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Esthetics In Compelete Denture – A Review

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Abstract: *Dentalesthetic managementconsist ofcreative and subjective components design to create illusion of beauty. Denture esthetics does not begin and end with selection of denture teeth, factors such as impression technique, occlusal plane, vertical dimension, and centric relation also significantly affect denture esthetics. The dentist must think through esthetic guidelines to achieve esthetics for complete denture.*

Keywords: *Denture Esthetics, Complete Denture, Facial Esthetics*

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I. Introduction

Esthetics is Greek word "aisthetikos", means perceptive. It pertains to the sense of the beautiful or the science which deduces from nature and taste the rules and principles of art[1]. The term esthetics was coined in 1950 the term in later years was related to the fine arts as the theory of beauty. Webster's third new international dictionary defines "esthetics" as appreciative of, responsive to, or zealous about the beautiful, having a sense of beauty or fine culture. According to glossary of prosthodontics esthetics is defined as pertaining to the study of beauty and the sense of beautiful[2].

In 17th century London's Peter de la Roche was believed to be one of the first 'operators for the teeth', men who publicized themselves as specialists in dental work. In 1728, Pierre Fauchard described the construction of dentures using a metal frame.

Patient evaluation is the first step to be carried out in treating a patient. Jamieson stated that "fitting the personality of the aged patient is often more difficult than fitting the denture to the mouth"[3]. Burns noted that "the psychological concept of self and body image is totally involved in esthetics"

Frush observes, "A smile can be attractive, a prime asset to person's appearance, and it can be powerful factor in the ego and desirable life experience of human being. It cannot be treated with indifference because of its deep emotional significance[6].

II. Esthetic Principles

An understanding of perceptual principles can eliminate mistake in the realm of esthetics[4]. The sins in the field of denture esthetics are of two types:

1. The sin against the principle of visual perception.
2. The sin against the principle of reality.

The relationship between objects made visible by contrasts is called composition. In dentistry we use this terminology in dental composition, dentofacial composition, and facial composition[5.] Unity means "one-ness". Unity is the ordering of the parts of a composition to give the individual total effect of the 'whole'. Unity exist in two types: static unity and dynamic unity. Any element which tends to unify a composition is a cohesive force. Segregating forces are opposite to cohesive forces.Dominance exists when a strong centralized structure is surrounded by well demarcated, characterized structured. In dentistry, two types of dominance areevident: individual or segmental. Dr. Max Wertheimer initiated the Gestalt theory of psychology in Germany around 1912. The Gestalt theory implies that the mind organises the outside world so that it can come to terms with it. This involves creating meaning, stability, balance and security[6]. These concepts allow the observer to achieve a better object-background relationship by encapsulating the following four constituents: proximity,similarity, continuityand closure.

III. Structural Esthetic Components

Facial components:

Frontal view: The frontal view of the patient permitssuitable identification of the reference guides that are vital in the esthetic treatment planning. The basic shape of the face when viewed from the frontal aspect can be one of the following: square, tapering, square tapering and ovoid. The interpupillary line passes through the

centre of the eyes. This should be parallel with the horizontal line and perpendicular to the midline of the face. The midline line is aessential vertical reference line. It not only locates the position of the facial midline but also defines the direction of the midline. It is mark out by joining the glabella, the tip of the nose, the philtrum and the tip of the chin. As a rule, the midline is perpendicular to the interpupillary line. The philtrum of the lip is one of the most accurate of anatomical guide posts. It is always in the centre of the face except in surgical, accident or cleft cases.

Lateral view: In the lateral view, the patient's head is held erect with the eyes gazing towards the horizon. This position gets the Frankfort plane to an angle of 8 degrees with the horizontal plane, which is termed the esthetic plane.

