inews
INFODENT
Special Edition IDEM 2018

INFODENT BOOTH:
4N27

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INEWS SPECIAL IDEM 2018- INFODENT Srl - Str. Cassia Nord Km 86,300 01100 Viterbo - Italy

NEW from the Piksters® people

Announcing a major advance in wedging technology -

Visit us at booth 4H-22 IDEM

Master Wedge

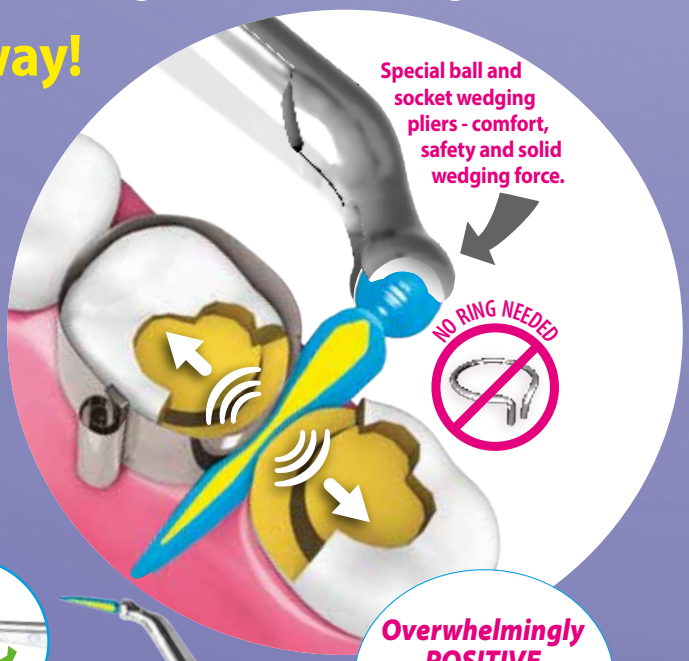
Patents Pending

The world's first RUBBER CORE 'CUT DOWN'① WEDGE for superb contact pressure & shape. Separates teeth like a ring, without the ring!

GET GREAT CONTACTS the EASY way!

✓ **Rubber core moulds wedge to anatomy of tooth & dual functions** as wedge and ring. Compresses on insertion and moves teeth apart (has more resilience than wood). This movement helps compensate for matrix thickness, creating better contacts.

✓ **Master Wedge works without a ring.** Rings can "ping" off and/or crush matrices, especially if the cusp is missing. However you can use Master Wedge with a ring and a sectional matrix if you wish for even tighter contacts. Some prefer the tight seal and zero flash by using Tofflemire - now you can use a Tofflemire etc with a **wedge that acts like a ring**.



✓ **Our exclusive wedge SPHERICAL END, along with our unique BALL & SOCKET PLIERS enables any insertion angle, plus a safe, solid lock.**

Overwhelmingly POSITIVE RESPONSE from the profession.

Get a grip with our "Lock and Load" Pliers.

✓ **Use with any matrix band - Tofflemire, Automatrix®, Siqveland OR Sectional Matrices.**
Now at last you can have the speed, ease and comfort of a Toffelmire and still get superb separation.

✓ **① Very important feature:**
The apex of the wedge is cut away
- allowing you to bend or burnish the matrix for a better contact **area** and a proper **emergence profile.**

Normal triangular wedge
The top of the triangle of most wedges pushes into the matrix band and makes it hard to get a good contact point - many dentists have been cutting this off! Don't waste time: simply use Master Wedge.

Master Wedge - trapezoidal in cross section
Master Wedge has the top of the triangle cut away - it's much easier to get **broad** contact points (instead of point contact at the marginal ridge, **loose** contacts or a **large embrasure space**). Get less food impaction & accumulation - vertically and horizontally.

Your Choice - Complete or Basic Kit

Basic Kit - 5 sizes for the dentist who wants to keep it simple. (100 wedges in sizes 3-7) **$76.50**USD

Complete Kit - 10 sizes for the dentist who wants the right wedge for every clinical challenge. (100 wedges in sizes 0-9) **$76.50**USD

Complete 10 sizes Kit (sizes 0-9)

Simple 5 size Basic Kit (sizes 3-7)

- XXX Small (#0)
- XX Small (#1)
- X Small (#2)
- Small (#3)
- Small-Med (#4)
- Medium (#5)
- Med-Large (#6)
- Large (#7)
- X Large (#8)
- XX Large (#9)

(actual size)

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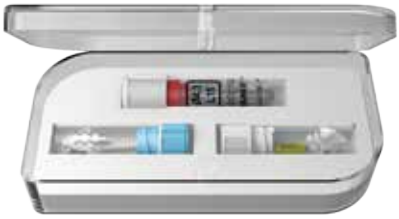

All-in-One Kit sample

All-in-One Kit contains 1x
- Paradigma® Implant
- Titanium closure cap
- Titanium healing cap*
- Plastic transfer (closed tray technique)
- 0° Esthetic abutment transmucosal h 1,8 mm*
- Definitive abutment screw gold-colour
- Plastic castable abutment
- Implant laboratory analog
- Laboratory abutment screw blue-colour

(*size vary with implant diameter)

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THE ROLE OF THE MEDIA IN BUSINESS AND SOCIETY

Exercising judgements over a business community is the simplest of things. Business leaders can move from heroes to zero – and occasionally back again, at the raise of a finger by the power of media. Rough justice perhaps – but many are the examples of the vital role of the media.

In the 1970s, the trade union movement slipped from its roots as a heroic saviour of the working man to the disruptive scourge of an industrial society.

The 80s and 90s chartered the ascendency of business, entrepreneurism and finance – its bankers were the 'masters of the universe'. Capitalism had become the way to go; business was good for everyone. And the media cheered it ever onwards and upwards. But when it all went horribly wrong. The financial markets collapsed and the 'masters of the universe' became the zeroes of the hour.

And as the wealth spreading ambition of 21st Century globalisation turned to dust, another era emerged. Austerity for the masses, prosperity for the privileged: not a good recipe for social harmony – with the frightening spectre of job-eroding automation lurking over the horizon. In many respects the free and fair media, played its part in exposing social injustices and holding business and government to account – just as it should.

But the flames were also fanned by a new type of media revolutionised by technology – in the world where the speed of reporting and the competition to file first – not only the facts, but the highest impact version of the facts, became the challenge of social media and 24 hour rolling news. Less scrupulous commentators, happy to use hyperbole, exaggeration or at the extreme the now famous 'fake news', have made fact, truth and accuracy an increasingly rare commodity – and tarnished all journalism in the process. For it is a combination of inappropriate behaviour by some in business and irresponsible reporting by some in the media, that has contributed to a wedge being driven between business, the media and society. Even in the dental sector, never has the aim of our Press Office been more important in today's business - to support and encourage high quality specialized journalism giving reliable market, economic and trade information to our readers. The **INFODENT INTERNATIONAL Press Office** is doing its best in expanding unbiased information on different markets around the world; searching, requesting and comparing information from reliable sources. Committed to the facts. Certain of our beliefs in balance and determined in our duty to report fairly and accurately. In today's world, businesses are not simply judged by how much money they make, but much more on how they make money. Reputation is all.

Ethics, social purpose, contribution to society are not optional extras but key criteria for access to talent, capital, customers and consumers – for the long-term future of any enterprise.

Today we believe we are at a tipping point – where if we fail to win trust, to earn respect, to re-establish the core values and recognition that business and media are good for society – we will all live to regret it.

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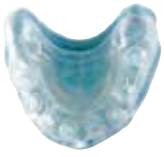

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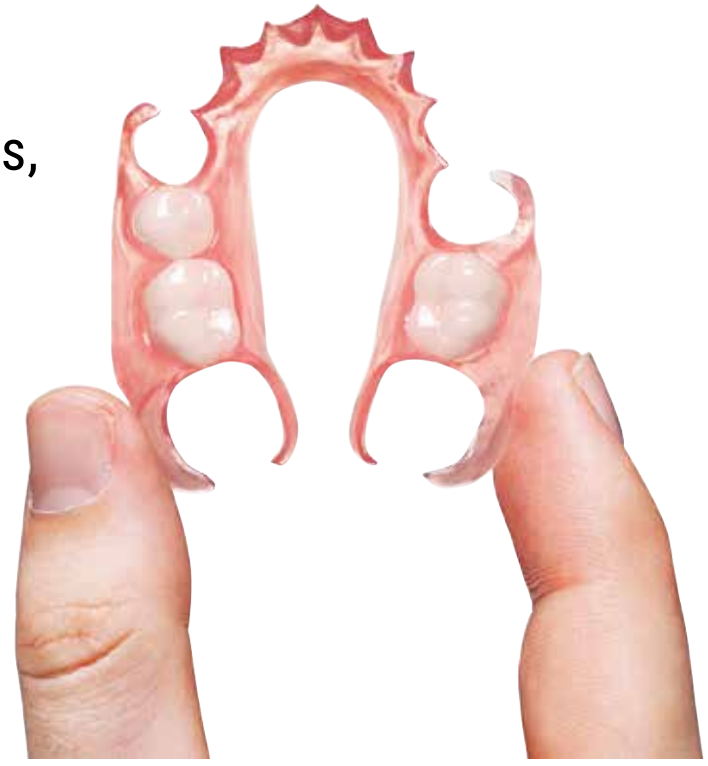

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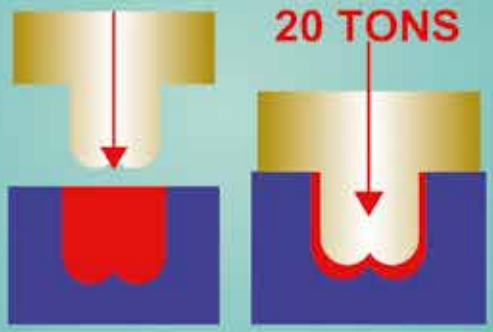

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Design | Shmulik Neto

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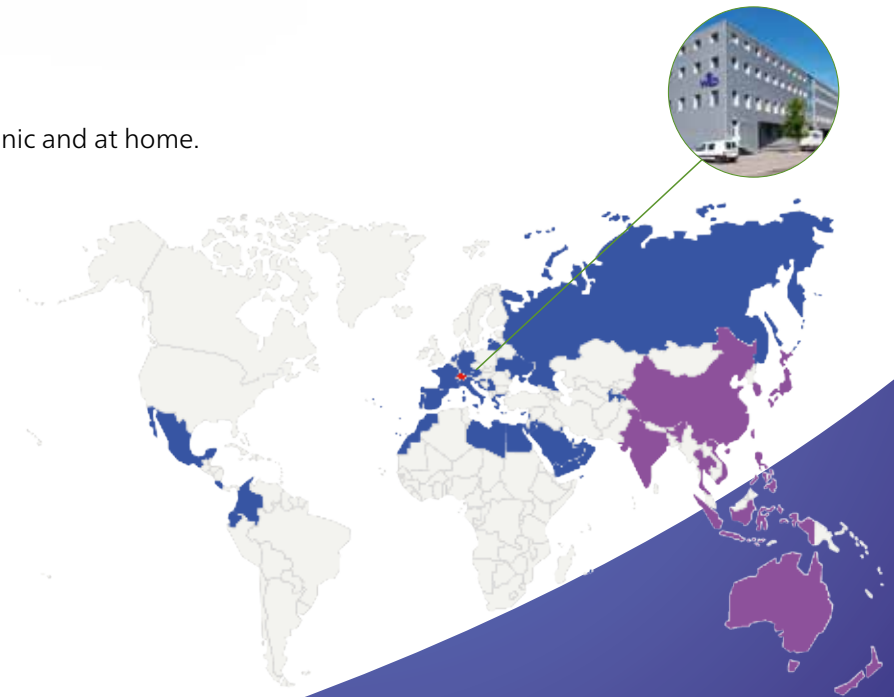

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Photo: Interdent production of dental alloys

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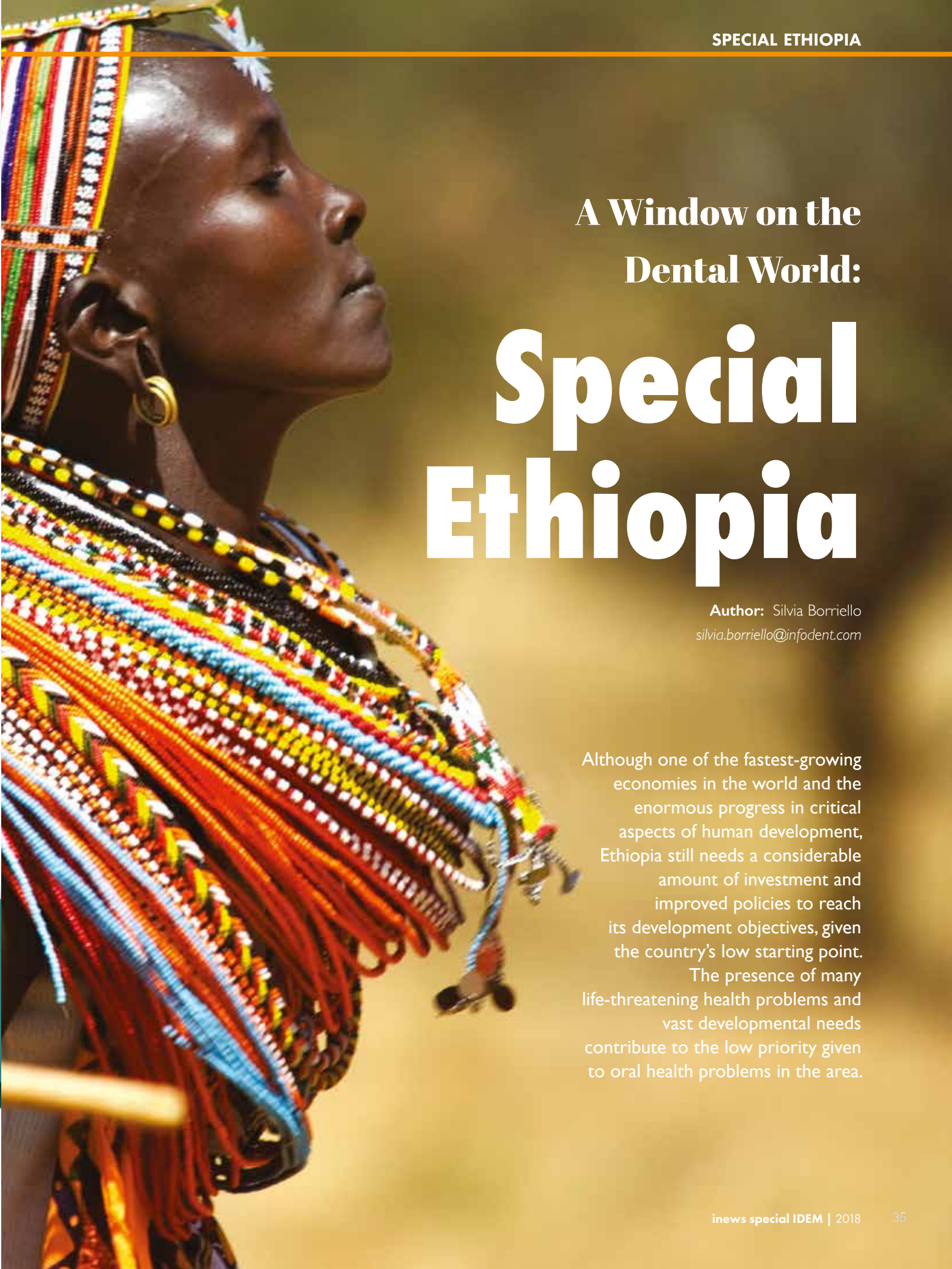

A Window on the Dental World:

Special Ethiopia

Author: Silvia Borriello
silvia.borriello@infodent.com

Although one of the fastest-growing economies in the world and the enormous progress in critical aspects of human development, Ethiopia still needs a considerable amount of investment and improved policies to reach its development objectives, given the country's low starting point. The presence of many life-threatening health problems and vast developmental needs contribute to the low priority given to oral health problems in the area.

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OSPEDALE
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Ethiopia is in East of Africa with a total land area of 1,104,300 sq. km. The capital city is Addis Ababa, situated near the center of the country. Landlocked, it borders Eritrea, Somalia, Kenya, South Sudan and Sudan—its tiny neighbor, Djibouti, is also its main port. Situated in the Horn of Africa, the country is at the crossroads between the Middle East and Africa. Thus, throughout its long history Ethiopia has been a melting pot of diverse customs and cultures. Today, it embraces a complex variety of nationalities, peoples and linguistic groups. Its population speaks over 80 different languages.

Ethiopia is one of the few African countries to have maintained its independence, even during the colonial era (except for a short-lived Italian occupation from 1936-41) as such maintaining its own culture. Currently, a federal system of government is in place and political leaders are elected every five years. Last parliamentary elections took place in May 2015, with 58 political parties participating in the electoral process. The ruling party, the Ethiopian Peoples' Revolutionary Democratic Party (EPRDF) and its affiliates won all the 547 parliamentary seats in national and regional elections. The EPRDF and its allies have been in power since 1991. Major changes in the administrative boundaries within the country have been made three times since the mid-1970s. At present Ethiopia is administratively structured into nine regional states—Tigray, Affar, Amhara, Oromiya, Somali, Benishangul-Gumuz, Southern Nations Nationalities and Peoples (SNNP), Gambela, and Harari—and two city administrations, that is, Addis Ababa and Dire Dawa Administration Councils. **Ethiopia is also one of the least urbanized countries in the world with just over 20% of the population living in urban areas.** More than 80 % of the country's total population lives in the regional states of Amhara, Oromiya, and SNNP.

