followed by the development of approach3 and Carisolv® in the 1990s.

The major components of MI dentistry currently focus on prevention, re-mineralisation and minimal dental intervention in the management of dental cartoon lesions. It has failed to give the necessary attention to the problems that negatively affect smile aesthetics, for example non-cartious dental lesions, or developmental defects and malocclusion.

The treatment modalities of contemporary cosmetic dentistry are trending towards more invasive procedures with an over-utilisation of crowns, bridges, thick full veneers, and invasive periodontal aesthetic surgeries, while neglecting long-term oral health, actual aesthetic needs and the characteristics of the patient.

• Social trust in dentistry is degrading, owing to the trend of fulfilling the cosmetic demands of patients without ethical consideration and sufficient scientific background (the more you replace, the more you earn; more is more mentality).

In this article, I introduce a concept and TP for minimally invasive cosmetic dentistry (MICD), in order to address these facts properly and integrate the evidence-based MI philosophy and its application into aesthetic dentistry.

Defining MICD

As the perception of aesthetics and beauty is extremely subjective and largely influenced by personal beliefs, trends, fashion, and input from the media, a universally applicable definition is not available. Hence, smile aesthetics is a multifactorial issue that needs to be adequately addressed during aesthetic treatment. MICD deals both with subjective and objective issues. Therefore, in this article I define MICD as “a holistic approach that explores the smile defects and aesthetic desires of a patient at an early stage and treats them using the least intervention options in diagnosis and treatment technology by considering the psychology, health, function and aesthetics of the patient”.

The core MICD principles are:

1. application of the sooner-the-better approach and exploration of the patient’s smile defects and aesthetics desires at an early stage in order to minimise invasive treatments in the future;
2. smile design in consideration of the psychology, health, function and aesthetics (Smile Design Wheel®) of the patient;
3. adoption of the do-no-harm strategy in the selection of treatment procedures and the maximum possible preservation of healthy oral tissues;
4. selection of dental materials and equipment that support MI treatment options in an evidence-based approach;
5. encouragement of the keep-in-touch relationship with the patient to facilitate regular maintenance, timely repair and strict evaluation of the aesthetic work performed.

The main MICD benefits include:

1. promotion of health, function and aesthetics of the oral tissues and positive impact on the quality of life of the patient;
2. preservation of sound tooth structures (banking the tooth structure), while achieving the desired aesthetic result;
3. reduction of treatment fear and increased patient confidence;
4. promotion of trust and enhancement of professional image.

The MICD treatment protocol

In my experience, the TPs that are currently in use in aesthetic dentistry are mostly based on more invasive and minimally invasive techniques and procedures. With the use of such protocols, cosmetic dentistry is popular, and often, unknowingly, heading towards the over-utilisation of invasive
AD

jective perception) of the patient. Various types of questions, personal interviews and visual aids can be used as supporting tools. In this step, the practitioner should ask the patient to complete the MICD self-smile-evaluation form. The information obtained will help estimate the perceived smile aesthetic score (a-score) and will be used as the base-line data in the evaluation step.

Next, diseases, force elements and aesthetic defects of the smile are explored. Information on the medical and dental history, general health and specific health (oral-facial) of the patient is collected and complete oral and periodontal charting is performed. In order to understand the forces, elements, the existing occlusion, comfort, muscu-

lar activity, speech and phonetics are thoroughly examined with the evaluation of para-functional and other oral habits, comfort during mastication and deglutition, and temporomandibular joints (TMJ) movements. The necessary diagnostic tests, photographic documentation and the diagnostic study models are prepared during this step for the further exploration of existing diseases, force elements and aesthetic defects.

In the subsequent step, the data collected is guided to evaluation to the accepted normal values of a patient’s sex, race and age (SRA) fac-
tors. The aesthetic components of the smile are analysed in detail grouped into macro- and other dental tissues. (dental: central dominance, teeth propor-

tion, symmetry, buccal corridor, display zone, smile index and lip line) and micro-aesthetics (dental: incisal edge, axial inclination, incisal embrasure, tongue and dental joint). The practitioner can now grade the smile in terms of the patient’s health, function and aesthetics as follows:

- **Grade A**: The established parameters of oral health, function and aesthetic components are within normal limits and aesthetic enhancement is required only to fulfill the patient’s cosmetic desires.
- **Grade B**: The established parameters of oral health and function are within normal limits; however, the aesthetic parameters are below the accepted level. Aesthetic enhancement is required to improve the aesthetic parameters.
- **Grade C**: The established parameters of oral health and function or both are below the normal limits. An establishment treatment is mandatory prior to aesthetic enhancement.