Dentolabial Considerations:

The ideal incisal curve when observed in the frontal view is a convex curve that trails the natural concavity of the lower lip during smiling. David Sarver referred to this as the incisal arc[7]. The incisal profile is the position of the incisal edges in the anteroposterior direction. It must be placed within the confines of the inner border of the lower lip[7]. Smile Line is an imaginary line drawn along the incisal edges of the maxillary anterior teeth. Tjan and Dong divided smile lines into low, average and high smile line[7]

Dental Considerations:

The three main components of a colour are its hue, intensity, and value. Huerefers to the characteristics of a colour that give it its identity and differentiate itfrom other colours. Intensity refers to how much of the actual pigment is in the colour being described. If the colour has a strong concentration of hue pigment, it is a strong colour.Value describes the lightness or darkness of a colour[8]. Axial inclination compares the vertical alignment of maxillary teeth, visible in the smile line, to central vertical midline. Axial inclination can also refer to the degree of tipping in any plane of reference[8].

Tooth dimension**:** Correct dental proportion is related to facial morphology and is essential in creating an esthetically pleasing smile. The width to length ratio of the centrals should be approximately 4:5 (0.8–1.0); a range for their width of 75–80% of their length is most acceptable. Numerousguiding principle for establishing correct proportions in an esthetically pleasing smile are:Golden proportion (Lombardi), Recurring esthetic dental proportions (Ward), M proportions (Methot) and Chu's esthetic gauges.

Phonetics:Phonetics is a function that is created by the relationship between the teeth, lips and the tongue, and it can be considerably compromised by insufficient restorations. Pronunciation of the sound of m, e, f/v, and s can be a valuedsupport in recognizing some of the functional and esthetic limitations to be monitored when creating the prosthetic treatment plan[15]. They can give useful indications for establishing both appropriate tooth position and length, as well as for determining a suitable vertical dimension of occlusion[9].

Gingival health - The gingiva acts as the frame for the teeth, thus the final esthetic success of the case is greatly affected by the gingival health.

IV. Anatomic And Physiologic Factors

Dentures defines the appearance of the lower one-third of the face in edentulous patients. The lips must be supported correctly if normaltone of the orbicularis oris muscle is to be reestablished.Insufficient or unnecessary support of the lips effects thephiltrum, nasolabial, and mentolabial folds, alteringnatural lip contours. Supporting the facial musculature with properly formed denture borders is necessary. Thickness of labial flange of both dentures is accomplished at the impression phase of treatment, so that the esthetics as well as retention and stability are important goals. Overextension of these borders gives the patient the appearance of having a cotton roll under the lip[8]. Compensate for alveolar bone loss at the impression phase of treatment is a major objectives in denture esthetics, followed by contouring occlusion rims properly for adequate support of the musculature and to facilitate placement of teeth. And finally establish or re-establish the correct vertical dimension of occlusion to reestablish physiologic muscle length and eliminate a prognathiclooks.

V. Dentogenic Concept

Introduced by Frush and Fisher in 1955. "Dentogenic" is a coined word meant to convey, in reference to prosthetic dentistry, exactly the same a meaning as the suffix – genic imports to photograph in the word "photogenic".Dentogenic means the art, practice, and techniques used to achieve that esthetic goal in dentistry[4]. Factors of dentogenic concept – Sex, Personality and Age

Interpretation of Sex Factor: The roundness, smoothness and softness are typical for women. The feeling of softness is characteristic of femininity. A schema of the masculine form illustrates the cuboidal, hard, muscular, vigorous appearance which are typical of men. Masculinity expresses aggressiveness, boldness, hardness, strength, action, and forcefulness[10].

Interpretation of Personality Factor[11]: The three division of the personality are-

1) Delicate-meaning fragile, frail, the opposite of robust
2) Medium pleasing-meaning normal, moderately robust, healthy and of intelligent appearance

3) Vigorous - opposite of delicate, hard and aggressive in appearance, muscular type.

Interpretation of Age[12]:

The interincisal distance increases with age therefore the mandibular teeth become more visible. Teeth abrade with age. The wearing away of the natural teeth at the contact points creates spaces between the teeth. The migration of teeth also creates spaces. Gingival tissues recede with age. Selecting a long tooth, contouring the wax and positioning the tooth properly can reproduce this recession.

