLF® TECHNIQUE WAS ONE OF THE FIRST TO INCORPORATE AND PRODUCE A PROTOCOL FOR THE USE OF MICROIMPLANTS**



**Q:** Rocky Mountain Orthodontics®, which makes your SWLF® technique, has always been linked to the improvement of breathing in children; in the words of its president Martin Brusse, now deceased, a Breathing Enhancement Orthodontic Company. What does this mean to you, what is the connection with your therapeutic philosophy?

**A:** The slogan of RMO® has more meaning today than ever. I have had the opportunity to work on different research projects at the University of Santiago de Compostela, which revealed the intimate relationship between the position of the mandible and the space in the upper airway passages. We now know that an under-developed, atrophic maxilla, or a retruded mandible can lead to the appearance of an Obstructive Sleep Apnea-Hypopnea Syndrome (OSA), with the serious repercussions that this pathology has in children (clinical profiles of cerebral hypoxia, somnolence, inattention and educational achievement, irritability including sudden death) and adults (exponential increase in arterial hypertension, ictus, heart disease, impotence, etc.).

The relationship between skeletal malocclusions and these types of pathologies, that can potentially compromise the quality of life and life expectancy of those who suffer from them, tells us that orthodontic problems go far beyond aesthetics or dental alignment. This explains our concern for the early and “on-time” treatment of orthopedic maxillary problems. Dental Maxillary Expansion, with Quadhelix 3D by Wilson, or skeletal (with Rapid Expansion), or mandibular advancement in Class II malocclusions (with Liberty Bielle or functional appliances), are characteristics of our early therapeutic approaches. But we must not forget the treatment of adult patients with dental expansion and mandibular advancement, or orthognathic surgery. Cephalometric analysis designed by Dr Ricketts already placed great importance on the assessment of the upper airways in orthodontic treatment.

**THE SLOGAN OF RMO® HAS MORE MEANING TODAY THAN EVER.**



**Q:** In the Straight Wire Low Friction (SWLF®) Technique you talk a lot about Clinical Success and Emotional Orthodontics. What do you mean?

**A:** If the SWLF® Technique was limited to the use of the Synergy® bracket, a particular number of wires and also a particular biomechanics, it would be one more technique among those in the market. The SWLF® Technique embraces a complete treatment philosophy, that includes a specific 3D diagnostic system, numerous diagnostic and treatment protocols and a particular, and I think innovative, vision of treatments in mixed dentition for the Class II malocclusions, dysfunctional problems and TMJ disorders. However, what presides over our therapeutic objectives is the clinical success of the professional, that the efficiency of the system and its results achieves the satisfaction and happiness of our patients.

This is the meaning of what we call Emotional Orthodontics: ensuring that the new smile we are going to achieve for the patient improves their quality of life, their expectations, their self-realization. One of the keys of Emotional Orthodontics is the making of a digital and/or real mock-up that convinces the patient of the need to undergo the treatment that we propose to them. There is nobody better than us, the orthodontists, to make a digital diagnosis of the smile that, through neuromarketing, produces the emotion and need in the patient to make a change in their life through a new smile. In the SWLF® Technique we do not sell straightened teeth, not even smiles or health, what we really selling are dreams and happiness.

**Q:** Is the emotional factor so important in the SWLF® Technique?

**A:** In a dental appointment there are two kinds of patients: the rational, who come with trouble, pain or because they need a filling, and represent 80% of all patients, but only 20% of the income. The emotional patients, who ask us for a radical change to their smile, a complete aesthetic improvement, make-up only 20% of patients yet represent some 80% of the income for a dental clinic. The emotional patient, in contrast to the rational, looks for something more in the dental treatment; self-affirmation and happiness through the attainment of a spectacular smile, and they are prepared to invest their time and money to achieve it. We have to be aware of the immense value that the smile and facial appearance have today. The orthodontic clinic has a high percentage of adult emotional patients and we have to know how to respond to them; finishing many of our treatments with whitening procedures or veneers.

