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 growing, 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 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. It is to be noted that the treatment modalities of any health care service should be aimed at the establishment of health and the conservation of the human body with its natural function and aesthetics. However, it is worrying to note that the treatment philosophy and the characteristics of the patient 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. Minimally invasive dental care (MiCD) is a do no harm practice philosophy, has 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 scientific sense (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 will bring about a major shift in the nature of dental services from traditional restorative care to cosmetic and preventive services.

The increased market demand for smile aesthetics among patients is forcing general practitioners of today to incorporate the art and science of cosmetic dentistry into their practice. Cosmetic dentistry is not yet recognised as a separate clinical specialty, like orthodontics, periodontics or paediatric dentistry. Cosmetic dentistry is synonymous with multidisciplinary dentistry, as its success and failure are related to the patient’s psychology, health, function and aesthetics. Ethical, high-standard cosmetic dentistry skill training of clinicians is essential for the increased global market of cosmetic dentistry and its promotion. It is widely seen that the treatment modalities of contemporary cosmetic dentistry are tending towards more invasive procedures with an over-utilisation of full crowns, bridges, veneers, and invasive periodontal and aesthetic surgery, while 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 an anxiety task. In order to practise 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 practitioners 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. This highly business-oriented trend 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...
with questions of beauty and artistic taste” and “cosmetic” as “improving only the appearances of something.”

In dentistry, “aesthetics” explains the fundamental taste of a person concerning beauty, whereas “cosmetic” deals with the superficial or external enhancement of beauty. Therefore, aesthetic dentistry falls under need-based dental service, and is generally guided by the sex, race and age (SSRA factors) of the patient. However, cosmetic dentistry, which is influenced by perception, personality and desires (PFD factors), can be categorised as want or demand-based dental service. For example, a patient’s request to replace old amalgam restorations with tooth-coloured restorative materials can be considered an aesthetic requirement or demand. The request of an old woman for pearly white teeth and the ideal smile design is far more than an aesthetic requirement, and must be considered a cosmetic demand or requirement.

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 tissues.
3. Cosmetic, or demand 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 naturo-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, and enhancement of beauty. Therefore, dentistry deals with the superficial or external enhancement of dental practice in the global market. However, quality and healthy clinical practice is always a dream of a good clinician, and establishing such practice requires an unbiased vision, learning and serving attitudes, and dedication from the dentist. Wernant understood that science and art in dentistry have no meaning if practised by an unethical operator, who does not respect science in dentistry.

**Ethical operator:**

Dr. Ravi Koirala, a professional with a firm philosophy and knowledge of the patient's long-term health, function and aesthetics, practices dental procedures that do not harm the patient.

Clinicians practising no harm dentistry are generally cheerful, happy and healthy in their professional life.

**Non-invasive treatment:**

When hard and soft tissue are predicted at a superficial level during similar enhancement procedures.

- Smile exercise
- Teeth whitening
- Gingival reshaping

**Micro-invasive treatment:**

When hard and soft tissue are prepared at a superstructural level during similar enhancement procedures.

- Cosmetic chemical treatment such as chemical teeth whitening and bleaching
- Orthodontic treatment with tooth extraction
- Partial dentures and inlay bridges

**Minimally invasive treatment:**

When hard and soft tissue are prepared at a superstructural level during similar enhancement procedures.

- Cosmetic contouring treatment with or without gingiva
- Cosmetic restorations with minimal soft tissue preparation, such as laser treatments, fixed and removable prosthetics, partial dentures, and bridges
- Micro-invasive treatments such as direct bonding, ultra-thin veneers, adhesive pontics and overlays

**Smile Design Wheel approach**

A clinician has the right to adopt the practice philosophy that he or she prefers. However, it is always advisable to apply oneself to understanding, analysing and comparing this philosophy with others. I am very fortunate to have been brought up with the Vedic philosophy of the law of nature and the first, do no harm, and the second, prudence, which ensures that I live in harmony with the laws of life at home, school and in my society. The spiritual guidance and mentorship I received at an early age at home and school helped me to become a professional with a firm philosophy of do no harm, hence, I started practising, consciousness-based dentistry early in my career. During my 23 years of professional practice, I have experienced happiness and joy with high patient satisfaction, which has given me complete confidence and faith in my practice philosophy and the MiCD treatment protocol that I apply in my practice.

**Evidence-based selection**

I apply a simple yet very powerful test to keep myself stress and guilt-free and within the boundaries of professional ethics. The test is easy and very effective. The test ensures that I do not harm the patient with my treatment plan to my patient. Clinicians can apply the three-way test.
mentioned below just by taking a deep breath and closing their eyes for a few minutes and analysing their answers (the true response that comes to mind) with professional honesty and humility (using your correct responses positively to all the questions, then it is advisable for you to pro-
pose the treatment plan and take up the case if you give negative re-
sponses to the questions, then you should rethink your proposed treat-
ment plan to safeguard your and your patient’s long-term health, function and aesthetics using a more sensitive 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?
- Am I competent enough to take up the case?
- Will the patient be happy with the biological, financial and time costs of the proposed treatment?

I have been using this simple test since my early days of practice and enjoying every moment of my clinical practice without any mental stress and without any fear of doing harm to my guilt. Moreover, I have found that the end-result of my cases has always brought happiness to me and to my entire supporting team with high patient satisfaction. During all my MiCD clinical experiences, training workshops and seminars, I always encourage my trainees and audience to enhance the quality of their 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 can certainly help 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.18 The concept of “extension for prevention and retention” was pronounced by Dr G.V. Black 100 years ago and it was developed as a change in the restoration materials available at that time. However, with the development of porcelain-fused-to-metal technology in the late 1950s, the concept of “extension for functional aesthetics” was advocated, which is still very popular in clinical practice. The MiCD concept and treatment protocols are non-invasive, predictable, biocompatible, restorative, and safe to the patient’s desire, passion, dedication and skills, which can be learned, copied and applied immediately in the practice. Honesty and humanity are the inner qualities of a person and are deeply related to the level of a person’s consciousness, which are generally expressed as habits and attitudes. Therefore, we need to adopt these qualities in our school and from the profession and society.