Economic Profile - Ethiopia's huge population of over 100 million people makes it the second most populous nation in Africa after Nigeria. But, although the fastest growing economy in the region, it is also one of the poorest, with a per capita income of around $861, due both to rapid population growth and a low starting base. Over the last decade, Ethiopia grew at an average annual rate

DENTAL SCHOOLS IN ETHIOPIA

• Addis Ababa University. College of Dental Science. (Dentistry, Dental Therapy, Dental Hygiene and Dental Nurse). http://www.aau.edu.et/dental-medicine/ (State university)

• Jimma University. College of Health Science. Jimma is approx. 300 km from Addis Ababa. www.ju.edu.et/ (State university)

• Mekelle University. College of Health Science. Mekella is approx. 800 km from Addis Ababa. A new Endodontics training course has been established since this year. http://www.mu.edu.et/ (State university)

• Africa Health Science College. (Dental Medicine, Dental Therapist)
– Addis Ababa (Private school)

• Atlas Health College Dental. (Dental Science, Doctor of Dental Medicine, Dental Therapist) - Addis Ababa (Private School)

• Sante Medical college. (Doctor of Dental Medicine) - Addis Ababa (Private School)

Note: *statistical information, coverage rates and all data are taken and compared among different sources; however, they often vary significantly. As such the focus might have some weaknesses such as under-and over-reporting of data. This is also due to lack of accountability for accurate reporting, challenges with timeliness and quality of data and inadequate supervision from the Ethiopian authorities.*

AT A GLANCE

Total population (2017) **104,957,438**

Median age **18 years**

A large proportion of the Ethiopian population **(43 %) is under age 15**

Only **2.94 %** of Ethiopians are **over age 65**

Annual growth rate (2017) - 2.85 %

Total fertility rate (2013) - **4.5 per woman**

Living in urban areas (2017) – 20.4%

Literacy rate among adults aged ≥15 years - **49.1 %**

52 % of females and 38 % of males have never attended school

Amharic - official national language, in which all federal laws are published, and spoken by millions of Ethiopians as a second language. In most regions is the primary second language in the school curriculum

English - most widely foreign language spoken, also taught in schools

Unemployment rate - 17.5 % (2012 est.)

Public debt - 54.5 % of GDP (2016 est.)

Population living on <$1 (PPP int.$) a day (2007-2013) - **36.8%**

Cellular phone subscribers (2013) - 27 per 100 population

68 % of women and 53 % of men age 15-49 are not exposed to any mass media.

between 8 % and 11%, according to different data sources. **This growth was driven by government investment in infrastructure, as well as sustained progress in the agricultural and service sectors.**

More than 70% of Ethiopia's population is still employed in the agricultural sector, but services have surpassed agriculture as the principal source of GDP. According to The National Bank of Ethiopia agriculture, industry and services have contributed 36.7%, 16.7% and 47.3%, respectively, to GDP in 2015/2016. The construction industry, particularly roads, railways, dams and homes, is the main driver of growth in the industrial sector, contributing more than half of the sector's growth. Service sector growth is mainly dominated by expansion in communication and transport services, hotel and restaurant businesses, as well as wholesale and retail trading.

While the economy is growing rapidly, presenting many opportunities, there are also hurdles to doing business in Ethiopia. The 2017 World Bank's Ease of Doing Business report ranked Ethiopia 159th out of

Ethiopian Fiscal Year

Ethiopia has its own unique calendar year. The Ethiopian calendar has 13 months, 12 months with 30 days each and one month of 5 or 6 days depending on whether the year is a leap year or not. The Ethiopian calendar year begins on 11th September, which is the Ethiopian New Year, and ends on 10th September. The government fiscal year starts on 8th July and ends on 7th July. Both Ethiopian calendar and fiscal years fall in two Gregorian calendar years. This is important for companies organizing business in Ethiopia. Companies should avoid the Ethiopian New Year as many government officials, offices and key private sector companies are not available.

Ethiopia is a low-income country and while the proportion of people living below the local poverty line has declined by roughly a third over the past decade, the fraction remains high (33.5%).

	2000	2012
Total expenditure on health as % of gross domestic product (GDP)	4.4 %	4.9 % (2014)
Private final expenditure on health as % of gross domestic product (GDP)		3 % (estimated)
General government expenditure on health as % of total expenditure on health	54.6 %	60.6 %
Private expenditure on health as % of total expenditure on health	45.4 %	39.4 %
General government expenditure on health as % of total government expenditure	9.4 %	15.7 % (2014)
External resources for health as % of total expenditure on health	16.0 %	40.9 %
Social security expenditure on health as % of general government expenditure on health	0	0
Out-of-pocket expenditure as % of private expenditure on health	79.2 %	90.6 %
Private prepaid plans as % of private expenditure on health	0.5 %	1.9 %
Per capita total expenditure on health at average exchange rate (USD)	5 USD	22 USD
Per capita total expenditure on health (PPP int. $)	22 $	61 $
Per capita government expenditure on health at average exchange rate (USD)	3 USD	14 USD
Per capita government expenditure on health (PPP int. $)	12 $	37 $

Source: World Health Statistics 2015-2017, WHO

Life expectancy at birth (years):	1990	2015
Both sexes	45	64.8
Male	42	62.8
Female	48	66.8

Source: World Health Statistics 2010-2017, WHO

Adult mortality rate (probability of dying between 15 and 60 years of age per1 000 population):	1990	2013
Male	478	239
Female	366	198 (maternal deaths account for around 30 % of all deaths to women age 15-49)

Source: World Health Statistics 2010-2017, WHO

DENTISTRY AT A GLANCE

- **Number of dentists – between 60 and 200 according to different sources**
- **Ratio Dentist/Inhabitants - 1:1,268,000**
- **Number of dental technicians / assistants (2003) - 33**
- **Dental Schools: 3 State Universities (with an output of about 60 doctors per year) and 3 Private Dental Schools (with an output of around 60 doctors per year)**
- **Schools for dental technicians: none**
- **Scientific and Professional Organizations: 1**
- **Dental clinics in Addis Ababa: 52 approx.**
- **Dental manufacturers: none**
- **Dental dealers: 10 (approx.)**

189 countries; a drop of 11 rankings from previous year. The World Economic Forum identified burdensome customs administrative procedures, the high cost of logistics and access to credit and foreign exchange as major challenges to small and medium-sized enterprises in Ethiopia.

According to the United Nations Development Program 2015 Human Development Index, Ethiopia is one of the top 10 countries that has realized the most gains, particularly between 2010 and 2015. **This report applauded Ethiopia's achievement in improving life expectancy at birth, education and Gross National Income per capita. It also noted that strong economic growth over the past decade brought with it positive trends in poverty reduction in both urban and rural areas.** In the year 2000, 55.3% of Ethiopians lived in extreme poverty, but by 2011 this figure was 33.5%. Yet, despite progress, much remains to be done and the government is already devoting a very high share of its budget to pro-poor programs and investments. Large scale donor support will continue to provide a vital contribution in the near-term to finance the levels of spending needed to meet this.

Adult and maternal mortality rates are key indicators of the health status of a population. In Ethiopia they are also national development indicators:

Ethiopia's stable outlook and prospects for continued economic growth in the short and medium-term are on par with Uganda and neighboring Kenya. Since August 2011, Ethiopia has managed to contain yearly inflation at a single digit (7.3%, 2016 est.) through strict monetary and fiscal policy.

Ethiopia faces a growing trade deficit with total imports steadily increasing on average by 12.5% per year between 2004/05 and 2015/16. Its total exports amounted to $2.87 billion in 2015/2016, while imports for the same period expanded to $16.72 billion. While coffee remains the largest foreign exchange earner (27%), Ethiopia is diversifying exports and commodities such as gold (13%), oilseeds (17%), edible vegetables including khat (17%), livestock (7%) and horticulture products (7%) are becoming increasingly important. Manufacturing represented less than 8% of total exports in 2016, but manufacturing exports should increase in future years due to a growing international presence.

Major destinations for Ethiopia's exports in 2015/2016 were: Asia 37% (China accounted for 32%), Europe 34% (Switzerland accounted for 29%), Africa 21% (Somalia, accounted for 58%) and US 7%. Most of its imports come from Asia (63%) followed by Europe (25%), Africa (21%) and the United States (8%). Imports from China accounted for 38%, followed by India (7%). Italy, Turkey and Germany are the three major sources of Ethiopia's imports from Europe, jointly accounting for 8% of Ethiopia's total imports.

While the economic growth rate recently declined to about 8%. The government is implementing the 2nd phase of its Growth and Transformation Plan (GTP II). **GTP II, which will run to 2019/20, aims to continue work on physical infrastructure through public investment projects and to transform Ethiopia into a manufacturing hub, shifting from an agrarian**

economy to one more geared towards manufacturing and services, with the goal of making Ethiopia a middle-income country by 2025.
The private sector is expected to play an increased role in the economy under GTP II, despite public investment remaining strong. The Government reaffirmed its commitment to put in place an enabling business environment and a framework designed to attract more foreign businesses and investment. The Government has also investment incentives aimed at attracting FDI, particularly export-oriented projects.
Factors of production in Ethiopia such as land, labor and energy costs are comparatively low compared to other countries in Africa and around the world.

Oral Health Profile - A tooth ache, an abscess or broken cap or bridge can be a problem in Ethiopia because of the severe shortage of truly qualified and trained dentists using often quite obsolete techniques. **High risk of oral diseases and low access to adequate care condemns Ethiopia to sub-standard oral health, including lack of quality dental materials at an affordable price and insufficient investment in dental care.** Oral health services are characterized by few oral healthcare personnel and urban concentration, typically leaving the rural and peri-urban communities with emergency care only. **The presence of many life-threatening health problems and vast developmental needs contribute to making dentistry one of the least addressed disciplines in the history of medical practice in Ethiopia.** Sophistication of modern dentistry is new, it's developing and has a long way to go. Dental medicines are not easily accessible and some dentists may import them directly. However, a niche high class private market is available in urban areas especially in Addis Ababa.

The Government has also investment incentives aimed at attracting FDI, particularly export-oriented projects.

Data on oral health status are scarce and low public expenditure on dental health severely undermines oral care in Ethiopia. A 2014 survey among 20-39 years old adults attending dental health clinics in Addis Ababa gives a general outlook on the status of oral health and dental education. In fact, 52.3 % perceived dental health as less important than other medical health issues. The practice of correct tooth brushing is low: only 28.8% respondents knew the correct way of tooth brushing. In addition, 39.8% did not consider tooth brushing as an important factor in improving dental health. Moreover 64.1% of the respondents believed that it was easier to use traditional stick ("mefakiya", a natural chewing stick) than tooth brush with toothpaste and 45.8% had negative attitude to the use of toothpaste and tooth brush saying that it lead to bad mouth breath. **More than half (54.2%)**

MEDICINES

- Median availability of selected generic medicines (%) (2001-2008):
Public 52.9 % - Private 88.0 %

- Median consumer price ratio of selected generic medicines (2001-2008):
Public 1.3 - Private 2.2

-Total pharmaceutical expenditure in Ethiopia was approximately 10.4 billion Ethiopian Birr (ETB) in 2011, which accounts for approximately 39% of total health expenditure

- Government expenditure on pharmaceuticals, including both federal and regional governments, was estimated at ETB 1.2 billion in 2011 and ETB 2.1 billion in 2014

- The proportion of the pharmaceutical budget out of the total recurrent budget was, on average, 10% for hospitals and 9% for health centers in 2011/12

- Private funding of pharmaceuticals was ETB 6.7 billion in 2011 and reached ETB 12.1 billion in 2014, approximately 64% of total pharmaceutical expenditure and mostly out-of-pocket

- Pharmaceutical funding through health insurance mechanisms is not yet well developed in Ethiopia, but three types of health insurance schemes are expected to contribute to the coverage of pharmaceutical costs in the future

- PFSA is the major supplier of medicines for both the public and private sectors. Public health facilities can only procure from private sources when PFSA cannot supply them

- The private sector is not able to address gaps in supply. Dependence on PFSA stocks, difficulties in forecasting demand, and access to foreign currency exchange for ensuring non PFSA supply channels are said to impair growth of the private sector

Source: World Health Statistics 2010-2017, WHO // Systems for Improved Access to Pharmaceuticals and Services (see "Among main sources" below)

of the respondents had a belief that they should visit a dentist only if they had tooth pain and 48.3% did not think eating and drinking sweet things without cleaning teeth was harmful to teeth. Overall, only 36.7% of the participants perceived they had poor dental health.

The average density of dentists to head of population in Africa is 1 to 150,000; in industrialized countries, the average is 1 to 5,000. **In Ethiopia, according to the FDI Oral Health Atlas, the lack of access is even more dramatic with a density of only 1 dentist per 1 million people.** There is an insufficient number of dental schools and graduating dentists, the majority of which often migrate to a new continent. Humanitarian organizations make big efforts in oral care but their work is often discontinued.

The damage to oral health due to poor access to care is exacerbated by the fact that a high number of Ethiopians are disproportionally affected by many oral diseases. The combination of high risk of oral disease and low access to care, results in many patients not getting adequate treatment in time. For example, in the case of Noma, a neglected and deadly disfiguring disease of poverty affecting children, this can result in an 80% mortality rate. **For other oral diseases, which could be identified and treated during routine check-ups, the delay in access means that when many patients are finally able to visit their local dentist, it is often too late and only one option remains: tooth extraction; this can become up to 90% of dental work in Ethiopia.** The high number of people affected by HIV/AIDS leads to a high number of oral diseases (50-60% of patients) such as oral fungal, bacterial and viral infection, oral hairy Leukoplakia, HIV gingivitis and periodontitis, Kaposi sarcoma, non-Hodgkin lymphoma and xerostomia. Poor oral health is exacerbated by poor access to clean drinking water, poor sanitation, lack of fluoridation and malnutrition. **There is little to none oral health promotion and prevention mainly in impoverished regions of the country.**

Very little epidemiological research is done in oral health in Ethiopia and the extent of caries, periodontal diseases and the associated risk factors are not widely studied at the community level. Accordingly, a study (2011) was conducted among young adolescents in Addis Ababa to assess the type and magnitude of oral health problems as well as associated risk factors and to provide baseline information on the major oral health problems (dental caries, periodontal disease, malocclusion and dental fluorosis) among adolescents, presumably reflecting trends in adult population.

The prevalence of both periodontal disease and dental caries is alarmingly high. According to the survey 83.1% had never visited a dentist. Among those who had visited a dentist, most went for emergency treatment (41.4%) and extraction (21.6%).

The prevalence of dental caries was 47.4%. Age, sweets intake, tooth cleaning, poor oral hygiene and being from a poor household were significantly associated with having dental caries.

The most affected teeth with dental caries were the molars (49.4%) with mean DMFT at 1.85. The prevalence of dental caries observed in this study was nearly 3 times higher than a study conducted twelve years before in Addis Ababa among school children 12 year and above, which was 21.1%.

The prevalence of periodontal disease was 35.4%, bad mouth odor 4.4% and oral trauma 2.1 % with "falling" reported as the primary cause. Poor oral hygiene was observed in 60.3% of the children. Young adolescents who have mothers with low education level are more likely to have periodontal disease than those with mothers who have attended at least high school. Another important factor which was found to be associated with periodontal disease was poor oral hygiene.

Recent studies indicated increasing prevalence of dental caries mainly due to increased consumption of more refined and sugary foods. Sugar plays a key role in the increasing rate of dental decay in Ethiopia; prior to the commencement of the national production of sugar in 1958, the

NUMBER OF HEALTH PROFESSIONALS

- Skilled health professionals' density per 10 000 population (2005-2013): 2.8
- Physicians (2007-2009): 1,806
Density per 10 000 population: <0.5 (2007-2013)
- Nursing and Midwifery personnel: 19,158
Density per 10 000 population: 2.5 (2007-2013)
- Pharmaceutical personnel: 1,201
Density per 10 000 population: <0.5 (2007-2013)
- Environment and public health workers: 1,109
Density per 10 000 population: <0.5
- Community health workers: 24,571
Density per 10 000 population: 3

Source: World Health Statistics 2010-2017, WHO

prevalence of caries was very low. Today, there is an increasing demand to sugary products, the use of sugar as a sweetener in tea, coffee and milk is very common.

The high prevalence of calculus; even though more than 90% of the study participants claim to clean their teeth indicates that the tooth cleaning is not adequate, or the techniques used are not proper. **Among those who clean their teeth 57.7% uses a local twig/chewing stick which is commonly known as "Mefakiya".** Studies however have shown that traditional chewing stick is an effective way of maintaining good oral hygiene if the right type of shrub/twig and technique is used. The "Mefakiya" aids the mechanical removal of plaque, together with the antimicrobial effects.
The findings indicate the need for health sector actors and policy makers to recognize the increasing trend of oral health problems and design and implement preventive activities including expansion and strengthening of oral health services and large scale public education program to motivate regular dental check-up and proper oral hygiene practices.

Ethiopia is one of the fastest developing countries in the world and several are the opportunities for international operators investing in the country in the near future, considering also its geographic location which gives it strategic dominance as a jumping off point in the Horn of Africa, close to the Middle East and its markets. Furthermore, the government has investment incentives aimed at attracting foreign direct investment, transforming Ethiopia into a manufacturing hub. In such a framework the private sector is expected to play an increasing role.

