

# DENTAL TRIBUNE

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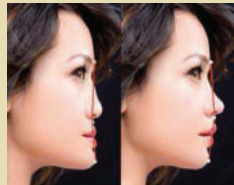
Skillful treatment planning key to successful Implant practice: Experts



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Smile analysis and photoshop smile design technique



CLINICAL PRACTICE

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4 sessions of Implantology course held in Karachi



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## 'DENTISTRY IN THE 21ST CENTURY'

# FDI 2015 Annual World Dental Congress, Bangkok

DT Pakistan Report

**B**ANGKOK - Bangkok is all set to host the 2015 FDI Annual World Dental Congress from 22-25 September 2015 at the Bangkok International

scientific session exceeding 90, scientific posters reaching 500 mark and with 150 high profile speakers from around the globe this event is the largest FDI in

event here in Pakistan as FDI media partner.

It is also a proven platform for global education, communication and development. FDI 2015 in

dentists, about 5,800 per head of population. This represents a rapid increase in supply from the 2007 ratio of 7,300 php, quoted in FDI's Oral Health Atlas (2009).



Trade & Exhibition Center (BITEC) a highly acclaimed exhibition venue, accessible from Bangkok itself by the renowned Skytrain. The theme of the congress this year is 'Dentistry in the 21st Century'.

With 12000 visitors expected to attend the forthcoming event, more than 255 exhibitors,

terms of speakers in the past 5 years.

Approximately 200 participants are travelling from Pakistan to attend this mega event including the President and office bearers of Pakistan Dental Association.

As always Dental News played a pivotal role in registering of participants and promoting the

Bangkok aims to provide all its visitors with the facilities and support to make this a truly productive and memorable experience.

With ever growing market in Thailand, the wisdom of the venue choice is visible as according to recent estimates, today the country has a workforce of some 12,000

The FDI President T.C. Wong in her message said that "after our 100th anniversary Hong Kong in 2012, this is the second time in three years that our Federation has demonstrated its confidence in the Asia Pacific region as an area of growth and development in the field of dentistry and the dental sector". *Continued on page 04*

## ORAL HEALTHCARE MARKET SALES DOUBLED DURING 5 YEARS PAST

# Market to grow up to 30.4 Billion by 2019 in Pakistan

DT Pakistan Report

**K**ARACHI - Oral care value sales grew by 14 per cent in current value terms to spike its sales to PKR21.2 billion in 2014. Moreover, oral care is likely to grow by a CAGR of 8pc at constant 2014 prices during the forecast period to reach sales of PKR30.4bn in 2019

The reason for its quick rise and attaining a high value is being attributed to huge investments made by multinational and local companies in television and billboard advertisements for creating oral hygiene awareness among consumers.

Moreover, urban consumers have also played a significant role in the growth of oral care as they have more education and awareness about

oral hygiene.

One of the reasons cited for the growth of oral care by 14pc in current value terms was that oral care companies have been continuously focusing on making doctors and dentists their brand ambassadors.

Market research reported that the market expanded by a staggering 117% in the last 5 years.

In addition to this, consumers have a vast variety of toothpaste in terms of price and benefits.

Another salient feature of the briefing was that Colgate-Palmolive Ltd maintained its lead in oral care with a value share of 49pc in 2014-



2015 followed by Close-Up holding 10% and Sensodyne holding 7% of the market share. The market survey finding articulates that the oral healthcare market has vast potential in the Pakistani market. While the importance of oral health care is being recognized by the public in general due to awareness campaigns being implemented, Dr. Ayyaz Ali Khan - a veteran dentist and head of Institute of *Continued on page 12*

## PMDC REWARDS

Students to pay more after PM&DC rewards



private colleges for their good performance

DT Pakistan Report

**I**SLAMABAD - The recent notice for grading of institutions by Pakistan Medical and Dental Council (PM&DC) reference PID (1) 775/15 has graded colleges as category A and B. The category A colleges have been prompted to

*"PM&DC's Good performance reward to be paid by medical Students"*

*"PM&DC grading puts private medical & dental colleges out of reach of a common man"*

increase annual tuition fees by seven per cent for the students getting admission to private medical and dental colleges, thus making it beyond the reach of a common man. These decisions were taken in the 139th session of the council held recently. In a public notice PMDC set mandatory grading requirements. They decided to categorize the recognized Medical & Dental Colleges as A & B. Medical Colleges who have made the list are the ones with 500 bedded own Teaching Hospital, latest treatment facility including MRI & CT Scan and a Nursing College.

All others who lack the aforementioned facilities are placed in category B. The meeting also decided that to let category A Private Sector Medical and Dental colleges raise their fees to Rs. 700,000.

