MiCD: Do no harm cosmetic dentistry

By Dr Sushil Koirala, Nepal

The demand for cosmetic dentistry is a growing trend globally. Increased media coverage, the availability of free online information and the improved economic status of the general public has led to a dramatic increase in patients’ aesthetic expectations, desires and demands. Today a glowing, healthy and vibrant smile is no longer the exclusive domain of the rich and famous; hence, many general practitioners are now being forced to incorporate various aesthetic and cosmetic dental treatment modalities into their daily practices to meet the growing demand of patients.

Cosmetic dentistry is a science-based art guided by the desire of the patient. Many young clinicians who plan to incorporate it into their practice are confused about what they and their patients actually wish to achieve.

The practice philosophy adopted by the clinic and the professional team members generally guides the overall output of the practice. Minimalist invasive cosmetic dentistry (MiCD) is a do no harm practice philosophy, with four fundamental components: level of care, quality of operator (dentist), protocol adopted and technology selected, which must all be respected in daily clinical practice. Adopting this holistic medical science practice philosophy is not an easy task, as it requires a change in the mindset of professionals.

In Parts I and II, I explain MiCD, do no harm cosmetic dentistry, based on my Vedic Smile concept, which I have been practising successfully in Nepal for the last 20 years, and advocating globally since 2009 as the MiCD global mission. It is to be noted that both parts are based on fundamental science (truth and available evidence), clinical experience and the common sense required in holistic dentistry.

**Cosmetic dentistry, a global trend**

The prevalence and severity of dental decay have been declining over the last decades in many developed countries and this trend is shifting towards developing countries as well. With increased media coverage, the availability of free online information, public awareness has fuelled the demand for cosmetic dentistry globally. Now, a glowing, healthy and vibrant smile is no longer the exclusive domain of the rich and famous! The population of beauty- and oral health-conscious people is increasing every year and data from various sources shows that the coming generations of children, especially from the middle-to higher-income population, will have fewer decayed teeth and will need less complex restorative dental care as they age.

These aggressive treatment modalities and philosophies are tending towards more-invasive procedures with an over- utilisation of full crowns, bridges, veneers and invasive periodontal aesthetic surgery, which is neglecting long-term health, actual aesthetic needs and the characteristics of the patient. These aggressive treatment modalities are indirectly degrading social trust in dentistry, owing to the trend of fulfilling the cosmetic demands of patients without ethical consideration and sufficient scientific background and promoting the “the more you replace, the more you earn” or “more is more” mindset in dentistry.

Changing the professional mindset of the practising clinicians is not an easy task, it is just like quitting smoking for a heavy smoker. In order to practice healthy dentistry, one must be groomed, starting from dental school education, with moral values, a high ethical standard, a positive attitude and a patient-centred practice philosophy. A student reflects the mindset of his or her teachers, and a teacher or mentor with comprehensive knowledge, clinical skills, honesty and humanity is difficult to find in today’s business-oriented dental education.

I believe that knowledge should be free and skill training must be useful and easily affordable to our young practising clinicians around the world. Compromised university dental education and expensive private skill training with biased mentoring have been promoting health-compromising treatment protocols and costly diagnostic, preventive and treatment technologies. These highly business-oriented trends will promote a change in the mindset of practising clinicians to adopt more-aggressive and invasive dental treatment modalities, leading to the practice of unhealthy dentistry in the long term.

**Aesthetic versus cosmetic dentistry**

The words “aesthetics” and “cosmetic” are viewed as synonyms by many cosmetic dentists. However, it is necessary to understand the core difference in meaning. The Oxford dictionary defines “aesthetics” as “the branch of philosophy which deals...
Cosmetic restorations with chemical tooth materials can be considered an aesthetic enhancement procedure when hard and soft tissue is not prepared during smile enhancement procedures.

In my clinical practice, I divide aesthetic and cosmetic clinical cases into three different categories:

1. Preventive, or support based: treatment prevents or intercepts the diseases, defects, habits and other factors that may adversely affect the existing or the future smile aesthetics of the patient.
2. Naturo-mimetic, or need based: treatment is carried out to restore or mimic the natural aesthetics, bearing the SRA factors of the patient in mind, and the treatment generally enhances the health and function of the oral tissue.
3. Cosmetic, or behaviour based: treatment is performed to enhance or supplement the aesthetic components of the smile; hence, the treatment outcome of cosmetic treatment may not be in harmony with the patient’s SRA factors as in nature mimetic dentistry, and cosmetic treatment may not necessarily be beneficial to the health and function of the oral tissue.

