

Esthetics considerations in the selection of teeth for complete denture patients: A Review

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Abstract

The selection of artificial teeth for an edentulous patient is a most important and often difficult problem for the dentist. He should select teeth which not only embody the proper form and size, but the most ideal shade as well. The art of selection of teeth for edentulous patients has been lost in the maze of tooth guides, folders and pamphlets and the numerous methods of selection advocated by researchers. An attempt has been made in this paper to briefly describe the various methods advocated in the literature and to reach a practical method. For the sake of clarity and simplicity, the matter has been dealt with deferent aspects of geometrical analysis of face form, arch form, facial profile and other parameters like age, sex and personality of the patients.

Key Words: - Artificial Teeth, Edentulous Patients, Dento-facial Harmony, Pre-Extraction Records, Dentogenics.

Introduction

Teeth selection is not simply a mechanical procedure, but requires dexterity and knowledge of biology. Selection of teeth forms an important step before teeth arrangement.¹ Objective of teeth selection-It is to create a dentofacial harmony. An acceptable cosmetic effect in any dental restoration has always been regarded as important to good dentistry. A well-made prosthesis will fail if it is deficient in this respect. Esthetics includes the appreciation and response to the beautiful in art and nature. Esthetics has been given many definitions in dentistry but according to Young. "It is apparent that beauty, harmony, naturalness and individuality are major qualities" of esthetics.² The dentist must visualize esthetics in relation to the patient and then translate that visualization into an acceptable esthetic result. The success of Dentist efforts depends upon his artistic ability, his powers of observation and his experience.

METHODOLOGY

I] Pre extraction records

Diagnostic casts: of patient's natural teeth or restored teeth prior to extraction of remaining teeth.

Recent photographs: They will often provide general information about the width of the teeth and possibly their outline form that is more accurate than information from any other source.

Radiograph of teeth: Radiographs made before the natural teeth were lost can supply information about the size and form of the teeth to be replaced.¹ Radiographic images are however always enlarged and may be distorted because of divergence of the x-ray.

II] Post-extraction examination Size and form of edentulous foundation, matching teeth to face forms and arch forms. If patient is already a denture wearer, mouth should be examined with the dentures in the mouth giving importance to physiological and aesthetic aspects.

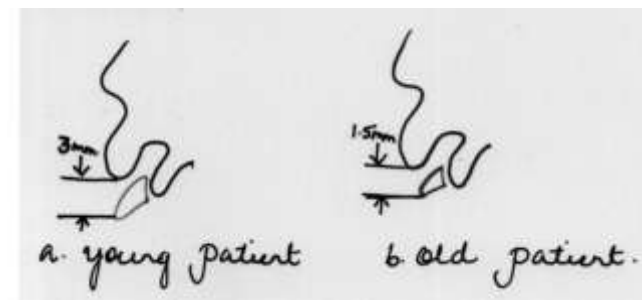
Factors influencing size and form of anterior teeth

Size of face, Amount of available inter-arch space, measured distance between distal of right and left maxillary cuspids, Length of lips, Size and relation of arches and Sex of the patient are the main factors which influenced the size and form of anterior teeth.³

Size of anterior teeth

Length

Normally necks of anterior teeth overlap the anterior ridge by 2-3mm cervically and incisal edges will show below the relaxed lip.



Width

Bizygomatic Width = Estimated width of maxillary Central Incisors
16

Bizygomatic Width = Approximate width of size anterior Teeth
3.3

Measuring width of anterior teeth

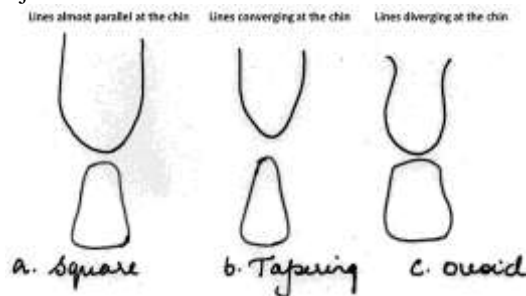
Mark corners of the mouth on the occlusal rim in the mouth and the distal surface of the upper canines can be indicated by marks made on the upper rim at the corners of the mouth. Then the distance between the marks is measured around the labial surface of the occlusal rim and anterior teeth of this width are arranged as indicated by the occlusal rim. A variation depends upon: Length of upper lip, Mobility of upper lip, Vertical height of occlusion and Vertical overlap.^{4,5}

Form of anterior teeth

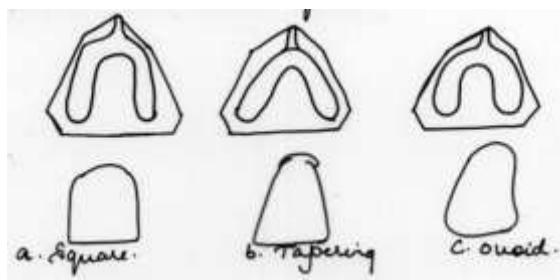
Based on face form:

Classification of face form by Leon Williams:

It consists of two imaginary lines passing about 2.5cm in front of the tragus of the ear and through the angle of the jaw.