As for the standalone Dental Colleges the ones with 60 bedded own teaching hospital have been graded as category A with liberty to increase the fee. The council after reviewing its 2013 regulations

*Continued on page 12*

# Fake Medicines on Sale in Pakistan, Claims US Media -It's A Crime Against Humanity, Says PMA

DT Pakistan Report

**K**ARACHI - A meeting of Pakistan Medical Association held here at the PMA House took serious notice of the news of an American broadcast in which it was claimed that 45 per cent fake medicines, containing brick powder, paints and insecticide, are being sold in the Pakistani market. These drugs, according to the report, are being manufactured allegedly by 4,000 licensed drug manufacturers. It further pointed out that former Interior Minister Rehman Malik has also testified this claim.

Taking a strong notice of the news, the PMA meeting said that the people involved in this business are committing a crime against humanity. "These criminals are not only playing with the lives of the people, but also fleecing them by supplying harmful material in the name of drug," it added. The meeting demanded a stern action and exemplary punishment against all those involved in the heinous crime. PMA also

requested the superior judiciary to take a suo motu action against the criminals.

The meeting was attended by PMA's (Centre) former president Prof S. Tipu Sultan, secretary general Dr Mirza Ali Azhar, treasurer Dr S.M. Qaisar Sajjad, PMA Karachi chapter president Prof M. Idrees Adhi, general secretary Dr Qazi M. Wasiq, Dr Naseer Baloch, Dr Ahmed Bhimani, Dr Hamid Manzoor, Dr Khalil Mukkadam, Dr Abdul Ghafoor Shoro, Dr Usman Ghani, Dr Najum Feroz Mehmudi. Those who participated in the meeting through video link from different parts of the country included PMA's (Centre)



president

Dr Aziz Ahmed Lehri, president-elect Dr M. Ashraf Nizami, Dr Talha Sherwani, Dr Bashir Ahmed Channa, Dr Izhar Ahmed Chaudhry, Dr Tanveer Anwar, Dr Shahid Malik, Dr Mehr Muhammad Iqbal, Dr Saeed Memon and Dr Pir Manzoor Ali.

## IADSR 2015

# Patient focus treatment need of the hour: Experts

DT Pakistan Report

**L**AHORE - The IADSR conference 2015 began in Lahore with great fanfare. The conference exceeded its targets for both speakers and participants. The conference theme is "Evidence Based Dental Practice; Choosing the best treatment for your patients", is something which is of interest to everybody specially the general dentist. The venue of this academic masterpiece is



University of Health Sciences Lahore

The highlight of the conference includes routine clinical practice issues from prevention of dental disease to use of antibiotics, recent root canal medicaments to decision between partial dentures and bridges, effectiveness of functional appliances & patient, career counseling backed by pre and post

conference workshops.

The conference also features best clinical case Awards named after our legendary dentists which is a laudable beginning for others to follow. The awards are Prof. Dr. B. A Y a z d a n i e A w a r d (Prosthodontics), Prof. Dr. M. Saleem Cheema Award (OMFS), Prof. Dr. Haider Tirmazi Award (Orthodontics), Prof. Dr. Mazhar-ul-Haq Award

(Operative Dentistry), and Dr. Riaz Shafi Qazi Award (Comprehensive Dental Care).

Prof Ayyaz Ali Khan is the man behind this highly successful academic conference and together with his team including Saima ch, Sumair Farooq, Dr Faisal, Sharea Ijaz, Mohsin Dewan, Nauman Khan, Faiza Awais, Haris Iqbal, Muhammad Suleman Tahir, Arsalan Malik,

Arshad Taqi and shoib farooq put together this excellent conference.

The participants are very impressed and gave positive feedback about the event and the topics it covered. They also appreciated the speakers. The event media partner is Dental News with PM&DC Certified CPD hours for General Dental Practitioners and Specialists attending it.

## DENTAL TRIBUNE

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# Colgate

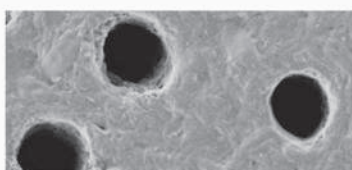
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# Finally, instant\* sensitivity relief patients can take home.

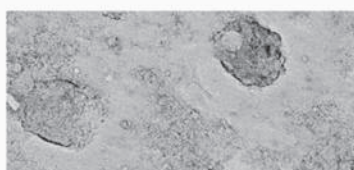
### A breakthrough: Pro-Argin™ Technology

BEFORE<sup>1</sup>



In Vitro SEM photograph of untreated dentin surface.

AFTER<sup>1</sup>



In Vitro SEM photograph of dentin surface after application.

