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Editorial

Esthetic prosthodontic treatment – The state-of-the-art



A significant advancement in providing esthetic prosthodontic treatment in Japan using CAD/CAM manufactured hybrid resin fixed restorations for premolars has occurred as a result of the 2014 decision of the Japanese health insurance system to cover this type of care. There is no doubt that the application of digital technology in esthetic prosthodontic treatment will evolve continuously in keeping with a greater emphasis on esthetics while simultaneously ensuring harmony with periodontal tissues. The Japan Prosthodontic Society is obligated to support the evolution of esthetic prosthodontic treatment from both an academic perspective as well as from a clinical perspective to ensure that proper prosthetic techniques are endorsed to the dental field. In this way, the oral health and quality of life of the Japanese people can be enhanced.

With this background, and for the purpose of exchanging and sharing the latest information regarding cutting-edge technology in esthetic prosthodontic treatment as well as to discuss pertinent scientific evidence, top-ranking clinical prosthodontists and dental technicians of our country who are vigorously leading this field gathered together and the first clinical meeting of Japan Prosthodontic Society “Prosthodontics ‘14” was held in Tokyo Medical and Dental University on December 6–7 in 2014 (the president of the meeting: Prof. Shunsuke Minakuchi). The meeting was separated into four parts as shown (Table 1). Every speaker presented an array of clinical patient treatments with long-term observation periods and every presentation was evidence-based. Impressively, many speakers mentioned white and pink esthetic scores [1,2] and the importance of their use. A patient should be routinely evaluated using these two scoring systems before starting esthetic prosthodontic treatment because both scores provide the clinician with useful information for treatment planning and they can effectively identify a patient’s esthetic concerns [3].

Symposium 1 “Pretreatment for esthetic prosthesis – Management of attachment level and harmony in cervical line” was planned to identify and elucidate the general goals of esthetic prosthodontic treatment and how pretreatment should be performed to successfully realize the patient’s goals. Since esthetic beauty of the smile and circum-oral presentation greatly affect a patient’s quality of life (QOL), a dentist should always try to offer an esthetically-pleasing

prosthesis. This symposium demonstrated that definitive general goals of esthetic prosthodontic treatment still do not exist because the standards of beauty are different among individuals and change over time. However, the following consensus regarding the goals was built among the speakers: (1) ‘function’ and ‘esthetics’ of prosthesis are not mutually exclusive but compatible with each other; (2) esthetics includes not only ‘white esthetics’ but also ‘pink esthetics’ and, importantly, the latter can contribute to the long-term stability of an esthetic prosthesis. There are three factors for determining white and pink esthetics, namely position, volume, and discoloration.

Position refers to the positional issues of tooth and implant. The tooth should be located at a proper position and an implant in the anterior region should be placed more lingually compared with the position of tooth root in order to preserve labial alveolar bone and avoid gingival recession after implant placement. Volume refers to the morphology and amount of soft and hard tissues around a tooth or implant. In order to achieve optimal pink esthetics, both a scallop shape of the gingiva and adequate level of alveolar bone are necessary and soft tissues should be supported by alveolar bone. If esthetic cervical lines are inadequate, augmentation or reduction of soft and hard tissues should be considered. There are a wide variety of pre-prosthetic strategies to manage the cervical lines including orthodontic treatment, gingivectomy, clinical crown lengthening with bone reduction, connective tissue grafting, guided bone regeneration and use of an ovate pontic. A patient’s native gingival biotype, the width of keratinized gingiva, and the biological width expected after placement of prostheses must be considered when selecting the appropriate pre-prosthetic strategy. Discoloration refers to the color of crowns, bridges or superstructures. Although successful resolution of concerns about discoloration mainly depends upon the dental technician’s skills, bleaching or whitening of teeth occasionally may dissolve some patient concerns about discoloration.

Symposium 2 “Preservation and regeneration of alveolar ridge including connective tissue grafting” was planned to clarify the clinical indications and importance of preserving or

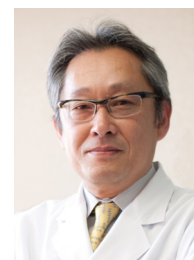


Table 1 – The schedule of “Prosthodontics ‘14’”.**Symposium 1**

“Pretreatment for esthetic prosthesis – Management of attachment level and harmony in cervical line”

Chairpersons: Takuo Kuboki (Okayama University),

Hidehiko Suzuki (Kansai Branch)

Speakers: Yuichi Ishida (Tokushima University), Yohei Sato

(Tsurumi University), Tomonori Waki (Tokyo Branch),

Morihiro Miyamae (Kansai Branch)

Symposium 2

“Preservation and regeneration of alveolar ridge including connective tissue grafting”

Chairpersons: Ryuji Hosokawa (Kyushu Dental University),

Yasunori Ayukawa (Kyushu University)

Speakers: Hiroyuki Kibayashi (Kansai Branch), Akihiro Yamasaki

(Chugoku-Shikoku Branch), Chihiro Masaki (Kyushu Dental

University), Tokuo Matsui (Kiwakai Ginza Perio Implant Center)

