

Integrating with nature via denture characterisation - A review.

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Abstract

Objective- To analyse the impact denture characterisation has on the patient's mindset and how it can be used to mimic the patient's natural appearance and provide a more realistic and lifelike appearance.

Method- In order to improve the patient's acceptance of the prosthesis, contemporary procedures enable the characterisation of the denture bases and the associated teeth. Within the bounds of the functional principles of complete denture fabrication, the patient and the dentist can collaborate to develop an aesthetically beautiful smile.

Conclusion- In recent years, denture characterisation has become more common due to the growing need for aesthetics. As prosthodontists, it is our duty to satisfy our patients' needs while also considering their budget, function, and appearance.

Applications- Producing anatomical characterisations that exist before tooth extraction is our aesthetic goal. Every denture should be made specifically for the patient, as opposed to being assembled in a straight line using a shining, flat sheet of acrylic resin denture base, which quickly reveals it to be false.

Key Words: Denture characterisation, esthetics, natural symmetry, teeth.

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Introduction

It is anticipated that by 2025, the proportion of those over 65 would rise from 12% in 2000 to more than 20%.^[1,2] The percentage of adults who are completely edentulous (i.e., have no teeth in either arch by the age of 70) is over 10% and is directly correlated with patient age.^[3] The majority of these patients receive complete dentures. Wearers may find a denture to be comfortable and functional, yet they may find it repulsive.^[4]

Review of literature

Martone asserts that "the asymmetry is an essential to beauty."^[5] The majority of natural objects are asymmetrical. It has an authentic

appearance because the creator included some asymmetry, even with regard to humans.^[5,6] Characterisation aids the dentist in combining his theoretical knowledge and creative abilities when creating dentures. The denture base and the teeth must be given the same value during fabrication, in line with the claim made by Frush and Fisher that the "environmental condition of the teeth is equally crucial as the tooth itself."^[5,7,8]

"Teeth should be placed where they grew," according to Payne.^[9] Depending on the patient's desire to create a natural illusion, a variety of techniques can be used. Hardy said, "the denture should look more like the

patient's natural teeth in order to meet the the patient's aesthetic needs for dentures." [10-12]

Goals of denture characterisation

The objective of aesthetic dentistry is to create the appearance of beauty via the use of creative and personal elements.^[13] It takes a systematic, systemic approach to assess, identify, and treat aesthetic issues. As dentists, our objective is to prepare several aesthetic aspects in order to achieve an attractive smile. Aesthetic principles include divine proportion, uniformity, hue, wholeness and balance, and the gestalt principle.^[14]

The shape, size, and colour of the patient's natural teeth can be ascertained from pre-extraction records such as the diagnostic cast of a patient with natural teeth or teeth restored with restorations, photos of the patient showing a pair of teeth in the patient's mouth, or radiographs of the patient with teeth in the oral cavity.^[6] Post-extraction records are useful if the patient formerly edentulous and wearing a denture. It is important to examine the patient while they have the denture in their mouth to determine whether the patient is satisfied with the size, shape, and earlier teeth that have been provided, or if changes are necessary to improve their appearance.^[12]

Denture characterization is dependent upon the following factors:

1. Denture tooth characteristics.
2. Artificial tooth modifications.
3. Tooth arrangement.
4. Suitable contouring.
5. Designing denture base

There are two fundamental approaches for characterizing complete denture.

I. Selection-based characterization: (arrangement and adjustment of prosthetic teeth)

To create subjective oneness, the teeth can be adjusted to complement the patient's age, sex,

and personality. According to Dentogenic concept, the selection, arrangement, and characterization of teeth can be guided by factors such as age, gender, and personality in order to enhance the natural appearance of the individual.^[5, 15]

The methods of characterization are [5,8]