Pro-Argin™ Technology works through a natural process of dentin tubule occlusion that attracts arginine and calcium carbonate to the dentin surface to form a protective seal that provides instant relief.<sup>2</sup>

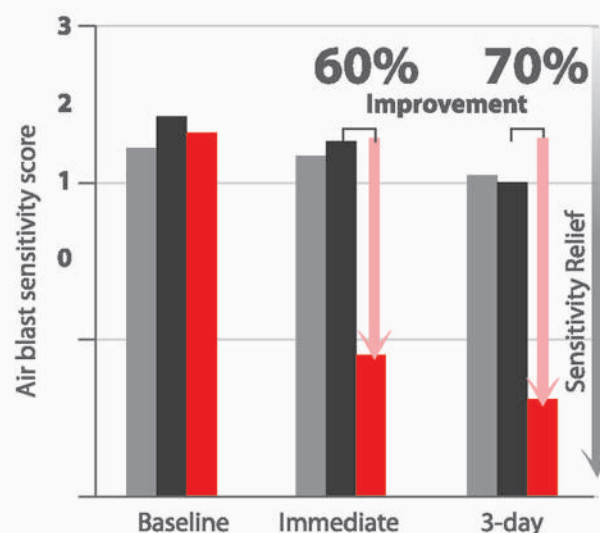
\* For Instant relief, massage a small quantity directly on the sensitive tooth for one minute. For lasting relief, brush twice a day regularly.

Scientific works cited:

1. Petrou I et al. J Clin Dent. 2009;20(Spec Iss):23-31.
2. Cummins D et al. J Clin Dent. 2009;20(Spec Iss):1-9.
3. Nathoo S et al. J Clin Dent. 2009;20(Spec Iss):123-130.

### The results are revolutionary

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- Negative control: Fluoride Toothpaste
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# Skillful treatment planning key to successful implant practice: Experts

**DT Pakistan Report**

**K**ARACHI - The Implant congress Pakistan 2015 organized by Dental News with Baqai Medical University and supported by Pakistan Dental Association and the Oral Diseases Commission of the Asia Pacific Dental Federation concluded at Pearl Continental Hotel Karachi.

The congress started with the recitation from the Holy Quran followed by the National Anthem. Earlier the conference started with pre-conference workshop at the AIC Center Karachi conducted by International and renowned Dr Erdem Ozdemir from Turkey.

The jam packed audience were treated to excellent lectures by the learned speakers including Dr Erdem Ozdemir, Prof Navid Rashid, Prof Kashif Ikram, Dr Nadeem Pasha, Dr Sameer Quraeshi, Dr Irfan Qureshi, Dr Khurram Ataullah, Dr Noorul Wahab and Dr Murtaza Kazmi.

The congress offered CDE hours by Baqai Medical University and was sponsored by M&C Dental the leading implant company in Pakistan, Helix Pharma



Both the workshop and congress got an overwhelming response and the registration had to be closed beforehand.

The congress attracted a galaxy of renowned and distinguished National Speakers from Karachi and Lahore besides an international speaker from

and Chughtai Dental Supplies.

The Scientific Committee head and principal Baqai Dental College Prof Dr Kashif Ikram, appreciated Dental News' efforts for the Implants Conference and also thanked all the speakers for their

valuable contribution.

Overall the event provided valuable insight to the dental

fraternity about various aspects of implant dentistry in Pakistan.

This international event will be

an annual event for the benefit of

the dental fraternity across Pakistan.

## Mouth cancer cases on the rise in Sindh

**DT Pakistan Report**

**K**ARACHI - Civil Hospital Karachi (CHK) Cancer Unit's in charge Dr Naor Muhammad Soomro said here that mouth cancer cases are on the rise in Sindh, particularly in urban areas, merely because of excessive use of tobacco products.

"In fact, mouth cancer cases are more common in the province due to rising trend of chewing chalia, pan, gutka, sheesha, smoking and other tobaccos substance," he added. About breast cancer among women, he said that hormonal imbalance was a major contributing factor in incidents of breast cancer.

He said that the CHK's Cancer Unit had provided services to 100,062 cancer patients from 2004 to June 2015, besides registering 8,733 new cancer patients. Giving break-up of the cancer patients registered between 2004 and June 2015, he said that 687 cancer patients were registered in 2004, 630 in 2005, 594 in 2006, 689 in 2007, 750 in 2008, 738 in 2009, 724 in 2010, 692 in 2011, 1,172 in 2012, 829 in 2013, 795 and 433 till June 2015.



Dr Soomro said that of the total 8,733 new cancer patients registered during the period, 5,952 were reported from Karachi, 280 from Hyderabad, 169 Khairpur, 151 from Lasbella, 125 from Larkana, 98 from Mirpurkhas, 95 from Badin, 59 from Dadu, 80 from Nawabshah and 74 from Ghokti.