Main sources:

- Extracts from "Monitoring and Evaluating Progress Towards Health Coverage in Ethiopia", https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4171462/
-Extracts from the "Ethiopia Demographic and Health Survey (EDHS) 2011". Part of the worldwide MEASURE DHS project funded by the United States Agency for International Development (USAID). The survey was implemented by the Ethiopian Central Statistical Agency (CSA). ICF International provided technical assistance through the project. For full survey: https://dhsprogram.com/pubs/pdf/fr255/fr255.pdf
- U.S. Department of commerce, extracts from: https://www.export.gov/article?id=Ethiopia-Market-Overview and https://www.export.gov/article?id=Ethiopia-Healthcare
- World Health Statistics 2010-2017, WHO
- U.S. Central Intelligence Unit: https://www.cia.gov/library/publications/the-world-factbook/geos/et.html
- World Bank: http://www.worldbank.org/en/country/ethiopia/overview
- World Health Organization: http://www.who.int/countries/eth/coop_strategy/en/index1.html
- "Systems for Improved Access to Pharmaceuticals and Services. 2016. Ethiopian National Health Insurance Scale-Up Assessment on Medicines Financing, Use, and Benefit Management: Findings, Implications, and Recommendations." Submitted to the United States Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.
- FDI Oral Health Atlas: https://www.fdiworlddental.org/press-releases/25022014-developing-countries-condemned-to-sub-standard-oral-health
- Extracts from study on "Oral Health of Young Adolescents in Addis Ababa—A Community-Based Study", http://file.scirp.org/Html/2-1340357_48849.htm
- Extracts from study on "Tooth Brushing Practice and its Determinants among Adults Attending Dental Health Institutions in Addis Ababa, Ethiopia", https://pdfs.semanticscholar.org/d953/e7468485c738cc040d082695ad68342f2b6f.pdf

Oral hygiene and dental care-seeking practices of young adolescents (aged 10-14) in Addis Ababa, December 2011

	Characteristics	%
Tooth cleaning (n = 658)	Yes No It bothers me	92.7 7.3 15.6
Reason for not cleaning (n = 45)	Don't know the benefit of I always forget Other	15.6 48.9 19.9
Clean your teeth with (n = 610)	Tooth brush Mefakia (local twig brush) Other	36.20 57.7 6.0
Frequency of teeth cleaning (n = 595)	Once a week Few times a week Once a day Other	19.3 38.5 32.6 9.6
Use of fluoride containing tooth	Yes No	38.3 61.7
Frequency of dental visit (n = 658)	Regularly every 6 – 12 Occasionally Only with dental pain Never visited a dentist	3.2 2.1 11.6 83.1
Treatment sought during the last dental visit (n = 111)	Check-up, examination Routine treatment Emergency treatment Extraction	20.7 16.2 41.4 21.6
Felt scared during the first dental visit	Yes No	69.4 30.6
Going to a dentist is synonymous with pain (n = 615)	Yes No	46.2 53.8

Note: A total of 658 children aged 10 - 14 years participated in the study; 53.4% were female and nearly all (97.7%) attended school. Only 21% had monthly expenditure >2000 birr per month meaning; 79% of the households lived on a monthly expense of about 100 USD. 37.7% of the households reported having five to six family members living in the household

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New Therapeutic Management of TMDs, Through the Immediate Re-educational Device: "Lingual Ring Ri.P.A.Ra."

AIM OF THE WORK
The aim is to present the authors' protocol-based experience on an alternative therapeutic use of the bite in patients with TMDs (Temporo Mandibular Disorders), which also included the active repositioning of the tongue. The protocol requires a more active cooperation of the patient and the use of the bite also as a re-educational tool. To achieve this the Ri.P.A.Ra. Lingual Ring was used; this occlusal device is not just a simple bite, but a device for positional and functional rehabilitation, which has been used by the authors for several years in the gnathological field.

MATERIALS AND METHODS
A consecutive series of 600 patients were observed, from February 2014 to February 2016. All subjects were evaluated using a codified clinical, anamnestic, instrumental protocol for the analysis of the presence of TMJ dysfunctions, developed according to the Research Diagnostic Criteria for Temporo Mandibular Disorders (RDC/TMD). From the initial 600 patients, 160 subjects were selected based on the inclusion and exclusion criteria, all with disc displacement with reduction that was treated according to the new protocol using the Ri.P.A.Ra. Lingual Ring.

RESULTS AND CONCLUSIONS
The present study showed interesting results in the treatment of patients with TMD. In fact, 99 patients out of 160 (62%) experienced remission of all symptoms in 3 months.
This confirms that the protocol is certainly valid to detect articular imbalances (clicking, TMJ pain, myalgia) arising from possible occlusal alterations, but especially by neuromuscular problems and tensions, also confirmed by the instrumental tests performed: MRI of TMJ with and without the Lingual Ring in the mouth and electromyography.

The diagnostic and therapeutic setting for RDC/1992 (1) and DC/2014 (2) of Temporo Mandibular Disorders (TMD) through axis 1 and axis 2 as well as its etiological framework have changed a lot in recent years. Most of all, the causal role attributed to dental occlusion (3, 4) has changed. While in the past it was highly focused on an etiological action (5, 6, 7, 8); now, instead, neuromuscular factors, linked to psychosocial (9) issues and to stress (10), as already cited in the past (11, 12, 13), combined to specific facial morphologies (14), have gained broad consensus. As such, bite therapy also needs to adapt to international literature which provides new therapeutic approaches: "Cognitive Awareness, Counseling, Self-Care, Patient Education, Lifestyle Modification, Behavioral Therapy" (15-23, 32), and needs to adapt to the "Bio-Psycho-Social" model through "conservative therapies based on evidence and on low invasiveness" (2, 24, 32). Therefore, traditional concepts of bite therapy must be reviewed. The bite should no longer be used passively only at night and a few hours during the day, with check-ups limited to the evaluation of occlusal contacts, but being an important therapeutic device, recognized and validated by the scientific community (25, 27, 32, 33), it must also turn into a re-educational device, in consideration of the role attributed to neuromuscular and psychosocial factors, together with the occlusal factor. This can be achieved through active involvement and collaboration of the patient with behavioral strategies and physical exercises performed by the patient with the bite. The review of international literature, in fact, now agrees in recognizing as valid, and sometimes on the same level, the following therapies:

A. Therapy with bite;
B. Therapy with counseling and self-care;
C. Therapy with physiotherapeutic exercises done by the patient at home and with the therapist (15-23) (fig. 1).

In the following work we present a new therapeutic protocol with a different use of the bite which includes more collaboration from the patient. The bite becomes a true re-educational tool with which the patient also implements the above mentioned therapies, B and C, and the clinician doesn't just check the occlusal contacts but uses the bite as a mean for neuromuscular deprogramming and for functional and cognitive-behavioral re-education (fig. 1). Such protocol, in order to be applied, requires the use of a new immediate device: the bite Ri.P.A.Ra. Lingual Ring (fig.2,3,4,5) already in use for some years in different public and private structures, among which the Department of

Clinical Gnathology at the Polyclinic Umberto I, University of Rome La Sapienza, (25, 26, 27), the Department of Orthodontics and the Department of Surgical, Oncological and Dental Disciplines at the Polyclinic "Paolo Giaccone" in Palermo, and in several other Public Healthcare Centers (ASL).

MATERIALS AND METHODS

Sample and Study Protocol

A consecutive series of 600 patients were observed, from February 2014 to February 2016 at the different mentioned structures. All subjects were evaluated using basic clinical, anamnestic, instrumental protocols to analyze dysfunctions and/or osteoarticular structural anomalies, according to the Diagnostic Criteria for Temporo Mandibular Disorders (DC/TMD).

Several pathologies were observed, and the patients were selected based on the inclusion and exclusion criteria as indicated below.

Inclusion criteria:

- disc displacement;
- joint pain =/> 20 scale NVS (Numerical Verbal Scale);
- muscular pain "myalgia" =/> 20 scale NVS;
- tension headache and/or migraine =/> 20 scale NVS;
- cervical pain and/or column pain arising from tension =/> 20 scale NVS;
- parafunctions associated to muscular and/or joint pain;
- consent to take part in the study.

Exclusion criteria:

- dislocations not linked to the joint disc;
- post-trauma outcomes, malformations, TMJ or maxillofacial surgery;
- patients already in therapy for such pathology;
- systemic joint pathologies (rheumatoid arthritis, arthrosis, psoric arthritis, Ehlers-Danlos Syndrome EDS);
- neurological and/or psychic headache and/or pathologies;
- partial edentulous with 8 or more missing teeth;
- positivity to axes 2.

From the initial 600 visited patients, 440 were not considered as they did not fall within the inclusion criteria. Of these 64 had joint lock; 26 referred to trauma or fracture outcomes; 120 had a pain threshold inferior to 20 VNS; 26 were missing more than 8 teeth and had no adequate prosthesis; 24 denied their consent in taking part in the study. The remaining 160 have been included in the new protocol. The sample was therefore represented by a consecutive series of 160 subjects of which 128 were female and 32 male, aged between 21 and 63, with average of 42 years. All patients (100%) were affected by joint disc displacement with reduction; 109 patients (68%) had TMJ pain; 115 patients (72%) had muscular pain; 123 patients (77%) had headache; 82 (51%) cervical pain; 130 (81%) had parafunctions with clear signs of abrasion, problems in teeth clenching or bruxism noises.

All patients were adequately informed on how to use the bite Ri.P.A.Ra. Lingual Ring and on the new protocol to follow (fig. 1):

A. Therapy with bite Ri.P.A.Ra. Lingual Ring to wear every night;

B. Therapy with counseling and self-care;

C. Therapy with physiotherapeutic exercises done by the patient at home and guided by the therapist in the different structures using the bite Ri.P.A.Ra. Lingual Ring (15-23) (fig. 1).

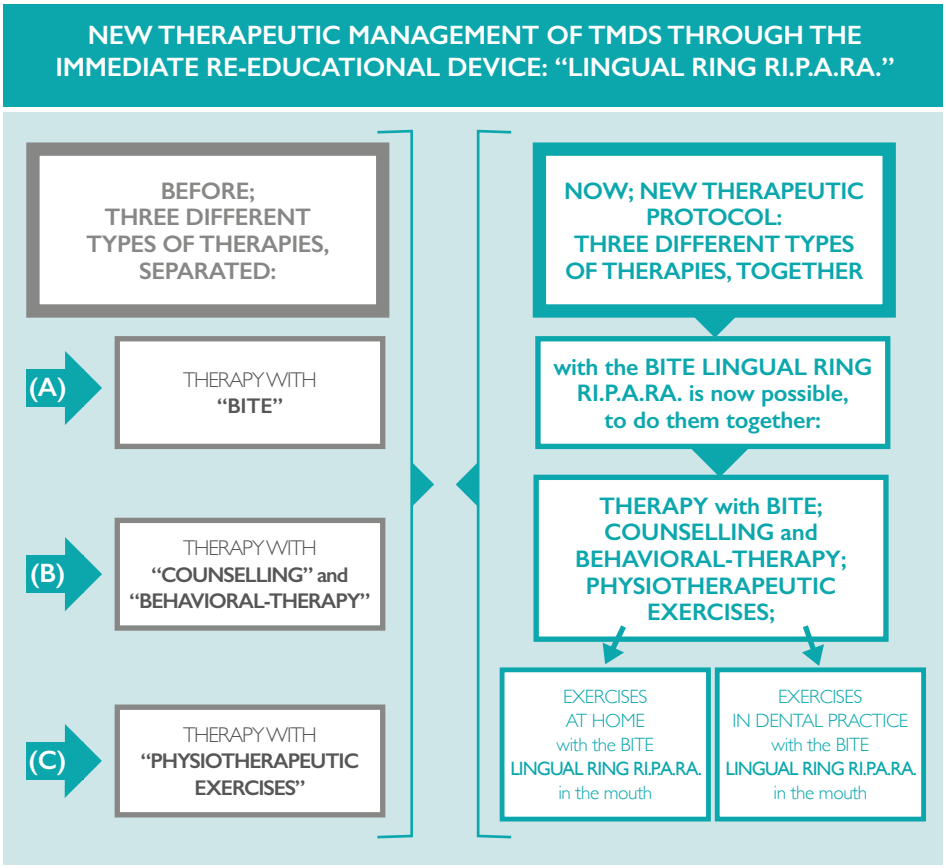

Fig. 1 New therapeutic protocol with Ri.P.A.Ra. Lingual Ring.

Detailed description of the shape and function of the Ri.P.A.Ra. Lingual Ring

Before presenting the clinical protocol in all its details, we hereby describe the Ri.P.A.Ra. Lingual Ring specific features – the Rampello* Active Positional Re-educational Lingual Ring (fig. 2).

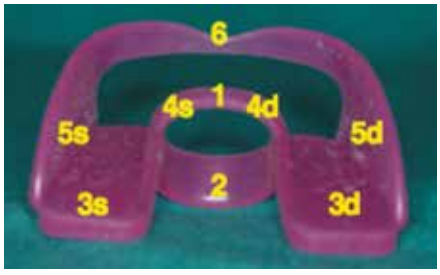

Fig. 2 Parts that make up the bite Ri.P.A.Ra. Lingual Ring.

Shape

The Ri.P.A.Ra* means= Rampello* Active Positional Re-educational Lingual Ring, as per registered patent**, is made up of several parts that we have conveniently divided into central C and peripheral P (fig. 2).

The central part C is made up of the Lingual Ring and two horizontal plates and it is the most "active" part. The peripheral part P is made up of balancing systems, anchorage, assessment and stabilization and it is the "passive" part. In part C, the Lingual Ring is made up of two arches: inferior arch "1" and superior arch "2", which are literally attached, forming a whole with the two symmetric horizontal plates which are to be positioned between teeth: plate "3d" on the right and plate "3s" on the left (fig. 2 and 3). The whole makes up the most important, universal and functional "active" unit. In part P, corresponding to the peripheral part with reinforcement systems, anchorage, assessment and stabilization, we have: two small symmetric palatal, vertical, reinforcement rims "4d" and "4s", two symmetric balancing, vertical and lateral cheek shields "5d" on the right and "5s" on the left, a linking front vestibular band "6" connecting the two lateral cheek shields. After countless technical compression, torsion, traction and cut tests, studies on similar devices already on the market and after many years of clinical trials on prototypes, a platinum medical silicone was chosen to produce the device. The chosen silicone is non-toxic, hypoallergenic, biocompatible and compliant with the legislation (UNI EN ISO 109931:2010) and EU 93-42 CE directives, hardness 55-60 Shore (class I medical device).

**Ri: Re-educator: for cognitive-behavioral therapy; P: Positional: as it modifies the posture of condyles, mandible, tongue and masticatory muscles; A: Active: as it is not a passive device among teeth but a device with which the patient makes specific exercises; Ra: Rampello: the creator's surname.*
***Industrial patent N. RM2014A000673 extended to Europe and the USA. Registered by the Ministry of Health as medical device with identification number 1175800, repertory "N", class code "A1", with commercial name "Ri.P.A.Ra. Lingual Ring", CND Q010499, regularly on the market since 2014 with "CE" mark.*

Function

Ri.P.A.Ra. Lingual Ring has very specific features as a result of many years of research and clinical validations (25, 26, 27). As described, in central part C there is a ring made up of two arches and two horizontal plates. The ring with the inferior arch "1" has two main functions: it brings the mandible and condyles in advanced position; it raises the tongue in advanced position with the tip against the "spot". While the superior arch "2" has the function of keeping the device

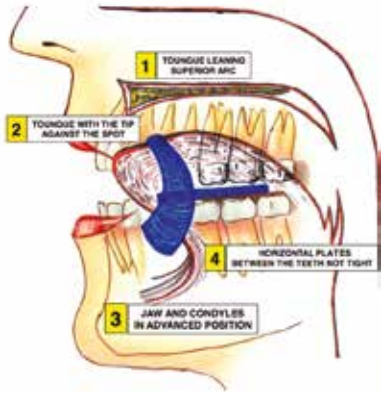

Fig. 3 Scheme of the correct positioning of the tongue and the bite Ri.P.A.Ra. Lingual Ring (sagittal view).

Ri.P.A.Ra. Lingual Ring has very specific features as a result of many years of research and clinical validations.

lifted up through the tongue. The two horizontal plates have other important functions: they modify the vertical dimension; they release the occlusal relation and they change the occlusal-articular relationship.
Part "P", consisting of the lateral cheek shields and the front band, balances the buccinator muscles' forces and helps to stabilize and retain the whole device. The new posture of tongue and mandible, as well as modifying the vertical dimension, stimulates the stretching of all oral cavity muscles, both vertical (masseter, internal and temporal pterygoids) and horizontal (external pterygoids and buccinators), as well as those of the tongue. As a consequence, it changes the lever and force of the arms and at the same time it keeps the tongue high and in advanced position with the tip against the "spot" for further neurological stimulation (28-31). Therefore, the new posture of mandible and tongue modifies the hyoid bone position as well as that of the rachis paravertebral muscles. As such, the Ri.P.A.Ra. Lingual Ring encompasses and acts on all these components aiming at the positional re-education of the tongue, mandible and the entire oral cavity (Fig. 3). This differentiates it from all the other universal devices which instead

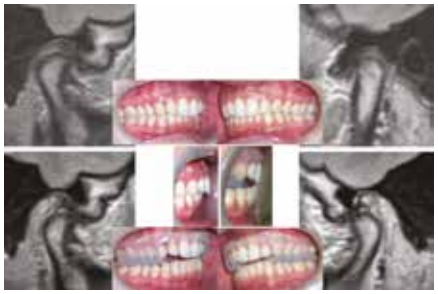

Fig. 4 Above: MRI without the Ri.P.A.Ra. bite in the mouth with disc displacement. Below: MRI with the Ri.P.A.Ra. bite in the mouth without disc displacement.

Fig. 5 Correct positioning of bite Farrar and bite Ri.P.A.Ra.. To notice the different positioning of the tongue.

only tend to keep dental arches distant without any repositioning or re-educational function as only thought to work as contrast "cushions" to the load of the vertical muscles forces (masseter, internal and temporal pterygoids). The occlusal-articular reprogramming, with tongue re-education obtained through new posture and exercises has beneficial effects on all parts of the oral cavity and on mandibular, cervical and cranium disorders or TMDs.