VI. Selection Of Teeth

Artificial selection of teeth includes –

1. Anterior teeth selection.
2. Posterior teeth selection.

Methods used for selecting anterior teeth are[8]–

Pre-extraction records: Diagnostic casts of patient's natural teeth or restored teeth prior to extraction,recent photographs of the patient and radiograph of teeth can be used.

Post extraction examination: If the patient is edentulous and was wearing complete dentures, examine the patient with the denture.

Use of golden proportion: Lombardi was the first to propose the application of the golden proportion in dentistry. The ratio can be can be established between the width of central and lateral incisor and continue this ratio in the placement of the remaining teeth and spaces.

Snow has supported the use of the 'golden proportion' as a means of applying the golden proportion across the midline to encompass the total canine-canine width. The golden proportion has been applied to the canine- canine width to become the "golden percentage":10%:15%:25%:25%:15%:10%.

RED proportion: Recurrent Esthetic Dental proportion was proposed by Ward states that the proportion of the successive widths of the maxillary teeth as viewed from the front should remain constant as we move posteriorly from midline which offers great flexibility to match tooth properties with facial proportion. Generally the values of the RED proportion used are between 60% to 50%.

Chu's esthetic scale: Chu's esthetic gauges also called proportion gauge enables an objective mathematical appraisal of tooth size rangers in a visual format for the clinician

Seven anatomic entities are used as guides to select the size of the anterior teeth[8].

Size of the face: The size of the upper central incisor tooth should be in harmony with the face size. Large faces require large teeth, and small faces small teeth for best esthetic values.The average width of the maxillary central incisor is estimated to be one sixteenth of the width of the face measured between the zygoma. The lateral incisors vary more in size, form, & position than any other maxillary anterior tooth. The combined width of the six maxillary anteriors is slightly less than one third of the bizygomatic width of the face[8]

Size of the maxillary arch: Accurately contoured occlusion rims are required. The measurements are made from the midline on the maxillary occlusion rim to the distal of the cuspid eminence. Mold selector can be used to make measurement of maxillary cast.

Incisive papilla and canine eminence:If the eminences are discernible, a line can be placed on the cast at the distal termination of the eminence. If the eminences are not discernible, the attachments of the buccalfrenum can be used. A line placed slightly anterior to the frenum attachment will be distal to the eminence.

Maxillomandibular relationship: Accurately articulated casts with the jaws in centric relation are necessary for the satisfactory determination of maxillomandibular relations, since patients can shift the mandible and compensate for some of the malrelations[13].

Contour of the residual ridge:The artificial teeth should be positioned to follow the contour of the residual ridges that existed when the natural teeth were present.

Vertical distance between the ridges: The length of the teeth is determined by the existing space between the ridges. When the space is available, it is more esthetically suitable to use a tooth long enough to remove the display of the denture base. Denture bases can be characterized, personalized, or natural appearing[8].

The lips: When the lips are relaxed and distant, the labial surfaces of the maxillary anterior teeth support the upper lip. In speech, the incisal edges of the maxillary anterior teeth contact the lower lip at the junction of the moist and dry surfaces of the vermillion border.

Nasal Width as a Guide:Boucher and Hoffman et al. referred to the nasal index as a guide to select the anterior teeth as it relates the inter alar width to the space available for setting the anterior teeth. Mavroskoufis and G.M. Ritchie gave a formula for the selection of the mesiodistal width of the anterior artificial teeth (A = N + 7 mm) where N is the nasal width[14].Abdullah in 2002 has proposed a formula to calculate the width of the central incisor from the inner canthal distance[15]. The ICD was found to be greater than the combined width of

maxillary central incisors. Thus the ICD was multiplied by 0.618. The resultant product was then divided by 2 to obtain the width of a single central incisor[15].

FCIW = ICD/ 2 9 0.618.

Facial profile:To determine the facial profile, observe the relative straightness or curvature. The facial profile is determined by three points**:** The forehead, base of the nose and prominent point of the chin.Based on these three points the profile can be: Straight, Convex or Concave.

