

Prosthodontic Perspective for Esthetics

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Abstract:- The primary goals for esthetic views illustrate that the dental appliance should operate well, permit the patient to talk commonly, aesthetically acceptable and should not irritate the tissues present over the residual ridges. The anterior teeth size, shape, color and arrangement play a vital role in articulation of specific speech sounds. Dental science is defined as an art dominates science, esthetics is considered as the major concern, and collected information should be applied to make a satisfying look whereas at the same time maintaining proper oral hygiene and esthetics.

Keywords:- Esthetic, Speech, Oral Hygiene.

I. INTRODUCTION

An acceptable esthetic in any dental restoration has continuously been considered necessary to accomplish proper treatment procedures. Teeth choice in complete dental appliance plays a vital role in good prosthetic success and improves the confidence of the patient.^[1] Therefore, replacement of teeth for esthetic purposes and tooth arrangement created the entire dental appliance should be fascinating. Correct positioning of tooth ought to be useful and aesthetically pleasing to reinforce the expectation of patient.^[5]

A complete analysis and understanding of physical and biological factors directly associated with the patient to rehabilitate the occlusion.^[4] The goals for treatment planis to construct dentures that operate well, permit the patient to talk commonly, acceptable esthetics, won't abuse the tissues over residual ridges.^[5]

II. HISTORY OF ANTERIOR TEETH SELECTION

"Berry's biometric quantitative ratio method", was projected in 1906.^[6] The "dimensions of central teeth should be in proportion with facial profile" for acceptable esthetics. (fig: 1)



Fig:1-horizontal line= bizygomatic width
Vertical line: hairline to gnathion

Outline of face = outline of teeth

Bizygomatic width/16=width of jaw central tooth

Hairline to gnathion/20 =length of jaw central tooth

In 1941, Sears projected the "Anthropometric Cephalic Index" .

Width of upper central incisor=Transverse circumference of head/13. (Or)

Width of upper central incisor=Bizygomatic width/3.3 (fig:2)

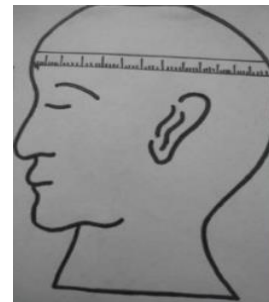


Fig:2- Circumference of head

The "Automatic Selector Guide" was projected in 1951. The method correlates measurements and looks in such a way that one reading solely is needed to pick the suitable tooth model based on dimensions of dental appliance and tooth type.^[3] (fig:3)



Fig: 3- Shade guide

III. CONCEPTS IN CHOICE OF ANTERIOR TEETH:

➤ *White's Conceptual Idea:*

This methodology was supported on fifth century B.C.Temperamental sorts were sanguine, nervous, bilious and lymphatics named for the physiological functions of blood, nerves, gall bladder secretions and body fluid of

the individual. Artificial teeth were indiscriminately designated to suit the patient's personality. An individual with "bilious" type would be expected to own short, broad, tapering teeth, whereas a "sanguineous" individual (fig:4) would possess large, skinny and slender teeth.^[2]

- *Bilious: body fluid*
Determined, fast to act, raging, energetic, passionate.
- *Sanguine: Blood*
Warm hearted, outgoing, volatile, optimistic, cheerful
- *Phlegmatic: Phlegm*
Slow, patient, calm, quiet, shy, rational, consistent
- *Melancholic: bodily fluid*
Serious, anxious, quiet, fearful, depressed, poetic, artistic, sad.^[2]

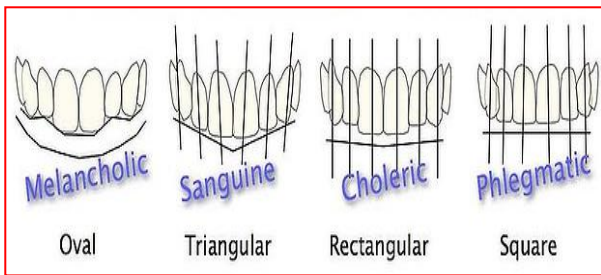


Fig:4- Types of personality

- *Concept of H.Pounds :*
H. Pound's formula is one of the strategies in measuring the dimensions of upper anterior teeth. The breadth of the upper anterior teeth is decided by dividing the bizygomatic breadth by sixteen. The length of the upper anterior teeth is obtained by dividing the length of the face by sixteen.^[1] (fig.5)