Giving community-wise details of the cancer patients reported at the health facility, he said that 2,747 cancer cases belonged to Sindhi community, 2,395 (Urdu-speaking), 751 (Baloch), 605 (Pashto), 553 (Punjabi), 275 (Memonai), 178 (Hindko), 193 (Gujrati), 164 (Katchi) and 147 Saraiki-speaking community. He said that the CHK's Cancer Unit offers all sorts of cancer treatment facilities free of cost.

According to a report, around 0.2 million people become victim of cancer in Pakistan every year and of them between 25,000 and 30,000 are reported from Sindh.

## PM&DC cabinet dissolved by presidential notification

**Monitoring Desk**

**I**SLAMABAD - According to media reports, through a presidential ordinance the Pakistan Medical & Dental Council's existing cabinet has been dissolved. It also further states that new elections will be held within 120 days electing a new cabinet to govern the PMDC.

The outgoing PM&DC President, Dr Masood Hameed was re-elected in April 2013, and had been much discussed for his cabinet's controversial decisions by the medical and healthcare fraternity. According to the notification, fresh elections are due to take place in the next 120 days to elect the new cabinet for the Pakistan Medical & Dental Council. This had prompted the health ministry to urge the government to issue an ordinance for dissolving the council. PMDC registrar Dr Shaista Faisal confirmed that the council had been dissolved and a new council would be formed through proper procedure.

## FDI 2015 Annual World Dental Congress

*Continued from front page*

With ever growing technology around the world, FDI has also introduced an app, called FDI2015, is available to download for free to smartphones and tablets from Apple Store and Play Store

The participants can create their own congress programme and itinerary, as well as news, alerts and messaging capabilities, the app features a congress centre floor plan and information on sessions, by type, speaker and subject.

The FDI World Dental Federation represents approximately 200 national dental associations and specialist groups. Our vision is to lead the world to optimal oral health and acknowledging oral health as a fundamental part of general health and well-being. Our vision is brought to life by being the global voice for oral health, and delivering excellence in oral health policy and promotion; continuing professional education; and access to care.

The FDI's Annual World Dental Congress has always been a unique opportunity to meet leaders of the dental profession from more than one hundred countries, as well as top personalities of the international and national trade and industry.

The Annual World Dental Congress and Exhibition is fully supported by the International Dental Manufacturers Association (IDM), the FDI's natural counterpart and partner at the global level."

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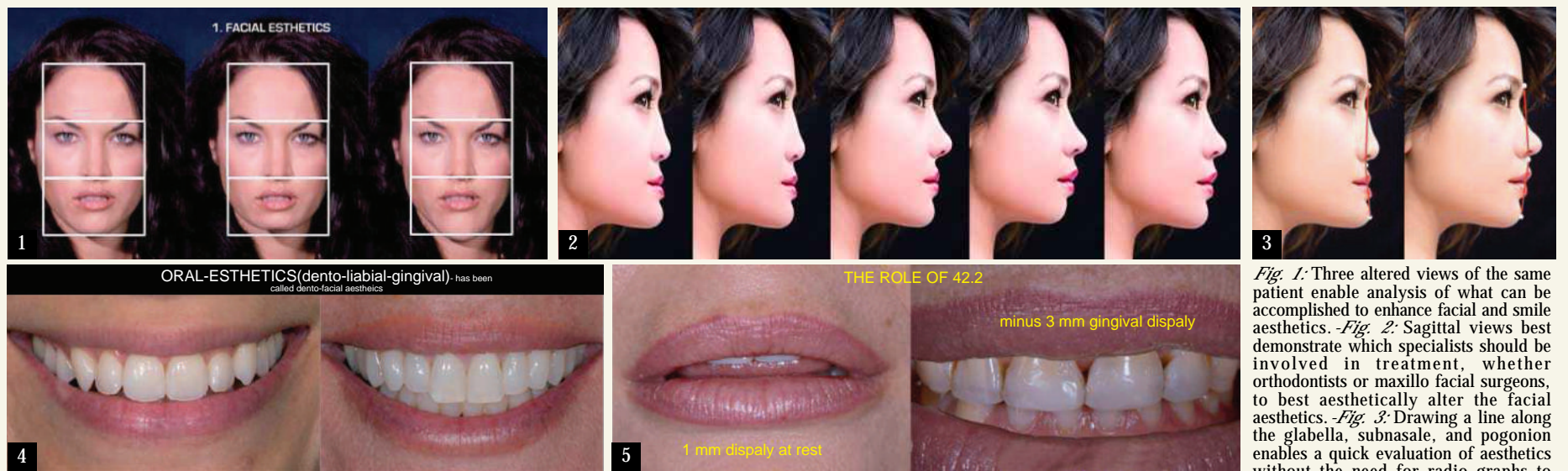
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\*with twice daily brushing

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# Smile analysis and photoshop smile design technique

By Prof. Edward A. McLaren, Lee Culp Lee Culp



determine alignment of ideal facial elements. - Fig. 4: Evaluating the maxillary incisal edge position is the starting point for establishing oral aesthetics. - Fig. 5: According to the 4.2.2 rule, this patient's smile is deficient in aesthetic elements, having only 1mm of tooth display at rest (left), minus 3mm of gingival display, and 4 mm of space between the incisal edge and the lower lip (right)

## Introduction:

### Smile analysis and aesthetic design

Dental facial aesthetics can be defined in three ways.