One of the characteristics of our technique is the Emotional Smiles Design, showing the professional how to sell emotionally and helping them to understand how our diagnosis and treatment plan should be presented to the patient: how to sell convincingly, but addressing the emotional, not the rational part of each patient. How to awaken the emotion, the desire to change through our treatment. It involves adding value to our work through the service given and the emotional happiness of our patients. The Emotional Smiles Design includes a protocol of cephalometrics, digital imaging, real and virtual mock-up, etc.

**Q:** What concerns do you have for the future of Orthodontics?

**A:** Undoubtedly new technologies, whilst bringing new advantages, will also give rise to new challenges. From an artisan orthodontic view, where the value of the professional lays in his/her diagnostic capacity, expertise or manual skills when bending wires, we are crossing the frontier toward the territory of digital technology where, to the vast amount of diagnostic information provided by the new digital and 3D radiological systems, must be added the appliances that are prefabricated and personalized for the patient with CAD/CAM techniques. I think that the orthodontic industry has seen a new business opportunity, one that without doubt, is much better than the simple production and sales of brackets and wires, in the diagnosis and fabrication of pre-adjusted appliances, and wants it to be the industry, (and not the professional as before), that generates the added value of the appliances.

We must not forget the attempt to simplify the work of the general dentist, with little or no training in orthodontics, to ultimately replace the orthodontist in the diagnosis and treatment plan and supply them with the necessary appliances for the correction of their patient's orthodontic problems, and the instructions for their use.

I think that this attempt to create a short-circuit or by pass between the professional and the general dentist, trying to ensure that they keep the lion's share of the added value of the products or appliances, is in the minds of many companies. Unfortunately, for the traditional orthodontist, the new technologies, beginning with the intraoral scanner and ending with the new memory shape polymer aligners, the indirect bonding of brackets and archwires made by robotic systems, are going to change the panorama of orthodontics throughout the world. The companies are aware that the exclusive fabrication of brackets, bands and wires will not be sufficient to guarantee their future and that they need to gamble for the new digital market.

Another problem is the relocation of the diagnostic and production centers, as well as the creation of remote treatment planning centers. We think that both digital radiology, as well as the STL 3D files that allow virtual images to be obtained that can then be reproduced, via 3D printers, in any part of the world. This is going to generate a considerable increase in tele-orthodontics.

The practitioner will send his files and, in a few days, receive at home the treatment plan and all the appliances and devices necessary for the patient's treatment, using internet and videoconferences for activation and control.





**Q:** According to what you have just told us, how do you see orthodontics in the coming years?

**A:** It is important to differentiate between countries, like the USA, where there is a reasonable number of orthodontists that feed off the general dentists, and there is a beneficial mutual interchange of patients between the specialist orthodontist and the general dentist. In other countries like Spain, the plethora of professionals has resulted in the reconversion of many specialist orthodontic clinics. In any event I think that the orthodontist's high skill set allows them to re-focus their professional practice, therapeutic philosophy, marketing strategy (without the need to renounce the practice of orthodontics only) toward a practice centered in emotional orthodontics and neuromarketing.

I see the new professional in orthodontics as a specialist in emotional patients; those who want to transform their lives, self-esteem and happiness through a new smile and a new face. The new orthodontist prepares a treatment plan, designs the patient's new smile and face, explains to them, through the virtual, or real mock-up, how it could be achieved, and directs and coordinates a specialist team (general dentists, periodontists, etc.). We think that the majority of the emotional patients, those who want to make an important change to their smile and /or face, require, to a greater or lesser extent orthodontic treatment, and in every case, a diagnosis undertaken by the specialist best qualified to do so: the orthodontist. It is true that with this philosophy we will lose referring dentists, but we have to think of what we will gain.

**Q:** You have been President of the European Orthodontic Society. What is your opinion on the teaching of orthodontics around the world?