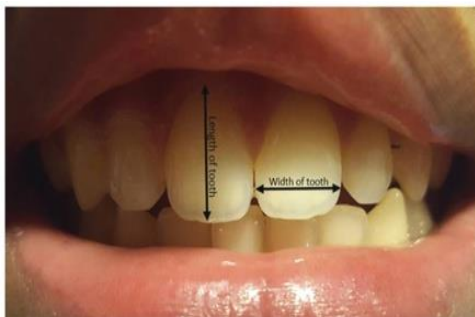


Fig:5- Width and length of central incisor

- *DYNAESTHETIC & DENTOGENIC CONCEPT: SPA factor (sex, personality, age)*
FRUSH & FISHER in 1956 gave dento-genic construct & its dynaesthetic interpretation to offer a lot of natural & individual look to the dentures of a patient.^[3] Fisher states that "Utilize the approach of associate degree creative person whereas analyzing the patient first on sex, i.e. Male or feminine, then on temperament i.e. Vigorous or delicate, & then on age, i.e. young, middle aged or previous." ^[8]

❖ *SEX*

- *Feminine characteristics:*
Femininity is expressed by conformation, sophistication and calmness that's typical for female characteristics. Thus, the choice of basic form that has the soft lines expression of the female type, in conjunction with effective temperament characteristics is especially useful.^[8]
- *Masculine characteristics:*
A typical masculine type is delineate as (cuboidal) exhausting muscular, vigorous look on the far side the analysis of physical look. A basic tooth type, that expresses masculine characteristic show massive or, boldness and hardness.(fig:6) therefore sex identity becomes associate degree automatic a part of the esthetic procedures .^[6]

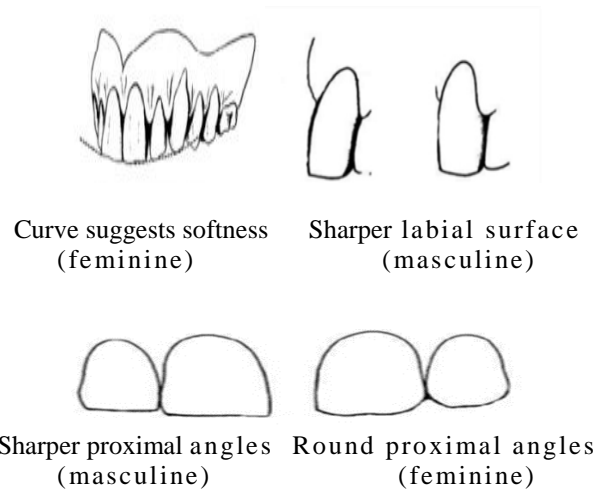


Fig:6- Characteristics of male and female

PERSONALITY: A vigorous personality needs square teeth with flat incisal edges, whereas a fragile temperament would force ovoid teeth. The strongly made, men extrovert may solely work into the daring, red finish of the spectrum. The shrinking violent kind of feminine may solely belong at the correct finish of the dimensions and also the medium, traditional kind, masculine or feminine, would work anywhere in between. divisions of temperament spectrum are; Delicate kind inexperienced to violet band) - 5% fragile, fragile, the other of sturdy, Medium kind (yellow to orange band) - 80%, normal, moderately sturdy, healthy and of intelligent appearance:^[9]

AGE: With age, the teeth wear at the incisal edges and interproximal surfaces. Labial surfaces appear praise and type seems squarer^[9] (fig:7). In females the teeth lose their curves as age proceed .The teeth of the male become a lot of square in type to enhance side weight and rectangularity of body.The dignity of increasing age should be appropriately represented within the dental appliance by careful tooth color choice and by model refinement, conjointly by the involvement of such characterization, as would be apt for the temperament and expectations of the patient. ^[10]