Traditionally, dental and facial aesthetics have been defined in terms of macro- and micro-elements. Macro-aesthetics encompasses the interrelationships between the face, lips, gingiva, and teeth and the perception that these relationships are pleasing. Micro-aesthetics involves the aesthetics of an individual tooth and the perception that the colour and form are pleasing.

Historically, accepted smile design concepts and smile parameters have helped to design aesthetic treatments. These specific measurements of form, colour, and tooth/aesthetic elements aid in transferring smile design information between the dentist, ceramist, and patient. Aesthetics in dentistry can encompass a broad area—known as the aesthetic zone<sup>1</sup>.

Rufenacht delineated smile analysis into facial aesthetics, dentofacial aesthetics, and dental aesthetics, encompassing the macro- and micro-elements described in the first definition above<sup>2</sup>. Further classification

Facial aesthetics	Total facial form and balance
Orofacial aesthetics	Maxillomandibular relationship to the face and the dental midline relationship to the face pertaining to the teeth, mouth and gingiva
Oral aesthetics	Labial, dental, gingival; the relationships of the lips to the arches, gingiva, and teeth
Dentogingival aesthetics	Relationship of the gingiva to the teeth collectively and individually
Dental aesthetics	Macro- and micro-aesthetics, both inter- and intra-tooth

Table 1: Components of smile analysis and aesthetic design.

identifies five levels of aesthetics: facial, orofacial, oral, dentogingival, and dental (Table 1)<sup>1-3</sup>.

### Initiating smile analysis: Evaluating facial and orofacial aesthetics

The smile analysis/design process begins at the macro level, examining the patient's face first, progressing to an evaluation of the individual teeth, and finally moving to material selection considerations. Multiple photographic views (e.g., facial and sagittal) facilitate this analysis.

At the macro level, facial elements are evaluated for form and balance, with an emphasis on how they may be affected by dental treatment<sup>3,4</sup>. During the macro-analysis, the balance of the facial thirds is examined (Fig. 1). If something appears unbalanced in any one of those zones, the face and/or smile will appear unaesthetic.

Such evaluations help determine the extent and type of treatment necessary to affect the aesthetic changes desired. Depending on the complexity and uniqueness of a given case, orthodontics could be considered when restorative treatment alone would not produce the desired results (Fig. 2), such as when facial height is an issue and the lower third is affected. In other cases—but not all—restorative treatment could alter the vertical

dimension of occlusion to open the bite and enhance aesthetics when a patient presents with relatively even facial thirds (Fig. 3).

### Evaluating oral aesthetics

The dentolabial gingival relationship, which is considered oral aesthetics, has traditionally been the starting point for treatment planning. This process begins by determining the ideal maxillary incisal edge placement (Fig. 4). This is accomplished by understanding the incisal edge position relative to several different landmarks. The following questions can be used to determine the ideal incisal edge position:

- Where in the face should the maxillary incisal edges be placed?
- What is the proper tooth display, both statically and dynamically?
- What is the proper intra- and inter- tooth relationship (e.g., length and size of teeth, arch form)?
- Can the ideal position be achieved with restorative dentistry alone, or is orthodontics needed?

In order to facilitate smile evaluation based on these landmarks, the rule of 4.2.2—which refers to the amount of maxillary central display when the lips are at rest, the amount of gingival tissue revealed, and the proximity of the incisal line to the lower lip—is helpful (Fig. 5). At a time when patients perceive fuller and brighter smiles as most aesthetic, 4mm of maxillary central incisor display while the lips are at rest may be ideal<sup>2,5</sup>. In an aesthetic