Therapeutic protocol

The therapeutic protocol adopted by us has combined three big therapeutic concepts all recognized by international literature (15-23). They have not been separated or carried out at different times but they have all been integrated together and carried out simultaneously, that is (fig. 1):
A. Therapy with bite Ri.P.A.Ra. Lingual Ring;
B. Therapy with counseling and self-care together with the use of the bite Ri.P.A.Ra. Lingual Ring;
C. Therapy with physiotherapeutic exercises done by the patient, wearing the bite Ri.P.A.Ra. Lingual Ring, both at home and under the direction of the clinician.
Therefore, the new protocol will include A, B and C simultaneously, wearing the bite

Ri.P.A.Ra. Lingual Ring in the mouth (Fig. 1). All patients were adequately informed on the type of protocol, its characteristics and on the use of the bite Ri.P.A.Ra. Lingual Ring, on the exercises to carry out with the bite Lingual Ring and on cognitive behavioral therapy with the complete program to follow according to the following scheme:

- Detailed information, explanation and instructions on the actual pathology so as to give the patient the conscious perception of the problem and the best possible compliance;
- Detailed information, explanation and instructions on self-care and behavioral precautions;
- Detailed information, explanation and instructions on the Ri.P.A.Ra. Lingual Ring device with indications on its use: to wear every night (6-8 hours) and for at least 2 hours during the day, to carry out the exercises with instructions to position the tongue high at the "spot"; cognitive information not to clench the teeth on the horizontal plates (3d and 3s);
- Detailed information and explanation on the exercises to carry out wearing the Ri.P.A.Ra. Lingual Ring device at home, at least three times a day on the first 21 days of therapy: in the morning on waking up; on returning home from work; at night before going to bed. Afterwards, at least once a day for the next 10 days and again with the instructions to position the tongue high at the "spot" and cognitive information not to clench the teeth on the horizontal plates (3d and 3s);
- During clinical check-ups, all patients were asked: to describe the evolution of symptoms, the presence or absence of disturbances or annoyances and the timing of use. At every check-up the patients were asked to carry out the prescribed physiotherapy exercises wearing the Ri.P.A.Ra. Lingual Ring while the clinician observed and eventually corrected movements coordination, underlining the importance of the tongue posture against the "spot" and, most of all, of the cognitive perception not to clench the teeth on the horizontal plates;
- The only occlusal therapeutic device used by all patients was the Ri.P.A.Ra. Lingual Ring;
- The established maximum duration of the entire cycle of treatment was 3 months.

All patients were adequately informed and a previous written consent to use the Ri.P.A.Ra. bite was obtained by each one of them.

A timing of regular check-ups was planned with check-ups every 15-20 days. All patients were evaluated according to a comparison of parameters measured at the beginning (T0): pain, analysis of mandibular movements with fluidity, symmetry and asymptomatic qualitative and quantitative comparisons. At the end of treatment a segmentation analysis was carried out with the following evaluation:

- W: got worse: at least one symptom or sign of having got worse and no sign of improvement;
- S: stationary: no symptom of improvement, no sign of having got worse;
- I: improved: at least one symptom of improvement and no sign of having got worse;
- MI: much improved: complete absence of signs or symptoms.

A summary of the analyzed symptoms, expressed both in absolute values as number of patients, and in percentage values, for a final evaluation of the effectiveness of the new integrated protocol, through the use of the Ri.P.A.Ra. Lingual Ring, are summarized in tables 1 and 2.

Expected functional and symptomatic answers

The expected functional and symptomatic answers from the application of the new protocol using the bite Ri.P.A.Ra. Lingual Ring were:

- Reduction of joint and muscular pain;
- Headache reduction;
- Reduction and disappearance of TMJ noises with subjective and objective qualitative and quantitative movement improvement;
- No significant changes in the dental contact observed by the patient or the clinician.

RESULTS

Analyzing the results has allowed us to come to the following considerations. The new protocol application time using the bite Ri.P.A.Ra. Lingual Ring was about 3 months for all patients. Minimum time for significant improvement in the symptoms was about 1 month in 52 patients. Maximum time was 3 months in 20 patients. Average time was 2 months in 88 patients.

	CLICKING	TMJ PAIN	MUSCULAR PAIN	HEADACHE	CERVICAL PAIN	PARAFUNCT.
Beginning	160	109	115	123	82	130
Got worse	0	0	0	0	0	0
Stationary	6	0	0	35	28	29
Improved	51	36	32	29	26	101
Much improved	103	73	83	59	28	0
Patients that have much improved all the symptoms simultaneously = 99						

Tab. 1 - Absolute values as number of patients.

	CLICKING	TMJ PAIN	MUSCULAR PAIN	HEADACHE	CERVICAL PAIN	PARAFUNCT.
Beginning	160	109	115	123	82	130
Got worse	0%	0%	0%	0%	0%	0%
Stationary	4%	0%	0%	28%	34%	22%
Improved	32%	33%	28%	24%	32%	78%
Much improved	64%	67%	72%	48%	34%	0%
Patients that have much improved all the symptoms simultaneously = 99 = 62%						

Tab. 2 - Percentage values compared to the number of patients.

Minimum bite Ri.P.A.Ra. Lingual Ring time of use was 4 hours in 16 patients. Maximum time of use was 13 hours in 95 patients between day and night including the time for physiotherapy exercises done at home. The average daily use was 8.5 hours. The initial joint pain found in 109 patients, 68% of the sample, disappeared in 73 patients (67% of the 109 patients and 46% of the total 160) and improved in 36 patients (33% of the 109 with TMJ pain and 22.5% of the total 160). As such, TMJ pain disappeared in 2/3 of the patients and diminished in intensity in about 1/3 of the patients, while no one reported of getting worse.

Myalgia, initially found in 115 patients, 72% of the sample, disappeared in 83 patients after treatment (72% of the initial 115 and 52% of the total sample) and diminished in intensity in 32 patients (28% of patients with myalgia and 20% of the total 160) confirming, here too, that over 2/3 of patients stopped having muscular pain and less than 1/3 had a pain reduction while no one had gotten worse.

Headache, reported by 123 patients, corresponding to 77% of the sample, disappeared after treatment in 59 patients (48% of the 123 and 37% of the total sample) and among the 64 still affected by headache, for 29 (24%) the headache had improved or was milder compared to beginning of treatment, while 27 patients remained stationary with mild and 8 with strong headache (22% and 6% = 28%) confirming that if the symptoms are linked to the dysfunction they tend to improve.

Cervical pain, initially present in 82 patients, corresponding to 51% of the sample, disappeared in 28 patients after treatment (34% of the 82) and all of them referred to tensions or had verticalizations of the cervical spine before treatment. Among the 54 stationary patients, 26 (32% of the 82) reported of a slight improvement and they mostly had pathologies of the cervical district such as: vertebral crushing, arthrosis or cervical distortion due to an abrupt head movement. While, the remaining 28 (34% of the 82) had an initial diagnosis of hyperlordosis. This figure leads us to believe that our protocol, with the Ri.P.A.Ra. Lingual Ring, can be of greater advantage to subjects with rectilinization of the cervical spine tract rather than subjects with hyperlordosis. Therefore, we believe that an in-depth analysis of this parameter would be fundamental with further clinical, instrumental and interdisciplinary investigations. Among the 130 patients with parafunctions, 81% of the total sample, 101 (78% of the 130) reported of perceiving a different feeling while clenching the teeth and to waking up in the morning with less muscular tension, while for 29 patients (22%) there was no change and all remained stationary. TMJ noises, affecting the whole sample (160 patients, 100%), disappeared in 103 patients (64%), improved in 51 subjects (32%) and remained stationary in 6 patients (4%). No one reported of getting worse. These figures lead us to believe that our protocol has an excellent feedback in the medium and long term for symptoms such as TMJ pain, myalgia and muscular hyperactivity, while for more mechanical problems, whether or not linked to muscular hyperactivity and/or occlusal alterations, even if we had an excellent feedback, we believe in the need for a longer treatment time of more than 3 months, compared to the treatment time used in this first study, to further strengthen the anatomical-functional rebalancing. To finalize the results' evaluation we have summarized the final analysis, based both on the symptoms as well as on the answers given by the patients regarding how they felt before starting treatment (Table 1 and 2).

DISCUSSION AND CONCLUSIONS

Traditional bites used in gnathology today are mainly passive, they are not used by clinicians to carry out functional exercises and are not structured to do so. Patients only need to wear them and clinicians, during check-ups, only need to check if there are changes in occlusal contacts. Even the many immediate bites on the market in the last few years are mainly to protect teeth from the wearing out of bruxism and/or clenching of the teeth and are not re-educational or functional. The novel device Ri.P.A.Ra. Lingual Ring differs very much from classic devices and from the simple immediate devices as it is thought as re-educational bite.

As shown in the protocol description, the patient, as well as wearing the Lingual Ring, also becomes actively involved especially as regards tongue posture, physiotherapy exercises wearing the Ri.P.A.Ra. and the behavioral attitude not to clench the teeth on the bite's horizontal plates. This combines simultaneously the three therapeutic treatments A, B and C, already reviewed

by the literature (fig. 1) (25, 27, 32, 33). Therefore, in the last few years our treatment strategies have evolved in this direction and the mentioned protocol has been adopted allowing us to achieve the mentioned results and to draw the following considerations and conclusions.

• Not one patient out of the 160 in the sample has worsened his/her situation. This data is highly relevant given the low cost of clinical management, being a ready to use device, the limited economic and biological cost, but above all its low invasiveness, its reversibility and the conservative therapy based on evidence.

• Of the patients that remained stationary only: 6 (4%) out of 160 patients had clicking from the beginning; no one (0%) with TMJ pain; no one (0%) with muscular pain; 35 (28%) with headache, 28 (34%) with cervical pain; 29 (22%) with parafunctions. Therefore, very few subjects remained stationary and most likely they all had more complex or structural alterations, especially as regards cervical pain that, as already mentioned, seems to be linked more to pathologies of the cervical district such as post-traumatic tensions or hyperlordosis. In fact, we have noticed that patients with rectilinization have benefitted the most from our protocol rather than those with hyperlordosis; underlining as such the need for an in-depth investigation on this regard.

• Patients that have improved: 51 (32%) patients with clicking; 36 (33%) with TMJ pain; 32 (28%) with muscular pain; 29 (24%) with headache; 26 (32%) subjects with cervical pain; 101 (78%) patients with clenching of teeth and/or bruxism from the beginning.

• Patients that have much improved with total disappearance of the symptom: 103 (64%) patients out of the 160 with clicking from the beginning; 73 (67%) with TMJ pain; 83 (72%) with muscular pain; 59 (48%) with headache; 28 (34%) with cervical pain.

• Lastly, by making a thorough evaluation of symptoms remission, we have seen that 99 patients, corresponding to 62% of the sample, reported a simultaneous disappearance of all symptoms. This figure, together with the figure of the patients that have improved and those that have much improved, confirms that the novel universal device Lingual Ring is certainly valid, together with the new protocol, to detect articular imbalances (clicking, TMJ pain, myalgia) arising from possible occlusal alterations but above all from neuromuscular problems and tensions. This conclusion is above all confirmed by the instrumental tests performed: MRI of TMJ with and without the Lingual Ring in the mouth (fig. 4 and 5); "T0" electromyography without the device and "T3" after 3 months of Lingual Ring utilization; axiography with and without the device in the mouth documenting the occlusal and condylar tridimensional repositioning.

The novel device Ri.P.A.Ra. Lingual Ring differs very much from classic devices and from the simple immediate devices as it is thought as re-educational bite.

Overall, our study conclusions can only be positive, if we also consider the 3 months of protocol, which is a short time. The novel universal bite Lingual Ring, immediately available for the patient and clinician, combined to self-care and exercises – counseling, behavioral therapy and exercises at home and with the clinician. – (8-12), and to behavioral gnathology (fig. 1), has demonstrated to be an effective device for the immediate treatment of TMDs.

Advantages and disadvantages

On the sidelines of what said it is important to briefly summarize advantages and possible disadvantages of this new therapeutic approach.

Advantages

• Possibility to combine different therapeutic approaches in a more complete treatment plan, that is: bite therapy, information and educational therapy, therapy with physical exercises and myofunctional re-education, behavioral therapy.

• The immediate use of the bite Lingual Ring, ready to use, both for the patient and the operator.

• Low economic and clinical management; low biologic invasiveness, attaining to valid conservative therapies.

• Reduction of waiting times (often long), both in private practices but especially in public structures.

• Easy management for the patient and clinician.

• The use of the tongue in functional re-educational therapy.

• Good tolerability and versatility.

• Possibility of having differential responses from the different types of TMDs, to be able to eventually differently adjust the continuation of therapeutic treatment. This last point reinforces the logic behind "conservative therapy based on evidence and low invasiveness", requested by the scientific community, to obtain the highest benefit with the minimum effort and only subsequently plan more complex therapies. On this regard we underline the fact that all patients will continue to be monitored and those that remained stationary or just improved will be examined again and included in the program using specific therapies or traditional bites. As well as the mentioned advantages, the clinician can also prescribe the bite Lingual Ring to patients that have finalized rehabilitative or prosthetic dental treatments for deconditioning and/or occlusal protection.

Disadvantages

The disadvantage of this new device and its protocol is mostly linked to a higher need of collaboration from the patient that needs to learn how to manage the bite both strategically and with timing. Another possible disadvantage could be the management of tongue posture, which is important for the correct positioning of the device in the mouth. Obviously, advantages and disadvantages are also linked to a clinician's training and ability. The present study, even if carried out on a population of 160 subjects, needs further in-depth analysis and a longer monitoring for clinical risks.

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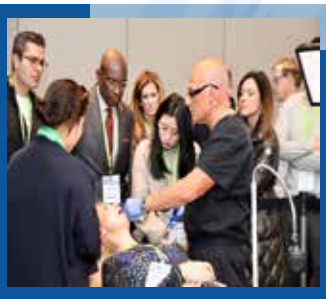


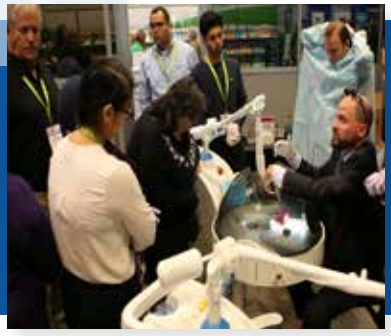

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Interceptive Treatment for the Class III Malocclusion

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INTRODUCTION

A developing Class III malocclusion is one of the most challenging problems confronting an orthodontic clinician. If left untreated the Class III malocclusion may worsen, with the majority of these patients ultimately requiring orthognathic surgery, as adults.

For this reason, I recommend early interceptive orthodontic treatment to reduce the percentage need for surgery. Unfortunately, when interceptive Class III treatment is initiated at the appropriate age, there is often a significant amount of time between the end of facemask treatment and the beginning of "definitive" orthodontics. I have written this article in an attempt to clarify the correct treatment protocol for Class III patients and to suggest methods of retention during their continued period of facial growth.

A developing Class III malocclusion can present with maxillary skeletal retrusion, mandibular skeletal protrusion, or a combination of the two. In addition to these sagittal problems there may also be posterior and anterior crossbites present. Dental compensation, such as maxillary dentoalveolar protrusion and mandibular dentoalveolar retrusion tend to produce poor facial profiles with midface deficiencies often apparent. The prevalence of Class III malocclusion is approximately 5% in the Caucasian population, rising to as much as 50% in the Japanese and Korean population.

TREATMENT OF THE CLASS III MALOCCLUSION

Although traditional orthodontic treatment, for developing Class III malocclusion, focused on the mandible as the primary cause of the discrepancy, recent studies have suggested that 63% of the skeletal Class III malocclusions display maxillary retrusion. The majority of patients tend to exhibit maxillary hypoplasia in conjunction with a normal or mildly prognathic mandible.

Dr. Derek Mahony

Unfortunately, I see too many young patients, for a second opinion, who are told there is nothing the orthodontist can do but wait until their facial growth is complete and then work them up for orthognathic surgery. Yet the majority of surgical procedures to correct Class III malocclusion involve maxillary advancements! This suggests that the problem was never excessive mandibular growth, but rather a lack of development of the maxilla. Such problems may have been caused by nasal airway blockages, when the child was younger.

Orthodontic treatment for the Class III malocclusion can be defined into the following categories:

1. Growth modification involving maxillary expansion and protraction face mask therapy
2. Growth modification involving a chin cup to restrain mandibular growth, or
3. Waiting until growth has ceased, thereby, committing the patient to either dental camouflage treatment, or orthognathic surgery.

In my orthodontic practice, children exhibiting early signs of a Class III malocclusion are given priority for treatment. My current treatment approach involves protraction and development of the maxilla, but I do not use chin cups as I feel they have an adverse effect on the patient's temporomandibular joints.

Controversy currently exists as to the optimum time to commence Class III orthodontic treatment. Takada examined maxillary protraction therapy and reported that the pre-pubertal and mid-pubertal time frame is best, due to the maxilla's natural growth (stage C2-C3).

TREATMENT OBJECTIVES FOR THE CLASS III PATIENT

If we treat patient as early in the growth cycle as possible, i.e. as soon as the Class III problem can be diagnosed, the following treatment objectives may be achieved:

1. Reduce the growth in the size of the mandible.
2. Increase the size of the maxilla to its maximum genetic potential, and
3. Move the maxilla forward to its maximum genetic potential.

A cephalometric analysis is essential to confirm the diagnosis of the Class III malocclusion and to formulate either a surgical, or non-surgical, treatment plan.

I personally use the Jefferson cephalometric analysis as this is ideally suited to the correct diagnosis of a Class III patient.

In the Jefferson analysis the size of the mandible and the position of the mandible can be easily related to the length and position of the anterior cranial base. The size of the maxilla and the position of the maxilla, may also be related to the size and position of the anterior cranial base. The Jefferson cephalometric analysis provides an easy visual means to identify maxillary/mandibular disproportions.

CLASS III ORTHOPAEDIC APPLIANCE OPTIONS

The cephalometric analysis should be supplemented with a clinical diagnosis, and a study cast analysis. The Schwartz/Korkhaus study cast analysis enables a clinician to determine the correct dimensions of the maxillary and mandibular arches. If the maxilla is wide enough a maxillary sagittal appliance may be used, otherwise a 3D appliance is indicated. In the 3D appliance the expansion screw should be placed straight and parallel to the midline palatal suture. This will ensure that there is minimum reciprocal distalising of the maxillary buccal segments during the activation of the sagittal appliance. Such an appliance may also be used for pseudo Class III patients; however, a lower Hawley retainer or a fixed lingual arch, must be worn to minimize further mandibular growth. I have used either a modified Frankel III, a Han appliance, or a reverse twin block for the orthopaedic correction of a growing Class III malocclusion. For any of these appliances to be successful, the maxilla must be only slightly retruded and the patient must be able to provide an edge to edge bite. The most successful treatment in my practice however, involves the use of a maxillary 3D appliance to enlarge the maxilla, in conjunction with a reverse pull facemask (protraction headgear) to move the maxilla, as a body, forward into a more favourable position. The reverse pull headgear is fitted in combination with a "fixed lower labial" appliance and Class III intraoral elastics in an attempt to prevent further mandibular growth. These varying forms of "interceptive" orthodontic treatment may save your patient from orthognathic surgery, which itself isn't always successful. The disadvantage of dentoalveolar base compensations to correct a Skeletal III problem, is that extractions of lower bicuspids are often required. Such dental camouflage is rarely inidicated as the lower anterior teeth respond to retraction mechanics by simply tipping backwards. This can lead to periodontal problems, on the labio-gingival portion of the anterior teeth. Such treatment is highly unstable as the lower extraction space reopens with time. If I extract to "orthodontically camouflage" a non-growing Class III malocclusion I prefer to remove a lower incisor in preference to lower first premolars, or place TADs in the superior oblique ridge of the mandible, and extract the third molars.