**MiCD treatment protocol and clinical technique**

Minimally invasive dentistry was developed over a decade ago by restorative experts and founded on sound evidence-based principles.19,20 In dentistry, it has focused mainly on prevention, remineralisation and minimal dental intervention in caries management and not given sufficient attention to other oral health problems. For this reason, I developed the MiCD concept and its treatment protocol in 2002. I have integrated the evidence-based minimally invasive philosophy into aesthetic dentistry in the hope that it will help practitioners achieve optimum results in terms of health, function and aesthetics with minimum intervention treatment and optimum patient satisfaction. The MiCD concept and treatment protocol are non-invasive, predictable, biocompatible and restorative (MiCD protocols are non-invasive, predictable, biocompatible, restorative, and safe to the patient’s desire, passion, dedication and skills, which can be learned, copied and applied immediately in the practice. Honesty and humanity are the inner qualities of a person and are deeply related to the level of a person’s consciousness, which are generally expressed as habits and attitudes. Therefore, we need to adopt these qualities in our school and from the profession and society)

**Conclusion**

In order to practice in 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 aesthetic and functional humani-

**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 practi-

cably, a comprehensive evaluation is advised to always summarise his or her cases under the ten areas listed in Table 7A, which is the MiCD summary ten.

Table 7A: MiCD treatment plan summary

<table>
<thead>
<tr>
<th>Table 7A MiCD treatment summaryten</th>
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<tbody>
<tr>
<td><strong>Aesthetic components</strong></td>
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<tr>
<td>Macro aesthetics: dental materials are used or the tooth form and color is modified to achieve a beautiful smile and overall facial symmetry and attractiveness</td>
</tr>
<tr>
<td>Micro aesthetics: the tooth form and color is modified to achieve a beautiful smile and overall facial symmetry and attractiveness</td>
</tr>
<tr>
<td><strong>Smile design parameters</strong></td>
</tr>
<tr>
<td>Clinical success: excellent, good, satisfactory, needs improvement</td>
</tr>
</tbody>
</table>
| Rehabilitation: rehabilitation is a process of replacing missing dental tissue and correcting alignment, rotation, vet-

<table>
<thead>
<tr>
<th><strong>Cosmetic News</strong></th>
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<tr>
<td><strong>New materials and</strong></td>
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<td><strong>Treatments in</strong></td>
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<td><strong>Cosmetic</strong></td>
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<td><strong>Dentistry</strong></td>
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**Editorial note:** A complete list of references is available from the publisher.

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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-esthetics 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.1

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

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, sagittal) facilitate this analysis.

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 pertaining 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 teeth</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>

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 line 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 4.5–5 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 1 mm in length, with lateral incisors 1–2 mm shorter than the central incisors, and canines 1–1½ mm shorter than the central incisors. —Fig. 10: The canines and other teeth distally located are usually perceived as occupying less space in an aesthetically pleasing smile.—Fig. 11: 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. 12: If feasible, the contact area can be extensively moved up to the root of the adjacent tooth.—Fig. 13: 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. 14: The polygonal lasso tool is an effective way to select the teeth.—Fig. 15: Click “fill” 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. 16: Click “fill” 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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Come very close to and almost touch the lower lip, being no more than 2 mm away. 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 from the center of the incisal edge, lateral incisors, and canines in an up/down/up relationship are considered esthetically pleasing. However, this may create a false perception that the 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).

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 intertooth relationship, with the two central incisors being most important.
- The midline only should be moved restoratively up to the root of the adjacent tooth if the midline is within 4 mm of the center 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, square and brachycephalic). When patients present 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%. However, aesthetic smiles could demonstrate proportions outside this range. Natural proportions demonstrate a lateral incisor between 60% and 70% of the width of the central incisor, and this is larger than the golden proportion.1 However, a rule guiding aesthetics does not reflect natural tooth proportions.11 However, a rule guiding aesthetics is slightly over 11 mm.10 The aesthetic zone for the central incisors is between 10.5 mm and 12 mm, with 11 mm being a good starting point. Lateral incisors are between 11 mm and a maximum of 2 mm shorter than the central incisors, with the canines slightly shorter than the central incisors by between 0.5 mm and 1 mm (Fig. 11).

The intertooth 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 proportions. Natural proportions demonstrate a lateral incisor between 60% and 70% of the width of the central incisor, and this is larger than the golden proportion. However, a rule guiding aesthetics does not reflect natural tooth proportions.11 However, a rule guiding aesthetics is slightly over 11 mm.10 The aesthetic zone for the central incisors is between 10.5 mm and 12 mm, with 11 mm being a good starting point. Lateral incisors are between 11 mm and a maximum of 2 mm shorter than the central incisors, with the canines slightly shorter than the central incisors by between 0.5 mm and 1 mm (Fig. 11).

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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 two-pixel stroke pen/tile (Fig. 17) which will create a perfect tracing of your selection. Click "OK" to stroke the selected tracing/trace with the lasso selection tool one tooth at a time and then stroked (Fig. 18). Select and stroke (trace) the teeth 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 have 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. Adobebox 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 "*.jpg" or "*.psd" (Photoshop) as the file type. This selection will preserve the transparency. You will want to save it as a JPEG file type. In the file menu, click "file" and select "save as". Save it as a JPEG file type, which will preserve the transparency. 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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