

Aesthetic Characterization of Complete Denture – A Review

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ABSTRACT:

Complete denture patients primarily, prioritize the normal life-like, aesthetic appearances of their dentures over the features of form and function. Different characterization techniques using pigments, tints, and fibres for denture bases, and altering the shape, and placement of the corresponding teeth help to fabricate a more aesthetically pleasing prosthesis which can enhance the patient's quality of life. Therefore, this review has expounded on the basic principles and techniques of modification of complete denture bases and teeth to characterize complete dentures to enhance patient satisfaction.

Keywords: Complete denture, Characterization, Aesthetics

INTRODUCTION:

Complete denture prosthesis aims to restore function and form for edentulous patients concerning mastication, phonetics, and esthetics¹. Worldwide, edentulousness afflicts about 7% population above the age group of sixty-five years and India accounts for more than ninety percent of this population^{2,3}. Historically, in the eighteenth century, most denture bases were made with porcelain and they concentrated on aesthetics more than function². In the later years, the theory of *dentogenic* perception took center stage and it illustrated the ideologies of the importance of age, sex, and personality to be incorporated in the characterization of complete denture construction⁴. A complete denture patient suffers not only from psychological aspects of fear, anxiety, and depression over adapting to the new prosthesis but also from issues of mastication, aesthetics, and phonetics⁵. Thus, dentists must try and characterize the form of complete dentures in terms of facial aesthetics to suit the patients' needs, aspirations, and quality of life in terms of speech and appearance of the denture^{1,3}.

The term "*Denture Characterization*" means to modify the form and colour of the denture bases and teeth to impart a life-like appearance to the denture bases and the teeth⁴, without deviating from principles related to function elaborated in the dental curriculum⁶. This can be achieved using various modification techniques to alter the arrangement of teeth and making physical amendments to the contour and colour of the denture

bases using tints to give it an illusion of natural oral structures³.

OBJECTIVE OF THE STUDY:

This review aims to highlight the various techniques to improve the complete denture with their advantages and limitations to enhance the patient's quality of life in terms of function and aesthetics.

MATERIALS AND METHODS:

This literature review has incorporated English language articles sourced from PubMed and Google Scholar electronic databases from 1956 till date and is limited to "*Characterization of Denture Bases and Teeth*". The abstract and full texts of the articles specifically included in the review concentrated on the various techniques to improve the aesthetic characterization of denture bases and teeth.

LITERATURE REVIEW:

Characterization for denture aesthetics should not be random alteration of the denture bases and the corresponding teeth but principles of vertical dimension, occlusal plane, centric occlusion, and centric relation are also important to maintain retention and stability of the dentures in the mouth⁷. Therefore, before embarking on this journey the following guidelines have to be taken into consideration which includes: *facial aspects of characterization; smile line; aesthetic and functional placement of teeth; phonetics; triad of gender, personality, and age; tooth*

selection, and characterization of the denture bases and teeth⁷. They are explained as follows:

Facial Aspects of Characterization: This includes observing the shape of the face in the frontal view (round, square, tapering); the position of the interpupillary line and midline of the face to see if they are perpendicular, and the lateral view (Frankfort plane or aesthetic plane should be 8 degrees to the horizontal plane).

The smile line is classified as *low, average, and high* based on the incisal edge of the maxillary central incisor and its relation to the inner border of the lower lip. The idyllic incisal curve should be convex about the concavity of the lower lip when viewed from the frontal aspect⁷.

Aesthetic and Functional Placement of Teeth:

Colour consideration is based on the principles of hue, intensity, and value. *Hue* is the actual colour and is differentiated into the strong and weak concentrations of its pigmentation- i.e., the *intensity* of the colour, and value is darkness or lightness of the colour⁷.

Phonetics:

In denture patients refer to the appropriate pronunciation of syllables such as *m, v, f, v* based on the relationship of the position and shape of the teeth to the tongue and lips⁷.

Triad of Gender, Personality, and Age while Considering the Ketogenic Aspect of Denture Characterization:

Gender refers to the feminine (round smooth, and soft) and masculine (hard, cuboidal, muscular) features of the face. *Personality* includes fragile, moderately

robust, and robust with an aggressive or muscular appearance. The features of *age* signify, for example, that the mandibular teeth are more visible; teeth have more of incisal and vertical abrasion with the development of spaces⁷.

Tooth Selection:

Anterior Teeth:

can be selected using pre-extraction records like photographs and diagnostic casts if any or post-extraction records like previous dentures. The *functional placement* of the teeth is constructed on the axial inclination of the maxillary anterior teeth concerning the midline and smile line. Correspondingly, an aesthetically attractive smile depends upon the *golden proportion* delineated as the width of the anterior teeth to their respective lengths should be 4:5 i.e., 75 to 80 percent of their length⁷.

Posterior Teeth:

are carefully chosen based on their buccolingual, mesiodistal, and occuso-gingival length of the teeth. They can be anatomic or non-anatomic⁷.

Characterization of Denture bases and teeth:

Denture bases and teeth need to be characterized appropriately in patients with- a higher upper lip line; a prominent pre-maxilla; celebrities active on social media, and for psychological benefits in denture-wearing patients⁸ as the contemporary polished surfaces of the acrylic denture gives an illusion of being false and this can be accomplished by various methods. (See Tables 1&2).