### Practice philosophy in dentistry: The mindset

The majority of dental schools around the world focus on teaching knowledge and skills in dental medicine that are based on contemporary dental science and art. Dental school education does not give due consideration to healthy dental practice philosophy or the professional ethics, attitudes and respect bearing the SRA factors of the patient in mind, and the treatment generally enhances the health and function of the oral tissue.

Cosmetic, or behaviour based: treatment is performed to enhance or supplement the aesthetic components of the smile; hence, the treatment outcome of cosmetic treatment may not be in harmony with the patient’s SRA factors as in nature mimetic dentistry, and cosmetic treatment may not necessarily be beneficial to the health and function of the oral tissue.

### Minimally invasive treatment: when hard and soft tissue is prepared at a superficial level during smile enhancement procedures

- Cosmetic contouring (tooth and/or gingiva)
- Cosmetic restoration with minimal tooth preparation, such as the use of lasers, micro-abrasion, partial crowns, and bridges.

<table>
<thead>
<tr>
<th>Treatment options</th>
<th>Treatment procedures</th>
<th>Biological cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-invasive treatment: when hard and soft tissue is not prepared during smile enhancement procedures</td>
<td>Smile exercise</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Approximation of white spots</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oral appliances and tooth guard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dentures and extractions of tissue</td>
<td></td>
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<tr>
<td></td>
<td>Gingival mask</td>
<td></td>
</tr>
<tr>
<td>Micro-invasive treatment: when hard and soft tissue is prepared at a shallow level during smile enhancement procedures</td>
<td>Cosmetic chemical treatment, such as bleaching and veneers</td>
<td>Very low</td>
</tr>
<tr>
<td></td>
<td>Restoration with chemical tooth materials, such as bonding, composite, tooth-whitening systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gingival mask</td>
<td></td>
</tr>
<tr>
<td>Minimally invasive treatment: when hard and soft tissue is prepared at a superficial level during smile enhancement procedures</td>
<td>Cosmetic contouring (tooth and/or gingiva)</td>
<td>Low</td>
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<td></td>
<td>Cosmetic restoration with minimal tooth preparation, such as the use of lasers, micro-abrasion, partial crowns, and bridges.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gingival mask</td>
<td></td>
</tr>
</tbody>
</table>

### Streamlined treatment when hard and soft tissue is prepared at a deeper level during smile enhancement procedures

- Tooth preparation for crowns, bridge abutments, high and deep restorations.
- Orthodontic treatment with tooth extractions.
- Implants.
- Antibacterial procedures, such as perio-therapy, oral hygiene, and surgical procedures.

Table: Treatment options, treatment procedures and biological cost in cosmetic dentistry.

<table>
<thead>
<tr>
<th>Summary a better</th>
<th>Follow early diagnosis, prevention and intervention approach</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Smile Design Wheel approach</th>
<th>Understand psychology, establish health, restore function and enhance aesthetics (P-Factors and the Smile Design Wheel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress harms</td>
<td>Select the most conservative treatment options and procedures to maximize the possible biological cost</td>
</tr>
<tr>
<td>Evidence-based selection</td>
<td>Select materials, tools, techniques and prosthetics based on objective evidence</td>
</tr>
<tr>
<td>Keep in touch</td>
<td>Encourage regular follow-up and maintenance</td>
</tr>
</tbody>
</table>

Table: MiCD core principles.

### Cosmetic News

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**Keep in touch**

- Encourage regular follow-up and maintenance
- Select the most conservative treatment options and procedures to maximize the possible biological cost
- Select materials, tools, techniques and prosthetics based on objective evidence

**Evidence-based selection**

- Select the most conservative treatment options and procedures to maximize the possible biological cost
- Select materials, tools, techniques and prosthetics based on objective evidence

**Keep in touch**

- Encourage regular follow-up and maintenance

mentioned below just by taking a deep breath and closing their eyes for few seconds and analysing their answers( the true response that comes to mind) with professional honesty and humanity (evaluating your conscience response positively to all the questions), then it is advisable for you to propose the treatment plan and take up the case. If you give negative responses to the questions, then you should rethink your proposed treatment since you and your patient's long-term health, function and aesthetics using a more sensible and less destructive approach.

The three-way test consists of three basic questions:
- Would I use this treatment for a member of my own family in this situation?
- Will the patient be happy with the biological, financial and time costs of the proposed treatment?