**A:** I think that the leading international academic and scientific institutions (WFO, EOS, AAO, etc.) agree on the need for full-time university training for a minimum of three years as a guarantee of quality. The problem lies in the adaptation of the programs and especially that of the teachers. Countries like the USA have always taken dental training very seriously and have exercised an important control over the number and quality of the postgraduates. In Europe, the European Orthodontic Society, the European Orthodontic Teachers Forum and the Network of Erasmus based European Orthodontic Programs (NEBEOP) strive to realize quality postgraduate programs. The European university postgraduate exchange programs are being of great assistance.

My colleagues at the EOS have struggled every year to improve the postgraduate training in the European universities. It is very important that the program has an important component in the basic sciences (anatomy, craniofacial growth, biomechanics, etc.), that the teachers, especially in the clinical phase, are orthodontists of recognized standing and experience and that each student starts and finishes at least 50 cases of different complexity, employing all kinds of techniques.

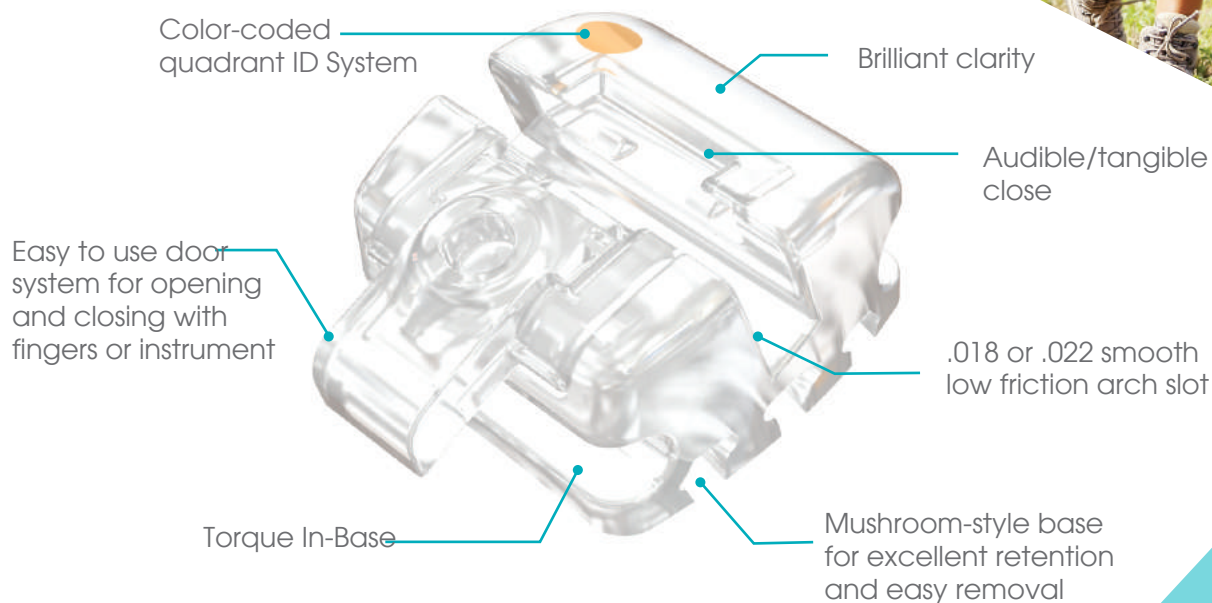
Now, from the IADR (International Association for Dental Research) and thanks to professor Cristina Teixeira, of New York University, we are going to start a new stage, boosting the importance of the sciences and basic and clinical research in Orthodontics. Unfortunately, here in, Spain, we belong to that group of countries where disastrous educational planning in dentistry, and postgraduate orthodontics that lack the minimum standards of quality. The business of university master's programs in orthodontics, can be the only explanation for the huge number of programs in our country. The universities and private schools of Spain train every year half as many orthodontists as the USA.