Based on arch form:



Based on profile of the face

The labial surface of the tooth viewed from the mesial aspects should show a contour similar to that when viewed in profile.



The labial surface of the tooth viewed from the incisal aspect should show a convexity or flatness similar to that seen when the face is viewed from under the chin or from the top of the head.⁶

Relationship of upper arch and upper incisors



V shaped arch – teeth narrower at the neck than the incisal edge.

Rounded arch – ovoid teeth.

Squarish arch – parallel sided incisors.

Colour of teeth

Knowledge of physics, physiology, and psychology of Colour is valuable in the selection of teeth Colour. Hue, Saturation, Colour of Teeth, Brilliance, and Translucency are the parameters to select colour of the tooth.^{7,8}

Hue: It is the specific Colour produced by a specific wavelength of light acting on the retina. The hue of teeth must be in harmony with the Colour of patients face. **Saturation:** It is the amount of Colour per unit area of an object.

Brilliance: It is the lightness or darkness of an object. People with fair complexion generally have teeth with less Colour and the Colours are less saturated. Thus, the teeth are lighter and in harmony with the Colours of the face. People with dark complexions generally have darker teeth that are in harmony with the colour of the face.^{9,1}

Characteristics of natural teeth Neck of tooth has more pronounced Colour than incisal edge. The incisal edge, if unworn is more translucent than the body of the tooth. Maxillary central incisors are lightest teeth in the mouth, maxillary laterals and mandibular incisors are slightly darker. Canines are still darker. Posterior teeth are usually uniform in colour and slightly lighter than canines. Teeth darken with age.¹⁰

Translucency: It is the property of an object that permits the passage of light through it but does not give any distinguishable image.

Suggestions for selecting the teeth: Always moisten the shade guide because when in mouth, the teeth are always moist and this has an effect on the reflection and refraction of light and hence the Colour. Always place the teeth in the shade of the upper lip in position they are to occupy. They will appear darker in this position than in hand. Select teeth under natural light. Attempts to look at the face as a whole rather than focus on teeth.

Selection of posterior teeth

The cuspal inclines for posterior teeth depend on the plan / scheme of occlusion selected by the dentist. Commonly used posterior cuspal inclinations are 33°, 20° and 0°. The inclination is measured as the angle formed by the mesio-buccal cusp of lower molar with the horizontal.^{10,11}

Selection includes

Shade, Size, Buccolingual width, Mesiodistal length, Vertical length, Number and Form

Shade:

It should harmonize with the shade of the anterior teeth. Bulk influences the shade of the teeth and for this reason it is advisable to select a slightly lighter shade for the bicusps if they are to be arranged for aesthetics. They may be slightly lighter than the other posterior teeth but not lighter than anterior teeth.¹²

Size and member of posterior teeth:

The size and number of posterior teeth are closely related to usage. These characteristics are dictated by the anatomy of the surrounding oral environment and physiologic acceptance of supporting tissues. The posterior teeth must support the cheeks and tongue and function in harmony with the musculature in swallowing and speaking as well as in mastication.

Buccolingual width of posterior teeth:

The buccolingual width of artificial teeth should be greatly reduced from the width of natural teeth they replace. Artificial teeth that are narrow in buccolingual direction enhance the development of the correct form of the polished surfaces of the denture by allowing the buccal and lingual denture flanges to slope away from the occlusal surfaces. This occlusal form permits forces from the cheeks and tongue to maintain the dentures in position on the residual ridges. Narrow occlusal surfaces with proper escape ways for food also reduce the amount of stress applied on food during mastication to the supporting tissues of the basal seat on the other hand the posterior teeth should have sufficient width to act as table upon which to hold food during trituration.

Mesiodistal width of posterior teeth:

The mesiodistal width of posterior teeth is determined by the edentulous area between the distal of the mandibular cuspids and the ascending area of the mandible. After the six mandibular anterior teeth have been placed in their final position a point is marked on the crest of the mandibular ridge at the anterior border of the retro molar pad. This is the maximum extent posteriorly of any artificial teeth on the mandibular ridge. In well-formed ridge the apex of the retro molar pad is taken as posterior level and is resorbed ridges the point where retro molar pad turns upward.¹²

Vertical length of buccal surface of posterior teeth

It is best to select posterior teeth corresponding to the inter-arch space and to the length of the anterior teeth. The length of the maxillary first premolars should be comparable to that of the maxillary canines to have the proper aesthetic effect.