I have been using this simple test since I entered the dental profession and enjoy every moment of my clinical practice without any mental stress and I hope to do the same till the day I lay my dental hat. Moreover, I have found that the end-result of my case has always been appropriate to me and to my entire supporting team with high patient satisfaction. During all my MiCD workshops, training, seminars, always I encourage my trainees and audience to enhance the quality of our operator factors (knowledge, skills, honesty and humanity) because it is the pillar of successful MiCD. It is my personal belief that, a clinician adopts a habit of testing his or her treatment plan with the three-way test before proposing it to the patient, it certainly helps him or her to promote overall happiness in his or her practice with high patient satisfaction.

Extension: Invasive dentistry

If we look carefully at the history of restorative dentistry, the word ‘extension’ (or ‘invasive’) has always been a point of focus among clinicians. The concept of ‘extension for prevention and retention’ was pronounced by Dr G.V. Black 100 years ago and it is the fundamental principle to which the MiCD summary is based. In order to establish the macro-aesthetic components (shape and size) modification, this helps the clinician to achieve aesthetic smiles with micro-or minimally invasive procedures with very low biological cost.

- Brightness: tooth bleaching or colour modification in MiCD is carried out once teeth are in acceptable alignment but before the tooth form is modified. The level of tooth colour modification depends on the quality of the existing colour of the dentine and the patient’s desire. Home and office bleaching are popular methods for modifying tooth colour. However, in some cases, procedures such as remineralisation, micro-abrasion, walking bleach and thin enamel veneers are used.
- Contour: a contour is an outline of the shape or form of something. In dentistry, cosmetic contouring entails reshaping teeth or gingivae to an aesthetic form. Cosmetic contouring can be performed in two ways, additive and subtractive. Additive cosmetic contouring entails changing the tooth form using tooth-coloured restorative materials such as a resin composite (direct and indirect) or ceramic (veneers), and changing the gingival shape using graft materials. Subtractive cosmetic contouring entails removing dental tissue by grinding or texturizing, and gingival tissue by selective surgical procedures— which are irreversible in nature and so proper care must be taken.

Conclusion

In order to practise no harm cosmetic dentistry, a clinician requires the desire, passion, dedication and will power to become an honest professional with humanity because honesty and humanity are the pillars of do no harm cosmetic dentistry, since the mind controls all other practice factors. The clinician must understand that honesty and humanity are not scientific like knowledge and skills, which can be learned. In dentistry, cosmetic contouring is advised to establish the macro-aesthetic components, which are generally expressed as habits and attitudes. Therefore, we need to learn these qualities at dental school and from the profession and society.

Self-evaluation and the realisation of the level of inner happiness that you obtain through your daily professional work are vital for understanding and beginning to practice no harm cosmetic dentistry in your practice.

Editorial note: A complete list of references is available from the publisher.

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### MiCD summary ten

After completion of any MiCD clinical case, the patient’s overall satisfaction and the clinical success must be evaluated. In order to evaluate clinical cases comprehensively and practicably, a MiCD summary ten is advised to always summarise his or her cases under the ten areas listed in Table W as the MiCD summary ten.

#### Table W: The MiCD summary ten.

<table>
<thead>
<tr>
<th>Aesthetic components and smile design parameters.</th>
<th>Ten areas</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Smile Design Wheel</td>
<td>1. Smile Evaluation</td>
<td>Good</td>
</tr>
<tr>
<td>2. Smile HFA Grade</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>3. Aesthetic category</td>
<td>More</td>
<td></td>
</tr>
<tr>
<td>4. Treatment complexity</td>
<td>Simple</td>
<td></td>
</tr>
<tr>
<td>5. Proposed treatment</td>
<td>Accepted</td>
<td></td>
</tr>
<tr>
<td>6. Established outcome</td>
<td>Improved</td>
<td></td>
</tr>
<tr>
<td>7. Enhancement category</td>
<td>Preventive</td>
<td></td>
</tr>
<tr>
<td>8. Biological cost</td>
<td>New</td>
<td></td>
</tr>
<tr>
<td>9. Extremity</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>10. Clinical success</td>
<td>Good</td>
<td></td>
</tr>
</tbody>
</table>

#### Table III: Aesthetic components and smile design parameters.

**Cosmetic News**
**Smile analysis and photoshop smile design technique**

Prof. Edward A. McLaren & Lee Culp, USA

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 the colour and form 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.

Rufenacht delineated smile analysis into facial aesthetics, dentofacial aesthetics, and dental aesthetics, encompassing the macro- and micro-elements described in the first definition above. Further classification identifies five levels of aesthetics: facial, orofacial, oral, dentogingival, and dental (Tab. 1).²

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.³ During the macro-analysis, the balance of the facial thirds is examined (Fig. 3). If something appears unbalanced in any one of those zones, the face and/or smile will appear unesthetic. 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. 3), 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).