This plethora of orthodontists coupled with the opening of hundreds of chains of clinics, low-cost insurance, and the economic crisis, has brought us to an extreme situation, wherein hundreds of young orthodontists “with their briefcase” make the rounds of general orthodontics clinics doing the orthodontics they can, or are allowed to do. Spain, in this sense, is a good example of what a modern, developed country that aspires to have quality orthodontics should never do. From these lines I want to advise other countries that the plethora and unchecked postgraduate training is a one-way street, that today prevents the majority of professionals in Spain from practicing orthodontics with dignity and minimum standards of quality and professional ethics.



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Aesthetic Self Ligating Bracket



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Synergistic Solutions for Progressive Orthodontics®

# DENTAL MONITORING™ AGE OF THE APP

KEEPING UP WITH ADVANCING CULTURE AND TECHNOLOGY

BY DR. LOUIS-CHARLES ROISIN



“There’s an app for that” is one of the most iconic phrases of the early 21st century, but it took about a decade to apply to healthcare. Nowadays, thanks to an extraordinary leap in the technical advances and affordability of high tech, it seems that healthcare is currently living its mobile technology boom.

Here are some reasons behind this rise: first, Millennials (also known as Generation Y, those born around the turn of the Century) are coming into their own as patients and practitioners, and they’re taking their love of everything connected right to the heart of the clinic. Second, with smartphones now ubiquitous, what was once extraordinarily rare technology, such as motion sensors or live data-streaming, is now the norm.

As a result, more and more patients are looking for new ways to get involved with their treatment and communicate with their health care provider: a 2015 Salesforce study shows that more than 70% of American Millennials would welcome the use of an app provided by their doctor to manage their health, and more than 60% would want to provide their doctor with ongoing health data via a mobile or wearable device. The natural consequence of that was the meteoric rise in the number of fitness and health mobile apps, tracking everything from general well-being to symptoms of depression or even fetal heartbeat.

**“70% OF AMERICAN MILLENNIALS WOULD WELCOME THE USE OF AN APP PROVIDED BY THEIR DOCTOR TO MANAGE THEIR HEALTH”**

What we’re seeing is the advent of “Connected Health”, a model where technology enables healthcare providers to deliver care remotely with more control, less chair time and a more rational use of resources. Connected Health aims to maximize health resources by providing opportunities for patients to better self-manage their ongoing treatments and easily engage with clinicians.





So far, the closest equivalent in orthodontics was the occasional patient sending a smartphone picture of their mouth through office's email, and that's a pity. Orthodontic treatments are long-term affairs, dependent on many factors, not least of which is the cooperation of the patient and their active engagement in their treatment. The length and success of a treatment is also affected by the availability of relevant information.

Learning that a treatment objective like the expected value of a maxillary expansion has been reached as soon as it happens can save both patient and doctor the hassle of back-and-forth between the patient's home and the clinic. Learning of an diastema opening soon enough can potentially save months of corrective action. All of these factors point to a new opportunity for Orthodontists: joining the ever-widening family circle of Connected Health practitioners, for more confidence in the outcome and progress of their treatment plans. As of now there's only one system that allows Orthodontists to remotely monitor their patient, and that system is Dental Monitoring™.

### THIS SOLUTION IS BASED ON THREE INTERCONNECTED PLATFORMS:

**1** A smartphone app dedicated to the patient, that regularly prompts them to take intra-oral pictures and guides them through the process of taking quality pictures. This app is freely downloadable on the App Store (iPhone) or Google Play (Android) but requires the validation of the patient's orthodontist to function. The beauty of this system is that it presupposes no particular equipment or skillset on the part of the patient, instead utilizing the smartphone of the patient and guiding them through the process of taking intra-oral pictures.



**“ ALL OF THESE FACTORS POINT TO A NEW OPPORTUNITY FOR ORTHODONTISTS: JOINING THE EVER-WIDENING FAMILY CIRCLE OF CONNECTED HEALTH PRACTITIONERS, FOR MORE CONFIDENCE IN THE OUTCOME AND PROGRESS OF THEIR TREATMENT PLANS.**

**2** An evaluation platform that uses the pictures in two distinct ways. A team of orthodontists working at Dental Monitoring™ verifies the pictures to provide comments, notifications or alerts on the current state of the patient's mouth: hygiene, occlusion, state of the appliances.