From the above, the practitioner will obtain a smile aesthetic grading in terms of the patient’s health, func-
tion and aesthetics, as well as a complete overview over the smile aesthetic problems and solutions (macro- and micro-smile defects).

The patient’s PHA factors are the four fundamental components of aesthetic dentistry and must be respected to achieve healthy, harmonious and beautiful smiles. The design step depends on the information obtained from explora-
tion and analysis. The information on psychology is subjective in nature; however, health, function and aesthetic analysis provides the objective information that will guide the design with the various established and basic principles of smile aesthetics and also the feas-
ible and practical extent of the aesthetic desires of the patient. The aesthetic make-up, manual tracing, digital makeover and smile cata-
logs are some of the popular tools used in this step. A new smile, alter-
native designs, types of treatments involved, complexity, possible risk factors and limitations, treatment limitation, and alternative courses should be established during this step.

With the aid of this simple grading system, any practitioner can determine the complexity of the treatment involved for the accom-
plishment of a new smile design for an individual patient and can plan for the necessary multidisciplinary support.

The last step of this phase is the most important in MICD TP because in this step the patient is presented with an image of his or her future smile. Visual aids, such as a smile catalogues, aesthetic mock-ups, manual sketches, mod-
ified digital pictures, computer-designed makeovers or animations can be used as presentation tools. The results of the design step are systematically presented to the patient with professional honesty and ethics. All pertinent queries of the patient related to the proposed smile need to be addressed during presentation. The treatment com-
plexity, its implementation, the risks involved, possible complications, treatment cost estimation and maintenance responsibility must properly be explained to the pa-
tient. The patient is thus involved in finalising the treatment plan and gives written consent form before proceeding to Phase II.

Phase II: Achieve

As per the TP, which is finalised during the presentation step, all necessary preventive interceptive and orthodontic treatments are conducted in order to establish the proper health and

For easy application, the aesthetic treatments in MICD are cate-
gorised as follows:

- **Type I**: Micro-aesthetic compo-


- **Type II**: Mini-aesthetic compo-


- **Type III**: Macro-aesthetic compo-


- **Type IV**: Cosmetic alterations

As the treatment modality de-

pends on the clinical feasibility and experience of the practitioner, simple and practical methods are used to categorise the MICD treatment com-

plexity:

- **Grade I**: Treatment that may re-

quire consultation with a special-

ist (preventive, simple oral sur-

gery/endo/periodontics/implants, short orthodontics);
- **Grade II**: Treatment that requires the procedural involvement of other dental specialists (complex endodontics/periodontics/ortho-

odontics) but not oral and maxillo-

facial surgery or plastic surgery;
- **Grade III**: Treatment that requires the procedural involvement of oral and maxillofacial surgery or plastic surgery.
Nothing else is Sensodyne

✓ Established expertise in dentin hypersensitivity
  • Continuous development of dentin hypersensitivity solutions since its launch as the first desensitizing toothpaste providing both sensitivity relief and caries protection\(^1\)
  • Strong scientific evidence in the field of dentin hypersensitivity\(^2\)\(^{-}3\)\(^6\)
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✓ Proven to provide your patients with significant relief from the pain of sensitive teeth
  • Proven in publications\(^2\)\(^{-}11\) and confirmed by patients\(^2\)

✓ Specifically developed to provide the right care for your patients
  • Proven to relieve the pain of dentin hypersensitivity\(^2\)\(^{-}11\)
  • Provides ongoing and effective pain relief with continued use\(^2\)\(^{-}11\)
  • Low abrasion\(^12\) to minimize damage to exposed dentin\(^1\)\(^{-}3\)\(^{-}14\)
  • Protects against caries\(^3\)\(^8\)\(^{39}\) and strengthens tooth enamel\(^3\)\(^8\)\(^{41}\)
  • Offers a range of variants to encourage patient compliance

Number 1 patient preferred desensitizing toothpaste brand\(^{42}\)
14 Trends & Applications

Fig. 3a. Smile after establishment of contact.

Fig. 3b. Smiling with aesthetic enhancement with non-invasive veneers treatment.

Fig. 4a. Gummy smile with lack of upper central dominance.

Fig. 4b. Harmonised smile with proper central dominance. Treated with MI approach.

