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2016

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Editorial

The future of implants

Our main novelty this year is the "ImplantBook – the Ultimate Global Guide 2016". Starting from 2016 we will be publishing a yearly ImplantBook, a comprehensive world guide on implantology, circulating around the world, addressed to dentists and dealers, giving implant manufacturers great visibility thanks to a simple, intuitive and practical layout.
Among the chaos of manufactures and pseudo manufacturers around the world we are trying to provide, in a single volume, a thorough review of implants as well as current innovations utilized in oral implantology. The ImplantBook will address all fields related to implantology, including: the use of 3D imaging, osteointegration and biomaterials, rotary instruments, equipment and supplies for implants, radiology, piezosurgery, software and micromotors.

Based on current trends, the potential market for implant treatment is huge and we believe implants will experience significant growth in the coming years, in terms of demographics, consumer awareness as well as other factors. As baby boomers enter their 50s, 60s, and 70s, many will need treatment to replace missing teeth and implants have many quality-of-life benefits for many of these patients. Despite the vast number of patients who could benefit from implants, many general dentists, according to surveys, are involved in very few implant procedures per month. There are excellent opportunities and dental practices need to get ready today!

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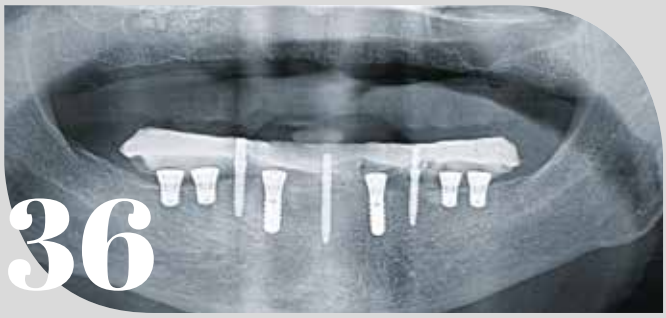
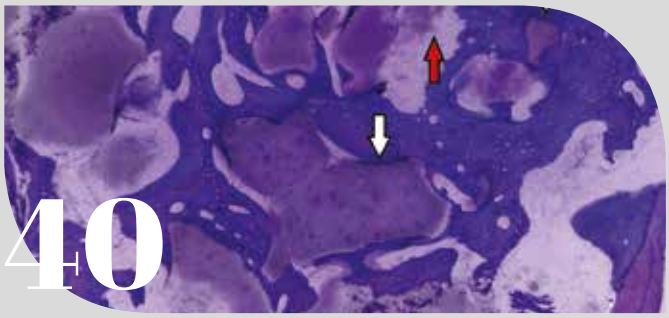


SPECIAL REPORT DOCTOROS BY INFODENT
Evaluation of 4 mm implants in mandibular edentulous patients with reduced bone height. Surgical preliminary results.
"Rehabilitation of totally edentulous patients with conventional removable dentures could be unsatisfactory for patients due to instability, discomfort, nerve punching and affection of the ability to eat and speak..."



SPECIAL REPORT DOCTOROS BY INFODENT
Post-extraction application of beta-tricalcium phosphate in alveolar socket.
"In normal conditions, healthy bone is under continuous remodelling and has an effective self-repair capacity. Bone remodelling maintains a continuous balance of bone formation and resorption in a dynamic process..."

IDEM SPECIAL REPORT
Tips, tricks and ideas to discover the Lion City.
"Someone calls it the Lion City, someone the Garden City, or even more the Red Dot, but officially the world's only city-state is the Republic of Singapore. This city that just over a century ago was..."

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Company Profile

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Cover
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Back cover
ImplantBook
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Asa Dental
Make people smile

Aldo Puccetti • President

History

It was the 1960s when Aldo Puccetti began moving his first steps in the commercialization of dental instruments.
He immediately understood that, to become leader in the dental field, you needed to have greater control of all the process phases: design, production, storage and sale.
So Asa Dental opened a facility in Maniago to manufacture their utensils and began its production history in Europe's major industrial hub for steel and knives.
The innovation that the company brought about in the course of the years came from this facility, redefining the standards for articulators, inventing an extremely more economical and practical version, but also creating new instruments with separate handle and tips in order to optimize production, reducing costs and substantially cutting process times.
Simultaneously with production developments in the field of steel utensils and instruments, Asa Dental grew through the acquisition of competitors such as Kaltoplast – the company that invented saliva ejectors and main contestant in the field – and Derby Dental, manufacturer of dental instruments and leader in the French-speaking market. Asa Dental thus became one of the main protagonists of the international dental industry and world leader in the production of disposables. The rest is modern history: the history of an Italian group that has placed technology at the service of efficiency.

Philosophy

Asa Dental is certainly bucking the trend. In recent years, under the leadership of its new General Manager Alessandro Malfatti, the whole of the company's production has been concentrated in Italy, to try and focus everything on Made-in-Italy product quality but also to have strict control over the entire production chain.

The industrial philosophy on which Asa Dental founds its activities is based on perceiving market demands in advance and providing prompt answers with intelligently designed, impeccably manufactured products, distributed in capillary fashion worldwide, with an unparalleled price/quality ratio.

Manufacturing in Italy allows reducing production times throughout the process chain, while at the same time having stringent quality control on production and being able to focus on Italian excellence.

Alessandro Malfatti • GM

Internationalization

In an increasingly globalized market, in addition to having sales coverage in 170 countries, Asa Dental perceived the importance of being physically present in strategic markets. For this reason, in 2010 the first American branch was opened – still today the main extra-European market – and in 2013 the Chinese branch was inaugurated to follow the most important emerging market on the planet from up close, while the Russian branch facility will be opened soon.

Asa Dental headquarters and branches

Production

Production is concentrated in three plants: Maniago, Marlia and Bozzano. The Maniago plant manufactures laboratory instruments such as articulators, facebows, pliers, diagnostic, restorative and surgical instruments, hand instruments and cutting instruments with extremely high-precision implants and tools.
The facility is located in Europe's major industrial hub for steel and knives. A secular tradition and an unequaled volume of satellite

Impression Trays

activities that allow producing extremely high quality instruments, with leading-edge technological solutions in an excellent price/quality ratio.
The Marlia plant produces all the disposables that have made the Asa Dental brand famous worldwide: dappens, syringes and saliva ejectors as well as impression trays, instrument trays and occlusors. It is the company's flagship facility, the only one in the world capable of producing saliva ejectors without phthalates, and

Saliva Ejectors

Dappen

with a production model capable of producing 600 million of them per year in a surface area of just 3000 m2.
In addition to saliva ejectors, the company excels for its production of impression trays, making it the most important plant in Europe with its 400,000 units manufactured and individually packaged each year. 24/7 guaranteed productivity.

Napkins

The facility in Bozzano performs quality tests and product check-ups, finishing processes, removal of process residuals, washing and polishing. Bozzano in the company's headquarters and logistics center. Here, the strict quality standards and traceability of every production lot are implemented and monitored, and it is here that the entire production coming from the other plants is stored in order to be shipped to the 170 international markets that Asa Dental regularly supplies.

Logistics Centre

Logistics

In the course of this last year, logistics at Asa Dental have made a further and decisive leap forward. With international markets expanding, production continually increasing and new quality standards to maintain, it has become necessary to provide the company with an operational instrument endowed with high logistic potential. 4,000 m2 of warehouse space within a total area of 20,000 m2 are the operational basis for Asa Dental's new automated logistics center. Thanks to the new advanced WMS – Warehouse Management System – software that monitors in real time and regulates all corporate logistics, delivery of thousands of articles arriving daily from the production sites of Maniago and Marlia takes place even faster.
The software works in combination with the imposing Automatic Vertical Warehouse, the most evolved storage system in the world that, with its over 10 meters of height, can stock up to 70,000 Kg of products, reducing the floor space required by 90%, sending out up to 10 orders simultaneously in an infinitely shorter time compared to traditional methods.

Automatic vertical warehouse

Training

The new challenge for Asa Dental is called training. Simultaneously with the creation of the new logistics center, the company retained it important to invest also in the professional training of odontologists. Inaugurated in 2015, the training center is comprised of a 2500-m2 conference hall equipped with the most modern technologies that can host training courses, workshops and meetings.
An annual program packed with interesting appointments is drafted at the beginning of the training year by the scientific committee and proposed to the entire network of Asa Dental professionals. The course programs and schedules are available on the website www.asadental.com, where you can register and be kept abreast of training activities also thanks to an e-learning platform.

Training courses

Hosting up to 95 people, with a Full-HD video-projection system, simultaneous translation service and workstations for practical training activities, the hall is the location of the new ASA DENTAL EDUCATIONAL CENTER, a project that engages the collaboration of nationally and internationally renowned opinion leaders.

The 2016 program can be found at the following address:
www.asadental.it/training2016

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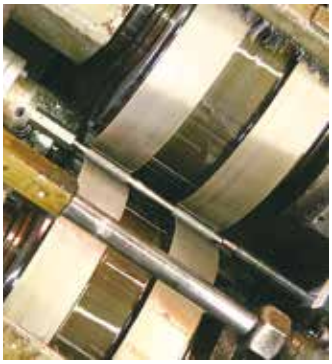





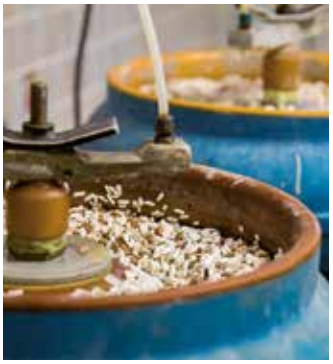


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Guided Implantology

Author: Dr. Alessandro Preda

Implantology is the branch of dentistry dedicated to restoring missing teeth, in the way most similar to the natural one: by inserting implants where teeth have been lost, for various reasons. The above tells us that implantology is a surgical discipline aimed at prosthetic rehabilitation which cannot be achieved by excluding the prosthetic project.
Realising all this, correctly and with result predictability, depended greatly on the surgeon's **experience, expert eye** and **manual skill** until only a few years ago. The operator's manual skills and experience also affect the choice of implant characteristics in terms of diameter and length.

Information Technology (using dedicated software for implant prostheses design that acquire DICOM files and then returns three-dimensional images of the jaw bones) and robotics (using 3D printers) have recently changed the picture described above, allowing us:

- **virtual planning of the surgical and prosthetic phase;**

- **realisation of a surgical TEMPLATE,** with incorporated rigid guides, that allows insertion of the designed implant at the position, angle and depth as planned in the virtual project.
The above is achieved using dedicated kits with drills that have a working part and a perfectly coaxial guide cylinder for the TEMPLATE's rigid guide

- **Execution of a pre-constructed prosthesis:** By placing the surgical TEMPLATE on plaster models created previously, **"plaster surgery"** can be carried out and a temporary prosthesis

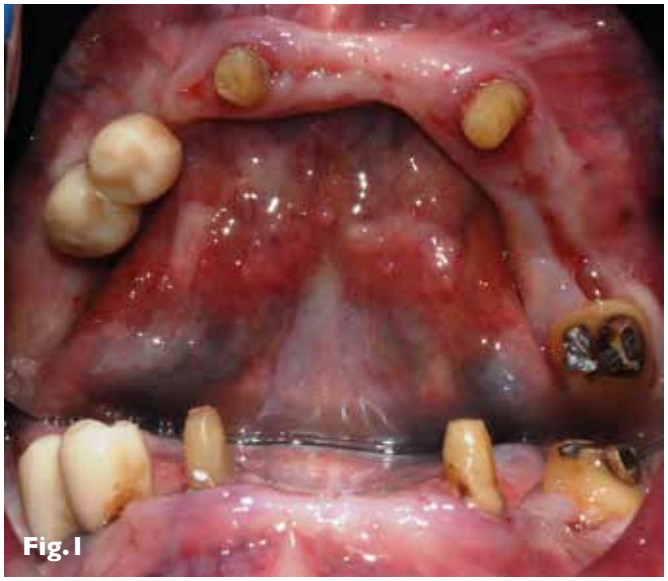
Fig.1

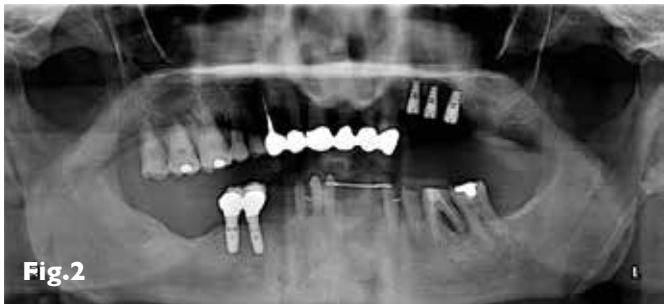
Fig.2


Fig.3


Fig.4


Fig.5

can be created, that is designed virtually and can be placed in the patient's mouth immediately after guided entry of the implants **(immediate loading).**

Today we are going to talk about ***assisted Software Guided Implantology*** and ***assisted Software Guided Implant-prosthetics.***

The case

Man aged 67 with lower bilateral anterior edentulism **(Fig. 1)**; no contraindications contained in medical history. Firmly asks for immediate fixed rehabilitation on implants. This request made us decide to perform ***assisted Software Guided Implantology*** with immediate loading, by inserting six implants, three each side in the edentulous areas. After proceeding with the panoramic X-Ray **(Fig.2)** and planning the case with Software Guided Implantology **(Fig.3)**, by reconstructing mandibular patient bone, a surgical template **(Fig.4)** and a customized temporary fixed prothesis **(Fig.5)** are constructed in the laboratory.

After inserting the surgical template into the patient's mouth (it is anchored to the teeth and making sure it is congruent and stable a necessary condition for carrying out the project) **(Fig. 6)**, circular mucotomies were carried out using the guides, **(Fig.7)** after which mucosa cylinders were removed. The middle surgical sockets on each side are prepared first of all **(Fig. 8)** where, using the template, the first two implants are inserted **(Fig. 9)**, using specific assembly tools that are firmly anchored to the implants themselves.

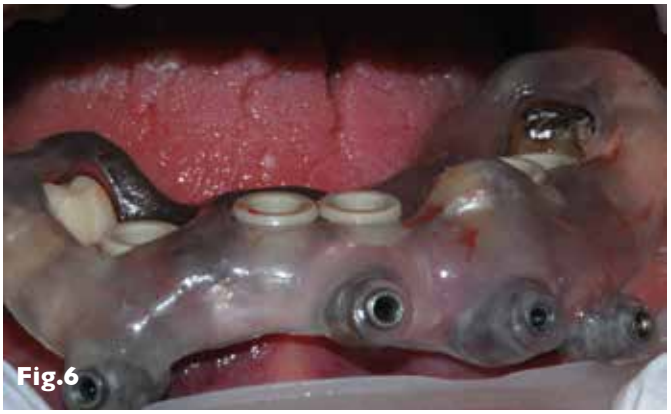
Fig.6


Fig.7

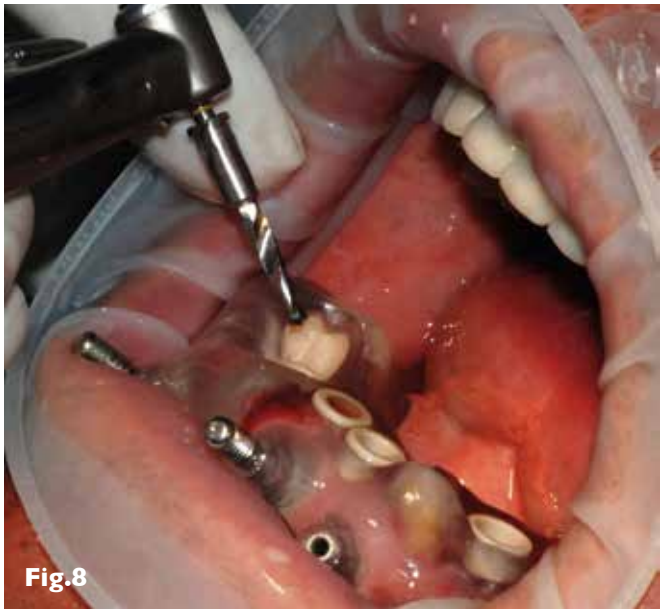
Fig.8

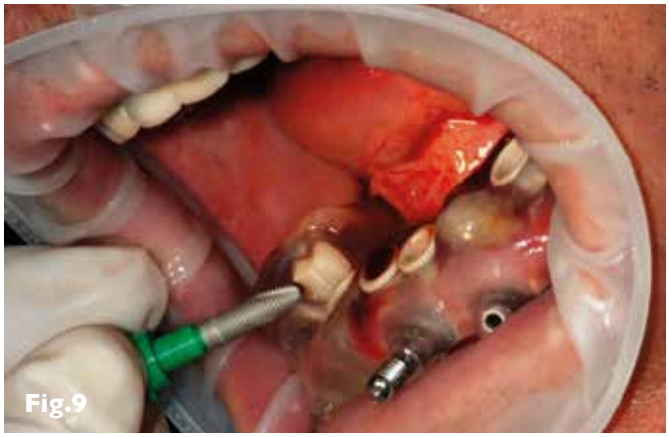
Fig.9

This procedure aims to stabilize the template permanently, preventing any accidental displacements.
Once the template is stabilized, the same procedure is carried out using the remaining guides.
Once the implants have been positioned, the assembly tools are removed, unscrewing the connection screws to the implant itself and the template, and viewing the correct implant position. By using peek temporary abutments **(Fig.10)**, the pre-constructed fixed prosthesis, previously made by the technician in the laboratory **(Fig. 5)**, were rebased with cold cured acrylic resin **(Fig.11)**.
The operation ends in a classical manner by fixing the prosthesis with prosthetic connection screws to the implants **(Fig.12)** and the final X-Ray **(Fig. 13)** gives us a complete overview of the patient mouth with implants perfectly inserted.