For a more complete monitoring, the orthodontist provides a 3D model of the teeth of the patient (scan or impressions), and the pictures are used to update this model regularly, providing precise data on tooth movement, tooth shape change, treatment activity, and post-treatment stability.

The DM orthodontists also offer their perspective on all movement calculated, to alert doctors on additional parameters such as unexpected movement and abrasion, so doctors gain a better understanding of the kinetics of the treatment.

**3** The third platform is the doctor's dashboard. Entirely web-based, it provides several tools for case analysis and communication with the patient.

For simple visual evaluation, the photos are made available to the orthodontist as soon as they're taken.

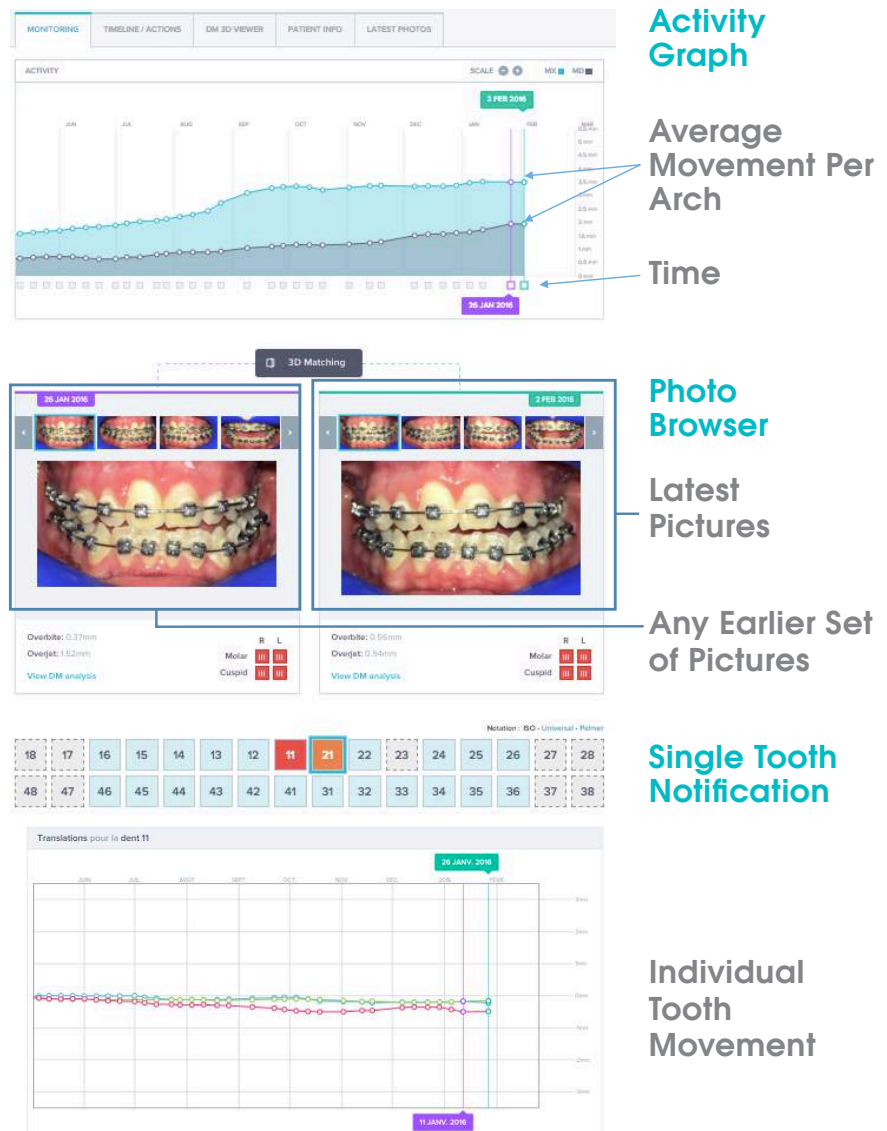


Figure 1

The DM dashboard is the Orthodontist's toolbox. Organized from least to most complex, each tool helps you gain maximum insight in minimum time.