Correction of a Class III malocclusion, using facemasks and expansion therapy, results from a combination of skeletal and dental changes which produces an improvement in the soft tissue profile.

PROTRACTION FACEMASKS (REVERSE PULL HEADGEAR)

The reverse pull facemask was first described in Germany, more than 100 years ago. The individual most responsible for reviving interest in this technique is Delaire. Petit (1983) modified the facemask of Delaire by increasing the amount of force generated by the appliance and decreasing the overall treatment time. McNamara (1987) described a version of the petit facial mask that attaches to a maxillary splint, which is bonded to the posterior dentition. The splint is fitted with hooks to attach elastics to the facemask, and the expansion screw is incorporated in the appliance. This is termed as a bonded hyrax. Mid facial orthopaedic expansion can produce a slight anterior movement of Point A and a slight inferior and anterior movement of the maxilla. Downward and backward rotation of the mandible is seen with the use of maxillary protraction particularly in the facemasks which have a chin cap incorporated into the design, e.g. Delaire and Petit styles. These are now reverse pull facemasks available (Grummons) for patients suffering from severe temporomandibular joint dysfunction. These reverse pull facemasks are designed to keep all reciprocal forces completely off the mandible. I tend to favour these facemasks for Class III skeletal open bite patients because the conventional facemask causes an anterior and vertical movement of the maxilla. This results in bite opening which is desirable in deep bite patients, exhibiting over closure of the mandible, but is contraindicated in open bite patients. The ideal facemask for high angle patients is the Tandem Bow. Correction of a Class III malocclusion, using facemasks and expansion therapy, results from a combination of skeletal and dental changes which produces an improvement in the soft tissue profile. Patients I have treated with this technique demonstrate a statistically significant hard and soft tissue movement, which favourably improves the entire dentofacial complex.

ELASTIC TRACTION

A facemask is secured to the face by stretching elastics from hooks on the maxillary splint to the crossbow of the facemask. Heavy forces are generated, usually through the use of 5/8 inch, 14 oz. elastics bilaterally. Lighter forces may be used initially, but the forces increase to orthopaedic strength as soon as the patient is used to the appliance.

The elastics are attached in the canine area of the maxillary splint. These elastics should be worn for a minimum of 12 hours per day, with the patient exceeding the minimal amount as much as possible. I advocate full time use of the reverse pull facemask when a patient is not in public and is able to do so. If the elastics are placed too far posteriorly in the maxillae the "Kline Effect" can be seen. This causes the maxilla to tip anteriorly and leads to an unsightly display of gingival tissue (gummy smile). Intra oral Class III elastics may also be used if attached to

a holding arch in the mandible. These elastics are placed in a Class III direction from the maxillary first molars to the soldered hooks on the holding arch. The size of these elastics is 3/16 inch, 4½ oz., in the primary and mixed dentition and 5/16-inch, 4 ½ oz. in the permanent dentition. It is very important to understand that the intraoral Class III elastics have a different vector of force when compared to extraoral Class III elastics. Extraoral Class III elastics pull at a horizontal, or parallel, relationship to the maxillary plane. Therefore, their reciprocal force is balanced between the frontal bone and the mandible. This in turn creates a horizontal force within the temporomandibular joints i.e. no upward distalising force vector. Intraoral Class III elastics, however, place a diagonal force upon the mandible, which can in turn cause the mandibular condyle to be displaced off the meniscus. Intraoral elastics, therefore, must have the following guidelines if they are to be used during the treatment of a Class III malocclusion:

a. they must never be used for any patient who is experiencing temporomandibular joint symptoms,

b. they must be terminated if the patient acquires any form of joint dysfunction, and

c. they must be worn intermittently to allow the mandibular condyles to decompress within the glenoid fossa. This permits proper circulation to be restored within the TMJ complex. The most satisfactory combination of intraoral and extraoral Class III traction is for the patient to wear the intraoral elastics during the day, removing them only for eating. The extraoral elastics should be worn at night, and as much as possible during the day, in conjunction with the intraoral elastics.

MAXILLARY EXPANSION APPLIANCE DESIGN

As essential part of the orthopaedic Class III treatment is the use of bonded maxillary splint. This appliance is an acrylic and wire maxillary expansion appliance that is bonded to the posterior dentition. The splint usually covers the first and second deciduous molars. The maxillary canines may also be included on patient with a complete deciduous dentition. The maxillary splint is made of a framework of 0.045 inch round stainless steel wire to which an expansion screw is attached. If second molars are present an occlusal rest is extended to these teeth to prevent their over-eruption during treatment. Two hooks, to which elastics are attached, are soldered to the wire framework. These hooks usually lie adjacent to the canines or first deciduous molars. The minimum thickness of the splint should be no less than 1.5 mm, otherwise it can promote occlusal decalcification due to abrasion of the appliance by the opposing dentition. When bonding the maxillary splint, in the mouth, the teeth should be carefully etched on their buccal and lingual surfaces. The occlusal surfaces are not etched, to facilitate removal of the appliance. I advocate the use of a light cured glass ionomer cement to prevent decalcification and facilitate removal of the excess cement, before activating with a LED light. Whichever GIC bonding agent is used it should have a low viscosity, and a long working time. The tissue fitting surface of the acrylic splint should be micro-etched in the laboratory to improve retention.

The maxillary expansion appliance is activated twice a day, for eight days, to produce a disruption in the sutural system. This facilitates the action of the facemask. Expansion is then slowed down to two turns a week to limit increases in the vertical dimension, but allow continued development of the maxilla until desired transverse change has been achieved. I recommend the super screw as it delivers ideal forces, and its rigid design minimizes tipping.

RETENTION OF ORTHOPEDIC CHANGES DURING THE CONTINUED GROWTH PHASE

If a patient is in a late deciduous, or early mixed dentition, at the conclusion of my facemask therapy I advocate the use of a modified Frankel III appliance to act an "active" retainer. The modified Frankel III appliance has sagittal expansion screws in the pre-maxillary region. The use of acrylic palots, in the labial sulcus, stretch the mucoperiostium to encourage bone deposition where it is needed. A Han appliance may also be used as a functional retainer. This appliance is a bi-maxillary design which resembles an upper sagittal appliance joined to a lower Hawley retainer. The Han virtually eliminates any reciprocal movement of the upper posterior teeth. I find that I get better patient compliance with a Han appliance than I do with a Frankel III. The major drawback of the Frankel III appliance is its poor patient acceptance. If, however, you can motivate your patient to wear it, it really works well. One of the disadvantages of the Han appliance and the modified Frankel III appliance is that Class III elastics and reverse pull facemasks cannot be worn simultaneously with them. The Truitt III appliance, however, permits the use of intraoral Class III elastics and extraoral Class III elastics, applied to a reverse pull facemask. The Truitt III appliance does, however, require a permanent dentition for retention. The maxillary portion of the Truitt III appliance is like a modified Schwartz plate. The following modifications may be added:

a. Occlusal coverage with a minimum thickness of 1.5 mm posteriorly,

b. Anterior tongue wires to curb a tongue thrust habit,

c. Posterior palatal spinner to allow myofunctional swallowing therapy to be initiated.

d. Frankel III mucoperiosteal pads to stimulate maxillary growth,

e. Elastic hooks placed on the maxillary first molars by soldering the hooks to Adams clasps. These are designed for the placement of intraoral elastics,

f. Soldered hooks on the omega loop of the labial bow, in the canine region, for the placement of extraoral elastics,

g. Expansion screws are incorporated into the appliance, to develop the sagittal and transverse size of the maxilla.

The mandibular portion of the Truitt III appliance is a modified Hawley with a labial bow. The labial bow is constructed of heavy 0.036 steel wire. It extends from the occlusal acrylic, downward, and is formed into the standard Hawley loop. This engages into the gingival third of the mandibular incisors.

The Truitt III appliance is activated by turning an expansion screw once a week (1/4mm). This adjustment should be reduced to once a fortnight if the patient has an anterior openbite. The intraoral and extraoral elastics are worn as per the rules of facemask therapy. The occlusal

acrylic coverage on the Truitt III appliance is adjusted just like a flat plane splint. There should be no lower cuspid guidance to prevent an anterior displacement of the meniscus within the temporomandibular joint. The lower labial bow of the Truitt appliance must be adjusted monthly to be in firm contact with the mandibular incisors.
This adjustment is done with three-jaw pliers to constrict the size of the omega loops. It is important to ensure that the labial bow contacts the gingival 1/3 of the mandibular incisors to avoid tipping of these teeth.

FINISHING CLASS III MALOCCLUSIONS IN STRAIGHTWIRE (PSL) BRACKETS

Once the developing Class III problem is corrected orthopedically I advocate the use of a Han, Frankel III or Truit III appliance to act as a retainer until mandibular growth is complete (stage C6). The patient is then ready for final orthodontic correction using fixed appliance therapy. The orthodontic portion of the treatment is best delayed until the patient has completed their pubertal growth. Any orthodontic treatment must be centred around the principles of maintaining the Class III dentoalveolar base compensation, within the lower arch and "burning anchorage" in the upper arch (type C anchorage continued). No retrusive mechanics should ever be used, to the maxillary dentition, in a Class III malocclusion. I used a "stopped archwire technique" in the maxillary arch to push the maxillary incisors forward into a Class I incisor relationship. This is achieved by placing Guerin locks mesial to the first molars and allowing a 0.016 X 0.022 thermal nickel titanium archwire to lie about 4 mm ahead of the maxillary brackets. When this archwire is ligated into the maxillary incisor teeth the wire is prevented from distal driving by the Guerin locks, so the wire pushes the maxillary incisors forward. To maintain my orthopaedic correction, during straightwire, I recommend the use of a Vesco arch. The Vesco arch is a fixed wire appliance, which is designed to correct dental and skeletal Class III malocclusions efficiently. Like Dr. Frankel's functional regulator, the Vesco arch contains maxillary lip pads which act as a cleat to bridge elastics from the archwire to the reverse pull facemask. A separation is incorporated through the centre of the acrylic lip pad to allow the orthodontist the option adapting the pad to the oral anatomy and eliminating patient discomfort. Also, due to the cantilever effect of the reverse pull elastics from the archwire, labial root torque is transmitted to the maxillary incisors. This counteracts their initial proclination during maxillary protraction.

To maintain my orthopaedic correction, during straightwire, I recommend the use of a Vesco arch

The Vesco arch permits the continued use of reverse pull facemask therapy during the straightwire phase of treatment. If orthodontic movement is required, lighter forces are applied to the Vesco arch, i.e. 200 gms. per side, but if we wish to continue orhthopedic correction of the maxilla, heavier forces are required, i.e. 600 gms. per side. The fixed appliance therapy in the lower arch is completed on a round stainless steel archwire (0.016). If we were to progress to a rectangular archwire we would express labial crown torque of the lower incisors. This will push them into a Class III position. I finish my Class III straightwire cases with a 0.021'"'x 0.025' TMA archwire in the maxilla and a round 0.016" stainless steel wire in the mandible. As mentioned earlier, if there is still crowding in the lower labial segment, when growth is complete I may advocate interproximal stripping, or the removal of a lower incisor. Extraction of lower bicuspids is contraindicated as the lower anterior teeth respond to retraction mechanics by simply tipping back. If the patient requires surgical treatment, decompensation is advocated with the use of rectangular wires, in both arches, to place the incisors over their respective skeletal bases. Class III elastics are replaced with Class II elastics to further decompensate the dentition.

SUMMARY FOR EARLY CLASS III MALOCCLUSION

Most Class III malocclusions involve a maxilla which is too small (sagitally and/or transversely) or too far back in relation to the anterior cranial base. There may be a combination of both of these problems. Understanding the problem is the key to determining which type of appliance to use. A thorough Cephalometric analysis is an invaluable aid in helping to make the correct diagnosis. The clinician should treat a mid-face deficient Class III malocclusion as soon as it is diagnosed. I find that Class II malocclusions are sometimes treated too early, before the forward growth of the mandible. In many cases a six-year-old Class II patient may self correct, when mandibular growth occurs. On the other hand, a six-year-old Class III patient is already one step out of normal and will not grow into a Class I occlusion. These patients need early intervention and require prolonged retention (throughout the post pubertal period) to maintain this orthopaedic correction. The clinician should always warn the patient, and the parents, that it is not always possible to avoid surgery, but early treatment mechanics can at least limit surgery to one jaw or reduce the percentage chance of requiring orthognathic surgery. A deep bite Class III malocclusion always has a better prognosis than an openbite, increased vertical, Class III problem. In the open bite, increased vertical Class III problem, it is important to observe the need for occlusal coverage and to watch for an anterior tongue thrust. These cases should also employ a non-chin cup style facemask.

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Treatment of "white spot lesions" after removal of fixed orthodontic appliances

Dr. Derek Mahony
Orthodontist, BDS(Syd) MScOrth(Lon) DOrth RCS(Edin) MDOrth RCSP(Glas) MOrth RCS(Eng) MOrth RCS(Edin)/FCDS(HK) FRCD(Can) IBO FICD FICCDE

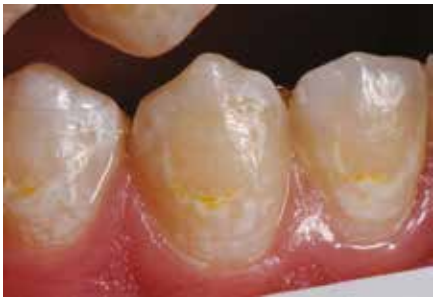

Figure 1 – White Spots - typical: C-shaped or irregular.

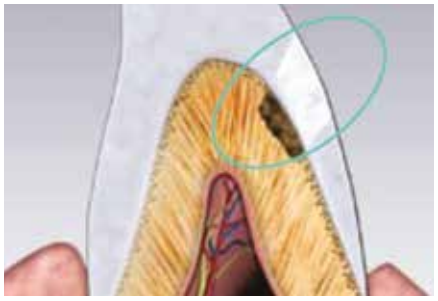

Figure 2 – Smooth surface caries lesion.

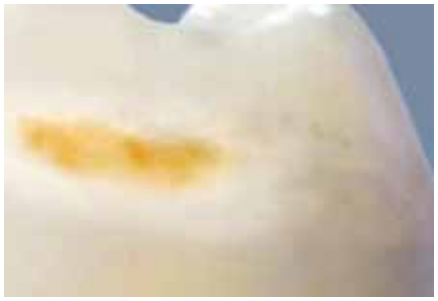

Figure 3 – Clinical image of an incipient caries lesion.

Demineralised white spot lesions occur frequently, after orthodontic treatment. Some teeth are more prone to demineralization (typically the maxillary lateral incisors and the mandibular canine teeth). The disto-gingival area of the labial enamel surface is the area most commonly affected. (Fig. 1) In the first few weeks after removal of the fixed appliances, there is a reduction in white spot lesion size, and appearance, possibly due to the action of saliva. (Fig. 2)

Various treatments have been proposed to assist remineralization. It is important to note that fluoride should not be used, in high concentration, as it tends to prevent remineralization and can lead to further unsightly staining. Low concentrations of fluoride may assist remineralisation, such as those amounts found in casein calcium phosphate materials. Stimulation of salivary flow, by chewing sugar- free gum, is also helpful.

This article will describe a revolutionary new approach to the cosmetic treatment of white spot lesions (Fig.3). Icon resin represents a rapid approach to the treatment of these carious lesions. The break through, micro invasive technology, fills and reinforces demineralised enamel, without drilling or anesthesia. (Fig. 4 & 5)

The reason previous approaches have fallen short, is because fluoride therapy is not always effective in the advanced stages of decay, and the use of restorative fillings almost always sacrifices significant amounts of healthy tooth structure.

Demineralised white spot lesions occur frequently, after orthodontic treatment.

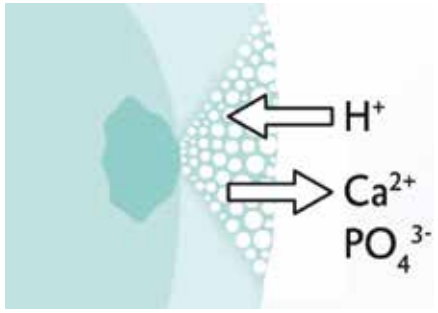

Figure 4 – Clinical image of an incipient caries lesion.

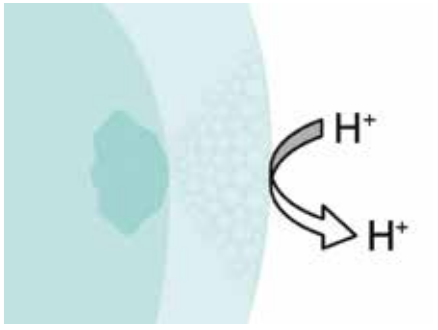

Figure 5 – Pore system of an incipient caries lesion.