Fig. 16: The polygonal lasso tool is an effective way to select the teeth.

Table 1: Components of smile analysis and aesthetic design.

<table>
<thead>
<tr>
<th>Facial aesthetics</th>
<th>Total facial form and balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orofacial aesthetics</td>
<td>Maxillomandibular relationship to the face and the dental midline relationship to the face per-trim to the teeth, mouth and gingiva</td>
</tr>
<tr>
<td>Oral aesthetics</td>
<td>Labial, dental, gingival; the relationships of the lips to the arches, gingiva, and tooth</td>
</tr>
<tr>
<td>Dentogingival aesthetics</td>
<td>Relationship of the gingiva to the teeth collectively and individually</td>
</tr>
<tr>
<td>Dental aesthetics</td>
<td>Macro- and micro-aesthetics, both inter- and intra-tooth</td>
</tr>
</tbody>
</table>

For a detailed guide to微笑设计 and its practical application, refer to the accompanying video tutorial.

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 guide from the gingival scallop to the tip of the papilla is 4-5 mm. Fig. 8: Acceptable width-to-length ratios fall between 70% and 85%, with the ideal range between 80% and 85%. Fig. 9: An acceptable starting point for central incisors is 11 mm in length, with lateral incisors 1-2 mm shorter than the central incisors, and canines 0.5-1 mm shorter than the central incisors for an aesthetic smile display. Fig. 10: The canines and other teeth distally located are visually perceived as occupying less space in an aesthetically pleasing smile. Fig. 11: Acceptable width-to-length ratios fall between 70% and 85%, with the ideal range between 80% and 85%. 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 extensively 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 “oil” 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.
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Evaluating oral aesthetics

The dentolabial gingival relation, 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 is the face in the maxillary incisal edges 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 4.2:1—which refers to the amount of maxillary central dental display when the lips are at rest, the amount of gingival tissue revealed, and the gingival line of the four incisors is central to the incisal edge. Rather, in most aesthetic tooth relationships, the gingival line of the four incisors is approximately the same line (Fig. 6), with the lateral incisors perhaps being slightly incisal. The gingival line should be relatively parallel to the horizon for the central incisors and the lateral incisors, which are often in line with the canines. This incisal inclination is that the canine and all adjacent teeth should be perceived to occupy less visual space (Fig. 12). Another rule to help maintain proportions throughout the arch is 32-3-4-5; 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 spaces (Fig. 15). Finally, contact areas can be moved restoratively up to the root of the adjacent tooth. Beyond that, orthodontics is required (Fig. 14).

Creating a digitalsmile 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 proper smile design treatments. It starts by creating tooth grids—predesigned tooth templates in different width-to-length ratios (e.g., 7.5 % 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:

1. To begin creating a tooth grid, use a cheek retracted image of an attractive smile as a basis (e.g., one with a 7.5 % width-to-length ratio). Open the image in Photoshop and create a new, clear transparent layer on top of the tooth (Fig. 15). This transparent layer will enable the image to be outlined without the work being embedded into the image.

2. 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.

3. To begin tracing the tooth grid, activate a selection tool, move to the tool palette, and select either the polygonal lasso tool or the magic 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 activated, click on the lasso tool in the menu bar; in the edit drop-down menu, select “stroke”; choose black for colour, and select a two-pixel stroke pencilline (Fig. 17), which will create a perfect tracing of your selection. Click "OK" to stroke the selected teeth (trace with the lasso selection tool) one tooth at a time and then stroke (Fig. 18). Select and stroke (trace) the teeth in 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 author’s experience, it is best to size the image to 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 removed. Drag the layer of the teeth to the trash, leaving only the layer with the tracing of the teeth (Fig. 21). In the file menu, click “save as” and choose .png or .psd (Photoshop) as the file type. This will preserve the transparency. You do not want to save it as a JPEG, since this would create a white background around the tracing. Name the file appropriately (e.g., 75.S.W/L central).

By tracing several patient’s teeth that have tooth sizes and proportion in the aesthetic zone and saving them, you can create a library of tooth grids to custom design new teeth for your patients who require smile design.

The Photoshop smile design technique

The Photoshop Smile Design (PSD) technique can be done on any image and images can be combined to show the full face of the lower third with lips on or lips off. This article demonstrates how to perform the technique on the cheek-retracted view.