The technique described, which is simple and safe to carry out **on the condition that all the project phases have been carried out correctly**, allows complex surgery to be carried out in relatively short times (60-90 minutes for a full-arch of 6/8 implants) with maximum predictability. The possibility of having a pre-constructed fixed prosthesis that can immediately be fitted for the patient (where the right anatomic-functional conditions allow it) considerably improves not only the aesthetics but also healing of the bone-implant interface that takes place under functional loading.

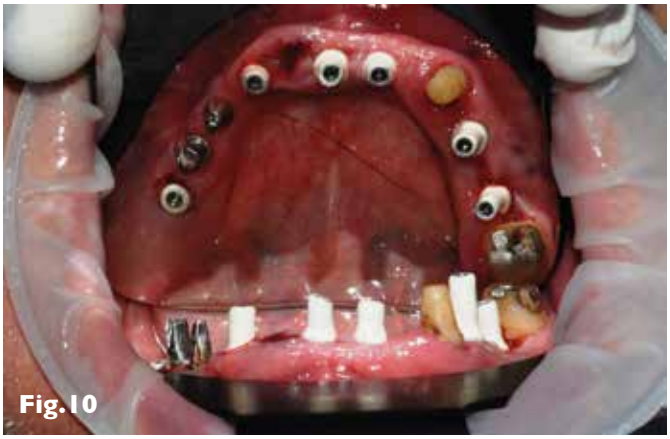
Fig.10

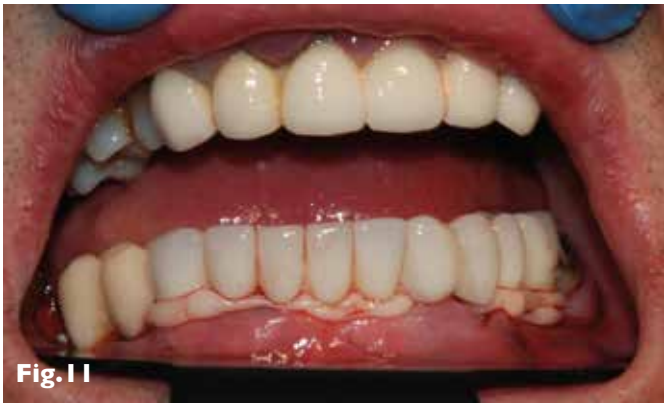
Fig.11

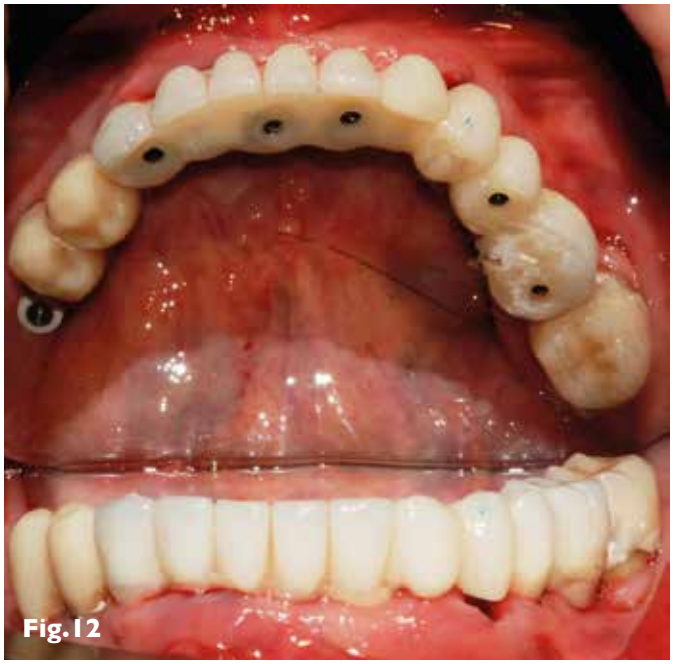
Fig.12

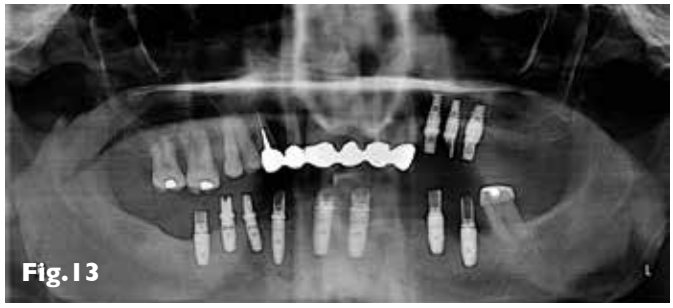
Fig.13

AT THE ROOT OF YOUR SUCCESS

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We would like to introduce you our company, or to bring you up to date on our situation, if you already know us.
Renowned throughout the world for its traditional craftsmanship and superlative quality of its knives and scissors, the small town of Maniago in northeastern Italy is the home of **DenTag®**.
Starting in the early 1950s, a team of expert artisan knife-makers established **DenTag®**, with – as may readily be imagined – knives as their very first products.
Soon thereafter, the ambition and vision of the founders brought the company towards another direction, diverting its attention to the manufacture of high-quality surgical and dental instruments.
Towards the end of the 1980s, **DenTag®** decided to modernize the entire production cycle in a new and more spacious factory, hence introducing the most modern machinery and sophisticated computer technology.
The raw materials - stainless steel, aluminum and titanium - are carefully selected. The tempering and sharpening techniques for which Maniago's craftsmen have been famous for generations have been applied in their precise manufacturing of instruments.
DenTag® introduced numerical-control production machinery and, where possible, the production processes have been completely automated and integrated by electronic comparative optical analysis. The entire production process is now computer-controlled in order to guarantee a consistent quality at all times.
Control and testing, both intermediate and final, as well as certain phases that are especially delicate and important in maintaining the quality of the product, are still entrusted to the watchful eye and the experienced hands of skilled craftsmen, who have been trained completely within the company.
This approach has led to products of superb quality and attractive design.
The company is constantly in contact with numerous universities and end users, which facilitate the utilization of all the latest scientific and technological discoveries and to align the production with the developing needs of the market.
Thanks to its focus on quality, **DenTag®** today produces surgical and dental instruments for numerous companies in Italy and abroad, as well as a range bearing its own brand.
In order to augment visibility with direct customers, **DenTag®** has created a line of instruments with a special smooth handle, which is marketed solely under its own brand name.
DenTag's instruments (both categories - Class I and Class II) are in full compliance with all current international standards and directives.
Given the highly-specialized nature of its products, **DenTag®** receives requests for new instruments – on a nearly daily basis. For this reason, research specifically focuses on the manufacture of instruments that are innovative in every way – in their shape, the materials used, and in the surface finish.
We are firmly convinced that, during this third millennium, the concept of total and real quality is destined to become increasingly vital, especially in light of the extraordinary level of globalization that is rapidly becoming the dominating factor in the market.
Versatility and continuous research into innovative production technologies will be the basis for **DenTag**'s expansion in this field.

And DenTag *is ready* !

The Evolution of Species

It is well known that **DenTag®** have always produced surgical and dental instruments…using stainless steel.
During the years, we have produced innumerable variations of instruments, for our own brand and for other ones. We also started the production of instruments in aluminium, titanium and with hard metal inserts too, always working with metals.
We believe, in our small way, that we have created a well-recognized, reliable quality standard
However, we are always aware of market changes and new trends, which evolves quickly and sometimes in an unexpected way.
Cyclically we receive requests for lighter instruments, but at the same time as reliable as those made of stainless steel. As we cannot use different materials for tips, to lighten instruments, we can only change handles. For this reason , we have started the production of a new set of handles made of plastic.
Clearly, this solution has been adopted before by other companies.
Therefore, we designed this new series of handles starting from the study of the state of art, trying to make advantage of, and if possible, to improve positive features, correcting possible mistakes.
The result of this research is a handle that, we believe for the first time, presents several different positive features combined together.

Material: Light (g 11) and resistant to stress. Its use turns out to be easy, with firm grip and not tiring. Tested and used in alimentary field, therefore totally non-toxic and free of potentially harmful substances. Autocla-vable without changes of form and colours.

Shape: Diameter of 10, 5 mm in the grip and 9,0 mm in the centre of the handle, to minimize the risk of carpal tunnel syndrome, due to prolonged use in the course of time. Longitudinal notches to increase grip and sensitivity.

Construction: During the moulding phase of the handle, we have inserted two suitably shaped stainless steel bushes, in which tips are then introduced. This procedure eliminates the presence of longitudinal internal metal cores, with considerable reduction of weight. Tips are not glued to the plastic, therefore there is no risk of releasing potential harmful substances

Appearance: Simple profile, easy to wash and clean. Without deep grooves or notches that may cause the accumulation of germs and bacteria. Being plastic material, its colouring is possible in different shades, aesthetically pleasing and with the advantage of recognising immediately the instrument

We are not the first ones who introduce plastic handle instruments in the market, but we have tried to do it in the best way.

Always respecting our quality standard, and we are proud of it, to

101% ITALIAN QUALITY

www.dentag.com

DenTag

The Evohandle

It is known that simple dental instruments such as curettes or double probes may injure the operator's hand or lacerate the glove (with the opposite working points). The possibility of injury is during use, handling or passing the instrument between **Assistant-Dentist-Assistant** while performing the procedures on the patient.

Directive 2010/32/EU - prevention from sharp injuries in the hospital and healthcare sector, also it states that it's necessary to prevent workers' injuries caused by all medical sharps and pointed devices.

Instruments with a handle **100**, **105** mm are too short and the tips, even if they are turned contrary than working one, very often touch on the back of his hand.

Instead, what it can do as an additional preventive action is to choose, when buying or replacing, one instrument with a long handle.

The longer instruments can be wrapped exactly like the other and, in the event that the dentist use cassettes or trays for sterilization of small size, it will be sufficient to put the instruments in the direction of the longer side

That's another reason to choose new Evofamily of instruments!

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Interview with G.COMM

Tell us something about G.COMM's history.

Our roots are in the Italian region known as Brianza, a land of established manufacturing traditions. G.COMM in 10 years of activity has gained a considerable reputation as a manufacturer of dental and electromedical equipment and supplies, focusing on components for dental units and in particular in the production of lamps and electric micromotors for the dental practice.

Your motto is "Quality, design, innovation". How does it influence your activity?

These three words identify what today makes G.COMM a benchmark among dental manufacturers. Thanks to our know-how, we can produce and sell with our own brand competitive, reliable, high-quality products that make the dentist's work easier and contribute to the patient's well-being, at the same time fully complying with the sanitary regulations, hygiene standards and environmental safety.
From the project development to its engineering and manufacturing, G.COMM manages all the production phases, giving to the company a high level of flexibility.

We guarantee an excellent pre- and post-sales assistance, but we also design and create custom-made products under the customers' specific, personal request to help them find the best and finest solution to their dental unit.
Customer care and passion for our products are the basis of the growing success of G.COMM around the world, distributing today in more than 30 countries. But we are determined to expand ourselves and experience new markets all around the world.

Dental lamps are your core products. How do the different models meet the dentist's demands?

In G.COMM we have put a special focus on the quality of the dentist's work. This mission inspired the design and production of our lamps. For instance, the motto of our IRIS VIEW lamp is: "Our target: your work".
We believe that quality of work is strictly related to the possibility of perceiving the smallest details in the area of operations. Out of this belief comes Iris View, a dental light with a Full HD videocamera (1920x1080px) and autofocus that allows to view the area of treatment with a 30x optical zoom.

Iris View permits to have a detailed image of the operating area, highlighting details which are difficult to see with naked eye, amplifying the visual capabilities of the professional and relieving eyestrain, leading to important progress in work methods.

Photo : Iris View dental lamp

The use of the videocamera improves communications both with the patient and specialized personnel. In the diagnosis phase diseases can be clearly shown on the monitor, making comprehension of the problem simple and immediate. During the operating phase, specialised staff can follow the evolution of the operation in real time and at the end of the work results can be assessed.

Photo : The use of videocamera

Iris View allows recording and broadcasting the operation in Hi Definition, making easy the connection to a wide range of devices. This opportunity is quite useful in various scientific contexts such as conferences, conventions and university lectures.

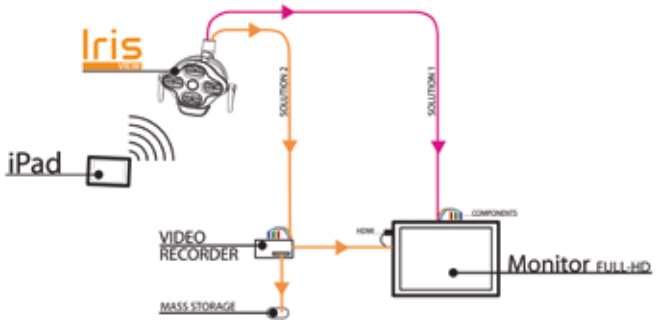

Photo : Connection to a wide range of devices

Iris View is expressly designed to improve the professionals' well-being and work.
The use of Monitor permits to work in complete comfort because the operating area can be observed in indirect vision. In fact, the dentist is not forced to maintain an incorrect posture such as being bent over the patient, but can operate sitting upright. In this way, he can reduce stress on the spinal column and consequentially decreasing the risk of professional ailments such as cervical problem, lumbar troubles and orthopaedic diseases.

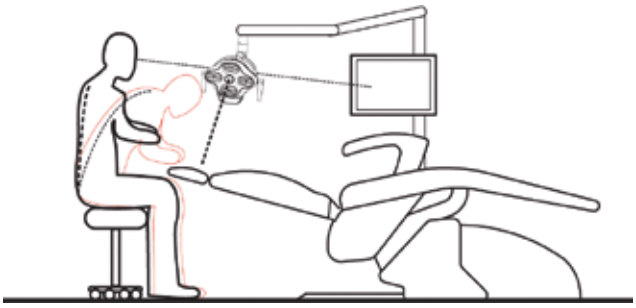

Photo : Complete Comfort

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I-Max: The new wall-mounted panoramic!

Honed from unrivalled technological and industrial expertise, the latest generation of I-Max panoramic systems is here to usher you into a new era.

The panoramic X-Ray system is now indispensable for dentists keen to offer their patients the best possible care. The future starts here! So choose the I-Max and let your clinic set the standard by using cutting-edge equipment that's ahead of its time.

Maximum quality, in a minimum of space

The new I-MAX is the lightest panoramic system available. As with an ordinary intra-oral X-Ray generator, it can be installed on a wall and linked to your network without the need for a dedicated PC.
This ultra-compact and lightweight system comes in one easy to-handle package. Incorporating an exclusive "Easy to Install" system, the I-Max is delivered to your clinic fully assembled. Its intelligent installation system means that only one technician is required to fit it on the wall.
Crammed to the hilt with technology, all of its electronic components have been optimised. The I-Max minimizes the risk of system failures and facilitates maintenance work.

Innovation, design and intelligence

Its sleek, sophisticated and lightweight design makes this system an attractive and valuable asset for your clinic. It's not just the design and lightweight concept that make it innovative. With the I-Max you can carry out any examination your patients could need, enjoying ultra-high definition images in every X-Ray. You'll be able to view all clinical and anatomical details with maximum precision. Your diagnostics will be conducted in complete safety. With its lasers and temple clamps, the I-Max features face-to-face operation, to ensure optimum patient positioning. What's more, with its ALI-S (Automatic Layers Integration System), your unit will immediately and automatically select the best shots in order to display a perfect image, without any intervention on your part. The I-Max is also unique in its didactic – and almost educational! - Human-Machine Interface (HMI). Its imaging tools and enhancing filters are automatically integrated into the control software.

Several programs to help you in your everyday practice

Boasting 24 programs, the I-MAX is designed to conduct the full range of examinations your practice demands:
- Standard panoramic
- Right/left semi-panoramic
- Reduced dose panoramic
- Panoramic with improved orthogonality
- Standard bitewing
- Left/right bitewing
- Frontal dentition
- Maxillary sinus examination
- TMJ examinations

As a complete panoramic, all these programs are available in both adult and child versions.

Perfection in a controlled budget

The new I-Max clearly offers a superlative Performance/Investment ratio: lower purchase, delivery and installation costs and easier maintenance. We haven't compromised our image quality, however, which guarantees ultra-high definition results.

By choosing the I-Max, you'll be using the smallest, lightest and most comprehensive panoramic system on the market.