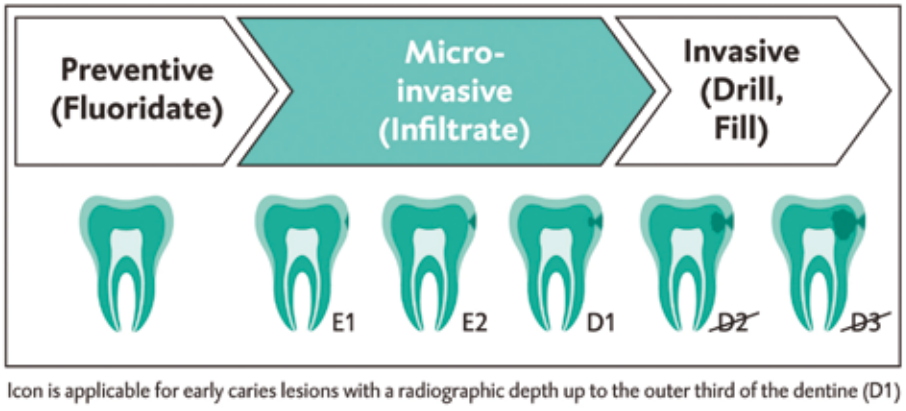

Figure 6 – The first treatment to bridge the gap between prevention and restoration.

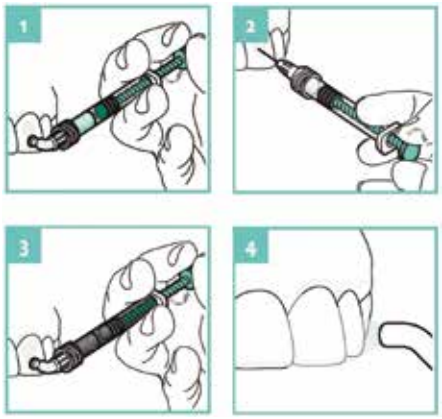

Figure 7 – Smooth surface procedure.

Instead of adopting a "wait and see" approach, Icon resin can arrest the progress of early enamel lesions, up to the first third of dentine (Fig.6). This is done in one simple procedure, without the unnecessary loss of healthy tooth structure.

The procedure, when using Icon, is as follows: the surface area of the white spot lesion is eroded with a 15% HCl gel. This opens the pore system of the lesion. The pore system is then dried with ethanol. Icon resin is then applied to the lesion, with the application aid. The extremely high penetration coefficient of the Icon resin enables it to penetrate into the pores of the carious lesion. Excess material is then removed, and the material is light cured.

The cosmetic treatment of cariogenic white spots, in one patient visit, is very appealing to patients, and their parents.

The total treatment time is about 15 minutes. (Fig.7)

The cosmetic treatment of cariogenic white spots, in one patient visit, is very appealing to patients, and their parents (Fig.8a, b).
There is no drilling or anesthesia is required, so there is greater patient comfort. Furthermore, patients that have already demonstrated poor compliance with their brushing, can be treated earlier. This is not just minimally invasive Dentistry; it is micro-invasive Dentistry.

I would recommend that all clinicians try the Icon product when attempting to remineralize white spot lesions, post orthodontic treatment.

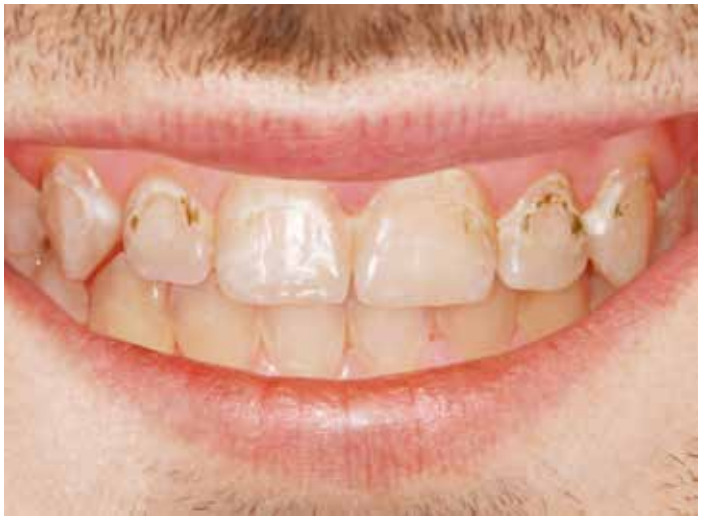

Figure 8a – Lesions before Icon treatment.

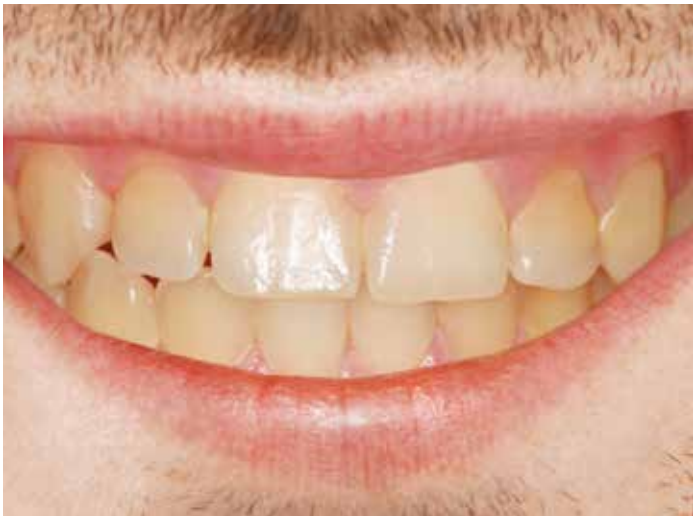

Figure 8b – After icon treatment.

Implant 3D GuideDesign Guided Surgery Solutions

Media Lab Inc. is a company which has been present in the market for more than 24 years and produces software for the medical and dental industry. Our Implant 3D and GuideDesign software are both **CE and FDA certified.**

Media Lab Inc. is present at International fairs such as IDS in Cologne, AEEDC in Dubai, IDEM in Singapore and ExpoDental Meeting in Italy. The international presence of the company coupled with the desire to offer complete solutions for guided surgery such as planning software and surgical guide design software (open system with more than 150 implant manufactures), means we are always looking for reliable partners as distributors.

Implant 3D is a software that allows you to perform three-dimensional implant simulation directly on your personal computer. It simulates the positioning of implants on two-dimensional and three-dimensional models, identifying the mandible nerve, tracing panoramics and sections of the bone model, displaying the three-dimensional bone model with the ability to calculate bone density. By using Implant 3D, **the dentist can plan implant-prosthetic surgery** more safely, efficiently and quickly.

GuideDesign is a module of the Implant 3D software that allows the **design of a surgical template** for performing implant-prosthetic interventions in guided surgery. GuideDesign allows you to create gums supported, teeth supported, bone support surgical guides.
With a **few clicks** of the mouse you can obtain an extremely precise and customized **surgical guide**. Simply by selecting the edge of the surgical guide and the **type of sleeves** to use, GuideDesign **generates the STL file** ready to be printed with a **3D printer.**

GuideDesign is a software that allows the design of a surgical template for performing implant-prosthetic interventions in guided surgery.

Advanced features allow you to create inspection holes and add text to better identify the printed template. GuideDesign allows you to export perforated model for analogs based on the used implant system and the size of the analogs.

What about Guided Surgery Solutions?

The Guided Surgery Solutions ModelGuide has Implant 3D e GuideDesign as its foundation. The ModelGuide method has the objective of giving patients aesthetically pleasant and perfectly functional teeth, eliminating any problems that may have arisen in the past when insertion of one or more dental implants would have created long-term surgical problems with serious inconvenience for the patient.
Modern implants are continuously evolving. Market demand arrives directly from the Clinic wishing to use an implant technique that guarantees reliability and precision. Indirectly, demand also arrives from the patients themselves who are looking for fast intervention, with minimum invasion, little pain or trauma post-surgery and perhaps the chance to walk out of the studio with the definitive prosthesis already in place.

The surgical guides allow implants to be set in place using the flapless technique. Use of this technique gives enormous benefits for patients such as minor anaesthesia, no cutting with scalpels, minor bleeding and no stitches and post-operation pain.
Following market requirements, each day our Company implements strict professionalism to provide the Clinic with a simple, cheap and efficient solution for guided surgery. At the same time, it is always committed to research and development into new technologies to always provide a state of the art product.
It's possible an integration with CAD/CAM software like intraoral scanner, import and export Optically Scanned Plaster Model and import prosthesis.

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Regenerative medicine

The CGF (Concentrated Growth Factors) initial popularity grew from its promise as a safe and natural alternative to surgery. The CGF promoters supported the procedure as an organism-based therapy that allowed healing thanks to its own natural growth factors.

Dott.ssa Paola Pederzoli
specialist in dentistry, dental prosthetics and aesthetic medicine

In recent years, scientific research and technology provided a new perspective on platelets. Studies suggest that platelets contain abundance of growth factors and cytokines which can affect the inflammation, the post-operative blood loss, the infection, the osseogenesis, the wound, the muscle laceration and the soft tissue healing.
Research now shows that platelets release also numerous bioactive proteins responsible for the attraction of macrophages, mesenchymal stem cells and osteoblasts that not only promote the removal of degenerated and necrotic tissues, but also improve tissues regeneration and healing.

In recent years, scientific research and technology provided a new perspective on platelets.

"APAG" *DENATURATION DEVICE*
- A.P.A.G. Activated Plasma Albumin Gel
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Built with anti-static and anti-magnetic materials.
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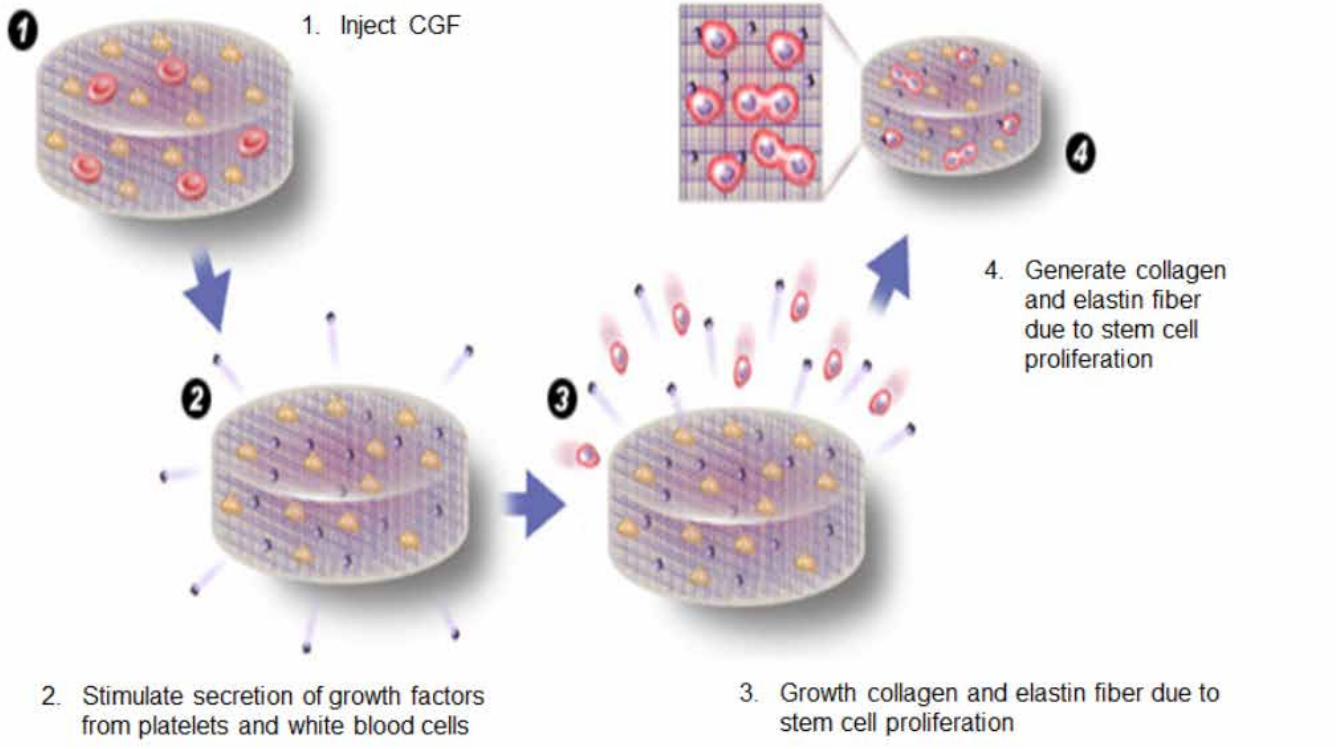
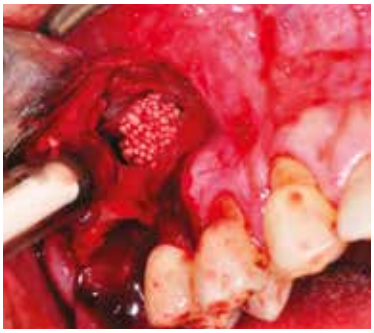


"MEDIFUGE MF 200"
BLOOD SEPARATOR
- Differentiated acceleration
- Speed and fractional - alternating RCF (does not allow the platelet degranulation)
- Anti-static and anti-magnetic rotor
- Constant temperature maintained by self ventilation / self decontamination

In regenerative medicine, three factors are important to optimize the regenerative process: the scaffold (biological, natural or synthetic), growth factors and autologous cells. All the above is present in CGF. CGF is obtained following a process of blood separation collected in vacuum tubes, using a special medical device (Medifuge, Silfradent Srl, Italy). The CGF technology has an interesting characteristic: the centrifugation simplicity and speed, allow a more elastic matrix of fibrin glue rich in growth factors. Using SEM analysis (Electron Scanning Electron Microscopy), Rodella and associates (University of Brescia) showed the presence of a fibrin network formed by thin and thick elements with numerous platelets trapped in the network itself, representing an optimal autologous scaffold. In addition to the growth factors released after the platelets activation and degranulation, we also count the vascular endothelial growth factor (VEGF), the insulin growth factor (IGF), the transforming growth factor (TGF), the tumour necrosis factor (TNF), the brain-derived neurotrophic factor (BDNF) and the presence of TGF-β1 and VEGF.

In Maxillary facial surgery and Implantology, the potentialities of CGF concentrated growth factors have been known for years.

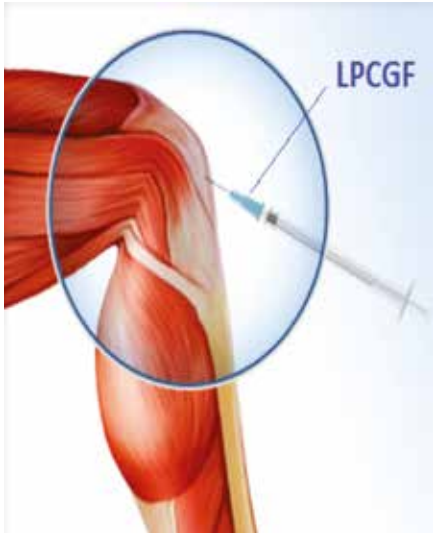
The presence of autologous cells like platelets and leukocytes, including CD34+ cells, have been described in the CGF. The histochemical evidences indicate the role of CD34+ cells, circulating on vascular level: neovascularization and angiogenesis. The presence of these cells in the PRP benefit the tissue re-growth. The CGF has a good regenerative capacity and various fields of application. The use of Platelet-rich Plasma (PRP) has already been for years a reality and a scientific evidence verified by the international medical community for plastic surgery in the treatment of severe burned cases. Plastic surgeons and their patients benefit greatly from tissue regeneration through PRP, obtaining a clearly superior recovery both in tissue quality and healing speed.



The CGF is now used in musculoskeletal medicine with increasing frequency and effectiveness.

In Maxillary facial surgery and Implantology, the potentialities of CGF Concentrated growth factors have been known for years. Its application helps and stimulates the bone regeneration both in managing endosseous implants and in the healing of difficult fractures.
This is a well-documented and effective procedure. Already in 1970, using PRP it was proven a 20% increase in the trabecular bone density, a 40% reduction in healing times and an 80% decrease in pain levels.
Researcher have investigated this effect also in periodontal problems. Conclusions reported that PRP technique represents a rich source of growth factors able to bring significant changes in periodontal damages and it is capable to suppress the cytokines release, limit inflammation and promote in such way the tissue regeneration.

Orthopaedic surgeons know well how the speed of healing processes for tendons and articular surfaces traumas improves thanks to the use of PRP platelets Growth Factors. The CGF is now used in musculoskeletal medicine with increasing frequency and effectiveness. Soft tissues injuries, such as tendinopathies and tendinitis, have been treated with PRP since the early '90s.



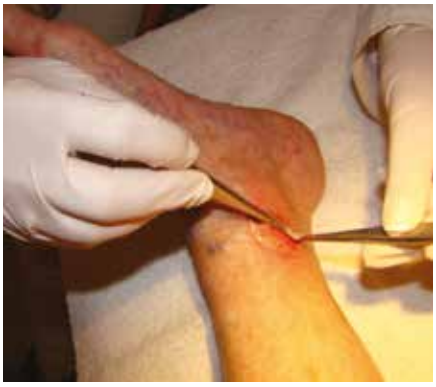
The PRP has also been used for the treatment of muscle fibrosis, ligament distortions, joint capsular laxity and in intra-articular injuries like arthritis, arthrofibrosis, injuries of the articular cartilage, meniscus injuries, chronic synovitis or joints inflammation.

Retrospective assessment in patients treated with a single injection of PRP for chronic tendinopathy, revealed that 78% had a clear clinical improvement within 6 months, avoiding surgical intervention.

"Excellent results were found also in the healing of skin sores in diabetic subjects."

In short, a valid technique that optimizes the healing processes of every tissue where it is applied. With the CGF technique instead, all that is necessary for our regeneration is autologous therefore already within us and we make it work for us. In the dermatological field CGF is used for alopecia (bulbar implants and mesotherapy). It's clear that it opens a new and exciting chapter, a true revolution in the field of aesthetic medicine: the application of the Platelet Growth Factor for skin rejuvenation through the stimulation of skin regeneration.