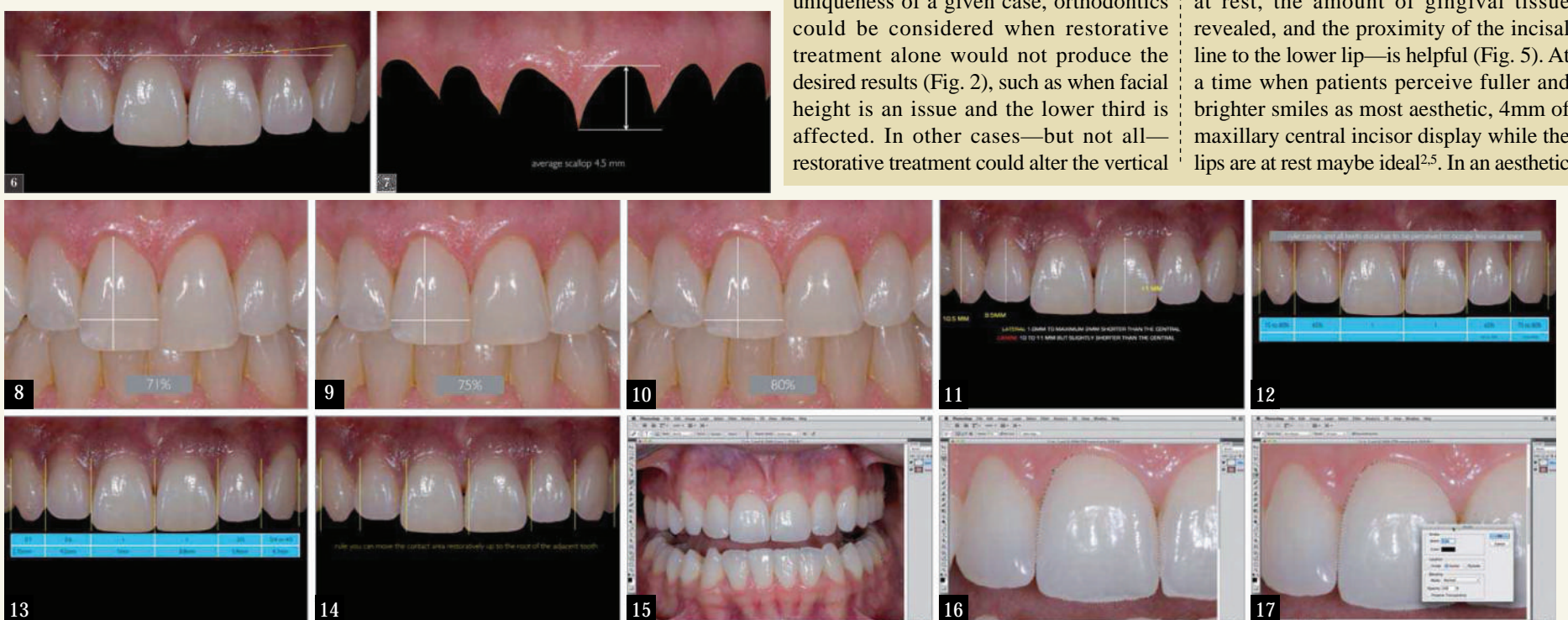


Fig. 6: Gingival symmetry in relation to the central incisors, lateral incisors and canines is essential to aesthetics. Optimal aesthetics is achieved when the gingival line is relatively horizontal and symmetrical on both sides of the midline in relation to the central incisors and lateral incisors. - Fig. 7: The aesthetic ideal from the gingival scallop to the tip of the papilla is 4-5mm. - Figs. 8-10: Acceptable width-to-length ratios fall between 70 % and 85 %, with the ideal range between 80 % and 85 %. - Fig. 11: An acceptable starting point for central incisors is 11mm in length, with lateral incisors 1-2mm shorter than the central incisors for an aesthetic smile display. - Fig. 12: The canines and other teeth distally located are visually perceived as occupying less space in an aesthetically pleasing smile. - Fig. 13: A general rule for achieving proportionate smile design is that lateral incisors should measure two-thirds of the central incisors and canines four-fifths of the lateral incisors. - Fig. 14: If feasible, the contact areas can be restoratively moved up to the root of the adjacent tooth. - Fig. 15: Photoshop provides an effective and inexpensive way to design a digital smile with proper patient input. To start creating custom tooth grids, open an image of an attractive smile in Photoshop and create a separate transparent layer. - Fig. 16: The polygonal lasso tool is an effective way to select the teeth. - Fig. 17: Click "edit > stroke," then use a two-pixel stroke line (with colour set to black) to trace your selection. Make sure the transparent layer is the active working layer.