1. Changing the teeth's long axis' direction
2. Arrange the teeth such that the tips of the maxillary lateral incisors are visible when the patient speaks seriously; the number of tips varies according to the patient's age and gender, with women having more than men.
3. Make the divergences of the teeth's proximal surfaces from the contact points asymmetric.^[5]
4. Make the midline eccentric.
5. Position one maxillary lateral and central incisor parallel to the midline, and slightly rotate the other incisors posteriorly.^[5]
6. Position the necks of the two maxillary central incisors such that the neck of the posterior incisor is facing the anterior side and slightly in front of the other one.^[13]
7. Make the left and right maxillary cuspids asymmetrical. Rotate one such that it faces behind the other.
8. As people age, gingival tissues recede. This recession can be replicated by choosing a long tooth, shaping the wax to depict gingival recession, and then lightly colouring it to give it a genuine look.^[8]
9. Grinding the incisal edges. As teeth age, they erode. Any tooth can be shaped to the suitable shape by reshaping the mesiodistal diameter and incisal edges.
10. A very precise arrangement of teeth might not be the best. Actually, subtle tooth position adjustments like overlapping, tilting, rotating, and incisal variations can help create a denture that seems real.
11. Natural dentition frequently has diastemas and spacing. There are gaps between the teeth due to the natural teeth eroding at the

contact areas or teeth moving. Artificial teeth can be positioned to create gaps and simulate wear, giving the impression of natural teeth. The diastema that is provided should be more than 2-3 mm. Fibrous food often gets stuck in diastemas smaller than 2-3 mm, which can be embarrassing.

12. The teeth may have a minor crack in them.
13. Restorations made of gold or alloy can frequently be inserted into these teeth to give the appearance of being natural. The clinical success of prosthetic teeth may be attributed to the usage of gold occlusal surfaces.
14. Posterior teeth may have a silver filling or may receive a cast crown. When seeking out new dentures, to maintain originality some patients request a crown be inserted into the prosthesis.
15. One or two teeth that are darker in colour than the rest of the set can be used to represent a discoloured tooth. Food stains and filling discolouration cause older individuals' teeth to seem darker.

II. Characterization of the denture bases

Pound first described the method of colouring acrylic denture bases in 1951 in order to mimic the typical gingival colour based on racial and personal colour patterns.^[16] A technique for achieving a natural appearance through the use of both tinting and stippling was presented by Lynn C. Dirken. Kemnitzer replicated the melanotic pigmentation of the gingiva by combining blue and brown stain.^[17] Denture base characterisation is appropriate for individuals with a prominent premaxillary process or an active upper lip and in performers such as actors and singers who might reveal parts of their gums during a performance.

1. *Shaping the denture base to provide characterisation*

Festooning: The gingiva's shape resembles a festooned look with stippling or orange peel texture, with periodic elongated prominences that match the shapes of the roots.^[8] Rather than only cutting wax grooves between each tooth, it is advised that casts from patients who still have their own teeth be utilised as guidance for wax-up and carving procedures. Without stippling and festooning, light is not distributed and reflected randomly, causing the denture to appear as an impostor—a smooth, pink mirror.^[18]

Stippling: There are several ways to stipple the areas that mimic the attached gingiva. The end effect is positive stippling that looks natural, seems to accumulate less calculus and debris, and is simpler to clean.^[14]

Care must be taken to wax the denture to the appropriate thickness and finish and polish it after processing if the created stippling is to remain in the final denture.^[8]

One of the many techniques employed is

- a) The toothbrush method.
- b) The offset bur method.
- c) The blow wax method.

2. *Tinting of custom dentures*

Traditionally, to define colour, gingival stains were added to the gingival surfaces in the flask after dewaxing. With this method, the dentist or a technician can characterise the colour of the denture after it has been prepared.^[14] After the fabrication in the appropriate shade of denture base material, the denture is moulded and smoothed using an acrylic bur rather than polished. This is the time for custom tinting. It is preferred to use the more recent, cadmium-free autopolymerizing and light-cured shade modifiers. Recreating melanin pigmentation Denture wearers may benefit from a new road that leads to mental peace, contentment, and wellbeing. For those with pigmented oral tissues, this technique uses resins that are purple and brown in colour. Pound asserts that ethnic and individual gingival colour

anomalies can be included with artificial dentures.^[18]

3. *Paint-on or brush-on method*

According to John L. Powers, the dusting and wetting procedure is laborious and entirely fictional when the patient is not present. As a result, he devised a method for applying the colouring substance directly to the processed denture while the patient is there. According to him, each patient's denture has a different colour. Therefore, different patients require different coloured resins, and the denture base's colouring can be adjusted to match each patient's tissue colour.^[18]