Self-Sealing Sterilization Pouches

Available in different sizes:

<table>
<thead>
<tr>
<th>Pouch Size</th>
<th>Inner Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>76 mm x 254 mm</td>
<td>49 mm x 120 mm</td>
</tr>
<tr>
<td>83 mm x 259 mm</td>
<td>62 mm x 120 mm</td>
</tr>
<tr>
<td>89 mm x 254 mm</td>
<td>63 mm x 200 mm</td>
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<tr>
<td>97 mm x 310 mm</td>
<td>70 mm x 70 mm</td>
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<tr>
<td>114 mm x 240 mm</td>
<td>77 mm x 220 mm</td>
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<tr>
<td>110 mm x 235 mm</td>
<td>77 mm x 235 mm</td>
</tr>
<tr>
<td>224 mm x 381 mm</td>
<td>224 mm x 381 mm</td>
</tr>
<tr>
<td>265 mm x 467 mm</td>
<td>265 mm x 370 mm</td>
</tr>
</tbody>
</table>

- Special value with self-seal pouches and easy open thumb hole.
- The difference with built-in color coding indicators, along with punch resistant blue tape, see-through plastic, providing visual confidence that sterilization is achieved and maintained.
- The pouch can maintain 2°C below 160 days under room temperature normal storage condition.

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Table 1: MICD treatment options

<table>
<thead>
<tr>
<th>Ntreatment options</th>
<th>MI treatment options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile training</td>
<td>Micro- and macro-abrasion</td>
</tr>
<tr>
<td>Tooth whitening</td>
<td>Selective contouring (gums/teeth)</td>
</tr>
<tr>
<td>Re-mineralisation of white spots</td>
<td>Direct restorations with minimal tooth preparation</td>
</tr>
<tr>
<td>Short orthodontics (sectional)</td>
<td>Minimal Preparation</td>
</tr>
<tr>
<td>Adhesive Brackets</td>
<td>Adhesive Brackets</td>
</tr>
<tr>
<td>Non-preparation veneers</td>
<td>Non-preparation veneers</td>
</tr>
<tr>
<td>Enamel augmentation</td>
<td>Enamel augmentation</td>
</tr>
<tr>
<td>Oral appliances</td>
<td>Oral appliances</td>
</tr>
</tbody>
</table>

Table 2: Non-invasive treatment options

- Patient factors: regular maintenance status, compliance issues and attitude of the patient towards aesthetic treatment;
- Product factors: bio-compatibility, mechanical and aesthetic quality of the products used for the treatment;
- Protocol factors: severity of the condition, predictability and its evidence-based nature;
- Professional factors: existing knowledge and skills, and attitude towards developing these.

Detailed clinical documentation of the case during maintenance and evaluation can provide various cues to the practitioner in the evaluation of his or her clinical success in terms of case planning, material and protocol selection, as well as his or her existing restorative skills. I believe that a thorough evaluation can support any practitioner in initiating practice-based research and keeping up-to-date with the recent trend of evidence-based dentistry (Figs. 4a–5b).

MIDC treatment modalities

Various types of treatment modalities are available in MIDC. Their effective use depends mainly on the level of smile defects, type of smile design, proposed treatment type and the treatment completion complexity. There is one only principle in selecting treatment modalities in MIDC: always select the least invasive procedure as the choice of the treatment.

The two categories of MIDC treatment are N and M treatment (Table 1). However, conventional invasive treatment modalities may also be required, depending on the complexity of the case.

Conclusion

Mr. Koirala was developed over a decade ago by restorative experts and founded on sound evidence-based principles. In dentistry, it has focused mainly on prevention, re-mineralisation and minimal dental intervention in carries management and not given sufficient attention to other oral health problems. I believe that the MI philosophy should be the mantra adopted comprehensively in every field of the dentistry. For this reason, I have explained the MIDC concept and its TP, which integrates the evidence-based MI philosophy into aesthetic dentistry, in the hope that it will help practitioners achieve optimum results in terms of health, function and aesthetics with minimum treatment intervention and optimum patient satisfaction.

Acknowledgements

In formulating the MIDC TP, I discussed the concept with several national and international colleagues in order to ensure that it is simple, practical and comprehensible. I would like to extend my gratitude to Dr Akira Senda (Japan), Dr Dieter Denti (Switzerland), Dr Hishio Hisamitsu (Japan), Dr Oliver Hendegard (Singapore), Dr Dinos Koumandras (Greece), Dr Mahi L. Singh (USA), Dr Bruchich Kondo (Japan), Dr So-Ran Kwon (Korea), Dr Prakash Bhushal (India), Dr Vijayanarayanan Vijayakumar (Sri Lanka), as well as Dr Shubh R. Adhikari, Dr Rabindra Man Shrestha, Dr Binod Acharya and Dr Dinesh Bhusal of Nepal, for their valuable comments, advice and feedback.

Editorial note: A complete list of references and the MIDC forms are available from the publisher.

Contact Info