#### Optimize Treatment Time & Control Stability:

The activity graph provides you with real time evaluation of the treatment activity, to allow for optimized and individualized care:

- Optimize treatment time with better understanding of individual biological response
- Measure impact of treatment on non-treated arch
- Verify stability of post-treatment at a glance

Compare the current situation with similar views in the past  
The patient takes regular pictures, allowing the doctor and their team to always have access to updated visuals, and compare current visuals with any and all previous dates. The photos are available immediately after they have been taken, providing the most efficient response time.

#### Avoid Aggravation:

DM provides a detailed analysis for each tooth: the movement is quantified in all directions and the doctor is alerted if one of these parameters reaches an unexpected value.

#### Be Warned In Time:

To ensure that you receive the most relevant information without having to look for it, each alert is sent via email to the doctor's team, and listed in the dashboard's notification center

**“AS OF NOW THERE'S ONLY ONE SYSTEM THAT ALLOWS ORTHODONTISTS TO REMOTELY MONITOR THEIR PATIENT, AND THAT SYSTEM IS DENTAL MONITORING™”**

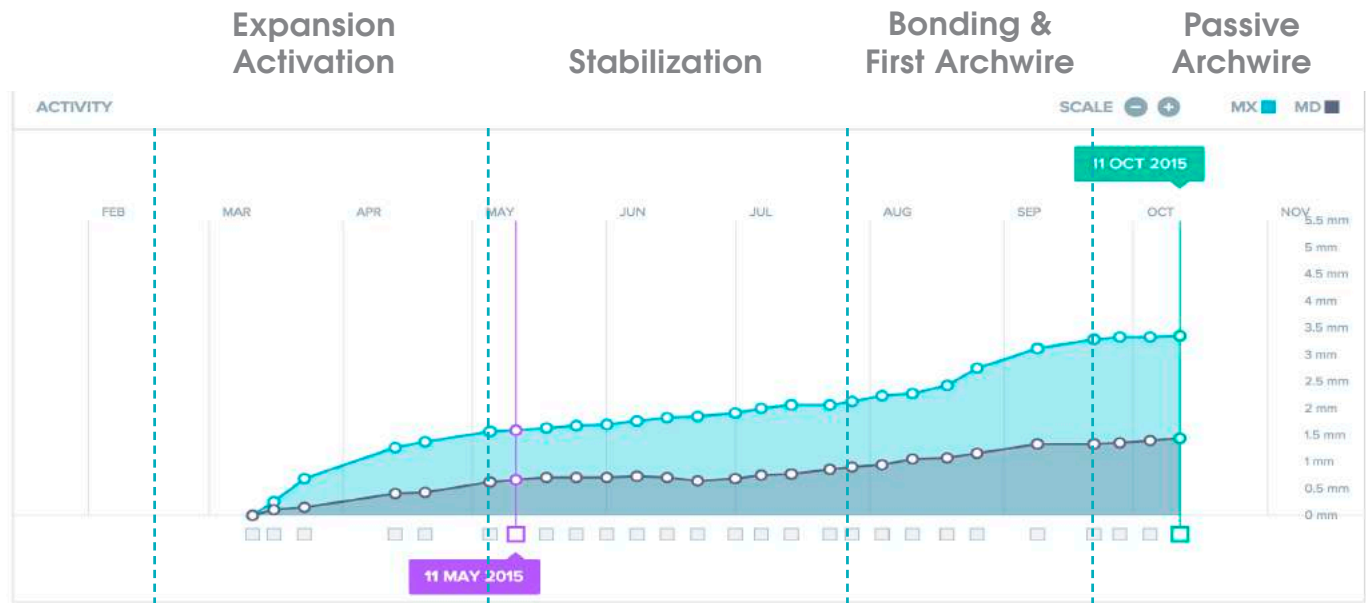


Figure 2: Expansion Control

## PRE-TREATMENT: MAXILLARY EXPANSION AND TOOTH ERUPTION

### PHASE 1: EXPANSION CONTROL

The first phase was maxillary expansion, PVS impressions were made and sent to Dental Monitoring™ for scanning. The DM monitoring was started, and a request was made to the DM team to alert the doctor when the expansion had reached 2.3mm, saving the family of the young patient long trips to the clinic. After receiving a notification that the expansion had reached the desired width, the orthodontist brought the patient back in.

### PHASE 2: STABILIZATION AND OBSERVATION OF ERUPTION

The patient couldn't be bonded until after a phase of stabilization and the full eruption of adult teeth. The next phase of DM monitoring included control of tooth movement to verify the absence of relapse, as well of visual control of the eruption of the full adult dentition. As you can see in figure 4, there was a relapse of the expansion before the full eruption. Receiving that information before the patient came back to the clinic allowed for a revised treatment plan that was ready when the patient walked into the clinic.