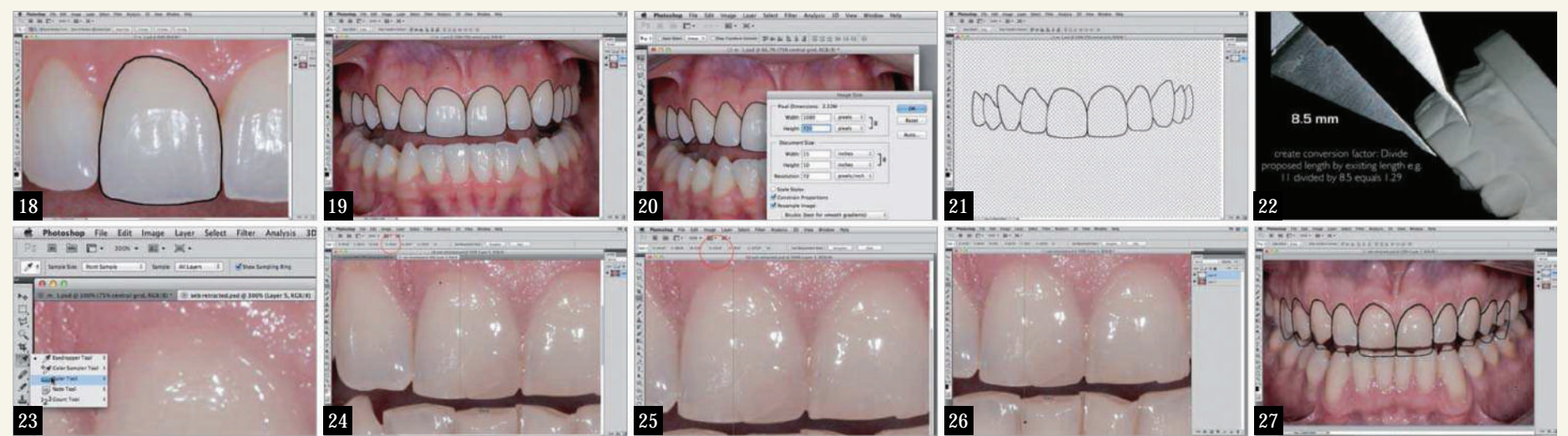


Fig. 18: Image of the central incisor with a two-pixel black stroke (tracing).—Fig. 19: Image of the teeth traced up to the second premolar to create a tooth grid.—Fig. 20: Size the image in Photoshop.—Fig. 21: Save the grid as a .png or .psd file type and name it appropriately. Create other dimension grids using the same technique.—Fig. 22: To determine the digital tooth size, a conversion factor is created by dividing the proposed length by the existing length of the tooth.—Fig. 23: Select the ruler tool in Photoshop.—Fig. 24: Measure the digital length of the central incisor using the ruler tool.—Fig. 25: Measure the new digital length using the conversion factor created earlier.—Fig. 26: Create a new transparent layer and mark the new proposed length with the pencil tool.—Fig. 27: Open the image of the chosen tooth grid in Photoshop and drag the grid on to the image of teeth to be smile designed. This will create a new layer in the image to be smile designed.

smile, seeing no more than 2mm of gingiva when the patient is fully smiling is ideal<sup>6</sup>. Finally, the incisal line should come very close to and almost touch the lower lip, being no more than 2mm away<sup>2</sup>. These guidelines are somewhat subjective and should be used as a starting point for determining proper incisal edge position.

**Dentogingival aesthetics**

Gingival margin placement and the scalloped shape, in particular, are well discussed in the literature. As gingival heights are measured, heights relative to the central incisor, lateral incisor, and canine in an up/down/up relationship are considered aesthetic (Fig. 6). However, this may create a false perception that the lateral gingival line is incisal to the central incisor. Rather, in most aesthetic tooth relationships, the gingival line of the four incisors is approximately the same line (Fig. 6), with the lateral incisor perhaps being slightly incisal.<sup>[7]</sup> The gingival line should be relatively parallel to the horizon for the

being most important.

- The midline only should be moved restoratively up to the root of the adjacent tooth. If the midline is within 4mm of the centre of the face, it will be aesthetically pleasing.
- The midline should be vertical when the head is in the postural rest position

**Evaluating dental aesthetics**

Part of evaluating dental aesthetics for smile design is choosing tooth shapes for patients based on their facial characteristics (e.g., long and dolichocephalic, or squarish and brachycephalic). When patients present with a longer face, a more rectangular tooth within the aesthetic range is appropriate. For someone with a square face, a tooth with an 80% width-to-length ratio would be more appropriate. The width-to-length ratio most often discussed in the literature is between 75% and 80%, but aesthetic smiles could demonstrate ratios between 70% and 75% or between 80% and 85% (Figs. 8–10)<sup>1</sup>.

proportions. Natural portions demonstrate a lateral incisor between 60% and 70% of the width of the central incisor, and this is larger than the golden proportion<sup>11</sup>. However, a rule guiding proportions is that the canine and all teeth distal should be perceived to occupy less visual space (Fig. 12). Another rule to help maintain proportions throughout the arch is 1-2-3-4-5; the lateral incisor is two-thirds of the central incisor and the canine is four-fifths of the lateral incisor, with some latitude within those paces (Fig. 13). Finally, contact areas can be moved restoratively up to the root of the adjacent tooth. Beyond that, orthodontics is required (Fig. 14).