POSTERIOR TEETH SELECTION:
Factors for selecting posterior teeth:
Size of The Teeth**:**Following factors for selecting the size of the teeth[16]

1. Buccolingual width of posterior teeth
2. Mesiodistal length of posterior teeth
3. Occlusogingival (vertical) height of the facial surfaces of posterior teeth

Occlusal form[16]**:** The steep 33° buccolingual inclines of lower anatomic teeth modifies by grinding to 20° or modified anatomic teeth of this angulation are used for patients with strong, well- formed ridges.
Form of the Teeth[16]**:**Artificial posterior teeth are available in two forms –Anatomic teeth and Non anatomic teeth
Selection of Material for Artificial Teeth: The following are the types of artificial teeth[16] - Acrylic, Porcelain, Composite resin teeth, artificial teeth with metal occlusal, Radio opaque artificial teeth.

VII. Characterisation Of Complete Dentures

"Denture characterization is alteration of the form and color of the denture base and teeth to produce a more realistic appearance[2]." Hardy stated that, "To meet the esthetic needs of the denture patient, we should make the (denture) teeth look like (the patient's) natural teeth." Frush and Fisher state that "the environment of the teeth is as important as the tooth itself".

The four factors involved in fabricating real life-like dentures are –

1. Selection of anterior teeth with respect to size, form, colour, and arrangement of anterior teeth to suit the patient's need.
2. Characterising the denture teeth
3. Creating accurate denture base contour
4. Matching the denture base colour to the patient's oral tissues.

The characterisation of denture is still more critical when patient has short upper lips, single arch complete denture is given opposing a dentulous or partially dentulous arch and in implant supported prosthesis[17]. The method can aid in communication include – Good quality photograph, colour mapping chart, shade guides and wax characterisation

Complete denture can be characterized by two basic methods -

1. Characterization by selection, arrangement and modification of artificial teeth: The teeth can be altered to match with the patient's age, sex, and personality to offer subjective unity. Fisher said that gender, personality, and age can be used as guiding principle for tooth selection, arrangement, and characterization to improve the natural appearance of the individual.
2. Characterization of the denture bases: Pound in 1951 incorporated the racial and individual colour peculiarities of the gingiva in artificial denture. Kemnitzer used a mixture of blue and brown stain to replicate the melanotic pigmentation of the gingiva[18].

Stippling: Lynn C. Dirksen defined stippling a technique which provides an inexpensive means of obtaining more natural lookingbuccal and labial contours for complete dentures. Suresh Nayar and Nicholas W. Craik had specified that gingival stippling is a characteristic of the healthy attached gingiva. Replicating gingival texture and contours contributes to the natural appearance of labial flanges in complete dentures by producingirregular reflection of light
Colouring the Denture Base: Usually heat curing or auto-polymerizing resins of various shades or colors are painted on the denture base or are shifted on to the mold during denture construction to obtain a tinted denture. Most widely used tints today are the various pigments, which are placed with in the original mold chamber, so they do not affect contours[19]Additional shades aside from the standard Kayon Tints can be mixed from earth color pigments which enable the dentist to match virtually any color of gingival tissue. Most widely used tints are the Kayon dental stains or tinting resins. One Kayon Kit contains five shades[20]

Soft tissue shade guide: The soft tissue shade guide is used to select a denture base material. Using this similar shade guide, other tissue colors and unusual characteristics, i.e., blotches of melanin, are also recorded on the denture tinting chart.

Light cured gum shading[20]**:** It consists of micro filled composite resin, can be applied in multi-layered technique and can delivers unlimited possibilities for gingival reproduction.

VIII. Conclusion

Payne writes that "teeth should be placed where they grew". Martone has stated that, "The key to esthetics lies in asymmetry." Esthetic dental treatment consist of artistic and subjective components design to generate illusion of beauty. An organized systemic approached is required to evaluate, diagnose and resolve esthetic problems. Our goal as a dentist is to attain a pleasing smile by preparation of various esthetic elements. Esthetic principles include divine proportion, symmetry, colours, unity and harmony and the gestalt principle.

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