Figure 3: 3D Model of Achieved Full Expansion

## ACTIVE TREATMENT : OPTIMIZATION AND INCIDENT CONTROL

### PHASE 1: OPTIMIZATION OF WIRE CHANGE

The activity graph offers precise data on the evolution of the activity of an archwire or aligner, which is data that can be used to individualize care, or generalized to have true statistics of activity across techniques.



Figure 4: Activity Graph



**“ YOU HAVE A NEW NOTIFICATION FROM DENTAL MONITORING: NOTICEABLE ALIGNER UNSEAT ON 33 ”**



In the case below, the orthodontist then used the DM dashboard to send a simple message to the patient:

**"Hi there. Dental Monitoring notified us that your aligner is not tracking on your bottom right canine tooth. Try to use your "chewies" in that area to see if you can get that to seat down all the way. I would also like you to stay in your current aligner until you take the next set of photos."**

The next photo exam showed that the tooth was now tracking properly. And the patient was able to continue his treatment without further incident. Catching this incident and solving it within the week it happened rather than the next time the patient happened to visit the clinic meant saving chair time, treatment time, travel time to and from the clinic for patient and doctor, for a perfectly controlled treatment outcome.

## PHASE 2: INCIDENT MANAGEMENT



Figure 5: Bracket Interference Front

figure 5 shows interference between teeth and brackets on 4, 5 and 6. The doctor received an alert. The 3D Matching was used to determine whether there was any tooth wear or unexpected movement and confirms that there was none. An appointment with the patient is scheduled immediately to avoid damage and bond occlusal pads, the results of which you can see on figure 6.

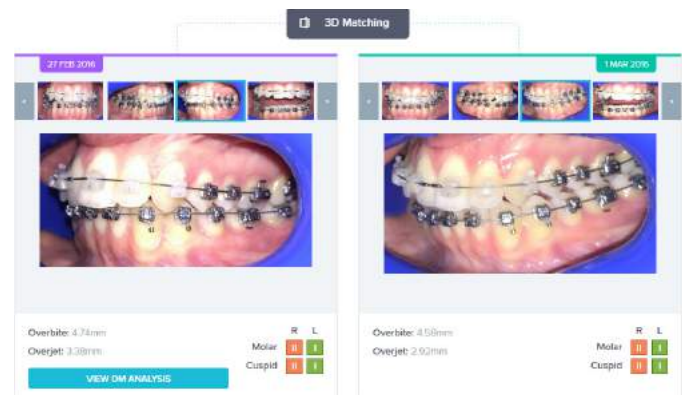


Figure 6: Bracket Interference Side

## POST-TREATMENT: CONTROL STABILITY REMOTELY

Relapse is a universal concern. While no doctor or technique can guarantee perfect stability, DM offers enough data to stave off incidents before they lead to serious problems or necessitate costly retreatments with a disappointed patient. The patient can receive a remote analysis regularly, for as long as needed, and without ever needing to come to the clinic. On the part of the clinic, the work is kept minimal, since incidents are notified.