The first step in the PSD technique is to create a digital conversion of the actual tooth length and width, and then digitally determine the proposed new length and proportion of the teeth.

Determining digital tooth size

To determine digital tooth size, follow these steps:

1. Create a conversion factor by dividing the proposed length developed from the smile analysis by the existing length of the tooth.
2. The patient’s teeth can be measured in the mouth or on the cast (Fig. 22) if the length measures 8.5 mm but needs to be at 11 mm for an aesthetic smile, divide it by 8.5. The conversion factor equals 1.29, a 29% digital increase lengthwise.

3. Open the full arch cheek-retracted view in Photoshop, and zoom in on the central incisor.
4. Select the eyedropper palette.
5. A new menu will appear. Select the ruler tool (Fig. 23).
6. Click and drag the ruler tool from the top to the bottom of the tooth to generate a vertical number, in this case 170 pixels (Fig. 24). Multiply the number of pixels by the conversion factor. In this case, 170 x 1.29 = 215.9 pixels; 215.9 pixels is digitally equivalent to 1 mm (Fig. 25). Determine the digital tooth width using the same formula.
7. Create a new layer, leave it transparent, and mark the measurement with the pencil tool (Fig. 26).

Applying a new proposed tooth form

Next, follow these steps:

1. After performing the smile analysis and digital measurements, choose a custom tooth grid appropriate to the patient. Select a tooth grid based on the width-to-length ratio of the planned teeth (e.g., 80/150 or 80/65/R). Open the image of the chosen tooth grid in Photoshop and drag the grid onto the image of the teeth to be smile-designed (Fig. 27).
2. If the shape or length is deemed inappropriate, press the command button (control button for PC) and “z” to delete and select a suitable choice.
3. Depending on the original image size, the tooth grid may be proportionally too big or too small. To enlarge or shrink the tooth grid created (with the layer activated), press command (or control) and “z” to bring up the free transform function. While holding the shift key (holding the shift key allows you to transform the object proportionately), click and drag a corner left or right to expand or contract the custom tooth grid.
4. Adjust the size of the grid so that the outlines of the central incisors have the new proposed length. Move the grid as necessary using the move tool so that the incisal edge of the tooth grid lines up with the new proposed length (Fig. 28).
5. Areas of the grid can be individually altered using the liquidity tool (Fig. 29).

Digitally creating new aesthetic teeth

Next, follow these suggested steps:

1. With the new tooth grid layer and the magic wand tool both activated, click on each tooth to select all of the teeth in the grid (Fig. 30).
2. Expand the selection by two pixels at the border of the menu, click “select modify > expand” and “F9” (Fig. 31). Note that the selection better approximates the grid. You can expand the selection or contract as necessary using the same menu.
3. Activate the layer of the teeth (cheek-retracted view) by clicking on it (Fig. 32).
4. Next, activate the liquidity filter (you will see a red mask around the shapes of the proposed teeth). The mask creates a digital limit that the teeth cannot be altered beyond. This is similar to creating a mask with tape for painting a shape (Fig. 33).
5. Use the forward warp tool by clicking on an area of the existing tooth and dragging to mold/shape the tooth into the shape of the new proposed outline form (Fig. 34).

Repeat this for each tooth. If you make a mistake or do not like something, click command (or control) and “z” to go back to the previous edit (Fig. 35).

Adjusting tooth brightness

The following steps are recommended next:

1. Select the whitening tool (dodge tool) to brighten the teeth. In the dodge tool palate, click on “midtones” and set the exposure to approximately 20. Click on the areas of the tooth you want brightened (Figs. 36 & 37).
2. Alternatively, with the teeth selected, you can use the brightness adjustment in the brightness/contrast menu, click “image > adjustments > brightness/contrast.”

Performing the changes on only one side of the mouth allows the patient to compare the new smile design to his/her original teeth before agreeing to treatment.

Creat a copy
To save the information you have created for presentation to the patient, follow these tips:
1. Go to “file” and select “save as.”
2. When the menu appears, click on the “copy” box.
3. Name the file at that step.
4. Save it as a JPEG file type.
5. Signature where you want it saved.
6. Click “save.”

A file of the current state of the image will be created in the designated area. You can now continue working on the image and save again at any point you want.

Conclusion
Knowledge of smile design, coupled with new and innovative dental technologies, allows dentists to diagnose, plan, create, and deliver aesthetically pleasing new smiles. Simultaneously, digital dentistry is enabling dentists to provide what patients demand: quick, comfortable, and predictable dental restorations that satisfy their aesthetic needs.
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