Symposium 3

“Configuration of crown contour and finish line, and management of black triangle including implant prosthesis”

Chairpersons: Takashi Sawase (Nagasaki University), Yohei Satou

(Tsurumi University)

Speakers: Yoshihiko Mutobe (Kansai Branch), Tatsuaki Matsunaga

(Kyushu Branch), Keisuke Ihara (Tsurumi University)

Symposium 4

“Development of esthetic materials and technique using CAD/CAM systems”

Chairpersons: Yoshiyuki Hagiwara (Nihon University),

Kenji Maekawa (Okayama University)

Speakers: Takafumi Otani (University of Washington), Kazuhiko

Tsuchiya (Kyushu Branch), Katsuichiro Maruo (Kanagawa

Dental College), Yoshimi Nishimura (Kansai Branch, Dental

Creation Art), Shinpei Tanaka (Showa University)

regenerating the alveolar ridge and to describe techniques for ridge preservation and augmentation. As alveolar bone is resorbed after tooth extraction, the volume of the alveolar ridge decreases and the shape of the ridge becomes concave. The abnormal volume and shape of the alveolar ridge may hinder fabrication of a prosthesis with a sufficiently high level of esthetics to satisfy the patient. Therefore, recovering an ideal or normal soft tissue morphology of the affected region prior to implant or pontic placement is desirable. Strategies for ridge augmentation include free gingival grafting, connective tissue grafting and guided-bone regeneration. With regard to connective tissue grafting, several techniques such as the pouch or the roll method have been introduced. These strategies are useful to augment the alveolar ridge and, in particular, the connective tissue graft is an essential treatment option to improve a patient’s pink esthetic score. If the shape of the alveolar ridge would be successfully recovered by any ridge augmentation technique, use of an ovate pontic or modified ovate pontic could be effective in providing superior esthetic results. In addition to ridge augmentation techniques, ridge preservation techniques were also discussed [4]. Although several successful clinical patient treatments involving socket preservation using hydroxyapatite particles or other bone substitution materials immediately after tooth extraction or ridge preservation using immediate loading implants were presented in the symposium, it is still unclear whether these strategies are effective in maintenance of the alveolar ridge over the long-term. It is important for successful

esthetic prosthodontic treatment that a prosthodontist considers what kind of prosthodontic intervention should be selected before extracting teeth and also discusses with the patient the benefits and risks of reconstructing soft and hard tissues.

Symposium 3 “Configuration of crown contour and finish line, and management of black triangle including implant prosthesis” was planned to elucidate optimal crown contour and to determine the best position of a finish line and how to manage the “black triangle” from the standpoint of achieving an esthetically-pleasing crown or bridge or implant restoration.

Regarding the configuration of crown contour, the following conclusive answers were obtained during the symposium: (1) in order to prevent gingival recession, the subgingival crown contour on the labial side should be made straight or slightly concave so that the thickness of soft tissue can be secured; (2) when the gingival papilla is incomplete, the subgingival crown contour on the mesial and distal sides should be made convex to add slight pressure against the gingival papilla to increase its height; (3) the cervical line of the gingiva can be controlled to some degree by changing the subgingival crown contour. An adequate thickness of soft tissue on the labial side can assist in preventing or retarding gingival recession in the case of both implant restorations and crowns and bridges. However, if the cervical line of the gingiva is too high compared with that of a reference tooth, conversely, a convex crown contour should be created in order to decrease the level of the soft-tissue margin. The convex subgingival configuration of crown contour on the mesial and distal sides is advantageous because it increases the height of gingival papillae. Provisional restorations may be used to test different crown contours in an iterative manner to determine an ideal configuration of gingiva and harmony in the cervical line of the gingiva. When a satisfactory esthetic and functional result for a patient is obtained and confirmed by the clinician regarding the esthetics and function of the provisional restoration, it is recommended to convey the restoration contour to the dental technician by means of a pick-up impression of the re-contoured provisional restoration.

Regarding finish line location, fundamentally-speaking, it should be placed supragingivally. However, it is usually placed subgingivally to meet esthetic demands of the patient. Furthermore, it is recommended to place finish lines at a similar position to the gingival scallop of the same kind of tooth on the contralateral side. Regarding depth, it is recommended to place finish lines 0.5–1.5 mm and 1.5–2.0 mm subgingivally for tooth and implant restorations, respectively.

When the interdental papilla is absent, a black triangle results. Since the presence of black triangle greatly impairs esthetics, its management is a major challenge for prosthodontists. Although there are many elements which influence the maintenance and reconstruction of interdental papillae such as the morphology of the tooth crown, biotype of gingiva, or distance between tooth roots, the most important element is the position of the alveolar bone crest. The distance between the proximal contact point and the alveolar crest should be less than approximately 5 mm (3.5–6.5 mm depending on the tooth, pontic or implant indication). If the distance exceeds

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