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The fruit of unrivalled technological and industrial expertise, the latest generation of I-Max panoramic systems is here to usher you into a new era. With a futuristic and ergonomic design and exceptional image quality, coupled with its user and installation friendly product features, we know you'll love it too!

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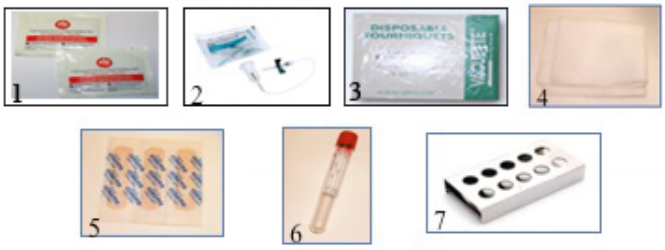
CGF Concentrated Growth Factors: Protocol and characterization

The CGF is an autologous platelet concentrate, developed by Sacco, in 2006 and obtained from blood samples through a simple and standardized separation protocol, by means of a specific centrifuge (MEDIFUGE 200, Silfradent srl, Forli, Italy), without the addition of exogenous substances. The main feature of the CGF resides in its consistency: it is an organic matrix rich in fibrin, able to "trap" platelets, leukocytes and growth factors; elements that play an important role in the regenerative processes.

CGF-(Concentrated Growth Factors)

Salient features of the CGF:
- Simple, safe and economic
- Natural - 100% autologous
- Thick Fibrin Matrix
- Leukocytes, Platelets and Growth factors
- Variable kinetics release
- Matrix for Bone Graft Material

The CGF may be a valuable aid in the field of regenerative medicine, to speed up the process of regeneration. In fact this growth factor concentrates, showed great regenerative properties and versatility (Sohn et al. 2009).
Its use has been proposed in various situations ranging from filling of extraction sockets (Tadić et al., 2014) to the filling of the cavity after cystectomy (Mirković et al., 2015), or in the sinus lift procedure (Kim et al., 2014; Del Fabbro et al., 2013; Sohn et al., 2011). Moreover, it can be used alone or with autologous bone particles or biomaterials (Gheno et al., 2014). Some authors suggest wetting the surface of the implants with CGF in order to accelerate the bone-integration (Siebrecht et al., 2002).
- Scanning Electron Microscopy (SEM) studies have shown that the CGF presents a fibrin network formed by thin and thick fibrillar elements (Rodella et al., 2014).
- Histo-morphological studies (Borsani, Bonazza et al., 2015 submitted) have allowed to see the fibrin network structure and the distribution of blood cells (leukocytes, erythrocytes and platelets) in the CGF.
- Finally, in vitro studies using different human cell lines (Borsani, Bonazza et al., 2015 submitted), have shown that the addition of the CGF to the culture medium, stimulated cell proliferation (Borsani, Bonazza et al., 2015, submitted).



CGF is obtained using polyethylene tubes (Vacuette Test Tubes), coated with silica micro particles and without the addition of exogenous substances. After collection, the blood samples are immediately centrifuged using a special centrifuge device (Medifuge, Silfradent, Italy).

CGF - MATERIALS

BLOOD COLLECTION
1. Antiseptic swab
2. Complete butterfly
3. Tourniquet
4. Gauzes
5. Patches
6. Vacuette Test Tubes (Greiner Bio-One GmbH, Kremsmunster, Austria)
7. Tube rack

CGF MEDIFUGE (Silfradent)

Characteristics

• Benchtop centrifuge dedicated to the CGF production, equipped with an appropriate rotor with alternate and controlled speed and with an acceleration always below 300 RCF.
• The medical device MEDIFUGE allows for the use of up to 8 test tubes for the creation of CGF (fibrin);
• A microprocessor control system allows for the maintaining of a constant speed;
• The exception rotor system with self-ventilation protects the blood sample from heat exposure;
•The rotor-holding compartment, the closing door and the test tube-holding jackets guarantee biological safety in terms of bio-containment, in the event of test tube breakage;
•The test tube-holding jackets and rotor are built from thermal, antistatic material that is easy to clean, extract and sterilize in an autoclave at 135°;
•MEDIFUGE is equipped with a decontamination cycle with UVC reflected light;
•Cycle duration 5 minutes at 1,000 revs;
•The electronic control engine and its internal parts require no maintenance;
•Noise levels fall below the standards required and do not exceed 57 dBa.

CGF centrifugation protocol (One step protocol)

30" acceleration
2' 2,700 rpm/ 735 g
4' 2,400 rpm/ 580 g
4' 2,700 rpm/ 735 g
3' 3,000 rpm/ 905 g
33" deceleration and stop

At the end of the process, three blood fractions were identified: (1) the upper layer, representing the liquid phase of plasma named platelet poor plasma (PPP); (2) the lower layer, representing red blood cells (RBC) because of mainly contains erythrocytes; (3) the middle layer, representing the solid CGF consisting in three parts: the upper white part, the downer red part (about 0,5 cm from RBC) and the middle "buffy coat*" part (interface between white and red part) *(Figure 1 A,B,C).*

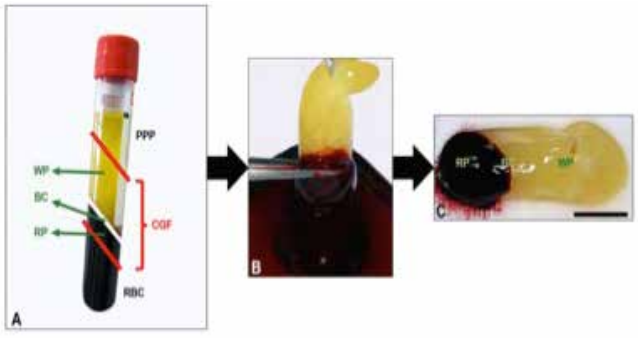


Fig.1A,B,C: phases of CGF

CGF- Morphological characterization

FIBRIN NETWORK

The use of electron microscopy (SEM), allowed to observe that the CGF fibrin network of the is constituted by thin and thick fibrillar elements *(Figure 2A).*

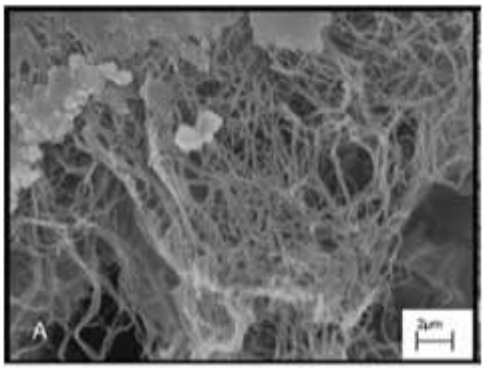


Fig.2A: SEM analysis of CGF, fibrin network

Hematoxylin-eosin staining, allowed to observe the architecture of the CGF fibrin network *(Figure 3).* The images showed that the fibrin network and architecture changed moving from the buffy coat* to the white part. In particular, near the buffy coat* the fibrin network was strictly compact *(Figure 3A)* while far from the buffy coat* became with a larger mesh *(Figure 3B).*

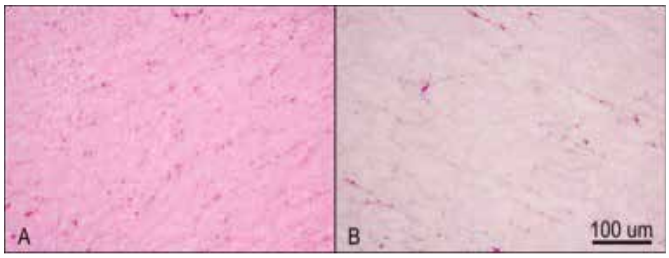


Fig.3: Architecture of the fibrin network: A) near the buffy coat; B) far from the buffy coat;

BLOOD CELLS

The May Grunwald Giemsa histological staining *(Figure 4A)* and Hematoxylin-eosin *(Figure 4B),* allowed to localize blood cells present in the CGF. White blood cells are mainly located in the buffy coat* and dispersed in it, especially in the red part of the CGF; the red blood cells are present only in the red part of the CGF.

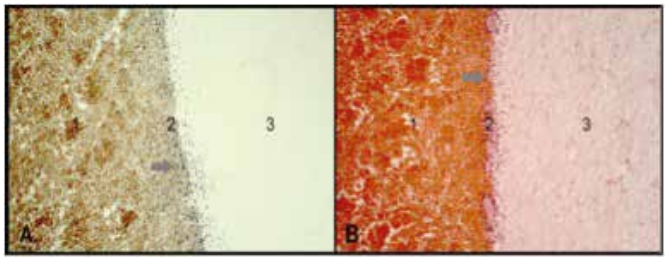


Figure 4: A) May Grunwald Giemsa; B) Hematoxylin-Eosin

Using immunohistochemical analysis, with the platelet marker CD61 *(Figure 5B)*, platelets appear principally in the buffy coat* of the CGF, although platelet aggregates have been highlighted also in the white part of the CGF.

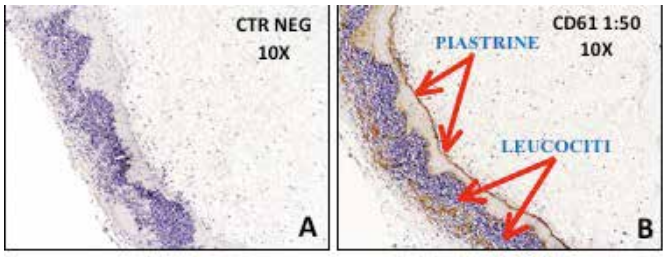


Figure 5: platelets immunohistochemical analysis using CD61: A) negative control, without CD61; B) with CD61

* interface between the white part (PPP) and the red part (RBC) of CGF.

CGF - in vitro Growth Factors Release

The in vitro kinetics release of certain CGF growth factors, showed that this is specific to each factor. In fact, some of them have a quick release (1 day) while others have a slower release (up to 6-8 days)*(Figure 6 a,b)*.

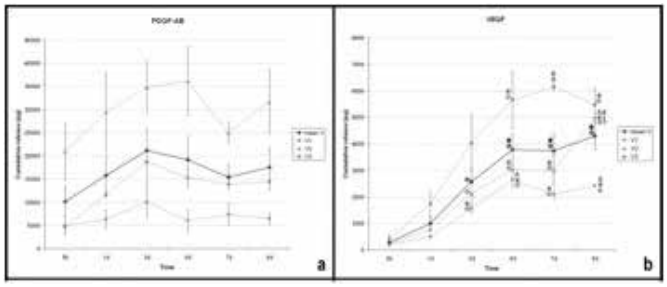


Figure 6: Kinetics release of a) PDGF-AB and b) VEGF

TNF-ß reaches its maximum accumulation at day 1 and after decreases (Figure 6 c). So it has a fast kinetic release.

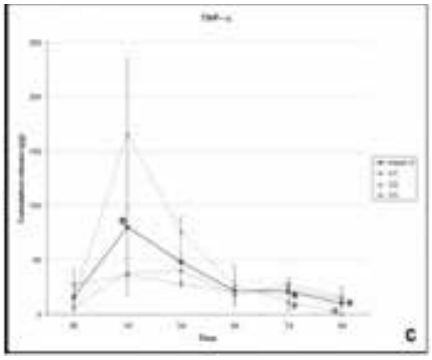


Figure 6 c: Kinetics release of TNF-ß

TGF-ß1 e BDNF have a constant accumulation *(Figure 6 d,e)*.

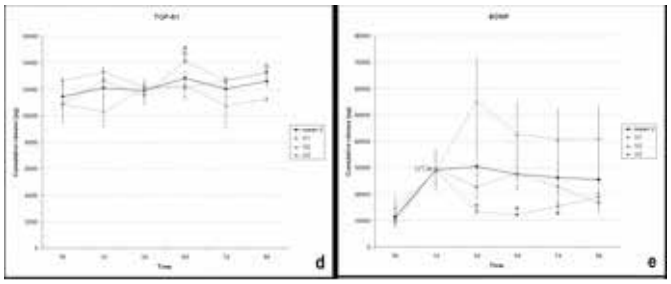


Figure 6: Kinetics release of d) TGF-ß1 and e) BDNF

BMP-2 reaches its maximum accumulation on day 8 and IGF-1 on day 6 *(Figure 6 f,g)*.

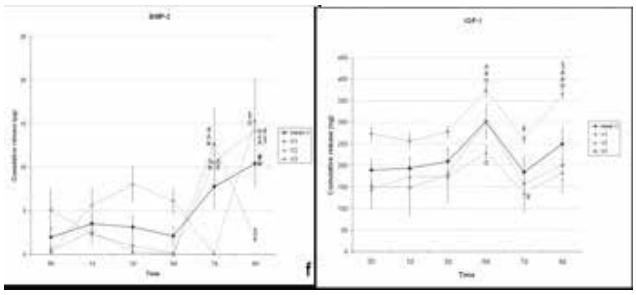


Figure 6: Kinetics release of f) BMP-2 and g) IGF-1

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Concentrated Growth Factors:

A new medicine for tissue and bone regeneration.

Tissue regeneration is a continuing challenge both in biological and clinical terms. Regenerative medicine and tissue engineering are continuously making huge advances in the identification of new strategies in the field of tissue regeneration. In this field, platelet concentrates represent an interesting and innovative therapeutic alternative, as they provide a rich source of autologous growth factors involved in the induction of cell proliferation, in extracellular matrix remodeling and in the angiogenetic mechanisms, that take place during the different stages of tissue regeneration.

Photo
Two CGF
Yellow part:
fibrin clots
Red part:
erythrocytes

Platelet preparations are obtained from patient's venous blood through a standardized protocol of centrifugation, that sometimes, using the addition of exogenous substances, allows to isolate a fraction rich in platelets and growth factors, called "platelet concentrate" or "platelet gel ".

Photo
Fibrin clots

The platelet growth factors have extremely high efficiency in every biological process, in which it is necessary to stimulate tissue repair, growth and modulation of cell life and self-control of the immune system. The technique of platelet concentrates moves plasma rich in growth factors from the blood to the treatment area, speeding and tracking the natural processes of healing.

Photo MEDIFUGE
machine MF 200

Concentrated Growth Factors (CGF), developed by Sacco in 2006, is a special type of platelet preparation with great potential for clinical application.

At the base of the regenerative process, three factors are particularly important: the scaffold (organic, natural or synthetic), growth factors and autologous cells. All these elements are present in the CGF which is obtained by a "one-step" centrifugation process of the blood samples, using a special centrifuge (Medifuge Mf 200, Silfradent srl, Forli, Italy), without the addition of exogenous substances. Its main characteristic lies in its consistency; in fact CGF is an organic matrix rich in fibrin, thus more dense than other platelet concentrates, able to "trap" a large amount of platelets, leukocytes and growth factors, showing regenerative properties and versatility.

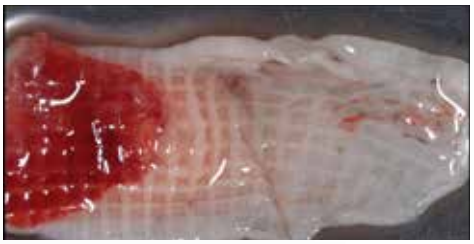

Photo
CGF biological
membrane

These features, together with the simple and standardized centrifugation protocol MEDIFUGE, make the CGF a superior autologous product which can be used in different areas of regenerative surgery; for example in dentistry, maxillofacial surgery, cosmetic surgery and orthopedics.

Its clinical efficacy, has so far been demonstrated in various situations ranging from filling of extraction sockets (Tadić et al., 2014), to the filling of the cavities after cystectomy *(Mirković et al., 2015)*, to interventions of sinus lift and augmentation of the crestal profile (Kim et al., 2014; Del Fabbro et al., 2013; Sohn et al., 2011). In addition, CGF features, make it suitable to be used both alone and with bone particulate or autologous biomaterials (Gheno et al., 2014). In conclusion, if it is true that the blood is the "source of life" for the organism, platelets in it play an important role in the body's regenerative processes.

The research, however, does not stop and Silfradent has still in progress studies at several universities in Italy (University of Bari, University of Brescia), Europe (ACTA Amsterdam University, Dental School-Medical University Vienna; University of Warwick - UK) and also outside Europe (IPK center Hospital Havana-Cuba; Almejiera center Hospital Havana-Cuba).

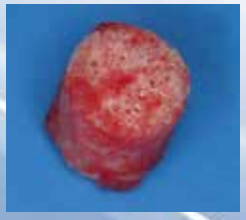

Photo
Bone-Ring graft material mixed with
CGF

Suni Medical
SuniRay2

SuniRay2 is more than just a digital sensor—it's a comprehensive digital imaging system designed to effortlessly integrate into your practice. Everything from its recently tested "excellent" overall image quality to its industry-leading low levels of radiation exposure to its overall durability and reliability attests to SuniRay2's balanced-approach design philosophy. Some sensors boast great image quality; some boast patient comfort or safety; some boast best overall value.

The SuniRay2 digital imaging system—designed and engineered right from Suni Medical Imaging's Silicon Valley headquarters—excels on all these fronts and more, and comes packaged with user-friendly software that allows the SuniRay2 to easily integrate right into your practice.

