



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

*International Journal of Recent Scientific Research*  
Vol. 8, Issue, 4, pp. 16468-16470, April, 2017

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Research Article

### REDEFINING COMPLETE DENTURE ESTHETICS THROUGH CHARACTERIZATION

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DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0804.0154>

#### ARTICLE INFO

##### Article History:

Received 17<sup>th</sup> January, 2017  
Received in revised form 21<sup>th</sup>  
February, 2017  
Accepted 28<sup>th</sup> March, 2017  
Published online 28<sup>th</sup> April, 2017

##### Key Words:

Characterization, Dentogenic, Dynesthetic,  
Festooning, Stippling, Custom Denture  
Tinting, Shade Guide, Photocured Denture  
Coating

#### ABSTRACT

Denture characterization in the field of prosthodontics has seen an upsurge in the recent times. There is an increase in the esthetic demands of the patients as well. The various processes allow the dentist to construct a denture with high esthetics and a high economic value. This review article discusses a brief overview on the ways in which we can characterize both artificial teeth by altering their positions and the methods employed in tinting the denture bases.

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#### INTRODUCTION

Esthetics refers to idealizing or harmonizing the artificial with the natural.<sup>1</sup> The concept of esthetics in dentures wasn't quite known until 1952- when Wilhelm Zech, a sculptor by profession tried to incorporate something more than geometric designs to artificial teeth. Based on different personalities he chose to give a soft touch to the feminine type and the rugged coarse features to the males. Later, in 1955, the dentogenic concept was introduced to bring in a revolution into the aesthetics in artificial dentures. And characterizations of these dentures add as a compliment to the esthetic factor in an artificial denture. Complete dentures must be as aesthetic as its function. According to the glossary of prosthodontics terms "Denture characterization is modification of the form and color of the denture base and teeth to produce a more lifelike appearance."<sup>2</sup> Denture esthetics includes two components- teeth and the supporting denture.

##### Denture characterization includes

1. Characterization by selection, arrangement and modification of artificial teeth, and
2. Characterization of the supporting denture base.<sup>3</sup>

Hence, the purpose of this article is to enhance the skillful maneuvers performed during denture fabrication in order to contribute to a more life-like appearance to these complete dentures.

##### Characterization by selection of teeth

Based on the interpretation of the esthetic components in dentures, 2 concepts can be mentioned that were spoken of by Frush and Fisher way back in 1955, introducing us to the earliest concepts on esthetics.

"Dentogenics", refers to the art, practice, and techniques used to achieve that esthetic goal in dentistry. The Dentogenic concept summarized that gender, personality and age provide guidelines to "enhance the natural appearance of the individual" - Fisher.<sup>4,5</sup>

Then "Dynesthetic concept portrayed secondary factors of a dentogenic restoration. It was believed that the application of dynesthetic techniques to the dentogenic concept brought about a more psychologic and physiologic comfort to all of our patients.

##### The factors included

- The selection of artificial teeth,

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- their subsequent sculpturing,
- the individual and detailed positions of these teeth,
- and the color and contours of the denture base.<sup>6</sup>

#### **Characterization by arrangement of teeth**

1. Light shades of teeth mold may be considered for young people whereas the darker shades can be preferred for elder.
2. A hair line crack can be incorporated in the artificial teeth.
3. Modifying the direction of the long axis of teeth helps in accentuation of natural effects.
4. Placing the incisal edge of one maxillary central incisor slightly in an anterior direction to the other central incisor
5. The incisal edges being together but keeping the cervical end of one of the central incisors ahead of the other creates a harmonious and lively position.
6. We can also bodily move one of the central incisor anteriorly to the other which provokes a more vigorous position thereby imparting some life-like appearance.
7. Combined rotation of two central incisors placing the distal surface forward of one of them. We can also depress one incisor at the cervical end and the other depressed incisally.
8. Lateral incisors may be slightly rotated to show its mesial surface thereby overlapping the central incisor. This effect softens the smile.
9. By rotating the lateral incisors mesially and making their distal end prominent, the effect of the smile turns out to be hardened.
10. Creating asymmetry in the divergences of the proximal surfaces of the teeth from their contact points.<sup>7</sup>
11. Using an eccentric midline creates a bit of naturally looking asymmetry. Martone stated that, "The key to esthetics lies in asymmetry".
12. Creating asymmetry for the maxillary right and left cuspids. Rotating one tooth to a posterior direction than the other tooth can also help in creating asymmetry.
13. Grinding the incisal edges can be done to portray attrition with age. Reshaping the incisal edges and mesiodistal diameter makes it possible to modify any tooth to the desired form.
14. An appearance of gingival recession can be incorporated to enhance the periodontal condition that comes up with age.
15. In order to mimic spacing and diastemas which often exist in natural dentition; a slight diastema can be created between the lateral incisor and the canine on one side. In diastemas smaller than 2-3 mm, fibrous food tends to be trapped and turns out as a source of embarrassment.<sup>8</sup>
16. The virtual effects of a natural dentition can be made more pronounce by placing any gold or alloy restorations in these teeth. A silver filling can also be given on posterior teeth.
17. Cast crowns can be given on posterior teeth as well. Placing a metal crown in the denture can also resemble their natural dentition to some extent.
18. Modification in tooth shades can be done in the form of a discolored tooth (example- mimicking a root canal treated tooth) can be shown by selecting one or two teeth

of darker shade compared to the rest. Older patients generally tend to have darker teeth as a result of discoloration from fillings and food stains.