## ALL TREATMENT PHASES: KEEP THE PATIENT MOTIVATED.

The simple fact of taking regular pictures and receiving notifications from the DM app helps to keep patients motivated, especially when they can see the progress of their treatment through their 3D matching.

Regular messages from the doctor when they connect to their file add a personal touch that is invaluable. Showing the patient the graphs associated with their treatment is also a great way of keeping them informed, interested, and cooperative.

## MAKING HISTORY

For the first time in history, and with a little help from the latest developments in machine vision, patients have a device in their hands and their pockets that can keep them informed of everything that is happening in their mouths in between appointments.

Thanks to Dental Monitoring™, that information can come to you in a timely manner, organized efficiently and easily accessible. While DM doesn't make teeth move faster, it can ensure that you have no surprises at the chair. With the time spent crafting your treatment plan, DM can offer a way to preserve your work by offering the means to prevent incidents, and the information to optimize it further!

**FOR THE FIRST TIME IN HISTORY...PATIENTS HAVE A DEVICE IN THEIR HANDS AND THEIR POCKETS THAT CAN KEEP THEM INFORMED**





### Are your patients keeping a low profile?

In the last 81 years that RMO® has been in the Orthodontic industry, technology and innovations have improved considerably. Patient comfort and product reliability are two of the most important characteristics of a successful and sustainable bracket.

This is how the FLI® Twin bracket was invented. Keeping the patient in mind, we crafted a smooth, comfortable, and low profile bracket. Constructing an attractive fit in the patient's mouth.

Creating beautiful smiles is effortless when the patient is comfortable and willing to **SMILE BIG** for FLI® Twin brackets.



**FLI® TWIN BRACKETS**





# TRULOCK™

## BONDING SYSTEM

### LIGHT ACTIVATED ADHESIVE PASTE

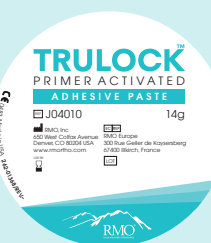


Trulock™ Light Activated Adhesive is a single paste resin-based, fluoride containing bracket adhesive that requires no mixing, resulting in reduced waste, improved performance consistency, and no working time constraints.

#### BENEFITS:

- No mixing, no waste
- Low-viscosity paste reducing likelihood of runoff

### PRIMER ACTIVATED ADHESIVE PASTE



Trulock™ Primer Activated Adhesive is a Paste-Primer orthodontic formula designed to bond metal, ceramic and plastic brackets. The unique filler and primer combination produces an ideal bond and a smooth tacky viscosity minimizing bracket drift or movement.

#### BENEFITS:

- Self curing for easy use
- Optimal viscosity to minimize drift

### ETCHANT GEL/LIQUID



Trulock™ Etchant contains 37% phosphoric acid for use on both dentin and enamel. The viscosity of Trulock™ Etchant Gel provides ideal control to prevent the material from flowing onto exposed surrounding surfaces. All formulas rinse away clean without leaving any residue.

#### BENEFITS:

- Ideal to prevent overflow
- Dual usage on both dentin and enamel





## THE WORLD'S FIRST MOBILE MONITORING SOLUTION IN ORTHODONTICS

## DENTAL MONITORING<sup>TM</sup>

DENTAL MONITORING<sup>TM</sup> allows you to control the position and shape of your patients' teeth remotely and continuously. DENTAL MONITORING<sup>TM</sup> combines the most advanced technology in machine vision with patented algorithms in order to create the first self-monitoring system in orthodontics. **for more info visit [www.rmortho.com/products/dental-monitoring](http://www.rmortho.com/products/dental-monitoring)**