Less wear resistance: Tendency to dull in appearance during use as a result of loss of surface luster. Care should be taken when polishing the denture to prevent undesirable modifications in tooth contour.

Teeth Arrangement

In prosthodontics the term “arrangement” would refer to a procedure of locating, tilting, rotating and spacing artificial tooth/teeth in relation to the plane of reference and to each other with the object of creating a natural appeal and based on biomechanical requirements of complete denture treatment. General position of each of the tooth is such that the imaginary root passes through restored ridge contour of maxillary foundation.¹³

Table 1: - Relation of tooth to the frontal plane:

Angulations	Maxillary Central incisor	Maxillary Lateral incisor	Maxillary Canine
Labial inclination	Slight inclination	Relatively more labial inclination and cervical depression than C.I.	Located in upright manner – cervical portion of the tooth should be more prominent
Relation of tooth to clinical midline	Reveals very slight mesial inclination	Shows relatively more mesial inclination than central incisor	Is placed in a upright manner
Relation of incisal edge to midsagittal plane (rotation).	Reveals an angle a little less than 90° to the sagittal plane	Reveals an angle of 30° to sagittal plane	Reveals an angle of 45° to sagittal plane
Relation of incisal edge to occlusal plane	Is in contact with occlusal plane	Remains ½ - 1mm away from the occlusal plane	Canine tip remains in contact with the occlusal plane

Arrangement of mandibular anterior teeth

Lower central and lower anterior teeth are placed upright. Lower canines are mesially tilted –sleeping canines. The lower anterior teeth are placed in a mesial relation to the upper anterior teeth. There is horizontal overlap of about 2-3mm. There is a vertical overlap of about 1-2mm.

Arrangement of Posterior Teeth*Relationship of teeth to cast:*

In mandible bone loss occurs from both buccal and lingual sides in downward direction, since natural posterior teeth are lingually inclined, the artificial teeth can be set right over the lower ridge without encroaching on the space occupied by the cheek / tongue. In maxillae, the loss is entirely from buccal and labial surfaces and hence the residual ridge lays slightly more palatally all round. The maxillary posteriors are placed slightly lateral to the crest. In order to reduce the tipping forces on the lower denture, a compromise is done by not placing the upper teeth on the crest of the ridge which would otherwise result in discrepancy in occlusion.^{13,14}

DENTOGENICS**Sex Factor***Expression of feminine characteristics*

“From her finger tips to her smile ----- A woman is feminine.

An excellent beginning is to select initially a mold which express soft anatomic characteristics or one which is highly adaptable to being shaped and formed into a dictate type of tooth by certain grinding procedures. The interpretation of femininity will keep to the spherical form instead of circular so as to identify the third dimension. The basic feminine form should however be harmonized with the individual patient. The individual is accomplished by

definite grinding procedures where the incisal edges must follow a curve rather than a straight line.^{15,16,17}

Expression of masculine characteristics:

From his fists to his mouth. A man is masculine. A basic tooth form which expresses masculine characteristics shows vigor, boldness and hardness.

Personality Factors

He should be concerned with the personality of a patient when constructing a denture because this is our best measure of his priceless individuality and the most reliable source of knowledge by which we may express his dignity through prosthodontic methods. The comprehensive use of personality depends upon our manipulation of tooth shapes (molds), tooth Colours, tooth posterior and the matrix (visible denture base) of these teeth.^{16,17}

Age factors

There is beauty in age as well as in youth, but in fact age has the edge. It is routine first to consider light shades for young people and darker shades for older ones. Age in the artificial tooth must also be accompanied by mold refinement. In the artificial tooth, we may reflect the appropriate age effects by such means as grinding the incisal edges and removing the incisal enamel at such an inclination and to such depth as to convey reality to the composition. The sharp tip of cuspid suggests youth and as age increases it should be judiciously shaped, not abruptly ground so as it imply abrasion against opposing teeth. The erosion imparted to artificial teeth by careful grinding and polishing very efficiently conveys the illusion of vigour and advanced age.^{17,18,19}

Conclusion

There are no definite guidelines for selection of posterior teeth. But it mainly depends on the type of patient and the condition of the supporting tissues. And hence, the selection of teeth is the responsibility of the dentist which he acquires through knowledge and experience.

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