The growth factors contained in the platelets are able to stimulate various cellular mechanisms like the proliferation and migration of fibroblasts (dermis functional units!) and the synthesis of collagen, recalling and reactivating the stem cells present in the area we are treating, improving the skin condition. It is important to point out that the Platelet Growth Factor CGF Treatment is not a mere aesthetic treatment, but a biological method that tends to restore the best vital conditions of our skin with an excellent improvement of the skin's aesthetic and an optimization of the cutaneous physiological parameters. The number of platelets, concentration and release of the growth factors, strongly depend on the type of kit used, on how the platelets are activated and on the centrifuge used.



Could modern Aesthetic Medicine not benefit of this **miraculous solution**?

Aging is not only made of wrinkles. Flattened cheekbones add various years to the ID as well. Luckily, today we can earn back fullness and turgidity typical of youth without falling into the unpleasant "pillow face" effect, showed by many stars.

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We can create a volumizing filler (A.P.A.G.)

	Prolif. Pre Osteob.	Prolif. Fibroblast	Chemotaxis	Sint. Extracellular matrix	Vascularitation
PDGF	++	++	+	+	*
TGF	+/-	+/-	+	++	*
EGF	-	++	+	++	-
IFG	++	+	++	++	-
VEGF	*		-	-	++

Growth Factors

PDGF AB ~100-300 ng/mL

PDGF BB ~10-15 ng/mL

PDGF AA ~1-5 ng/mL

TGF ß1 ~90-400 ng/mL

TGF ß2 ~0,5 ng/mL

VEGF ~10-30 ng/mL

EGF ~30 ng/mL

IFG ~50-200 ng/mL

+ Growth
- No effects
*** Indirect effects**

using a component (PPP) to reach, with thermal impulses, a high temperature (75°) to obtain a gel that, once cooled down will be mixed with CD34+.

Or we can obtain a filler that creates an aged collagen reconstruction bringing the PRP to 44°, again with thermal impulses. Therefore, with a simple peripheral venous blood sample we can create:

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- A.P.A.G. to create a filling effect

At the end of the first session, all patients are given a kit containing mask, cream and lotion, with the addition of growth factors to prolong the treatment effect, for home care maintenance.
It is recommended to respect the protocol: three treatments over a two months period, the fourth after six months, the fifth at the end of the year and a maintenance treatment every year.
The whole treatment is relatively painless; a topic anaesthetic can be applied, twenty minutes before the injection.

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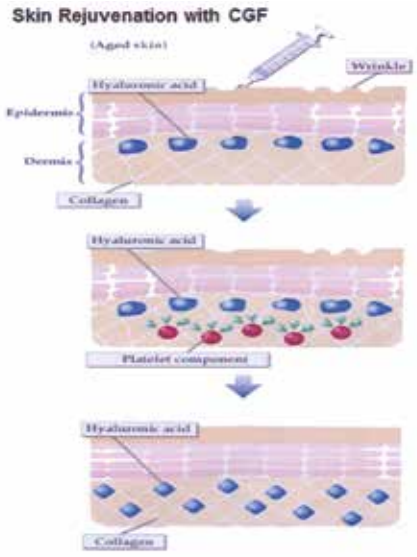

Trial of "Leonardo" a new rapid palatal expansion screw

Dr. Gabriele Galassini* Dr. Elena Marcuzzi ** Dr. Natasa Paulina***

Rapid palatal expansion has been a well-established procedure in orthodontic practice for many years now.

The first expansion was performed in 1860 by Emerson C. Angell, who, in San Francisco, expanded the maxillary arch of a fourteen and a half year old girl by a quarter of an inch in two weeks and noted the creation of an interincisal diastema, a sign that the expansion of the palatal suture had occurred.
This expansion was published in Dental Cosmos San Francisco Medical Press in 1860.
Different types of screws and activation protocols have been developed over the years. In the following project, we tested an innovative screw named **Leonardo** and made by ***SIA Orthodontic Manufacturer* (Italy)**, the characteristics of which allow for safe and effective activation, the quantity of which can be easily controlled.

External examination of the screw (Fig. 1a – 1b).
• Compact in appearance (7.5 x 12 millimeters) with rounded edges and a very smooth structure.
• The small screw cylinder has four teeth for preventing return.
• Small casing to prevent the screw from unwinding.
• Notches for controlling the amount of activation: each notch corresponds to 2 mm of activation.
• Stopping pins which firmly block the [Expander] once opened.

This device prevents complete separation of the screw, with its subsequent disconnection and accidental opening of the two parts of the Expander.

Bench testing (Fig. 2a – 2b)

The opening of the screw with the special key was tested. The direction of activation is clearly indicated with a very visible arrow printed on the body of the Expander. The screw is activated by turning the key as far as it will go. At the end of each activation a loud click sound is heard, which is made when it meets the braking ring, provided with the device. The [braking ring] prevents the screw from unwinding when the activation screw is removed. This ensures the screw has been activated correctly and allows for the simple reinsertion of the key at the next activation, leaving the insertion hole perfectly accessible.
There are notches for controlling how much the Expander is activated. The first two notches are stamped onto the body of the Expander, whilst the others are stamped on the concentric sliding guides. The latter notches are therefore visible during activation whilst the screw is opening. The notches are posi-

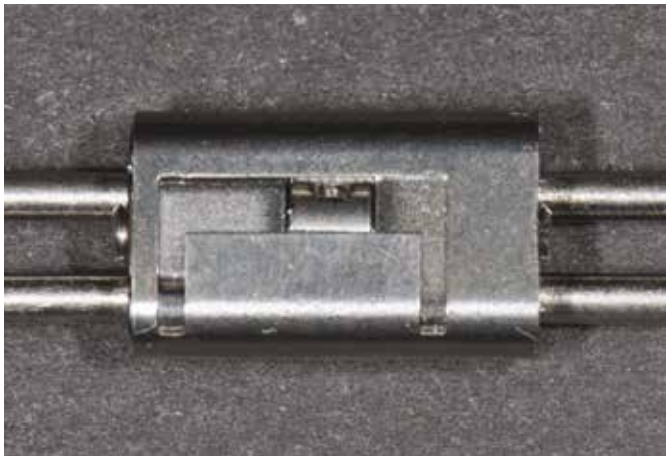

Figure 1a

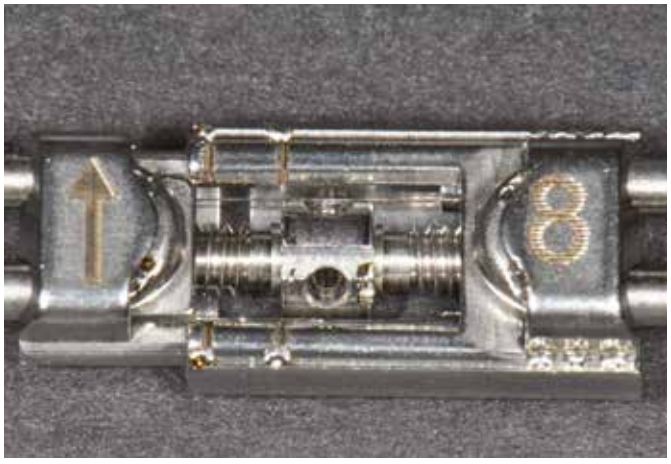

Figure 2a Screw activated at 4mm

Figure 1b

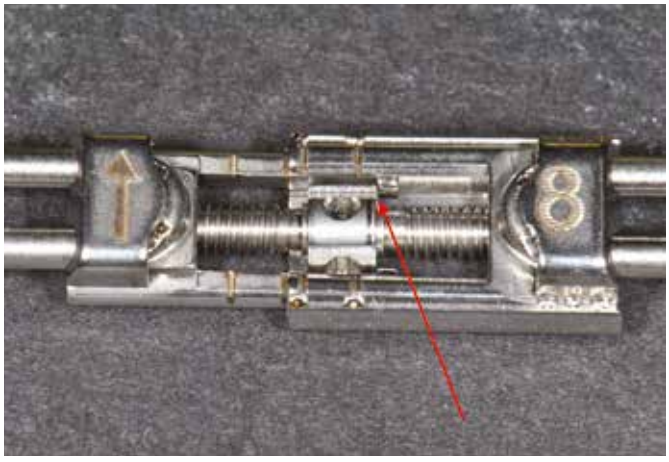

Figure 2b Screw activated at 8mm - note the stopping device

tioned two millimeters apart from each other. Each activation moves the screw forward by 0.2 mm, corresponding to a ¼ turn of the total circumference of the screw. The screw is therefore particularly stable for the whole expansion process and this is thanks to the double concentric sliding guide, one of the peculiarities of this Expander. The Expander remains stable until its maximum opening limit is reached, at which point it blocks without disconnecting the screw itself, thanks to a solid stopping device. This means it is possible to take advantage of the full length of the screw in absolute safety.

Clinical test (Fig. 3a – 3b – 3c – 3d – 3e)

We tested the Expander on a five years old Patient with a left-sided cross-bite.
We wanted to choose a very young Patient with a very small palate, given that it is mainly in these Patients that difficulties are most frequently encountered when activating the screws. These difficulties are linked to the confined spaces available for operating in. As a result, almost always, when the Parent removes the key after activating the screw, he/she tend to bring the screw back again, reducing how much they have activated it by. As a result, it is difficult for the Clinician to evaluate the real amount of expansion.

Activation protocol
The Expander was bonded to two bands and cemented onto the second deciduous molars and the rapid expansion protocol was implemented, which provides for the activation of the screw twice a day. (Fig. 4a – 4b)

We asked the Parents to do this themselves, but remained contactable at all times for anything they needed or in case of emergency.
The Patient was examined after one week:

Rapid palatal expansion has been a well-established procedure in orthodontic practice for many years now.

Figure 3a

The Parents reported that they had noted the creation of an inter-incisive diastema on the fifth day, as is generally the case at this age, from our experience.

We discharged the Patient after having personally activated the screw to check its stability and the efficacy of the stopping device.

On the fourteenth day we terminated activation as the pre-determined amount of expansion of 5.5 millimeters had been reached (fig. 5a – 5b). The correct amount of activation was confirmed by the reference notches. As you can see from the photo, the third notch is about to appear, indicating six millimeters, but is still slightly hidden by the sliding guide, whilst the two previous notches are clearly visible on the body of the expander.

The expander remained blocked in the mouth for one month and was then replaced with a Quad helix (Fig. 6), which includes a marker for lingual repositioning.

The Quad helix remained in the mouth for another four months, after which no other type of restraint was required. This protocol provides for the replacement of the rapid expander with a Quad helix one month after the end of activation. It is a protocol we have been using for more than twenty years and has been tested on more than a hundred cases, proving to be particularly effective and free of any contraindications. In fact in our opinion, one month is more than enough for the consolidation of the midpalatal suture, given that this is the average time required for the consolidation of fractures. The replacement of the expander with a Quad helix provided with a lingual marker offers the following advantages: it reduces the encumbrance to the palate. In fact, often owing to its encumbrance, the rapid expander forces

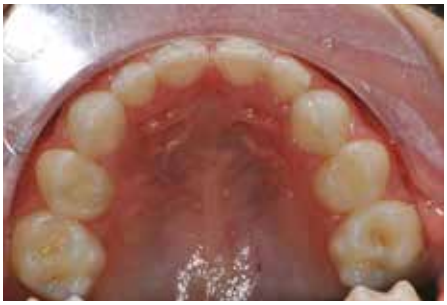

Figure 3b

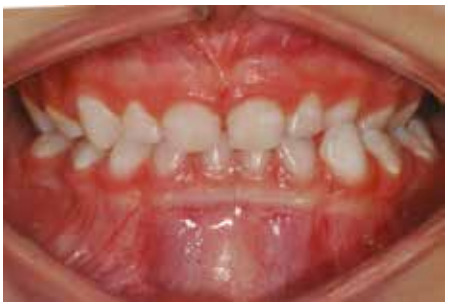

Figure 3d

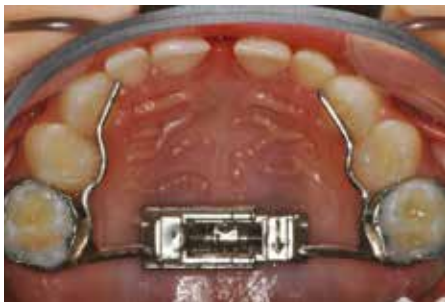

Figure 5a

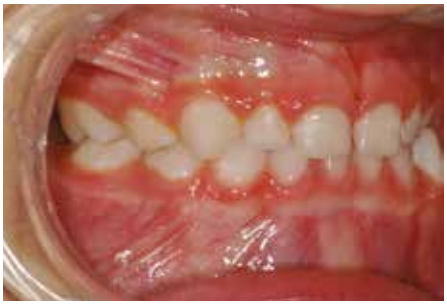

Figure 3c

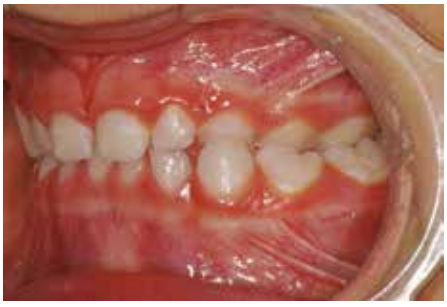

Figure 3e

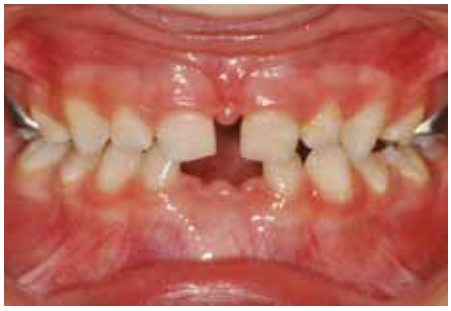

Figure 5b On the fourteenth day we terminated activation as the pre-determined expansion level of 5.5 millimeters had been reached

the tongue into a low, forward position, with a subsequent open bite from lingual dysfunction. As well as maintaining the breadth obtained with the rapid expander, the Quad helix can also increase it, by activating it by the required amount. Thanks to the lingual marker together with the modest encumbrance to the palate offered by the Quad helix (note its modeling in the photo), myofunctional re-education can be initiated immediately. This is definitely more important, in terms of the stability of the expansion and the prolonged use of the expander as a maintenance guard, given that the same prevents correct lingual repositioning, an indispensable condition for the stability of our treatment in the long term. In addition, since it is an elastic device, the Quad helix does not block the two hemimaxillae together, thus allowing the jaw to adapt to the occlusal forces, certainly a useful condition for the cranial architecture, which is also welcomed for osteopathic treatment.

Conclusions

In both bench and clinical testing, the Leonardo Expander has proven to be extremely precise, assembled with care, solid and without any flexion. The Parents of the Patient activated the screw at home with particular ease and precision, thanks to the braking device. In fact this feature enabled them to hear a "click" upon each activation, and above all to not turn the screw back when removing the key, thus undoing the activation they had just completed. This is such a frequent occurrence during the activation of traditional Expanders. The whole process went ahead without any problems and with the maximum level of comfort for the young girl, thanks also to the compact

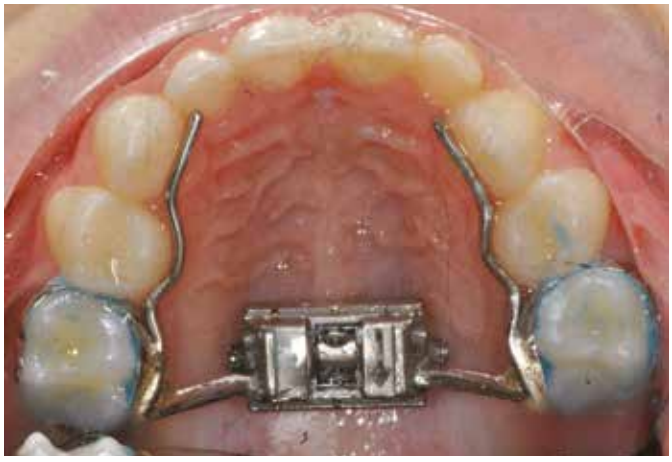

Figure 4a / 4b The expander was bonded to two bands and cemented onto the second deciduous molars

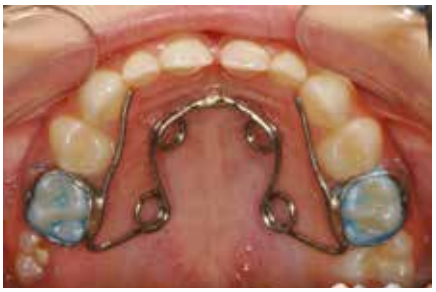

Figure 6 The expander remained blocked in the mouth for one month and was then replaced with a Quad helix

size of the Leonardo Expander, permitting effective and safe use in very young Patients. The arm and the screw of the Leonardo Expander were proven to be precise and without any flexion. The reference notches printed on the screw enabled the Clinician to check that the activation had been performed correctly. All this resulted in a greater sense of security for both the Patient and the Therapist, as well as being appreciated as an indicator of a high level of professionalism.

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Adding Value Through Additive Dentistry

Additive dentistry can be used to solve patients' complex dental problems while preserving their existing tooth structure, and more dentists should use it, says Dr. Christopher Ho, a lecturer at the University of Sydney, Australia, visiting lecturer at King's College London in Britain and faculty member of the Global Institute for Dental Education and Academy of Dental Excellence. "In the past, we had to grind teeth down to provide room for crowns made of porcelain fused to metal. Now, we can just bond very thin layers of materials such as ceramic or nano-hybrid composite resin to the remaining tooth structure instead. This is healthier and a superior treatment option because when you remove tooth structure, you are removing the integrity

of the tooth and weakening the tooth, and you might also cause inadvertent damage to the pulp in the tooth," he explained. Furthermore, such additive techniques help to preserve teeth's remaining enamel. "When you bond materials to enamel, you get a very predictable bond over the long term, which is good for patients," Dr Ho said. Recent advances in additive materials, such as the nano-hybrids and new versions of lithium disilicates, also have increased strength, excellent longevity and better aesthetics with lustre and fluorescence similar to natural teeth. Dr Ho said that additive dentistry is especially recommended for people whose teeth have been worn down due to the grinding of teeth or acid erosion caused by poor diet or diseases such as anorexia and bulimia. Dentists should also be familiar with both direct and indirect additive restoration techniques and use them either singly or in combination depending on the patients' needs. He concluded: "All dentists should have these additive concepts in their back pocket and know when and how to use them." Dr. Ho will be speaking on the 'Additive Approach to Complex Rehabilitation: Digital Workflow Meets the Art and Science of Dentistry' at the IDEM 2018 Conference in Singapore in April.