Most digital sensors come with a "closed" software system—i.e., a software system that works exclusively with the digital sensor it was packaged with. This means that when your digital sensor invariably breaks down from daily wear-and-tear and mechanical stresses, your options in searching for a new sensor to replace the broken one are restricted to the company whose sensors are compatible with your existing software. You're stuck purchasing a sensor from the same company for the sole reason that your imaging software won't work with anything else.

The SuniRay2 digital imaging system comes packaged with an "open" software system that is compatible with most practice management software. Using name-grabber software and command line integration, the SuniRay2 software package allows easy and efficient integration with your existing practice management software. And if you're happy with your imaging software but are looking for a new sensor—or if you're looking to replace a broken sensor and are just stuck with a "closed" software system—the SuniRay2 digital sensor is compatible with a variety of imaging software.

While the SuniRay2 digital imagining system has the flexibility and ease-of-use to make integrating new sensors or imaging software as painless as possible, the best way to avoid the headache of frequently replacing your digital sensors is to purchase a sensor that is durably built and designed for reliable performance. Sensors can be dropped; the cable attachment can be pulled or tripped on; patients can accidentally bite down on the sensor. With its new enhanced durability features, the SuniRay2 is designed to withstand these daily mechanical stresses while performing at the highest standards. SuniRay2's ultrasonically-sealed outer casing and Impact Protection Technology ensure a long-lasting, durable sensor that is robust without sacrificing patient comfort. The new Bite Pressure Protection guarantees the SuniRay2 sensor works even if a patient is applying a little extra pressure or strain. And in the case of accidentally pulling on or tripping over the sensor's cable attachment, the safety cable release feature and reinforced cable attachment make sure there's no pain for the patient and no damage to the sensor.

As a strong adherent of the ALARA principle (As Low As Reasonably Achievable), Suni has designed the SuniRay2 digital imaging system with the safety of both staff and patients in mind. Because SuniRay2 is sensitive to low doses of radiation exposure—in a recent CR Foundation evaluation SuniRay2 was shown to require the lowest dose to capture a diagnostic-quality dental X-ray—it allows you to minimize excess radiation exposure to your staff and patients. Compared to the average .2 milliseconds of radiation exposure time required to capture a diagnostic-quality image, SuniRay2's .05 millisecond radiation exposure time is also the best among all digital sensors. As awareness of the health risks associated with diagnostic imaging increases, SuniRay2's emphasis on patient safety is not just an added benefit but an integral attribute patients are increasingly starting to demand.

All this adds up to a complete digital imaging system designed with your entire practice in mind—a sensor that delivers crisp and clear images reliably and with minimal radiation exposure, packaged with user-friendly software that integrates hassle-free with your practice's specific needs, freeing you up to focus your attention on your patients.

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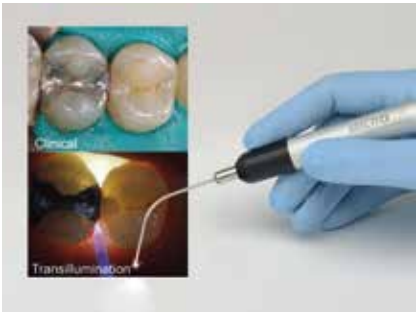

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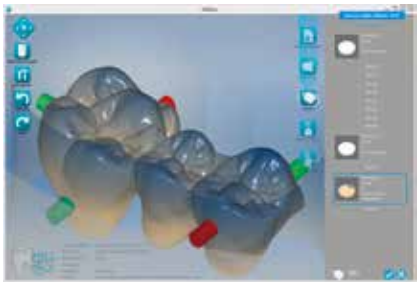

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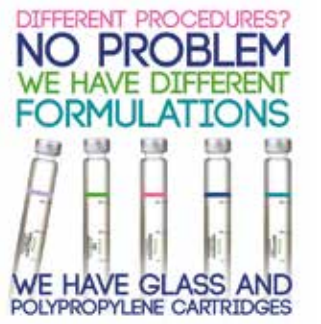

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Evaluation of 4 mm implants in mandibular edentulous patients with reduced bone height. Surgical preliminary results

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KEY WORDS
bone density, insertion torque, short implants, success rate.

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ABSTRACT

Aim Growing evidence has suggested the utility of short dental implants for oral reconstructive procedures in clinical situations of limited vertical bone height. The aim of this short comunication was to evaluate the clinical use of implants < 10 mm in length and to determine short implant-supported prosthesis success in the atrophic jaw.
Materials and methods Six women and three men were recruited for the treatment of edentulous mandibles. A total of 6 implants were inserted in each patient: two anterior implants of conventional lenght and four posterior 4 mm Titanium Zirconium (TiZr) implants. The insertion torque and bone density were evaluated.
Results The mean insertion torque for the 4 mm implants was lower than for conventional ones, without any statistical difference. Moreover, most of the patients (88%) showed a D2 bone type.
Conclusion The provision of short implant-supported prostheses in patients with atrophic alveolar ridges appears to be a successful treatment option in the short term; however, more scientific evidence is needed for the long term.

INTRODUCTION

Rehabilitation of totally edentulous patients with conventional removable dentures could be unsatisfactory for patients due to instability, discomfort, nerve punching and affection of the ability to eat and speak. A complete screw-retained implant-supported prosthesis may be a viable alternative in such cases. However, the lack of sufficient bone volume and close proximity to the inferior alveolar nerve may represent a difficult clinical situation for the placement of endosseous implants (1). By using short implants to circumvent these difficulties, the primary stability may be compromised due to the reduced contact area for osseointegration. Moreover, successful placement of short implants in dense bone may furthermore depend on an accurate surgical technique to prevent a loose fit and overheating of the bone site (2-3). Traditionally, clinicians have avoided the use of short-length implants in areas of compromised bone (e.g., posterior locations, low bone density, and thin ridges). With the introduction of new surfaces, the surgical and clinical performance of short-length implants may become very similar to that of standard length ones.
The main purpose of this short communication was to evaluate and report the surgical performance of novel short 4 mm implants made of Titanium Zirconium (TiZr) alloy with a hydrophilic surface.

MATERIAL AND METHODS

Six women and three men with a mean age of 64 (range 44–86) years were recruited for treatment of edentulous mandibles. Each individual was thoroughly informed of the overall requirements/procedures of the study after explaining the purposes of the study, the nature of the planned treatment and alternative procedures. Potential risks, possible complications, and benefits of the proposed treatment were explained to the study subjects and they all signed an informed consent. The inclusion and exclusion criteria were selected as follows.

› Inclusion criteria: age >18 years; committed to participate up to 3 years follow-up; complete edentulism in the mandible to allow placement of 6 implants (two in the canines zone of 10 mm in lenght and four 4 mm implants placed in the resorbed sites behind the mental nerve); full or partial dentition opposing the implants. The implant site had to be edentulous for >2 months and healed, with evidence of bone resorption and atrophy; the minimal residual bone height should be adequate in the canine zone, and at least 8 mm in the posterior zone.

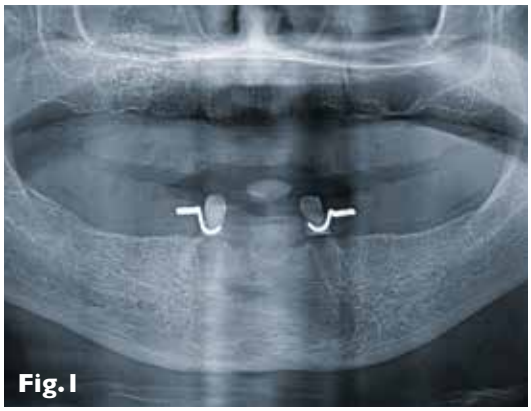
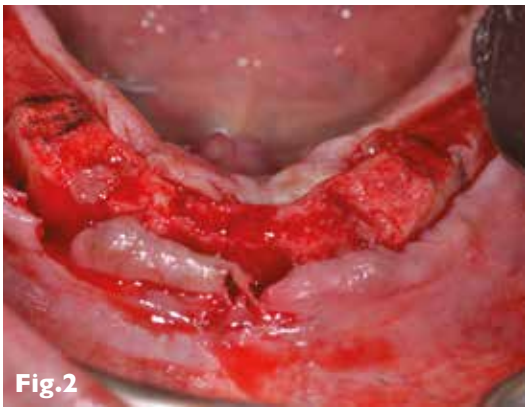


Fig.1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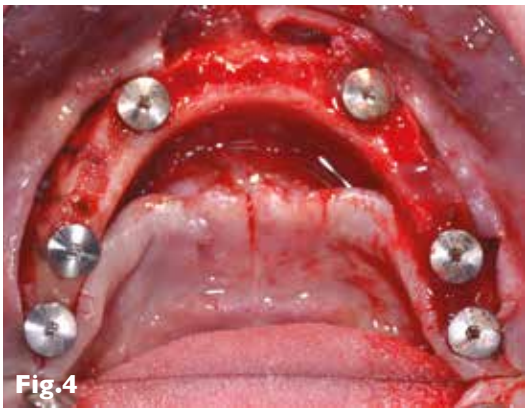
Fig.4

Fig. 1
Preoperative panoramic radiograph.

Fig. 2
Mucoperiosteal flap elevated before implant placement.

Fig. 3
Drilling sequence for 4mm Standard Plus Implants: Lance-shaped drill (pointed drill designed to break the cortical bone); 2,2mm drill (initial step for dental implant); Implant Depth Gauge; 2,8mm drill; Implant Depth Gauge: 3,5mm drill; Implant Depth Gauge.

Fig. 4
Six implants placed in edentulous mandible, two long implants of 10mm lenght and 4mm implants behind mental nerve in both sides.

› Exclusion criteria: presence of blood, metabolic, endocrine, renal, or neoplastic disease; human immunodeficiency virus infection; smoking >10 cigarettes per day; alcoholism; any conditions that may prevent study participation or interfere with analysis of results; mucosal diseases; history of irradiation therapy; previous reconstruction, bone grafting, or failed GBR at the site of intended implant surgery; severe bruxism/clenching; inadequate oral hygiene or unmotivated for home care; lack of primary stability; insufficient bone or any abnormality that would contraindicate implant placement.

Pretreatment procedures

A clinical and radiological examination was carried out including panoramic x-rays (Fig. 1) (8000C Digital Panoramic and Cephalometric System, Carestream, Rochester, NY, USA) and Cone beam scan (CS 9300 System, Carestream, Rochester, NY, USA). Bone and non-bone voxels were segmented using a heuristic segmentation algorithm that was developed specially for bone tissue with highly nonhomogeneous CT attenuation density distributions (4).

Study design

Each patient received 6 implants: two anterior implants of 10 mm length and four posterior implants of 4 mm lenght with a hydrophilic surface (Tissue Level Standard Plus, RN, Roxolid, SLActive, diameter 4.1 mm, Institut Straumann AG, Basel, Switzerland) for a screw-retained fixed complete denture.

Surgical procedure

Implant placement was performed using single-stage surgery. Local anesthesia was achieved by inferior alveolar nerve block and administration of an appropriate dose of Articaine dental® 4% with epinefrine 1:100.000 (Inibsa, Barcelona, Spain). A midline incision was done at the alveolar crest from the distal surface of the missing first molar. Full thickness mucoperiosteal flaps were raised and the path of the mental foramen identified with two realease incisions at the back (Fig. 2). The preparation of the implant sites was performed according to a precise sequence (Fig. 3). Immediately postoperatively, the initial implant stability was assessed by recording the insertion torque value of the 4 mm implants. Cover screws were placed on the implants and the flaps were repositioned

Fig.5
Preoperative radiograph after implant placement

Fig.5

and sutured (Fig. 4).
Antibiotics were prescribed at the discretion of the surgeon. Analgesics were given as required for pain control. The patients were instructed to rinse with a 0.12% chlorhexidine solution (Dentaid, Barcelona, Spain) twice a day for 1 or 2 weeks until suture removal. After suture removal, the patients were instructed in proper mechanical brushing of the implants using 1% chlorhexidine gel until placement of the final restoration. A removable temporary prosthesis was installed in the mandible by using provisional implants loaded with Structur (Voco Gmbh, Cuxhaven, Germany), in order to avoid stress/load on the definitive implants during the healing phase. Panoramic radiographs were obtained before and after surgery (Fig. 5).

Statistical analysis

The statistical software used was StatXact (Cytel, Cambridge, MA, USA) and descriptive statistics by means of Excel (Microsoft, Redman, WA, USA). The patient was used as the unit of analysis in all tests. For continuous data, a mean value was calculated per patient. The paired two-sample t-test was used and the level of significance was set at 0.05.

RESULTS

All implants survived until one month after insertion. The mean insertion torque for the 4 mm implants was 38.1 ± 1.2 Ncm, while for the 10 mm implants was 42.4 ± 2.1 Ncm (table 1). Using a paired two-sample t-test, no significant difference between the average insertion torques was found ($p=0.005$) (Fig. 6). Most of the patients had D2 bone (88%), while fewer patients had class D1 (8 %) or D3 (4 %) bone.

DISCUSSION AND CONCLUSION

Short implants should be used by experts with skillfull hands to avoid implant failures. The preliminary results of this study demonstrate that 4 mm long TiZr implants with an hydrophilic surface can be safely inserted in resorbed mandibles with insertion torques comparable to longer implants, thereby avoiding vertical augmentation procedures. Unlike the mandible (McGill Consensus meeting, Montreal, 2003), there is no consensus today regarding the number of implants for a maxillary overdenture. However, a recent systematic review revealed that a maxillary overdenture, supported by six implants, connected with a bar, is the most successful treatment regarding the survival of both the implants and the overdenture (6). Four additional extrashort implants, as proposed by the present study, implicate an additional cost, altought they may help the long implants, by increasing the stability of fixed resin prostheses, due to the wider spread of the implants within the arch. A second advantage might be that posterior bone resorption could be prevented, implicating less relinings of the prosthesis and avoiding mental nerve damage.
Pieri et al. suggested that even in quality IV bone, a successful treatment can be expected with two additional short implants, early loaded, supporting an overdenture (7). The lower bone quality/density in the posterior areas may be compensated by splinting of all implants with a cad-cam bar. The

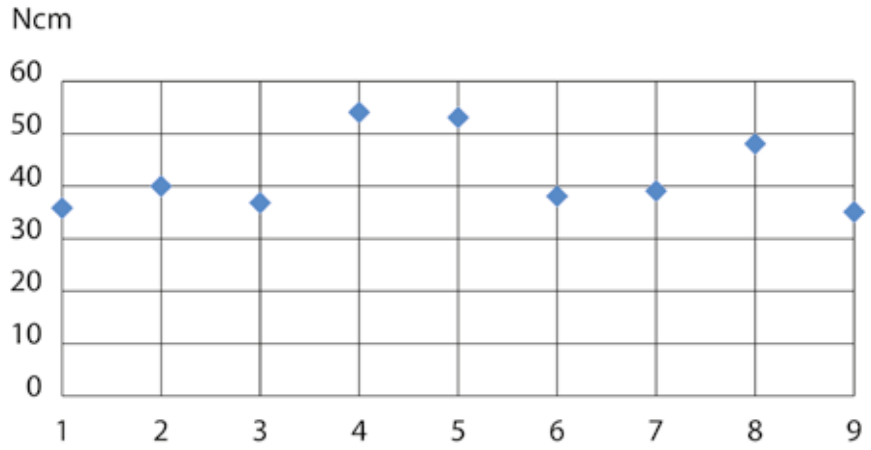

Fig.6

Fig.6
Mean insertion torque values per patient, recorded during the insertion of the 4mm implants.

Table 1
Mean insertion torque values (Ncm)+/- standard deviation (SD) per patient (P1 to P9), recorded during the insertion of the 4mm implants.

PATIENT	P1	P2	P3	P4	P5	P6	P7	P8	P9
Ncm	35	41	36	54	52	39	39	48	36
SD	0	11	5.6	6.4	14	7.2	1.5	7.5	7.5

Table 1

loading, in the present study, was avoided in the early stages and after the final restoration; moreover, unfrequent relining during the first weeks was performed to reduce crestal bone loss. Van Assche et al., studied the lack of information on the forces applied by different opposite arch conditions. Since the patient population of the study was limited, it was not possible to evaluate the influence of the applied forces of the opposing arch. They also showed that short implants can be a successful alternative to bone augmentation techniques for this treatment concept, also in type III or IV bone (8). The provision of short implant-supported prostheses in patients with atrophic alveolar ridges appears to be a successful treatment option in the short term; however, more scientific evidence is needed for the long term.

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Post-extraction application of beta-tricalcium phosphate in alveolar socket

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KEY WORDS
Bone graft; calcium phospare; dental implants; post-extraction alveolar socket.

ABSTRACT

Aim The objective of this study was to assess the capacity of beta-tricalcium phosphate to facilitate bone formation in the socket and prevent post-extraction alveolar resorption.