**Creating a digital smile designed in Photoshop**

Although there are digital smile design services available to dentists for a fee, it is possible to use Photoshop CS5 software (Adobe Systems) to create and demonstrate for patients the proposed smile design treatments. It starts by creating tooth grids—

of the teeth (Fig. 15). This transparent layer will enable the image to be outlined without the work being embedded into the image.

- Name the layer appropriately and, when prompted to identify your choice of fill, choose “no fill,” since the layer will be transparent, except for the tracing of the tooth grid.
- To begin tracing the tooth grid, activate a selection tool, move to the tool palette, and select either the polygonal lasso tool or the magnetic lasso tool. In the authors’ opinion, the polygonal works best. Once activated, zoom in (Fig. 16) and trace the teeth with the lasso tool.
- To create a pencil outline of the tooth, with the transparent layer active, click on the edit menu in the menu bar; in the edit drop-down menu, select “stroke”; choose black for colour, and select a twopixel stroke pencil line (Fig. 17), which will create a perfect tracing of your selection. Click “OK” to stroke the selection. Select (trace with the lasso selection tool) one tooth at



Fig. 28: Adjust the grid as required while maintaining proper proportions by using the free transform tool from the edit menu.—Fig. 29: Modify the grid shape as necessary using the liquify tool.—Fig. 30: Select all of the teeth in the grid by activating the magic wand selection tool and then clicking on each tooth with the grid layer activated (highlighted) in the layers palette.—Fig. 31: Use the selection modify tool to expand the selection to better fit the grid shape.—Fig. 32: Activate the layer of the teeth by clicking on it. Blue-coloured layers are active.—Fig. 33: With the layer of the teeth highlighted, choose “liquify”; a new window will appear with a red background called a “mask”.—Fig. 34: Shape one tooth at a time as needed by selecting “wand”.—Fig. 35: Once all of the teeth have been shaped, use the liquify tool.—Fig. 36: Tooth brightness is adjusted using commands from the dodge tool menu or image adjustments menu.—Fig. 37: Image of all the teeth whitened with the dodge tool.

central incisors and the lateral incisors and symmetric on each side of the midline<sup>2,8</sup>. The gingival contours (i.e., gingival scallop) should follow a radiating arch similar to the incisal line. The gingival scallop shapes the teeth and should be between 4mm and 5mm (Fig. 7)<sup>9</sup>.

Related to normal gingival form is midline placement. Although usually the first issue addressed in smile design, it is not as significant as tooth form, gingival form, tooth shape, or smile line.

Several rules can be applied when considering modifying the midline to create an aesthetic smile design:

- The midline only should be moved to establish an aesthetic intra- and inter-tooth relationship, with the two central incisors

The length of teeth also affects aesthetics. Maxillary central incisors average between 10mm and 11mm in length. According to Magne, the average length of an unworn maxillary central to the cemento-enamel junction is slightly over 11mm<sup>10</sup>. The aesthetic zone for central incisor length, according to the authors, is between 10.5mm and 12mm, with 11mm being a good starting point. Lateral incisors are between 1mm and a maximum of 2mm shorter than the central incisors, with the canines slightly shorter than the central incisors by between 0.5mm and 1mm (Fig. 11).

The inter-tooth relationship, or arch form, involves the golden proportion and position of tooth width. Although it is a good beginning, it does not reflect natural tooth

predesigned tooth templates in different width-to-length ratios (e.g., 75% central, 80% central) that can be incorporated into a custom smile design based on patient characteristics. You can create as many different tooth grids as you like with different tooth proportions in the aesthetic zone. Once completed, you will not have to do this step again, since you will save the created tooth grids and use them to create a new desired outline form for the desired teeth.

Follow these recommended steps:

- To begin creating a tooth grid, use a cheek-retracted image of an attractive smile as a basis (e.g., one with a 75% width-to-length ratio). Open the image in Photoshop and create a new clear transparent layer on top

a time and then stroke it (Fig. 18). Select and stroke (trace) the teeth up to the second premolar (the first molar is acceptable; Fig. 19).

- The image should be sized now for easy future use in a smile design. In the authors’ experience, it is best to adjust the size of the image to a height of 720 pixels (Fig. 20) by opening up the image size menu and selecting 720 pixels for the height. The width will adjust proportionately.
- At this time, the tooth grid tracing can be saved, without the image of the teeth, by double-clicking on the layer of the tooth image. A dialog box reading “new layer” will appear; click “OK.” This process unlocks the layer of the teeth so it can be

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