A New Protocol for the Management of Peri-Implantitis

Peri-implantitis is one of the most frequent pathological conditions that dentists and dental hygienists face.

A systematic review of epidemiology published in the Journal of Clinical Periodontology in 2015, for example, found that 22 percent of patients were affected by it. To date, however, there is no gold standard of treatment, nor randomised clinical trials in the literature comparing surgical and non-surgical treatment. To combat the condition, Dr Magda Mensi, Assistant Professor of Periodontology, Oral Surgery and Implantology at the University of Brescia's Dental and Hygiene School in Italy, embarked on a pilot study in 2013 to determine whether a combination of low-abrasive powder, topical antibiotic and curettage could be more effective against severe peri-implantitis than conventional manual or mechanical debridement. After one year, Dr Mensi and her colleagues observed 4 millimetres of pocket probing depth reduction, more than 3.7 millimetres of attachment level gain, and only 6.5 percent of bleeding on probing at level site in their study's 15 patients' 27 implants. These results were better than those of the conventional treatments. Furthermore, in the four years since the study began, only one patient has had a reoccurrence of peri-implantitis, and that was likely due to the patient missing several control and maintenance appointments and taking immunosuppressive drugs, as well as a worsening of her general health.

Dr Mensi's Multiple Anti-Infective Non-Surgical Therapy (MAINST) protocol consists of using topical 14 percent doxycycline delivered by a biodegradable controlled released vehicle to solve the peri-implantitis acute phase, a session of full mouth air-polishing therapy with erythritol powder delivered sub-gingival with a special nozzle, curettage of the internal pocket line with a piezoceramic device with PEEK-coated tips and, finally, a second application of the doxycycline gel.

The patients also underwent quarterly maintenance sessions and were instructed to use personalised home care instruments, such as sonic toothbrushes, interdental brushes and floss.

"This is very important. The patients have to be educated in plaque and calculus removal, motivated to carry out this maintenance at home, and show up for their dental sessions. If they come back only when there is a problem, it will be too late," said Dr Mensi. She added that the results from her study so far indicate that her MAINST protocol could be a gold standard of treatment for peri-implantitis. She said: "The only surgery that really works for peri-implantitis is regenerative, reconstructive surgery, but our protocol can be a better, non-surgical alternative. We are going to conduct a randomised control study to validate this hypothesis."

Dr. Mensi will speak in depth about the non-surgical approaches to peri-implantits at IDEM 2018 in April in Singapore.

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Interview with Mathias Kuepper

Mr. Mathias Kuepper,
Managing Director of Koelnmesse Pte. Ltd.

IDEM will be celebrating its 10th edition this year, how has IDEM developed over the years? IDEM has come a long way since it's inception in 2000.

The first edition opened with 165 exhibitors and only 2 national pavilions in the exhibition hall. This year at the 10th edition, we're set to welcome 500 companies and 13 national pavilions on 2 levels of the Suntec Convention and Exhibition Centre. Our conference started out as a single-track conference that attracted 500 local delegates; It has since grown to the format it is today with 2 Main Scientific Conference Tracks, a specialized Forum for Dental Hygienist and Therapists and a bevy of hands-on workshops covering topics from endodontics to aesthetic dentistry and more.

What can participants expect to see at IDEM 2018 Conference? What can participants expect to see at the exhibition? One of the session highlights that delegates can look forward to at is the real time live demonstration from the stage during the session "The Benefits of a Digital CAD/CAM Workflow – Delivering a Finished Crown in a Single Visit" on Day 3 of the conference. The crown for the patient will be milled live on stage while the lecture is ongoing. Also the full day session on how to manage an aging population will be of interest to many, as it is a relevant issue that many countries will continue to face with greying of their populations. Finally, the SDA Masterclass session never disappoints at the IDEM conference. This year Dr. Galip Gurel will be taking the stage for a full day to present a novel concept to help dentists create more aesthetic outcomes that will also appeal to their patient. He'll explain why creating a mock-up is so important and go through both the 2D and the 3D options available for smile design. While all of this is going on at the conference, the exhibition will be running concurrently. We've expanded the hall by an additional 2,000sqm this year and will have 500 exhibitors at the exhibition hall. Manufacturers, distributors and traders from across the world will be ready at the exhibition with the latest products and services from every sector of the dental industry. We've also increased the number of meeting and networking areas within the exhibition hall by introducing the IDEM Café, rest areas and the VIP Meeting Area.

Koelnmesse is known as a Trade Fair organizer and are known for their business-to-business exhibitions. How is this reflected in IDEM? Koelnmesse key competencies lie in organizing trade fairs that bring together companies from an industry to meet and establish new business partnerships. We are continuously on the look out to find new ways to connect potential business partners. At IDEM, we piloted a new Online Business Matching Platform last edition and received promising feedback on it. This edition, we've opened it up to a much wider audience to assist them in sifting through the thousands of visitors and exhibiting staff at the event and pre-schedule meetings during IDEM – all with the aim of helping our participants maximise the short 3 days of exhibition days.

How will you be celebrating the milestone of reaching the 10th edition? Hitting the 10th edition milestone for an event that is run biennially is a great achievement for us. We're humbled that interest for an extensive dental exhibition and conference continues to draw such a big crowd to our island and show our appreciation to everyone by offering celebratory drinks in the exhibition hall on the first day of the exhibition. We're also taking this opportunity to reflect on IDEM's history and look at how it became the leading dental exhibition and conference in the Asia Pacific. To this end, we have set up a Memory Wall in the exhibition to take visitors through IDEM's growth and development. Expect a blast from the past at the wall with photos from past editions and live sketch artists unfolding the IDEM story over all 3 event days.

Has planning for IDEM 2020 begun? Is there anything in the works that you can share with us? We are very proud with what we have achieved with IDEM so far but will not be resting on our laurels. For IDEM 2020, we plan on continuing to push the envelope to bring our attendees a world-class show. We've already started looking at more ways to enhance the attendee experience by providing more meeting and networking opportunities in the exhibition halls; We're also looking at continuing to introduce new digital technologies and trying out different conference session formats to appeal to a broader audience with different learning styles. As IDEM evolves to continue to stay relevant for our current participants and to attract the next generation of dental professionals from the region, we will not loose sight of IDEM's core values which is to provide quality scientific content and create a first touchpoint for companies to explore and learn about the diversity within the Asia Pacific Market.

The Business of Dentistry takes centerstage at IDEM 2018

The International Dental Exhibition and Meeting (IDEM) celebrates its 10th edition from 13-15 April 2018. Attendees at the event can look forward to its mainstay Main Scientific Conference and Trade Exhibition, which takes up Levels 3, 4 and 6 of the Suntec Singapore Convention and Exhibition Centre. Co-organized by Koelnmesse and the Singapore Dental Association, Asia Pacific's cornerstone event in dentistry is expected to attract approximately 9,000 attendees from over 83 countries. The exhibition floor will be hosting 13 national pavilions and 500 exhibitors from 38 countries.

Visitors can expect to see a myriad of products from 3D printers to intra-oral scanners to glass ionomer cement and much more on display during the three exhibition days. This year, the organizers have introduced an Online Business Matching Platform, which allows attendees to set up meetings with potential business partners at IDEM. In addition to the Online Business Matching Platform, more networking spaces and hospitality areas have been added to the exhibition floor to create a more conducive meeting atmosphere. Participants can head to the IDEM Café on Level 4 where they can grab a cup of coffee and sit down to discuss the latest solutions they've seen at the exhibition and catch up.

Running in tandem with the exhibition, the Main Scientific Conference will see thought leaders from every facet of dental science speak on a wide range of subjects such as emerging technologies in implant dentistry, digital solutions for the dental office, minimally invasive dentistry and much more. Hands-on workshops will run both pre-event and concurrent to the main conference to give delegates a variety of learning styles to choose from while they're at the event.

On day two and three of IDEM, dental hygienists and therapists can choose to participate in the Dental Hygienist and Therapist Forum (DHTF), a programme dedicated to discussing the needs of oral health therapists in Asia Pacific. Participants will be able to learn more about sleep bruxism, how to deal with white spot lesions and more.

To celebrate IDEM's 10 editions of success, the organizers have arranged for celebratory drinks with all participants on the opening day of the exhibition. A Memory Wall will be placed on Level 6 of the exhibition where artists will commemorate the IDEM story live over the event dates.

Onsite Registration will be available during show days from 13-15 April 2018.

Strong North American Partecipation at IDEM 2018

Forty North American dental manufacturers will exhibit at the 10th edition of IDEM Singapore which will take place from April 13-15, 2018 at the Suntec Singapore Convention and Exhibition Centre. The majority of U.S., Canadian and Mexican companies will display in the North American Pavilion located on the fourth level of Suntec, booths 4E-01 to 4F-23.

Mette Petersen, president and managing director of Koelnmesse, Inc., Chicago and pavilion organizer noted: "Dental products from North America are in high demand in South East Asia. More than 30% of dental imports into Singapore actually originate from the United States. Therefore, we expect strong interest in North American products from dealers and dental practices attending IDEM in April".

The total exhibit area will occupy two floors at the Suntec Singapore International Convention Center accommodating over 500 exhibitors. More than 8,000 visitors from the Pacific Rim region are expected to attend the 2018 event. IDEM attracts dealers, distributors, dentists, dental technicians, hygienists and dental students from the entire ASEAN region. Besides the North American Pavilion, IDEM 2018 hosts pavilions from Australia, Brazil, China, France, Germany, Italy, Japan, South Korea, Singapore, Switzerland, UK and Taiwan.

Attendees interested in contacting U.S. exhibitors during IDEM are welcome to stop by at the U.S. Pavilion Info Desk in Hall 4 F-13 or contact the North American representative Rita Dommermuth prior to the event.

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BioHorizons kicks off the Global Education Tour 2018 in Croatia

As one of the leading companies in the dental implant community, BioHorizons is committed to driving aesthetic implantology forward through science, innovation, and education. As part of this mission, the BioHorizons Global Education Tour 2018 will offer cutting-edge insights on implant therapy through presentation led by leading clinical experts in six countries around the globe. The attendees will have the chance to experience innovative clinical solutions and forward-looking evidence-based protocols available to help them achieve new levels of patient care and practice efficiencies. The tour will kick off on 17 to 19 May 2018 in Dubrovnik, Croatia.

The educational programme focuses on the management of advanced surgical procedures, regenerative solutions in the aesthetic zone and restorative results and the world of digital dentistry. Among the internationally recognized speakers are Gaetano Calesini, Pynadath George, Luca Gobbato, Ramón Gómez-Meda, Bach Le, Francisco Marchesani, Martijn Moolenaar, Carlos Repullo, Alain Romanos, Tiziano Testori, and Natalie Wong.

In addition, a pre-congress workshop will take place on Thursday, 17 May 2018. "TeethXpress Full Arch Immediate Load Course" will be led by Drs. Udatta Kher and Ali Tunkiwala and offer a hands-on component. It will focus on prosthetic planning for full arch immediate load cases, understanding componentry for the TeethXpress protocol, surgical procedures for achieving high primary stability, techniques for the fabrication of a screw retained provisional, the prevention and management of complications, and fast tracking of the prosthetic workflow. Several networking opportunities will be available to allow clinicians to share their experiences with their peers from around the world.

Additional tour locations include:

- Chile (Santiago de Chile, on 08 – 09 June 2018)
- Italy (Taormina, on 30 June 2018)
- Colombia (Bogotá, on 24 – 25 August 2018)
- India (Mumbai, on 01 September 2018)
- Spain (Madrid, on 27 October)

"The Global Education Tour will bring together leading implant specialists and forward-thinking attendees," says Veronica Zamora, International Marketing Director, BioHorizons. "These highly regarded international speakers will provide exciting insights into the latest advances in implant therapy."

The education partner for the BioHorizons Global Education Tour is the Oral Reconstruction Foundation, a not-for-profit foundation that sponsors research, training and education in the field of implant dentistry and related areas. As a continuing education provider through the Academy of General Dentistry, the Oral Reconstruction Foundation has approved the main program for 14 hours of CE credit.

Further information about and registration for the BioHorizons Global Education Tour 2018 are available on GET.biohorizons.com.

About BioHorizons

BioHorizons, Inc. is part of Henry Schein, Inc. (NASDAQ:HSIC) and a leading global provider of dental implants and tissue regeneration products for dentists and dental specialists. The company has a broad product offering, including dental implants, guided surgery, digital restorations and tissue regeneration solutions for the replacement of missing teeth.

BioHorizons products are available in 90 markets around the world.
For more information, visit biohorizons.com

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UNIVERSITY OF BRESCIA

Two International Dental Education Meetings Planned for 2019

In April 2019, the University of Brescia School of Dentistry will host two historically separate international meetings that share common goals related to dental education – advancing professional and personal development, encouraging cross collaboration, and increasing important networking opportunities.

"ADEA/ADEE SHAPING THE FUTURE OF DENTAL EDUCATION II"

will be held in the University of Brescia, Italy on 25th to 27th April 2019
A joint ADEA/ADEE partnership

In May 2017, the Association for dental Education in Europe (ADEE) and the American Dental Education Association (ADEA) hosted the first edition of "ADEA/ADEE Shaping the Future of Dental Education" at King's College in London. The first truly global meeting in nearly a decade focused on dental education welcomed more than 270 dental educators from nearly 50 countries. The four workshop areas were *Global Networking, Interprofessional Education and Practice, Assessment, and Emerging Science and Technology.*

For more information
www.adee.org/meetings/london2017/conclusions/index.html

"SIXTH ADEA INTERNATIONAL WOMEN'S LEADERSHIP CONFERENCE"

The ADEA International Women's Leadership Conference is one of ADEA's pioneering initiatives to support gender equity in global health and the inclusion of oral health in global targets for disease eradication. Established in 1999 to recognize the increased leadership role of women in the global health workforce, the previous five conferences (France, Canada, Sweden, Brazil, Spain) brought together participants from six continents to consider strategies for advancing women's leadership in global health, academic dentistry and research. The meeting proceedings are published as supplements to the *Journal of Dental Education.*

Meeting Objectives

- Maximize opportunities for international collaboration in education and research.
- Develop goals that promote WHO global health objectives for disease eradication.
- Promote interprofessional education and collaborative practice objectives for improved access, quality and health outcomes.
- Share best practices for academic/community partnerships for experiential learning and clinical care.
- Create faculty development opportunities for innovation, exchanges and international collaboration.
- Develop synergy among academic leaders that promotes change through collaborative efforts and mutual respect.
- Potentiate the effectiveness of the increasing role of women in academia, research and global community health. In the United States, 37% of full-time faculty are women.
- Lead curriculum innovation and changes that result from scientific discovery, emerging technologies and therapeutics.

Why are these meetings important to corporations?

- The in-tandem schedule will potentiate outcomes of both meetings through strategic approaches that link leadership with academic goals and global health outcomes.
- The meetings will identify contributing factors that support the science base for dental education, opportunities for collaboration, advances in technology, and other visionary forecasts for clinical practice in the future.
- Diversity and gender equity are increasingly present on global forum agendas- economic, competitiveness, labor force, health, and value-added perspectives.

About ADEA/ADEE Special Interest Group

The American Dental Education Association (ADEA) and the Association for Dental Education in Europe (ADEE) have had a strong historical relationship based on a mutual desire for the advancement of dental education systems. While there are differences between the two associations' contextual environments and operational activities, in recent years it has become clear that the challenges faced by the associations and by their respective memberships are becoming ever more interrelated.

To help explore and investigate these areas of commonality, the ADEE-ADEA collaborative's Special Interest Group (SIG) was introduced at the ADEE annual meeting in Riga, Latvia in 2014. The SIG has since held collaborative meetings on the rapidly changing international dental education context.

http://shapingdentaleducation.org
www.adee.org
www.adea.org

For more information or to discuss sponsorship opportunities, please contact Ms. Alessia Murano at

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"NO GIFT IS MORE PRECIOUS THAN GOOD ADVICE." Erasmus of Rotterdam*

The Oral Reconstruction Foundation is committed to science and further education for the good of the patient. The Foundation invests in research, supports inter disciplinary knowledge exchange, and promotes training and further education in dental implantology and related fields.

This is reflected perfectly in the 2018 Oral Reconstruction Global Symposium's theme "The Future of the Art of Implant Dentistry." The eminent scientific committee and the engagement of internationally renowned speakers guarantee that a differentiated and pioneering program awaits you in Rotterdam. The Symposium combines the latest scientific findings and practical experience, thereby contributing to the field of dental implantology in its entirety. In addition to both new and time proven concepts and technologies, we hope to achieve active exchange between science, practice, and industry. Numerous pre-symposium workshops will allow you to expand upon selected topics and practice them hands-on.
Rotterdam, the second largest metropolis in the Netherlands, is an innovative and inspiring city, and definitely worth a visit. It impresses with futuristic architecture and a fascinating maritime tradition. The city won't just excite architecture and art aficionados; it's also considered very family friendly.

At the same time as our conference, the people of the Netherlands will be celebrating their national holiday, King's Day, probably the biggest party in Holland. April 27 is the birthday of King Willem Alexander, celebrated every year with music, street parties, flea markets, and fairs. The king himself travels with his family through the country, and the people dress up in traditional "oranje." Celebrate this event properly with us, with an unforgettable night of partying in the single medieval building in Rotterdam – the Laurenskerk.

Register to participate in our symposium today. We look forward to seeing you.

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** Erasmus of Rotterdam (* 28.10.1466 in Rotterdam, † 11.07.1536 in Basel) was a Dutch philologist, philosopher and theologian. He is regarded as the most important European humanist of the 16th century and as a pioneer of the Reformation. The model of his humanistic ideals was antiquity, the intellectual values of which he tried to open up to the general public.*

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