Increased media coverage and the availability of free web-based information have led to heightened public awareness and thus 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 and most general practitioners are forced to incorporate various aesthetic treatment modalities in their daily practice to meet this growing demand.

The treatment modalities of any health-care service are aimed at the establishment of health and the conservation of the human body with its natural function and aesthetics. The concept of minimally invasive (MI) treatment was initially introduced in the medical field and was adapted in dentistry in the early 1970s with the application of dentistry, a universally applicable concept and treatment protocol for general practice.

Minimally invasive cosmetic dentistry
A concept and treatment protocol for general practice

Dr Sushil Koirala
Nepal

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In my experience, the TP’s that are currently in use in aesthetic dentistry are mostly based on more invasive techniques and procedures. With the use of such protocols, cosmetic dentists are knowingly, or unknowingly, heading towards the over-utilisation of invasive methods. Therefore, in this article I define MICO 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 MICO principles are:
1. application of the sooner-the-better approach and exploration of the patient’s smile defects and aesthetic 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 MICO 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 time and increased patient confidence;
4. promotion of trust and enhancement of professional image.

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health and specific health (oral-facial) of the patient is collected and complete dental and periodontal charting is performed. In order to understand the force elements, the existing occlusion, comfort, musculature, 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 following step, the data collected is guided to revelation to the accepted normal values of a patient's sex, race and age (SRA) factors. The aesthetic components of the smile are analysed in detail grouped into macro- (facial and dental midline relation, facial profile, symmetry of the facial thirds and hemi-faces), mini- (vitality of upper anterior teeth, smile arc, smile symmetry, buccal corridor, display zone, smile index and lip line) and micro-aesthetics (dental: central dominance, teeth proportion, axial inclination, incisal embrasure, contour, gingival margin, radiographic position, shape, profile, texture; maxillofacial: symmetry of the facial thirds and hemi-faces). 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 aesthetics 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 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, function and aesthetics, as well as complete overview over the smile aesthetic problems and solutions (macro-, mini- and micro-smile defects).

The patient's PHFA 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 exploration 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 feasible and practical extent of the aesthetic desires of the patient. The aesthetic mock-up, manual tracing, digital makeover and smile catalogues are some of the popular tools used in this step. A new smile, alternative designs, types of treatments involved, complexity, possible risk factors and complications, treatment limitation, and tentative costs should be established during this step.

For easy application, the aesthetic treatments in MICD are categorised as follows:

- Type I: Micro-aesthetic components;
- Type II: Mini-aesthetic components;
- Type III: Macro-aesthetic components.

The aesthetic treatments in MICD are designed to achieve new aesthetic desires. The patient with professional honesty and ethics, should be fully satisfied with the results of the establishment treatment plan and its implementation.

The enhancement step of MICD is focused on the fulfillment of the patient's aesthetic desires, which can be grouped into two categories based on the patient's needs and wants. Even though it is sometimes difficult to draw a clear line between the two and their related treatment, in MICD they are considered as follows:

- needs objective restorative needs of the patient in harmony with

With the aim of this simple grading system, any practitioner can determine the complete and final treatment involved for the accomplishment 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 catalogue, aesthetic mock-ups, manual sketches, digitalized 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 presentation complexity, limitations, the risks involved, possible complications, treatment cost estimation and maintenance responsibility must properly be explained to the patient.

The patient is thus involved in finalising the treatment plan and can be grouped into two categories based on the patient's needs and wants. Even though it is sometimes difficult to draw a clear line between the two and their related treatment, in MICD they are considered as follows:

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  - Strong scientific evidence in the field of dentin hypersensitivity
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  - Proven to relieve the pain of dentin hypersensitivity
  - Provides ongoing and effective pain relief with continued use
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  - Offers a range of variants to encourage patient compliance

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the SRA factors and the emphasis on oral tissues (nature-mimetic smile enhancement) wants subjective desires of the patient, which may not lie in harmony with the SRA factors (cosmetic smile enhancement).

During any want-based aesthetic treatment, where healthy oral tissue is treated with no direct benefit to health or function, the treatment modalities should be within the scope of non-invasive (NI) or MI procedures. The patient’s cosmetic desires alone should not be the rational for the treatment. Do no harm! should always be the credo pertinent to all dental treatment procedures.

Evaluation is the final step of MICD TP. Any ‘completed’ treatment without a proper evaluation is considered incomplete in MICD protocol. The following components need to be evaluated:

- Global patient satisfaction: After receiving aesthetic dental treatment, the patient is requested to complete the MICD exit form, in which the patient evaluates his or her new smile, gives a second perceived smile aesthetic score (b-score), and indicates his or her global satisfaction score. The b-score is compared with the previous a-score. This process helps determine the patient’s actual satisfaction status. In MICD, this is the main parameter for evaluating a patient’s aesthetic satisfaction.

- Clinical success: Clinical success is a multifactorial issue. Selection of proper cases (the patient), restorative materials, TP’s and their correct and skilled application are the key factors for clinical success. Therefore, MICD TP suggests self-evaluation of the following four factors (4Ps) using the MICD clinical evaluation form.

- Patient factors: Regular maintenance status, compliance and attitude of the patient towards aesthetic treatment;
- Product factors: Biocompatibility, mechanical and aesthetic quality of the products used for the treatment;
- Protocol factors: Treatment plan and terms of its simplicity, predictability and its evidence-based nature;
- Process factors: 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 evaluation and optimum patient satisfaction.

Acknowledgements

In formulating the MICD TP, I discussed the concept with several national and international colleagues in order to ensure that it is simple, practical and comprehensible.

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