Materials and methods After premolar extraction in 16 patients, the sockets were filled with beta-tricalcium phosphate. Six months later, during the implant placement surgery, a trephine was used to harvest the bone samples which were processed for histological and histomorphometrical analyses. Data were gathered on patient, clinical, histological and histomorphometric variables at the extraction and implant placement sessions, using data collection forms and pathological reports.

Results Clinical outcomes were satisfactory, the biomaterial was radio-opaque on X-ray. Histological study showed: partial filling with alveolar bone of appropriate maturation and mineralization for the healing time, osteoblastic activity and bone lacunae containing osteocytes. The biomaterial was not completely resorbed at six months.

Conclusion Beta-tricalcium phosphate is a material capable of achieving preservation of the alveolar bone when it is positioned in the immediate post-extraction socket followed by suture; it also helps the formation of new bone in the socket. Further studies are needed comparing this technique with other available biomaterials, with growth factors and with sites where no alveolar preservation techniques are performed.

INTRODUCTION

In normal conditions, healthy bone is under continuous remodelling and has an effective self-repair capacity. Bone remodelling maintains a continuous balance of bone formation and resorption in a dynamic process that adapts the bone to local forces (1). Above a critical defect size, however, bone cannot be repaired by its own osteogenic activity, and some type of bone grafts must be used (2).

Jaw bone defects can be caused by surgical resection, traumatic loss, ossification impairment (in the elderly), periodontal and peri-implant diseases and congenital disorders. These defects may complicate the surgical phase of implant supported rehabilitation treatment due to insufficient bone volume for an adequate implantation (3, 4). Jaw bone loss is frequently caused by post-extraction alveolar resorption, a physiological phenomenon which leads to a reduction of the original height and width of the alveolar ridge to a degree that varies among localizations and patients (5). Alveolar ridge preservation techniques have been developed to address the ensuing clinical problem, especially in aesthetic areas (5). They are conducted during or after extraction and are designed to minimize external ridge resorption and maximize bone formation inside the socket (5). Measures include autologous bone grafts, allografts, bone of animal origin (xenografts) and synthetic bone substitutes (alloplastic grafts), as well as the application of growth factors and gene therapies (3, 4, 6).

Beta-tricalcium phosphate (beta-TCP) is widely used as a biocompatible, resorbable and osteoconductive ceramic substitute to repair bone defects. Thanks to its physicochemical characteristics, it has been successfully used to fill spaces in multiple settings, including biology, veterinary medicine, human medicine and dentistry (7-12). It has also been proposed as a vehicle for growth factors that stimulate bone formation (12, 13). Various authors have reported on its capacity as a biomaterial for bone regeneration in animals and humans (4, 14-21).

The study is aimed at evaluating granular beta-TCP in post-extraction sockets in order to measure its bone regenerative potential and its capacity to preserve the original height and width of the alveolar bone for subsequent implant placement.

Specifically, the study objectives were the following.

1. To analyze the clinical and radiological results obtained after placement of the biomaterial in the post-extraction socket and at the subsequent insertion of dental implants.

2. To assess the effectiveness of beta-TCP as bone

filling material in the post-extraction socket.
3. To perform histological analysis of the amount and quality of bone formed in the dental socket six months after the placement of the biomaterial.
4. To determine the percentage of biomaterial particles in contact with patient bone.

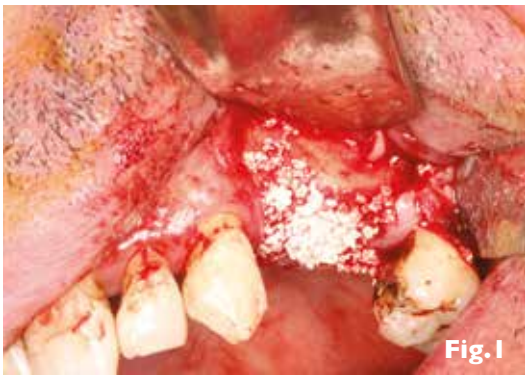
MATERIALS AND METHODS

Study design

This prospective longitudinal observational clinical study complied with the principles of the Helsinki Declaration and was approved by the clinical research ethics committee of the San Carlos Clinical Hospital, Madrid (Spain).
All patients in the study were aged over 18 years and scheduled for ≥ 1 premolar extraction due to periodontal disease, caries or fractures and for subsequent replacement with dental implant(s) up to a maximum of four premolar extractions (one per quadrant) per patient. Exclusion criteria were: failure to sign informed consent or commit to compliance with the study appointment schedule; the presence of endocrine-metabolic disease or chronic, general or local disease; the presence of disease that may be affected by the surgery or by the intraoperative or postoperative medication; alveolar socket wall defects; smoking habit of ≥10 cigarettes/day, due to its relationship with implant failure; and treatment with bisphosphonates or antibiotics during the previous month. Patients were recruited from the School of Dentistry clinic (Complutense University of Madrid, Spain) and private clinics. A non-probabilistic sampling of consecutive cases was conducted and only patients who met the above criteria were included.
Sixteen patients were enrolled in the study between March 2008 and July 2010, with a mean age of 44.3 years (standard deviation: 10.74); seven were male (44%) with mean age of 39.7 years and nine were female (56%) with mean age of 48 years. No participant (0%) was a daily drinker of alcohol, and two (12%) were daily smokers (of 1-9 cigarettes). A total of 19 upper and 2 lower teeth were extracted (lower teeth were excluded from the analysis because of this small number).
After a baseline clinical assessment, all patients received basic periodontal therapy before the surgery and were instructed to maintain good oral hygiene throughout the study.

Surgical procedure

After applying local anaesthesia and performing full- thickness buccal and lingual flap elevation, the premolar was extracted; a full-thickness flap was elevated to enable a subsequent suture to keep the granules of the material in place. Any granulation tissue present in the socket was removed by surgical curettage, and the socket was filled with 0.5 g beta-TCP KeraOs® (Keramat, La Coruña, Spain) mixed with physiological saline solution or blood from the same patient (Fig. 1). The socket was then closed by suture using a coronally repositioned flap (Fig. 2). Patients were instructed to rinse daily for two weeks with 0.12% chlorhexidine digluconate. Sutures were removed at 7-10 days post-extraction.
During the implant placement surgery (about 6 months after biomaterial placement), a bone biopsy was harvested using a trephine (inner diameter of 2.2 mm, outer diameter of 3 mm), placed in a 10% buffered formalin and sent to the Ceramic Institute of Galicia (Santiago de Compostela, Spain) laboratory for processing.



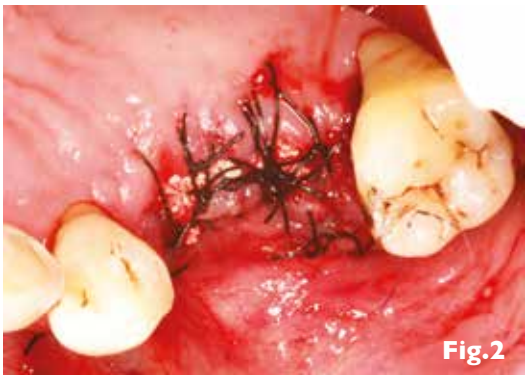


Fig. 1
Socket filled with a mixture of beta-TCP and patient blood.

Fig. 2
Socket closed by suture using a coronally repositioned flap.

Histological processing

The specimens were processed to obtain thin undecalcified sections following Donath's method and using the EXACT system.
Briefly, specimens were fixed in buffered 10% formalin, progressively dehydrated in alcohol and then embedded in photopolymerizable methacrylate resin (Technovit 7200®, VLC-Heraus Kulzer GMBH, Werheim, Germany). After polymerization, the specimens were cut with a diamond saw and then ground with silicon carbide papers to a width of about 70 microns. After thinning, samples were stained with Levai Laczko stain and chromotrope 2R/Harris haematoxylin.

	FEMALES	MALES	MEAN	STANDARD DEVIATION
Age (yrs)	48	39.7	44.3	10.47
Number	9 (56.25%)	7 (43.75%)		
Smokers (1-9 cigs/day)	2 (12%)	0 (0%)		
Drinkers	0 (0%)	0 (0%)		

Table 1
Results. Variables related to the individual. Mean age 44.3 yrs (standard deviation: 10.74); 7 males (44%) with mean age 39.7 yrs and 9 females (56%) with mean age 48 yrs. No participant (0%) was a daily drinker of alcohol, and two (12%) were daily smokers of 1-9 cigarettes.

A motorized Olympus BX51 microscope with Olympus DP71 camera was used to image the specimens, with Olympus D-cell capture software and Photoshop CS3 image processing software, employing a Wacom Intuos 4 pen tablet and applying the Olympus MicroImage 4.0 program to obtain histomorphometric measurements.
Data were gathered on the following.
1. Patient variables, sex, age, and consumption of alcohol and cigarettes (smoker = 1-9, non-smoker = 0 cigarettes/day, to test whether a light tobacco habit affects socket healing).
2. Clinical variables, biomaterial stability within socket and primary implant stability.
3. Radiological findings.
4. Histological variables at 6 months, degree of bone neoformation in socket, amount and quality of newly formed bone, degree of contact between patient bone and beta-TCP and degree of beta-TCP resorption, all assessed by direct microscopic observation.
5. Histomorphometric variables, areas of newly formed bone, immature bone, old bone, biomaterial and lamellar bone, bone-biomaterial contact index (perimeter of material in contact with bone / perimeter of whole material), remnant volume (surface of material present / [surface of material present + total bone surface]) and immature: mature bone ratio (mature bone surface / total bone surface).
Specifically designed forms were used to collect data at the following time points: tooth extraction, gathering patient variables; suture withdrawal (7-10 days post-extraction), recording radiological findings; and implant placement (around 6 months post-extraction), gathering radiological findings and data on material retention in the socket and primary implant stability. Histological data were obtained from the pathology report on samples taken at implant placement.
Microsoft Excel and SPSS were used for the statistical analyses, which included: descriptive analysis of patient, clinical and histomorphometric variables; frequency histograms for histomorphometric variables; Shapiro-Wilks normality tests for histomorphometric variables, age and healing time; 95% confidence intervals for histomorphometric variables; use of the Pearson correlation coefficient to analyse associations of different histomorphometric variables with each other and with healing time and age; analysis of variance (ANOVA) to determine the effect of healing time on newly formed bone area, biomaterial area and bone-biomaterial contact index; and the Student's t test to compare newly formed bone area, biomaterial area and bone-biomaterial contact index between shorter and longer healing times (5-6 months versus 7-8 months, respectively).

RESULTS

Patient variables

One male patient abandoned the study before implant placement. Among the 15 remaining patients, 21 biopsies were obtained after a mean healing time of 6.2 months (standard deviation: ±1.05). Out of the 21 biopsies, 3 were impaired during grinding and could not be processed, and 2 were incorrectly sampled and excluded from the analyses. Hence histological and histomorphometric analyses were conducted in a final sample of 16 biopsies (Table 1).

Clinical results

None of the patients evidenced biomaterial loss at implant placement; in some cases, the most superficial area showed residual graft particles that had no effect on the surgical procedure or primary stability, which was obtained in all cases. X-ray images revealed no complications, and in all the films, high radiopacity and consequent prompt identification of the material was detected.

Histological and histomorphometric results

No biomaterial fragments or necrotic bone splinters were detected in any of the 16 biopsies analyzed. In three cases, the biomaterial was integrated in the bone and surrounded by fibrous tissue with rim of osteoblasts and osteoid matrix; in one case, the biomaterial was surrounded by lax conjunctive tissue; in five cases, it was surrounded by mature bone trabeculae with scant osteoid and osteoblastic rimming; in seven cases, modest to highly abundant immature bone trabeculae growth was observed with osteoid and osteoblasts rim. Ten of

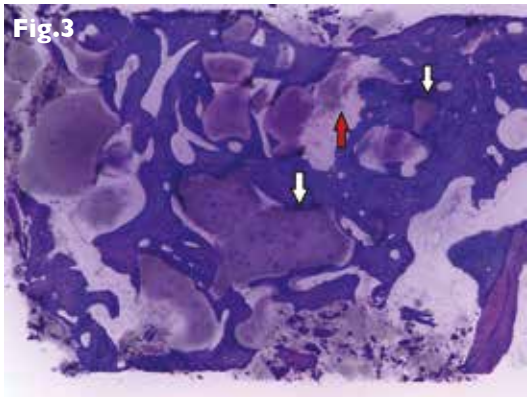


Fig.3

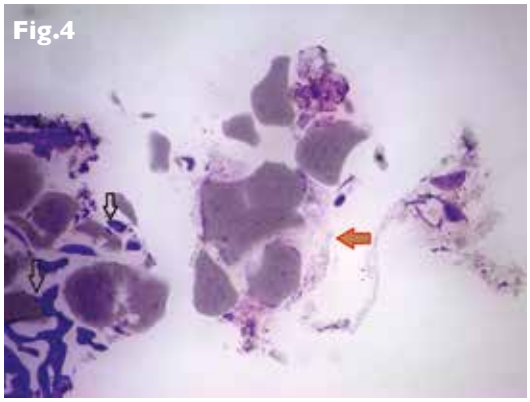


Fig.4

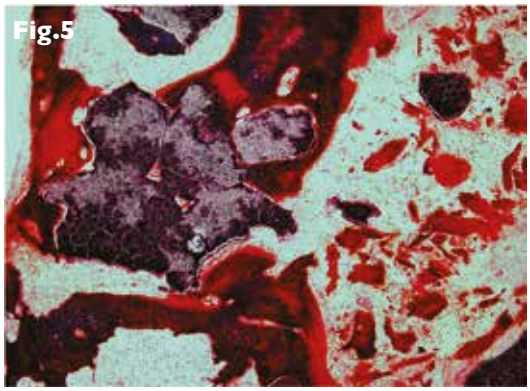


Fig.5

the biopsies showed the presence of medullary fibrosis, at a low level in most cases.

Evidence of vital bone growth was found in the sockets, with bone neoformation in close contact with graft particles. All samples showed residual particles of the material, with various degrees of material remodelling and resorption (Fig. 3, 4, 5).

The histological study at 6 months revealed that the degree of bone neoformation in the socket was generally moderate, that the newly formed bone was immature (consistent with the healing time) and surrounded by and in direct contact with biomaterial fragments and that the beta-TCP material showed initial signs of resorption.

Table 2 exhibits the results of the histomorphometric variables, which were found to follow a normal distribution (Shapiro-Wilk test). The frequency histograms showed that the mean contact between bone and biomaterial was <20% in 8 out of 15 biopsies and that the newly formed bone area was >20% in most of them; the biomaterial area was <20% in most of the biopsies. Calculation of 95% confidence intervals showed significance for all variables, except for the immature bone area and lamellar bone area, for which there were measurements in only two cases (Table 3). These two variables were excluded from analysis, using Pearson's correlation coefficient, of the relationships of histomorphometric variables with each other and with healing time and age; a positive correlation was found between remnant volume and biomaterial area (p= 0.0056) and between old bone area and the immature bone:mature bone ratio (p= 0.015).

Although the healing period was established as 6 months for this study, this time was sometimes influenced by specific patient circumstances and ranged from 5 to 8 months. The results for newly

VARIABLE (%)	MINIMUM VALUE	MAXIMUM VALUE	MEAN	MEDIAN	STANDARD DEVIATION
Newly formed bone area	0.30	45.33	20.15	13.64	15.42
Immature bone area	8.34	31.80	20.07	20.07	16.58
Old bone area	0.43	21.03	11.98	11.87	7.65
Biomaterial area	0.33	26.25	11.40	7.99	8.88
Lamellar bone area	2.02	6.11	4.06	4.06	2.89
Bone-implant contact index	0	69.70	32.31	19.82	24.94
Remnant volume	0	98.85	31.98	35.60	25.68
Immature bone-mature bone relationshop	0	96.07	42.62	36.13	36.48

Fig. 3
Newly formed bone around the biomaterial, (white arrows) with faint signs of resorption in the central area of the biopsy (red arrow). Most of the bone is newly formed, with traces of old bone at the periphery. Levai-Laczko stain. 100X.

Fig. 4 Material integrated in the bone tissue; there is a predominance of lax connective tissue (red arrow), although with areas of denser connective tissue. The biomaterial is integrated in bone trabeculae (white arrows). Levai-Laczko stain. 100X.

Fig. 5
Biomaterial surrounded by immature bone. Chromotrope 2R/Harris haematoxylin staining. 100X.

Table 2
Results. Descriptive statistics of histomorphometric variables. Table shows the minumim and maximum values for each variable; the mean and the median are also showed for each variable.

formed bone area, biomaterial area and bone-biomaterial contact index were analyzed in function of healing time, finding no significant differences. Then, newly formed bone area, biomaterial area and bone-biomaterial contact index were compared between healing times of 5-6 months and 7-8 months, finding no significant differences, altough borderline significance (p=0.08) was obtained for newly formed bone area.