#### **Characterization by modification of artificial teeth**

It can be done by incorporating stains to the denture teeth. Staining of teeth can be done to mimic abrasion (dental exposure), some shades of pitting or fluorosis. Varieties of staining kits are available nowadays. They are mostly self cured colored acrylic resins that can be applied by a brush; both intra-orally as well as outside the mouth. An example is the minute staining kit that is available in 7 colors- Brown, Yellow, Cervical Blend, Pink, Grey, Blue and White. The recent advances include Light curing Lite-Art and the Gradia-Gradia Gum range unit used for individual characterization.

#### **Characterization of denture bases**

Pound in 1951, was one of the first to suggest a method of tinting acrylic denture bases to simulate the gingival colour in artificial denture bases. The wax up of a denture requires the prosthodontist to have a skill of an artisan.

#### **Indications:<sup>9</sup>**

1. In patients with active upper lip
2. Patients having a prominent pre-maxillary process
3. For exposing gum tissues areas during performances like actors
4. For the psychological acceptance of dentures by the patient.

Characterization of denture bases include festooning, stippling, replicating alveolar eminence, inflamed or bulbous gingiva, tinting of denture base and incorporating imprints of rugae in the dentures.

**Festooning**-The gingiva represents a festooned appearance with elongated prominences in between to correspond to the root contours. The sulcus is marked by a no.23 explorer tip between tooth and wax -mesiodistally at the gingival margin. It involves removal of wax from the cervical portion of the teeth until sufficient areas of their labial and buccal surfaces are exposed. The free gingival margin has a definite rolled margin of wax, drawn tightly around the tooth. The bulk blends directly into the base material. More of facial tooth structure is exposed in aged patients -gingival recession. Gingival margin is accentuated by indenting it along the junction of the attached gingivae and the free gingival margin, blending it into these grooves.

**Stippling**- The stippled surface in dentures represent a natural attached gingiva that appears rough when wiped dry. It produces uneven light refraction which is responsible for a more pleasing natural effect. It is produced interdentally and in the interproximal regions. The various popular methods used are:<sup>10</sup>

1. toothbrush technique- by pressing the bristles of toothbrush against the surface of wax denture pattern
2. offset bur technique- by using a round bur (no's 4 and 8) in circular motion over the denture while the handpiece is running.

3. blow wax technique- done by blowing the molten wax on a heated wax spatula, 6 to 8 inches away from the wax of the denture base with your mouth.
4. the help of a sponge- by dabbing the sponge on the soften wax of the trial denture base.

Lynn C. Dirksen used stippled plastic contour veneer which was applied to the wax-up for 5 minutes. It practically eliminated carving and polishing of the cured denture.<sup>11</sup>

**Replicating alveolar eminence and inflamed or bulbous gingival:** They are depicted through a series of swellings corresponding to the roots of the teeth. The most marked is the anteriorly situated, canine eminence that blends into the peripheral border. The prominences become progressively less marked in the pre-molar and molar region. The reflection of inflamed or bulbous gingiva is reproduced by leaving more interdental wax.

**Incorporating rugae:** The patient can regain maximum sensation of contours in the palatal area. Different ways of incorporating rugae has been discussed. The most common method is by luting dental floss (thickness 0.75mm) with inlay casting wax in the trial denture base prior to flasking.

**Custom denture base tinting:** Usually heat curing or auto-polymerizing resins are painted on the denture base or placed within the original mould chamber, so they do not affect contours. The thickness and color of the outer layer of the denture base affect the extent of tint.

Ideal requirements of denture base tinting material:

1. Should be readily miscible with methyl methacrylate resin.
2. Should be non-toxic and biocompatible.
3. Should not add bulk to denture bases.
4. Should be of stable and non-fading texture.
5. Should be abrasion resistant during cleaning and in normal function.
6. Should not alter the original properties of the denture base resins.<sup>11</sup>

Denture base tinting techniques involve applying stains to the gingival surfaces in the flask after boil-out or may be done after the denture has been processed. The steps for tinting denture base include Shade matching via photographs or in person. The different stains are mixed with the basic color i.e clear acrylic. Three color shades are obtained for marginal gingiva, attached gingiva and denture base by adding tints in heat cure acrylic monomer. They can be applied via a small hairbrush wetted with monomer (preferably heat cured) or by dusting and wetting with dropper. Newer, autopolymerizing and light-cured shade modifiers are preferred as they are cadmium-free.<sup>12</sup>

**Simulating melanin stains:** Kemnitzer was the first to suggest the use of brown and purple resins for depicting pigmented oral tissues. The brush-on or paint-on technique can be applied, preferably in the presence of the patient to pursue best results. The characterized area should receive less polishing as over polishing might eliminate the carved areas completely.

**Soft tissue shade guide:** it is used to select the colour of the denture base material, most suited for the patient. Using this shade guide, the tissue colour can be recorded on the denture tinting chart.

**Light cure gum shading:** It comprises of micro-filled composite resin, applied in a multilayered technique. The shades are based on natural gingival tissue to produce lifelike esthetics. They are easy to polish and clean.

**Photocured denture coating:** This technique allows the polishing of the stained dentures as they contain clear, light cured resin coatings. The coating provides color-stability and a high gloss finish which makes polishing unnecessary.

## CONCLUSION

This review outlines the various methods to produce more lifelike esthetic dentures. It results in better acceptance by the patient. It ultimately lies in the skillful hands of the clinician to provide the esthetic component of the denture. Characterization of dentures should be followed by us as prosthodontists because we owe the power to restore our patients back with the same smile as before.

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