Table 1: Characterizations of Denture Bases

Reference. No.	Author/ (year)	Characterization Techniques	Advantages	Limitations
1	Nanda et al / (2016)	<ul style="list-style-type: none"> • Incorporation of Midline diastema in the maxillary teeth • Sticking dental jewelry to the canine with light cure cyanoacrylate • Labial lipping or the addition of an additional 2mm acrylic to the borders of the denture bases to increase the fullness of the lips and cheeks • Palatal recontouring to improve speech 	Harmonious prosthesis according to the patients' needs enhances their quality of care	-
5	Pachiou et al/ (2023)	<ul style="list-style-type: none"> • Incorporation of buccal corridors for an esthetic and attractive smile • Use of composite 	-	-

		<p>resin and different extrinsic colour pigments for attached, cervical, and mucosal gingiva to give it an illusion of natural mucosa</p>		
8,9	Ravi Kumar et al/ (2014); Srivastava and Choukse/ (2011)	<ul style="list-style-type: none"> • Tin foil rugae pattern • Festooning of the gingival margins using a sponge on hot wax • Illusion of stippling for attached gingiva for uneven refraction of light using the following techniques: sponge, toothbrush, blow wax technique, and offset bur • Alveolar eminences over the roots to be enhanced for natural effects, especially in the canine areas • Coloring agents like water- soluble and ester- soluble dyes; organic or inorganic pigments • Use purple and Brown tints for melanin pigmentation • Post-polishing light cured micro filled composite gum tints can be used for gingival reproduction 	Mimics natural oral structures	<ul style="list-style-type: none"> • Difficult to predict the results of staining at the outset • Shading with pigments is difficult on the gingival papilla and cuff • Stains can be lost while polishing the dentures
10	Neelkantan and Dhaded/ (2016)	<ul style="list-style-type: none"> • Use of auto-polymerizing clear resin using sprinkling method to reproduce rugae pattern in the denture • Usage of patterned tin foil is placed on the wax pattern and the denture is cured to mimic rugae 	<ul style="list-style-type: none"> • Characterization of palatal rugae to improve phonetics in denture patients • Improves on the biological adaptation of the tongue in the complete denture to enhance the perception of sour taste among denture wearers 	<ul style="list-style-type: none"> • Incorrect and too prominent rugae pattern can interfere with speech
11	Singh et al / (2019)	<ul style="list-style-type: none"> • Gingival Veins use minute fibers to mimic blood vessels • Denture coding with barcodes embedded in the acrylic on the palatal side of the denture 	<ul style="list-style-type: none"> • Denture bar-coding: Databases of patient details in case the denture breaks. Details of the patient's oral cavity for forensic purposes 	<ul style="list-style-type: none"> • The tedious task for the dentist as the characterizations have to be approved by the patients due to their

				different expectations <ul style="list-style-type: none"> • Can lower the strength and functioning of the dentures
12	Krishna Teja et al / (2021)	<ul style="list-style-type: none"> • Reinforcement of maxillary dentures by pre-impregnated glass polyurethane fibers to increase the fracture resistance of the acrylic dentures against heavy occlusal forces. • Hinged and sectional complete dentures with buttons, stainless steel butt hinges (5 mm wide and 0.5 mm thick), and or mandibular molar bands for patients with microstomia or restricted mouth opening • Liquid-supported dentures for flabby ridges • Hollow dentures using glycerin soap spacer to reduce the weight of the dentures for severely resorbed ridges. • Salivary Reservoir denture for Xerostomia patients • Cheek plumper's dentures for hollow or slumped cheeks by over-contouring the denture flanges within physiological limits. • Flangeless denture for the labially inclined premaxilla 	<ul style="list-style-type: none"> • Better function, strength, and esthetics • Improves retention and stability 	-
13	Vijayan et al / (2022)	<ul style="list-style-type: none"> • A printed photograph of the patient's gingival contour is cut and embedded on the labial and buccal aspect of the final denture using a thin layer of clear heat-polymerized resin. 	<ul style="list-style-type: none"> • Enhances the mucosal colour characterization of complete dentures. 	<ul style="list-style-type: none"> • Non-compliance with the proper protocol will cause leeching of the pigments giving it an un-esthetic appearance.

Table 2: Characterization of Denture Teeth

Reference. No.	Author/ (year)	Characterization Techniques	Advantages	Limitations
4, 8,9,14	Frush and Fisher (1956); Ravi Kumar et al (2014); Srivastava and Choukse (2011); William (1916);	<ul style="list-style-type: none"> • Square, ovoid, and tapered teeth for corresponding square, ovoid, and tapered face types • A light shade of teeth for younger, and a dark shade for older people • Hairline crack in teeth • Change the vertical and horizontal axes of teeth • Rotation of teeth Antero posteriorly or buccolingually • Spacing and diastema more than 2-3 mm in the artificial teeth arrangement to avoid food lodgment • Incisal Abrasion • Selection of long teeth to mimic gingival recession along with staining of the surrounding acrylic and the teeth • Asymmetric Midline • Golden or metal posterior teeth • Amalgam restorations on posterior teeth • Discolored teeth to mimic root-canal treated teeth 	<ul style="list-style-type: none"> • Aesthetic improvisations for a more natural-looking denture • Creates Illusion of natural teeth in artificial dentures based on gender, age, and personality of the patients 	Patient consent and acceptance are important
11	Singh et al / (2019)	<ul style="list-style-type: none"> • Overlapping of teeth • Attrited teeth with stained incisal areas 	<ul style="list-style-type: none"> • Individual characterizations according to the patient's 	Unrealistic demands of the patient

		<ul style="list-style-type: none"> • Fractured teeth 	facial form to enhance the naturalness of the denture	
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CONCLUSION:

Patient satisfaction is a key factor for the success of the complete denture prosthesis. Modern techniques allow the characterization of the denture bases and the corresponding teeth to enhance the patient’s acceptability of the prosthesis. The dentist and the patient can work in tandem to achieve an esthetically pleasing smile within the framework of the functional principles of complete denture construction.

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