DISCUSSION

In this study, post-extraction placement of beta-TCP in the socket did not cause any complications and achieved good clinical outcomes. There was histological evidence of bone neoformation at implant placement, with the presence of osteocytes and immature bone. The mean percentage of neoformed bone was 20.15%, in line with previous reports (22-25). The biomaterial area was less than 20% in most of the biopsies, confirming the resorbability of the biomaterial. The biomaterial was readily identifiable on X-ray, being much denser than the adjacent bone, as previously reported by Von Doernberg et al. (26). This characteristic is useful for the radiographic follow-up of healing, because the radiopacity changes as the material is resorbed and replaced by new bone.

Clinical studies on humans generally require the use of non-invasive techniques, e.g. radiology; but a biopsy study is the currently optimal method to assess the regeneration, quantity and quality of bone. A two-phase approach, inserting the graft in the first phase and the implant in the second, allows a histological sample to be obtained (20). This technique was applied in the present study.

We mixed beta-TCP with saline solution or blood from the patient, as in the study by Horowitz et al. (24), given the difficulty of managing this porous material in granular form (27).

Six months as bone healing time was selected, because most of the ceramic is resorbed, and the grafted tissue can be considered sufficiently stable for functional implant loading (19, 24). A study in pigs (28) found beta-TCP degradation to be slow, with 80% of the material resorbed at 28 weeks and 97% at 86 weeks; therefore, the authors recommended an interval of 5-6 months before implant placement in grafted areas, concluding that the cell response to their simultaneous placement could damage implant osseointegration. Some authors suggested lengthening this healing time in order to increase implant stability (4), and it was found that the presence of residual particles at 9 months does not compromise implant placement (23). In contrast, as reported above, Ormianer et al. achieved a 97% success rate after the immediate placement of implants in augmented areas and their immediate implant loading (22).

With regard to the mechanism of beta-TCP degradation before its substitution by bone, it was attributed by Wiltfang et al. (28) to chemical hydrolysis (halisteresis) and the activity of phagocytic cells (multinucleated giant cells). Two degradation pathways have since been described: osteoclast-mediated resorption and dissolution in interstitial fluid (23). A study in 2005 detected no osteoclastic activity in biopsies from sinuses augmented with this biomaterial, but this finding does not rule out the participation of osteoclasts although it suggested that it is limited (29). Besides these two mechanisms, it has been postulated that beta-TCP resorption may also be mediated by cells other than osteoclasts (20). However, Martinez et al. (30) suggested that osteoclasts or macrophage cells may not play an important role in beta-TCP resorption, as they found in the bone-beta-TCP interface cells

Table 3
Results. 95% confidence intervals. Calculation of 95% confidence intervals showed significance for all variables, with the exception of immature bone area and lamellar bone area, for which there were measurements in only two cases.

VARIABLE	Upper Interval limit	Lower interval limit	Statistical significance
Newly formed bone area	29.95	10.35	Significant
Immature bone area	169.11	-128.97	Not Significant
Old bone area	19.06	4.91	Significant
Biomaterial area	18.23	4.58	Significant
Lamellar bone area	30.04	-21.92	Not Significant
Bone-implant contact index	46.12	18.49	Significant
Remnant volume	46.20	17.76	Significant
Immature bone: mature bone ratio	63.69	21.56	Significant

of the reticuloendothelial system.
Some data are available on the use of beta-TCP for alveolar preservation (22-25). Ormianer studied the use of beta-TCP alone in 338 patients, although alveolar preservation was not investigated in all of these, and the number of patients undergoing the different procedures was not specified; the mean follow-up was 19.2 months and the global implant survival rate was 97.6%. In 2008, Brkovic reported on the use of beta-TCP with collagen alone in one patient, followed up for 9 months, reporting good clinical outcomes with bone formation activity.
In 2012, Horowitz used beta-TCP with a membrane in 30 patients, followed up for a mean of 6 months, also observing good outcomes with preservation of 91% of the socket width. Finally, in the same year, Brkovic studied 20 patients in two groups, one receiving beta-TCP with membrane and apically repositioned flap and the other beta-TCP alone, with a mean follow-up of 9 months, concluding that socket preservation was lower in the group without membrane. Our results are comparable to the findings of these four studies, because the implant survival was 100%, the clinical outcomes were good, bone neoformation was observed in the biopsies, and there was only a small volume of residual bone (11.98%) (Table 2).
There have also been reports on socket preservation with the use of other materials. Thus, Liasella et al. employed allografts with good results (31), while De Coster et al. (32) used biphasic ceramics but obtained poor outcomes that delayed implant placement.
After experiencing some problems in harvesting the specimens from the trephine, the protocol was modified and the samples were processed with the trephine as a block. Zerbo (33) also found it difficult to remove beta-TCP biopsies in a single piece from the trephine, and Suba (20) reported that biomaterial particles frequently broke during sample preparation.
In the present study three biopsies were lost in the polishing process, due to the complexity of sample processing, and one biopsy was taken from the incorrect area, a problem that some authors have resolved by using surgical guides (25).
In the study by Horowitz 2010 (34), two cases are discussed. In the first one an identical procedure to the one here described was followed, except for the use of a resorbable membrane after the placement of the biomaterial. The clinical outcome was excellent, allowing the placement of a dental implant 6 months after extraction. The biomaterial was replaced by new vital bone, just as in our work. Their second case is that of a smoker patient; the biomaterial was placed in the socket followed by a membrane. Healing time in this case was 10 months, after which an implant was placed. The clinical, radiological and histological results are comparable to those of our study, they observed the formation of osteon and Haversian systems in the biopsy due to increased healing time.
With the limitations of this study, especially regarding the small sample size, the histological and clinical results are in agreement with reports by various authors, evidencing problem-free healing, primary stability of implants placed in the augmented area, and an adequate substitution of beta-TCP particles by newly formed bone at 6 months.

CONCLUSION

The clinical and radiographic outcomes of this procedure are satisfactory, with no associated complications. Beta-tricalcium phosphate seems to be a biomaterial capable of achieving preservation of the alveolar bone when it is positioned immediately in post-extraction socket followed by suture; also facilitating the formation of new bone in the socket in the first six months. This resorbable material allows predictable and reproducible bone regeneration. As advantages, it can be noted its unlimited availability, its easy handling and its great radiopacity, allowing radiographic follow-up of the area. Multiple publications have shown the suitability of this material for use in bone augmentation techniques. Further clinical studies and randomized clinical trials are needed, comparing this technique with other available biomaterials, with growth factors and with alveoli in which no alveolar preservation techniques are performed.

ACKNOWLEDGEMENTS

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Management of impacted dilacerated maxillary incisor with strategic positioning of a straightwire appliance

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ABSTRACT

Aim: To describe the orthodontic management of root dilaceration of an impacted maxillary tooth following trauma to its deciduous predecessors, to show the clinical management of root dilaceration of a maxillary central incisor and describe how the dilacerated tooth was successfully moved into alignment in a young patient with a proper multidisciplinary approach, using the simple and effective straightwire technique.

Case report: After surgical exposure and orthodontic traction, the impacted dilacerated tooth was brought to alignment in the arch. The patient's chewing and speech function, and aesthetics were restored. The radiograph shows that the root is finally straight and relatively well developed. This approach avoids extraction and prosthetic rehabilitation of the dilacerated tooth.

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KEY WORDS
dilacerated teeth; straightwire appliance; impacted maxillary central incisor.

INTRODUCTION

Andreasen et al. [1971] defined dilaceration as the abrupt deviation of the long axis of the crown or root portion of the tooth, which is due to a traumatic non-axial displacement of already formed hard tissue in relation to the developing soft tissue [Andreasen et al., 1971].

The knowledge regarding how, where and when the traumatic injury has occurred is very important in order to make a precise diagnosis during the emergency visit, and to adopt the correct and most efficient clinical procedure [Ribeiro and Campos, 2009].

The aetiology of dilaceration is not fully understood. There are two main explanations of its causes: an acute mechanical injury to the primary predecessor tooth, which causes dilaceration of the underlying developing succedaneous permanent tooth; idiopathic developmental disturbances as the cause of dilacerations, mainly in cases where there is no clear sign or history of traumatic injury [Topouzelis et al., 2010; Smith and Winter, 1981; Jafarzadeb and Abbott, 2007; Stewart, 1978].

The treatment of a dilacerated anterior tooth includes surgical exposure followed by orthodontic traction; endodontic treatment or apicectomy may be associated [Lin, 1999]. Alternatively, treatment often involves surgical removal followed by orthodontic therapy to either close the space or keep it open until the patient reaches an age when implants or prosthetic treatment can be performed.

This article presents a patient with a dilacerated maxillary right central incisor managed with a multidisciplinary approach. The dilacerated tooth was disimpacted and aligned using a simple and effective method by strategic positioning of a straightwire appliance.

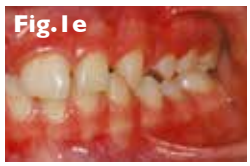
CASE REPORT

Diagnosis and treatment plan

A 9-year-old Caucasian girl was referred by her general dentist to our examination. The chief concern was the non-eruption of the maxillary right central incisor. His parents mentioned a traumatic injury affecting the frontal oral region when the child was 5 years old.

Clinical examination revealed that the patient had a symmetric face and brachyfacial type.

Intraoral examination showed an early mixed dentition and an Angle Class I molar and canine relationship. The impaction of the maxillary right central incisor had resulted in drifting of the adjacent teeth with a resultant midline deviation (Fig. 1). A metal chain showed through the gingival tissues of tooth 1.1 area because her general dentist



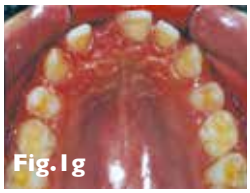


Fig. 1(a-i)
Pre-treatment extraoral and intraoral photographs.

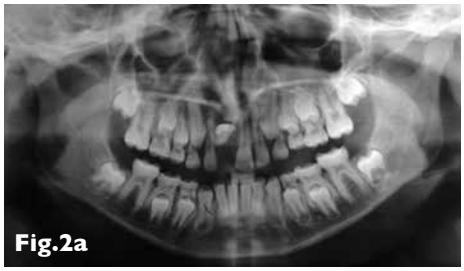
Fig. 2(a-b)
Pre-treatment panoramic and maxillary occlusal radiographs.

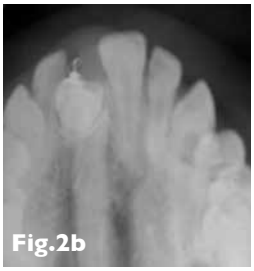
Fig. 3a
Pre-treatment cephalogram showing the dilacerated maxillary incisor;

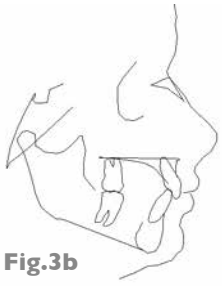
Fig. 3b
celophametric tracing

Table 1
Cephalometric data.

had performed a surgical exposure and applied a traction chain. We performed an occlusal radiograph that showed a bracket bonded to the palatal surface of the impacted tooth (Fig. 2).
Palpation of the vestibular mucosa indicated a bulge in the upper anterior area where the dilacerated incisor was probably located. Cephalometric, panoramic and occlusal radiographs revealed that the permanent maxillary right central incisor was impacted and displayed root dilaceration. Its apical foramen appeared as a circular radiopaque area with a dark radiolucent spot in the center, known as the 'Bull's eye'. The tooth's morphology and position were clearly visible in the lateral cephalometric radiograph showing a horizontally displaced tooth, with its crown rotated more than 100° from normal, and its incisal tip just below the floor of the nose (Fig. 3).
The palatal surface of the crown was facing forward "like the hand of a traffic policeman" and the root was shortened. It was not possible to exactly define the root apex on the conventional radiographs.
The analysis of the lateral cephalometric radiograph disclosed a skeletal Class II occlusion with a balanced facial pattern (Table 1).
The aim of the treatment was to guide the impacted incisor into proper alignment with the adjacent incisor teeth and to re-create a complete anterior dentition. The treatment aimed at obtaining proper crown and root alignment without further







	Pre-treatment	Post-treatment
SNA	81	82
SNB	76,5	78
ANB	5,5	4
Wits appraisal	2	0
SN/Go-Gn	34	37
FMA	26	28
SN/ANS-PNS	8	14
ANS-PNS / Go-Gn	22	23
+1 / ANS-PNS	112	118
IMPA	102	96
-1 / A-Pg	2	2
+1 / A-Pg	8	4
OVJ	5	2
OVB	4	2

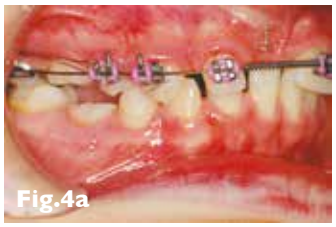


Fig.4a


Fig.4b

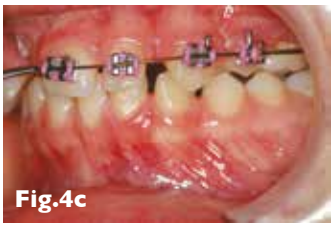


Fig.4c


Fig.4d


Fig.4e


Fig.4f

Fig. 4(a-f)
Intraoral view before surgery.

Fig. 5(a-b)
Surgical exposure of the impacted tooth.

Fig. 6(a-f)
Progress of the orthodontic traction.

root damage while maintaining the vitality and integrity of the root of the dilacerated tooth. The purpose of the treatment was, also, to extrude the tooth with all its supporting tissues (alveolar bone and attached gingiva) and to evaluate the long-term gingival and periodontal conditions.
The approach was multidisciplinary involving a combined surgical/orthodontic treatment.

Treatment progress

A STEP (Leone®, Florence, Italy) straightwire appliance was placed on the maxillary permanent teeth to create space for the impacted central incisor (Fig. 4). Prefabricated Ni-Ti, round section, 0.014 and 0.016-inch arch wires were used to align and to level the maxillary anterior teeth. Then an open-coil spring was positioned on 0.018 Australian archwire between teeth 2.1 and 1.2 to open up space in the arch to full availability for the dilacerated tooth.
After adequate space was obtained and the tooth began to erupt, the surgery was planned. Surgical exposure of the permanent maxillary right central incisor ensued with apical repositioning flap, so that a button could be bonded onto the labial tooth surface. The placement of a button on the labial surface allows for better palatal movement of the crown (Fig. 5). Orthodontic traction of the permanent maxillary right central incisor was accomplished by attaching the traction chain to archwires.
Alignment and leveling was then continued using


Fig.5a


Fig.5b


Fig.6a

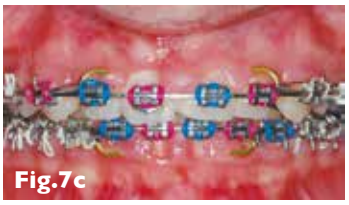

Fig.6b


Fig.6c


Fig.6d


Fig.6e


Fig.6f



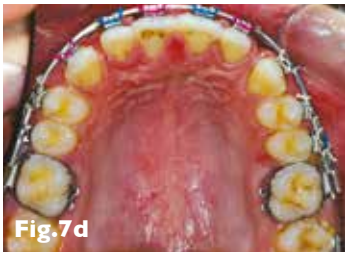
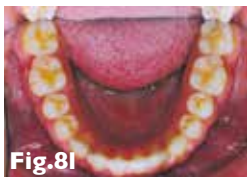
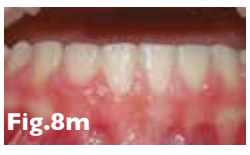


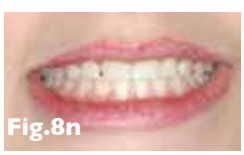
Fig. 7(a-d)
Strategic positioning of the bracket bonded upside down.

Fig. 8(a-o)
Records after debonding.

a 0.020 Australian archwire with a vertical occlusal step with an eyelet on extrusion axis. Traction was activated changing the elastic cotton thread every 2 weeks until the crown of the permanent maxillary right central incisor appeared properly oriented in the oral cavity. The traction force was about 40 g. This treatment stage lasted 6 months (Fig. 6).
Next, the button was removed from the labial surface of the permanent maxillary right central incisor and a bracket was bonded. Prefabricated round section Ni–Ti archwires with 0.014 and 0.016 inches were used again, in sequence, on the upper teeth.
In the same time a straightwire appliance was placed on the mandibular permanent teeth.
After that, Australian 0.018 and 0.020 inch archwire were used for the total alignment of the permanent maxillary right central incisor.
The right central incisor was brought closer to alignment, so an orthodontic bracket was bonded







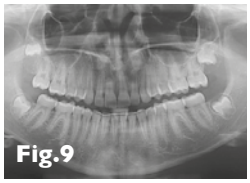


Fig.9

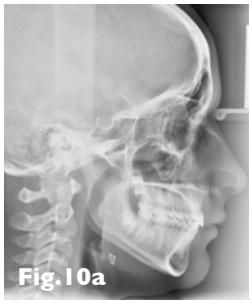


Fig.10a


Fig.10b


Fig.11

upside down on the labial surface to initiate labial root torque using a 0.019 x 0.025 Ni-Ti archwire. The strategic positioning of the bracket allowed a better position of the tooth root and harmonic gingival margin of the two central incisors (Fig. 7). Treatment continued with a 0.019 x 0.025-inch SS wire with tie-back. After about 3 months the bracket on the 1.1 was repositioned normally. The finishing stage was performed by 0.018 Australian archwire.