4. *Glossy technique*

According to Suresh et al, gingival stippling is a sign of wholesome attached gingiva.^[20]

By producing an uneven reflection of light, the replication of gingival texture and curves enhances the way flanges in dentures naturally appear. As a result, the gloss and reflection that are usually present on highly polished denture flanges are lessened, giving the illusion of being more natural.^[21]

Conclusion

In addition to replacing lost teeth, complete denture fabrication restores function, phonetics, and aesthetics. To give the dentures a more realistic and lifelike appearance, characterization of the entire set is required. Our aesthetic goal is to produce anatomical characterizations that exist prior to tooth extraction. Rather than using a shimmering, flat sheet of acrylic resin denture base to assemble acrylic teeth in a straight pattern, which soon exposes it as false, each denture should be customised to the patient's specifications.^[7,11] Our responsibility as prosthodontists is to meet the demands of our patients while taking their function, aesthetics, and financial situation into account.

References

1. Murdock SH, Hogue MN. Current patterns and future trends in the population of the United States: implications for dentists and the dental profession in the 21st century. *J Am Coll Dent.* 1998;65:29-3
2. Sue Learner. "News Analysis", *Nursing and Residential Care*, 2017
3. The Edentulous Mandible: Treatment Plans for Implant Overdentures, 573 Carl E. Misch
4. Engelmeier RL. Complete-denture esthetics. *Dent Clin North Am* 1996;40:71-84
5. Joseph S, Thomas S, Mathew S, Cherackal GJ, George AK. Characterization of complete denture - 11 Case reports. *SRM J Res Dent Sci* 2015;6:60-4.
6. Alexander L. Martone. "Physiographic cinematography studies of a prosthodontic patient: An initial report" - *The Journal of Prosthetic Dentistry*, 1964
7. Frush JP, Fisher RD. How dentogenic restorations interpret the sex factor. *The Journal of Prosthetic Dentistry* 1956;6(2):160-72.
8. Rushali kadam et al, Aesthetic Characterization of Complete Denture – A Review - *International Journal of Medical Science in Clinical Research and Review* 2023
9. SH Payne et al Construction of custom denture teeth *Dent Clin North Am* 1975
10. Hardy IR. Problem solving in denture esthetics. *Dent Clin North Am* 1960:305-20.
11. Salvatore J. Esposito. "Esthetics for denture patients", *The Journal of Prosthetic Dentistry*, 1980
12. Ramandeep Singh, Sonali Sharma, Aquib Javaid, Asusa Cicilia Loli, Chander Udhey. "A literature review on esthetics in complete denture", *IP Annals of Prosthodontics and Restorative Dentistry*, 2021

13. Ronald E. Goldstein's Esthetics in Dentistry, Wiley, 2018
14. Ravichandran S, Rajambigai A, Shree S, Milton J, Shirley E. Characterisation Of Complete Dentures: A Clinical Technique. IOSR Journal of Dental and Medical Sciences . 2023
15. Frush J. P., Fisher R. D. The dynesthetic interpretation of the dentogenic concept. J Prosthet Dent., 1958;8:558- 81
16. Pound E. Esthetic dentures and their phonetic values. J Prosthet Dent 1951;1:98-111
17. Lagdive S, Darekar A, Review: Characterization of Denture Bases- Redefining Complete Denture Esthetics. International Journal of Health Care and Biomedical Research 2012; 1:16-20.
18. Pound E. Applying harmony in selecting and arranging teeth. D. Clin. North America. March, 1962;241-258
19. Johnson HD. Technique for packing and staining complete or partial denture bases. J Prosthet Dent 1956; 6:154-9.
20. Nayar S, Craik NW. Achieving predictable gingival stippling in labial flanges of gingival veneers and complete dentures. The Journal of Prosthetic Dentistry 2007;97(2):118.
21. Becker CM, Smith DE, Nicholls JI. The comparison of denture-base processing techniques. Part II. Dimensional changes due to processing. The Journal of Prosthetic Dentistry 1977; 37(4):450-9.