Treatment results

After 26 months of treatment the brackets were removed and permanent retention was bonded to the lingual surface of the lower anterior teeth. At the end of the treatment, the free and attached gingiva of the dilacerated tooth appeared acceptable (Fig. 8). The dilacerated impacted teeth was properly aligned in the dental arch restoring the masticatory, phonatory functions and patient's ae-


Fig.12a


Fig.12b


Fig.12c


Fig.12d


Fig.12e


Fig.12f


Fig.12g


Fig.12h

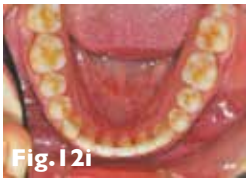


Fig.12i


Fig.12l

Fig. 9
Post-treatment panoramic radiograph showing no signs of root resorption of the aligned left central incisor.

Fig. 10a
A Post-treatment cephalogram proving that penetration of the cortical bone from the dilacerated root apex was avoided;
b cephalometric tracing.

Fig. 11
Superimpositions of the lateral cephalograms showing the dental and skeletal changes during orthodontic treatment: superimposition on the anterior cranial base (S-N).

Fig. 12
(A-L) One year post-treatment.

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sthetics. The root appears radiographically aligned and not severely compromised (Fig. 9-11). The patient was referred to the conservative dentist for restoration of the incisal margin. The one-year follow-up showed a good maintenance of the result. Aesthetic periodontal surgery and a prosthetic treatment might be recommended in adulthood (Fig. 12).

DISCUSSION

Most studies of dilaceration have concerned the maxillary central incisors, as was the case in the present study. McNamara et al. [1998] successfully aligned dilacerated maxillary central incisors planning a therapy that encompassed endodontic treatment and apicoectomy. Dilacerated impacted teeth can be properly aligned in the dental arch by appropriate treatment, which frequently requires cooperation among orthodontists, periodontists, paedodontists, endodontists, and/or prosthodontists. In the present study, no endodontic treatment or apicoectomy was needed during or after treatment, as has sometimes been required in similar cases.

A dilacerated tooth is said to be more resistant to extrusion than a tooth with a normal root, making the apical area more prone to resorption. However, in our patient, no severe root resorption could be detected, suggesting that, in the case of dilaceration, root resorption can hardly be predicted. Radiographic checkups during orthodontic traction are advisable [Cozza et al., 2005].

The success rate of an impacted dilacerated tooth alignment mainly depends on the following factors:
- position and direction of the impacted tooth;
- degree of root formation;
- degree of dilaceration;
- availability of space for the impacted tooth.

Machtei et al. [1990] also include the condition of the periodontium. McNamara et al. [1998] underline the decisive significance of the post-traumatic condition of the Hertwig's epithelial root sheath for a successful therapeutic outcome, since normal root development depends on its integrity. A dilacerated tooth with an obtuse inclination angle, a lower position in relation to the alveolar crest combined with an incomplete root formation has a better prognosis for orthodontic traction.

CONCLUSION

The factors that determined a positive outcome are the following.
- The strategic placement of the straightwire appliance allows correct positioning of the tooth root and harmonic gingival margin of the two central incisors.
- The placement of buttons on the labial surface allows the palatal movement of the crown.
- The use of light and constant orthodontic forces (40 g) exerted by means of traction chain and elastic cotton thread before and NiTi superelastic wires.

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Mineral trioxide aggregate in treatment of permanent teeth with open apex and endo-perio lesions. A case report

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KEY WORDS
Endo-perio diseases; Mineral trioxide aggregate; Open apex.

ABSTRACT

Background Mineral trioxide aggregate (MTA), one of the latest materials applied in dentistry, has a variety of potential uses. Numerous studies emphasise its biocompatibility with periodontal and hard tissues, as well as excellent sealing and regeneration abilities.

Case report This article describes the successful therapy of immature mandibular premolars with large open apex, resorption, and endo-perio lesions. In the presented case, the canal was filled with the MTA material. At present, the treated tooth is asymptomatic, and a three-year follow-up radiographic examination demonstrated the dramatic regeneration of periradicular tissues and the new hard tissue formation in the area of the affected teeth.

INTRODUCTION

Endodontic treatment of permanent teeth with incomplete root apex development, apical periodontitis and bone loss poses a challenge to the dentist [Andreasen et al., 2002; Felippe et al., 2005]. For many years, multi-appointment therapy has been performed using calcium hydroxide dressings. Such a treatment is however long-term and associated with the risk of root weakening and tooth fracture. Additionally, there is a fear that the patient will not see the dentist regularly to change temporary dressings [Andreasen et al., 2002]. In this situation, the application of mineral trioxide aggregate (MTA) seems to be a better treatment [Parirokh and Torabinejad, 2010]. MTA was developed in the early 90ties at the Loma Linda University in the USA, and in 1998 was introduced in the dental market as ProRoot MTA® (Dentsply Tulsa Dental Specialties, Tulsa, USA) [Torabinejad et al., 1994; Torabinejad et al., 1995]. Since that time, it has been successfully used in different clinical cases such as apexification of teeth with incomplete root development, direct pulp capping, pulpotomy and pulpectomy, repair of perforations of root and pulp chamber floor, treatment of tooth resorption, and retrograde canal filling during root resection [Roberts et al., 2008]. Numerous reports emphasise that MTA may improve the outcome of not only endodontic treatment but periodontal as well [Katsamakis et al., 2013; Srinivasan et al., 2009].

REPORT

A 12-year-old female patient was referred to the Endodontic Clinic of the Medical University of Lodz (Poland) to continue root canal treatment that had been started two years earlier at a private dental office. A medical history revealed that the girl suffered from asthma and received inhaled corticosteroids. On the basis of earlier treatment records it was found that after trephination of tooth #35, the calcium hydroxide dressing was inserted into the canal. Since then (1.5 year), no endodontic procedures were performed. On admission to the Endodontic Clinic, an extensive cavity within the tooth crown filled with a temporary dressing and a deep pathological pocket were visible. The dental radiograph showed the incompletely developed root apex with a very wide apical foramen, thin root wall, a bony pocket and chronic periradicular periodontitis around tooth #35 indicating an endo-perio lesion (Fig. 1). Due to a very bad condition of the tooth and a concomitant malocclusion, the patient was referred to the orthodontist for consultation whether tooth #35 should be treated or extracted for orthodontic reasons. The specialist diagnosed severe retrognathia and tooth abnormalities (crowding of upper teeth), and advised the endodontist to treat and retain tooth #35 as long as possible. The involved tooth was treated at the Endodontic Clinic using a dental operating microscope and a rubber dam for tooth isolation. After the removal of the dressing, a hemorrhagic exudate from the canal was observed. Approximate working length was established with an electronic apical locator and radiographs. The root canal was cleaned with 2.5% NaOCl and

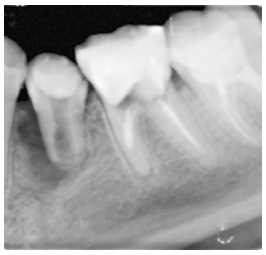

Fig. 1
Preoperative radiographic examination showing radiolucency at the apical and mesial area of tooth #35. The apex is clearly open.

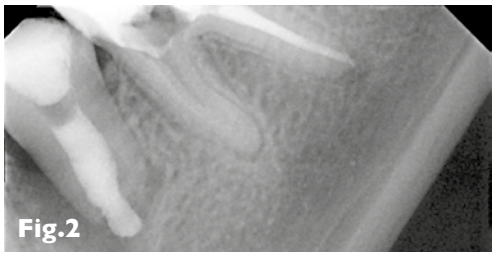
Fig.2

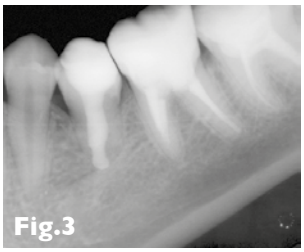
Fig.3

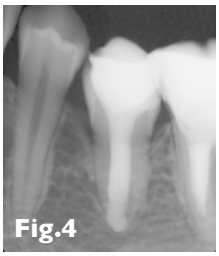
Fig.4

NaCl. Next, the canal was delicately dried with paper points and the calcium hydroxide dressing (Calxyl®, OCO Präparate) was placed for two weeks. At the first appointment, instructions on oral hygiene were given to the patient and rinsing of the oral cavity was recommended after each application of inhaled corticosteroids. The patient had in fact many teeth with fillings and carious lesions.

After two weeks, the calcium hydroxide dressing was removed by instrumentation and irrigation with 2.5% NaOCl and 17% EDTA. Additionally, ultrasonic activation of a #25 K-file passively placed in the canal was carried out to improve canal debridement and Calxyl®. The canal was finally filled. At first, the periapical region of the canal was filled with small pieces of resorbable collagen sponge (Biokol®, Stalmed). Next, small portions of the MTA material were inserted into the canal and condensed vertically using pluggers. In this way, the entire canal was filled with MTA. In the region of the pericoronal canal orifice, a sterile cotton pellet saturated with physiological saline was placed on MTA (Fig. 2). A tight dressing (GC Fujii Triage®) was inserted into the crown. After two days, the cotton pellet was removed and the permanent filling (Tetric Evo Ceram® Ivoclar Vivadent®) was placed. Root canal retreatment of tooth #36 was also carried out. The patient visited the endodontist again after the following one and three years, despite the recommended earlier follow-ups. Clinical examination did not present any pathological changes in the tooth and the periodontal ligament. On the basis of the radiograph, bone regeneration and healing of apical periodontitis were observed (Fig. 3, 4).

DISCUSSION

Modern endodontics offers different treatment possibilities, even in very complicated endo-perio lesions of immature teeth [Felippe et al., 2006; Kottoor and Velmurugan, 2013; Parirokh and Torabinejad, 2010]. In the presented case report, the incompletely developed root apex with a large open apical foramen, external root resorption, endo-perio lesions, extensive apical periodontitis involving the mesial side of the alveolar process along with the bony pocket were diagnosed. Additionally, a long time that had passed from the trephination to the final root canal filling was considered a poor prognostic factor. After preparing an access cavity to the tooth at the private dental office, a calcium hydroxide dressing was inserted into the canal and was left in the tooth for a period of 1.5 year. Long-term calcium hydroxide dressings weaken the root structure, possibly by naturalizing, denaturing, or dissolving the acidic components of dentine [Andreasen et al., 2002]. Moreover, the inadequate dressing within the tooth root and the crown undoubtedly contributed to ongoing bacterial infection. Despite such an unfavourable situation, the treatment was successful. Both, the root canal and periodontal treatment as well as canal filling with the MTA material were the factors which determined the success of therapy. Numerous studies emphasise very good biocompatibility, and antibacterial and antifungal activity of this material [Ferk et al., 2011; Al-Kahtani et al., 2005; Srinivasan et al., 2009]. MTA also possesses excellent sealing properties and the ability to harden in the presence of fluids including blood [Tang et al., 2002; Torabinajed et al., 1994]. MTA has low solubility in tissue fluids (less than 3%), therefore it does not undergo resorption [DaSilva et al., 2010]. MTA induces proper growth and development of the new root, bone and periodontal cells including periodontal ligament [Guven et al., 2007; Katsamakis et al., 2013]. MTA has stimulated the expression of osteocalcin, alkaline phosphatase, collagen type 1, and bone sialoprotein in cementoblast cell cultures [Hakki et al., 2009; Hakki et al., 2012]. The research also indicated that after MTA application, the human periodontal fibroblasts presented attachment, normal growth, and functions [Hakki et al., 2009; Lin et al., 2004]. A great advantage of this material is its strong alkaline pH and pH-related beneficial therapeutic activity. While hardening, the pH of MTA equals 10.2 and increases up to 12.5 during the first hours [Torabinejad et al., 1994; Torabinejad et al., 1995]. Calcium hydroxide also possesses alkaline pH, however it should not remain in the canal longer than two weeks as this time is optimal for its antibacterial activity and drying of exudate. In the presented case, a short-term placement of calcium hydroxide was justified by the presence of a large amount of exudate and

Fig. 2 Postoperative radiograph showing the root canal filled with MTA.

Fig. 3 Follow-up after 1 year after therapy completion.

Fig. 4 Follow-up after 3 years after therapy completion.

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concomitant infection of the root canal and periodontal tissues. MTA filling is a quicker and more effective method than using calcium hydroxide. In the case of canals with an excessively widened apical foramen, it is recommended to create a barrier in the apical region with a resorbable collagen sponge and then to condensate small portions of MTA. This procedure prevents excessive extrusion of MTA outside the root to the periapical tissues and enables the material to be condensed [D'Arcangelo et al., 2007]. The root canal with incomplete development of the root and/or its external resorption can be filled with MTA entirely or in two stages, in which MTA is inserted into the periapical part, and the remaining canal is filled with gutta-percha and sealer (most frequently thermoplastic gutta-percha is used) [D'Arcangelo et al., 2007]. In our patient, the entire canal was filled with MTA because the root (and the canal) was very short and the root walls were thin. Due to the unfavourable ratio of the crown length to the root length, future prosthodontic reconstruction (post and core crown) was excluded. The cavity within the crown and the coronal part of the root were restored with light-cured composite, which strengthens the tooth tissues.

After filling the entire or part of the canal with MTA, radiological examination and follow-ups are recommended. MTA due to 20% bizmuth oxide content is radiopaque [Song et al., 2006].

CONCLUSION

To sum up, the application of MTA in the treatment of nonvital teeth with the incompletely developed root and/or its external resorption and apical periodontitis involving endo-perio lesions is an efficient method of treatment, resulting in a good state of the tooth retained in the oral cavity and healing of inflammatory lesions in the bone and periodontium. Short-term treatment is an additional advantage of the MTA material.

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Dentaid appeals for dentists to help in Calais migrant crisis

International charity Dentaid is appealing for dentists who are registered to practice dentistry in France to provide essential treatment for thousands of migrants living in refugee camps near Calais.

One of the charity's trustees, Jonathan Gollings, has recently returned from France where he saw the desperate need for dental care in the camps. Hundreds of people, including many children, are suffering dental pain after travelling across Europe to find work or flee war and persecution. Many have serious dental problems with an average of eight people a day arriving with an abscess.

French law states that any dentist who works in the camps must be registered in the country and have permission to practice in Calais. Dentaid is now appealing for any UK dentists who registered to practice in France, or French dentists, to volunteer their skills.

Dentaid provides equipment and DentaidBoxes – entire dental surgeries that fit into a wheelie bin and can be operated without electricity and water - to countries all over the world were people are suffering due to a lack of dental care.

The charity also sends teams of volunteer dental professionals to Asia, Africa and South America – but is now keen to help closer to home in the wake of the migrant crisis and provide emergency dentistry for those in pain.

"We have been approached because there is a desperate need for dentistry in the refugee camps at Calais," said strategic director of Dentaid, Andy Evans. "We are hoping we can find a team of dentists who are registered to practice in France so we can make a real difference. Dentaid is a charity that is committed to eradicating dental pain all over the world whatever people's circumstances are."

Dentists who have permission to practice in France and particularly in the Calais region are asked to contact Dentaid on 01794 324249. To find out more about the charity visit www.dentaid.org.

For press inquiries please contact Jill Harding, press officer at Dentaid, jill@dentaid.org.

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Maco Dental Care

MaCo Dental Care, established in 1993, has by now passed the milestone of two decades of presence in the international dental market and proved itself carrying on a winning idea by building a reputation founded on the reliability and versatility.

This Italian company is the result of the will of its founder, Jose Felix Conte, to capitalize on his experience as an operator in dental industry giving birth to its own brand. So begins the story of MaCo and the company, after operating as a distributor of dental products in international markets, starts manufacturing dental implants. Into the industrial complex of Buccino, a town just under 100km south of Naples, MaCo realized a manufacturing plant of 6000m2 provided with advanced machinery and equipment.

The quality control system is based on maximum efficiency and safety, and his compliance with standards set by ISO 13485 has been very early certified. Furthermore, all MaCo products are released with CE marking. Over the years MaCo has implemented its catalog and today it commercializes six different connections (while two others are currently being launched) providing to specialists a wide selection of products able to meet every specific need related to the individual clinical case.

The growth of this company, based in the industrial area of Buccino, is not only remarkable in its manufacturing side and its commercial evolution is perhaps even more impressive. MaCo implants, in fact, have achieved a increasingly stable presence in the market and their spread abroad witness how the choice of maintaining highest quality standards standing into an affordable price range, has been successful. In many of the countries where MaCo Dental Care has begun to spread its products through participation in events and international trade fairs, the company has raised growing consensus and, in some cases, it has further strengthened its position by opening head office subsidiaries. MaCo Dental Care Mexico has been the first example of this type and now is a well-known presence in Mexican implantology so much that the company decided to hold there its first two international conferences.

Acapulco and Veracruz have hosted two events characterized by an increasing number of participants and a large response in dental sector. This partnership was further strengthened, with the third edition of the seminar, which concluded a week of classes, meetings and surgical practice which was attended by twelve Mexican professionals who were able to confront with MaCo Dental Care Italian opinion leaders. Following the successful Mexican experience, MaCo Dental Care has similarly worked in other countries: in Colombia, for example, where MaCo realized in the city of Cali, the first training center for continuous education of doctors and operators, in Spain, where its presence is by now consolidated, or more recently, in Morocco, where the company has played a leading role in the First Intercontinental Congress of Dentistry and Implantology held in Marrakesh in January of this year.

The latest addition is MaCo Russia based in St. Petersburg. Alongside these experiences MaCo distributes its products in Europe, North Africa, Middle East and South America.

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TIPS, TRICKS AND IDEAS TO DISCOVER THE LION CITY

The must seen after the trade-show.

Author: Alessia Murano

Someone calls it the Lion City, someone the Garden City, or even more the Red Dot, but officially the world's only city-state is the Republic of Singapore.

This city that just over a century ago was only a fishing village now is the beating heart of the avant-garde Asia, in all its story this island was occupied by Japan and colonized by the British, gaining its independence in 1963. That's why now the official language it's English, and is one of the reasons why nowadays is a melting pot area.

This is what you have to know about this sunny city, a list of the basics to see.

The fabulous food

Flavors from Malaysia, China, Indonesia and India collide, creating the delicious hybrid cuisine of Singapore, here you can feed your love for the food.
One of the best local dishes is the chicken rice, called Hainaese, the best place to try it is the Maxwell Road Hawker Centre. If you like hot and spicy you must try the chili crab. And how about coconut jam spread on a toast? Thant's the kaya toast, a real delight. You must also try the nasi biryani, a dish of rice with Indian spices, usually served with mutton chicken or fish, better if you try it in Little India.
If you like more sophisticated environment Mod-Sin (Modern Singapore) is your place, a new edition of Singapore cuisine with fresh cooking techniques, fusion flavors and innovative plating. Popular, local dishes are being reinvented, often with strikingly modern visual appeal, served up as classics on restaurant menus. Only gourmet cuisine, which gives local dishes an interesting twist, in fact Singapore Michelin Guide 2016, is the first to be published in a Southeast Country.
Try the weekend brunch that is becoming really common into the Australian-style cafes for example at Common Man Coffee in Robertson Quay.

Art

If you love arts than Singapore it's your city. If you prefer modern art than you need to visit the National Gallery, the latest jewel in Singapore's art crown. The National Gallery Singapore is a brand new visu-

Cover Photo
Singapore skyline and river at blue hour.
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al arts institution housing an unparalleled collection of modern Singapore and Southeast Asian art (Sunday to Thursday, Public Holidays: 10am–7pm; Friday to Saturday, Eve of Public Holidays: 10am–10pm). A stop is requested also at the Singapore Art Museum (Monday to Sunday 10am - 7pm; Friday 10am - 9pm), and at the Art Science Museum (Daily: 10:00am - 7:00pm), a colonial army base transformed into a contemporary art space.

The Garden City

Once Singapore was a large tropical rainforest, that's why it's hard to find a city as green as this one, in fact here we can find lots of eco-attractions and iconic parklands. The most important and famous is the Botanic Garden a tropical garden, 60 acres of land were transformed from a disused plantation into the popular recreational garden you see today, gaining the status of UNESCO World Heritage site. Inside of the Botanic Garden you can find the National Orchid Garden, the main attraction, which boasts the world's largest orchid display, with over 60,000 plants and orchids, you can visit it from 5 am until midnight, really useful if you want to avoid the crowd. For a super sized garden experience your must-visit should include the Garden by the Bay. Located next to Marina Reservoir, Gardens by the Bay offers breath-taking waterfront views. This multi-award winning horticultural destination spans 101 hectares of reclaimed land, and is made up of two main areas – Bay South Garden and Bay East Garden. Gigantic "super-trees" vertical gardens characterize this park with a structure high 50 meters with lights and music that plays every night (light show at 7:45 pm and 8:45 pm every evening). Walk on the suspended walkway between two Super-trees to enjoy a bird's eye view of the gardens.

Nightlife

Night owls will find an eclectic variety of dining and clubbing options. Dance the night away in Clarke Quay or Marina Bay. Do not forget that there's no better place to admire the expanding city skyline, than from rooftop bars. The perfect moment is the sundown when the Central Business District creates a perfect skyline that looks like a postcard. For something more relaxed there are the laid-back beach bars and cocktails hotspots with panoramic view. For cozy gatherings, the restaurant-bars at Club Street and Dempsey Hill are the places to go to. Supper locations in town can curb those late night hunger pangs too. An area that offers several nice restaurants is the Robertson Quay not so far from the prestigious Fullerton Hotel.

A multicultural melting pot

Singapore is a city where cultures meet; different architectural styles and a hybrid cuisine characterized this city. In the Lion city all the festival from different countries are celebrated. Lunar New Year or better the Chinese New Year is celebrated in China Town, knows here as the Spring Festival, for sure red is the

color of this season. Deepavali celebrated by Hindus across the world to mark the triumph of good over evil and light over darkness. The symbolism of Deepavali is aptly summed up in the simple act of lighting an oil lamp.

Hari Rava Adilfitri, most commonly knew as the festival of Eid mark the end of Islamic Ramadam. And last but not least, Christmas big celebration for Singapore during the year. The main historic precincts are Little India Kampong Glam, Chinatown and the Arabic neighborhood.

Taking a walk

When the French opulence meets the modern we recreate the Singapore architectural style. Above all if we are in the Civic District here you can find the top museums and the popular shopping malls even if you can find all the historic building of the Red Dot. Instead of walking into the crowd visiting, Tiong Bahru and Joo Chlat is always a good solution for those who like relaxing and quieting.

Photo 1
Red Orchid Flower
Petershort
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Photo 2
Pagode Bianco con Red Flags
FrankvandenBergh
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Interview with Dr. Hien Ngo
The Post-Amalgam Era Symposium at IDEM Singapore 2016

***The interview questions were posed by Dr. David Alexander, IDEM Singapore 2016 Scientific Programme Director*

Why is now the time to be organizing such a detailed symposium on dental restorative materials?
HN: The scope of the Minamata Convention (UNEP, 2013) is much wider than dentistry, its main objective is to "protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds". In 2014, the FDI issued a policy statement on Dental Amalgam supporting the recommendations of the Minamata Convention, which includes the "phasing-down" of amalgam. As this material has been one of the mainstays of dentistry for over 150 years, this move has huge impacts on the way dentistry is practiced everyday. We need to start preparing today!

Surely with all the various tooth-colored restorative materials available today, we are already in the post-amalgam era.
HN: You are right, with the wide choice of tooth-colored restorative materials and their improved performance, we are well equipped to enter the post-amalgam era in dentistry. However, when the FDI and UNEP only called for the "phasing-down", rather than the removal of amalgam from our profession, these authorities realized that amalgam is still an important tool in many parts of the world, this is mainly because of its perceived low cost, long track record and technique tolerant. There are still billions of amalgam restorations that are still in service and the search for the ideal tooth replacement material is still on. In preparation for the eventual removal of amalgam, the FDI policy statement stresses that authorities should work with the dental profession on a comprehensive global dental materials research agenda together with effective preventive strategies.
In the post-amalgam era, the profession has to focus on both restorative and preventive approaches to the management of dental diseases.

Briefly, how did the United Nations treaty on limiting the use of mercury come about?
HN: It started with the realization of the negative impacts, of mercury, to the environment. In 2001, the United Nation Environmental Program (UNEP) looked into this issue. By 2003 it concluded that there was enough evidence to recommend reducing the use of mercury globally. However, by 2009 UNEP realized that there were insufficient voluntary actions so it was decided to step up the pressure with the introduction of a "legally binding instrument", this is the birth of the Minamata Convention in 2013. Today, over 128 nations have signed this convention, which also includes a call to phase-down the use of mercury in dentistry.

As far as dentistry is concerned, what will be the main changes in the everyday practice of general dentistry?
HN: The main changes include focusing on managing dental diseases, early detection and empowering patients in effective preventive regimes. When repair is required, then the focus should be on maximum preservation of tooth structure. This can be achieved only with the use of adhesive dentistry and not amalgam. To gain public confidence, dental practitioners should demonstrate and communicate their commitments to safe handling practice, effective waste management and disposal of dental restorative materials. The public should be educated on the implication of the Minamata Convention and the choice of restorative materials should be based on a sound cost-benefit-analysis of each particular case. In this new era, dentistry will be both challenging and fun and the symposium will prepare participants for this new phase.

Dental Amalgam has been one of the mainstays of dentistry for over 150 years – how can dental professionals acquire the knowledge, learn the skills, and train their supporting staff to adopt the necessary procedures so patients may enjoy the benefits of these modern materials, in most cases, to replace amalgam?
HN: The alternative restorative materials to dental amalgam are not that new, most dental professionals and their supporting staff will already be familiar with these materials, even if they may not be in widespread use day to day in their clinics. What is new is the features and benefits that the most recently developed materials offer. The symposium will place much emphasis, especially the clinical techniques, on this aspect. So the adoption of new techniques, understanding the strengths and the limitations of various materials and then the training of the wider dental team should not be too challenging. A benefit for every member of the dental team will be seen in patient satisfaction as the aesthetics and longevity are so much greater now. The symposium will address how to restore a tooth, a whole dentition and reestablishing a healthy oral environment.

What are the major learning outcomes of the whole day symposium?
HN: This whole day symposium will enable participants to understand of the rationales behind the need to phase down the

use of dental amalgam and to gain a detailed and complete update on the latest advances in dental materials and the optimal techniques for clinical success.
By the end of the symposium, participants will gain practical know-how to deliver effective, evidence-based and patient-centered preventive and restorative solutions in the everyday practice of dentistry. We have assembled a panel of internationally renowned scientists and clinicians to share their knowledge and clinical experiences that will enable a greater understanding of the opportunities for oral health and dental practice in the shift towards the post-amalgam era of dentistry.

By attending the whole day symposium, will dentists be able to gain sufficient knowledge and skills, to initiate the changes required to their practices?
HN: The secret for success in tackling this "call to action" is to focus on getting ready for the new era. This symposium is designed to arm participants with an understanding of the rationales behind the phasing-down of amalgam, gain detailed knowledge on tooth colored materials, learn new skills on the selection and application of these and most importantly be able to communicate to members of the dental team and patients on the importance of this change. At the end of this day, participants will feel ready and empowered to embark on this new and exciting phase of dentistry.

Clearly the environment is at the heart of the treaty and the consequent change in the practice of dentistry, but what do you see as other benefits – to both the dentist and of course the patient?
HN: The risk associated with free mercury has been well appreciated by the dental profession. Waste management and safe handling practice of amalgam have been observed by the dental profession and they are well regulated. One can argue that, for the majority of dental practitioners, the transition to tooth colored restorative materials happened a while back. These materials have much improved performance and they are now very popular. The main objective of this symposium is to bring together a group of excellent speakers to bring to the participants the latest information, as well as sharing of experience and skills. The list of speakers includes eminent dental leaders, scientists and clinicians to ensure that each participant will benefit.

**Dr. Hien Ngo will be speaking at the IDEM Singapore 2016 conference to be held from April 8th to 10th 2016. Do join us at IDEM Singapore 2016, gateway to the Asia Pacific's dental market, with a massive 18,000 sqm of exhibitions space, over 550 international exhibitors and many of the world's experts in dental practice, education and research! To find out more information about what Dr. Ngo will be speaking on, please visit his page. Also, you may visit IDEM's social media sites on Facebook, LinkedIn and Youtube.

Interview with Mr. Michael Dreyer

Mr. Michael Dreyer
Vice President, Asia Pacific, Koelnmesse Pte Ltd

Why was Singapore chosen for all IDEM conferences?

Singapore has been an ideal location to have the 9 IDEM Singapore editions due to the country's attractiveness as a medical and dental hub. Known as a cosmopolitan city, Singapore is ideal in bringing together visitors, medical and dental professionals and international companies from all over the world to the IDEM Singapore conference and exhibition. Moreover, Singapore serves as a good launch pad for companies who are looking to expand into the other emerging markets around the region, especially into countries like Thailand, Vietnam, Indonesia, Myanmar and Cambodia.

What can our visitors and delegates expect from the upcoming IDEM Singapore 2016?

This year's conference will be even bigger and better – with a much greater number of limited attendance hands-on workshops - which have proven to be in high demand among partici-

pants. It is also our largest exhibition to date. The trade floor has expanded 2,000 sqm as compared to 2014, bringing the total exhibition space to 18,000 sqm. For the first time ever, exhibitors and trade fair visitors can expect to see a larger space for Exhibition, Scientific Conference and Forum sessions, which will be held over three levels, i.e. levels 3, 4 and 6 of the SUNTEC Singapore Convention and Exhibition Centre. In addition, a total of 12 country pavilions will be returning to join the IDEM Singapore 2016, Brazil, China, France, Germany, Italy, Japan, Singapore, South Korea, Switzerland, Taiwan, UK and U.S. Visitors and delegates can also expect to meet over 500 innovative and exciting exhibitors from 38 countries during three power-packed days of meetings and networking. Of these companies more than 100 are new exhibitors who will showcase their products and technology.

Since its inception in 2000, how has IDEM Singapore evolved over the past years?

IDEM Singapore has grown in numbers and strength with each edition. The event has attracted more attendees to the exhibition and conference with visitor numbers more than doubling over the past 10 years. 2004 saw 4,746 participants, while our last edition had a total of 7,842 participants. Our conference has evolved to include dedicated conference forums for different personnel within the dental team and for this 2016 edition we have more hands-on workshops than ever before. On the exhibition side, IDEM Singapore has continually expanded in space and in scope. For instance, we are noticing a trend in the increasing number of exhibitors bringing in products from the field of digital dentistry. As the industry is constantly developing, we are seeing similar shifts being adapted by companies who specialise in dental products and technology.

Do you have a message for our visitors and delegates who will attend the IDEM Singapore 2016?

Come and attend IDEM Singapore 2016 and engage and stimulate your mind through the exciting interactions with industry and professional leaders. Keep up-to-date with the latest insights, research and trends in both dental industry and science to help you strive for clinical excellence.

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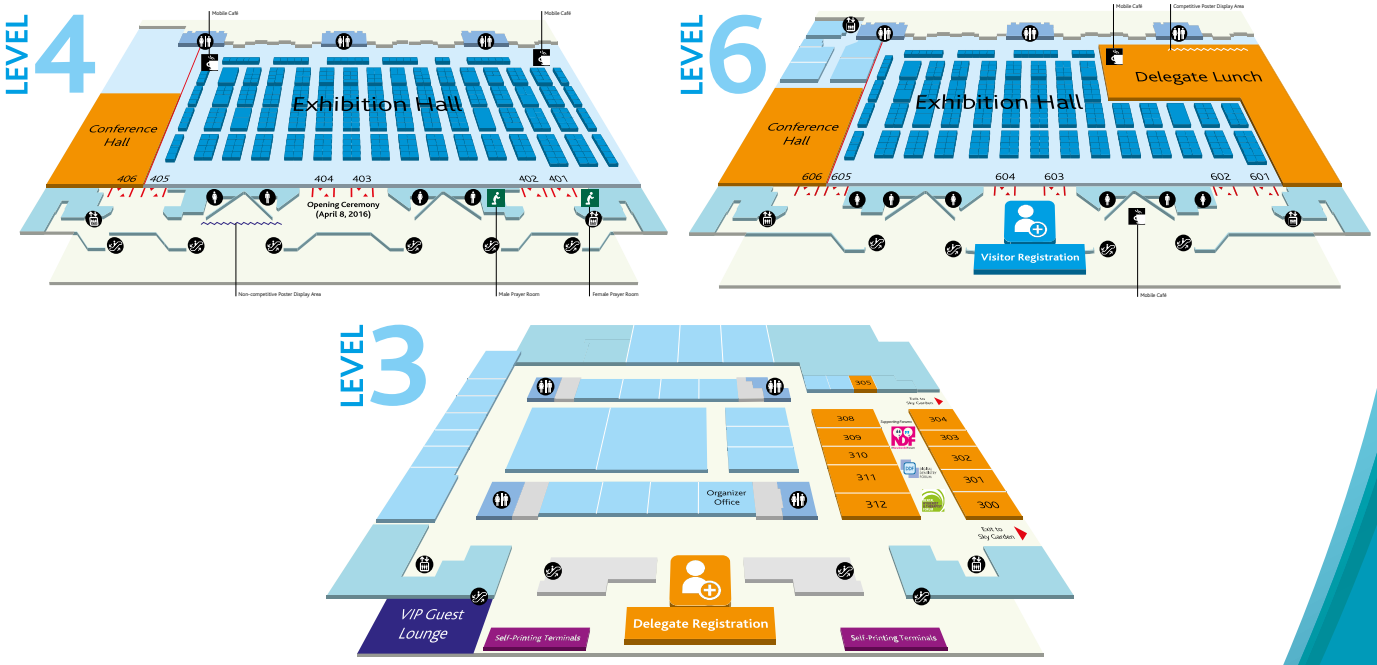

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