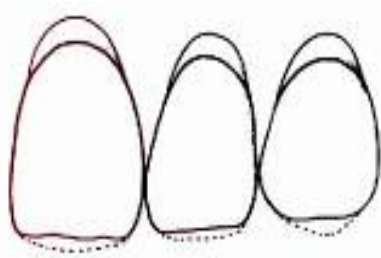


Fig:7- Teeth wear

➤ *Winkler's Concept:*

The bio-physical, biomechanical and also the cognitive aspect. The bio-physical read purpose expressed the importance of coordination of the facial muscle system and physiological limit with teeth arrangement. The mechanical read purpose is predicted on the mechanical drawbacks in arrangement of incisor teeth. Psychological read purpose is predicted on appearance and look. [6]

➤ *Conceptual idea of Leon William's :*

William developed a technique known as the law of symmetry. He believed that a correspondence develops between the inverted face kind and therefore the type of upper central teeth in the general public. He delineated threotypal kinds of teeth as square, tapering, ovoid. [4] (fig.8)

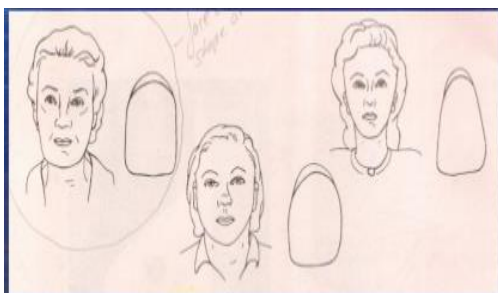


Fig:8- Three types facial form with corresponding teeth size

IV. PROPORTION OF GOLDEN RATIO

The proportion of golden ratio is that the mathematically constant magnitude relation between the larger and therefore the smaller length. The magnitude relation is 1.618:1:0.6.(fig:9).Lombardi was the primary to recommend the appliance of the golden proportion in odontology. He conjointly delineated the utilization of a 'repeated ratio' within the jaw anterior teeth and prompt the appliance of golden proportion. The idea of golden proportion has usually been offered as a corner stone of smile style theory.[7]



Fig:9-Ratio for golden proportion

➤ *Smile Designing Goals:*

The aim of esthetic makeover is to create a harmonious and sturdy masticatory system, wherever the hard and soft tissues and joints all operate in coordination. The important parts of smile coming up with embrace the following:

1. Tooth elements
 - a. Dental plane
 - b. Incisal lengths
 - c. Tooth dimensions
 - d. celestial point points
 - e. Axial inclinations
 - f. Interdental contact space (ICA) and purpose (ICP)
 - g. Incisal opening
 - h. Buccal passageway area

Tooth elements of smile designing:

➤ *Midline Of dentition:*

The plane refers to the vertical seismic profile between 2 upper anterior teeth. It ought to be perpendicular to the incisal plane and parallel to the plane of the face.(fig:10). the most allowed discrepancy are often a pair of millimeter and generally larger than a pair of millimeter discrepancy is aesthetically acceptable farewell because the dental plane is perpendicular to the interpupillary line. [2]

➤ *Midline ought to be*

- a. Parallel to the long axis of the face: the road angle that forms the contact between the centrals ought to be parallel to the long axis of the face;
- b. Perpendicular to the incisal plane: the road angle that forms the contact between the centrals ought to be perpendicular to the incisal plane and
- c. Over the papilla: The plane ought to drop straight down from the papilla. [1]

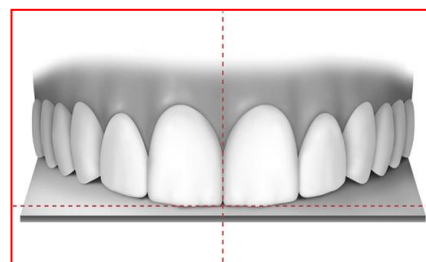


Fig:10- Midline of central incisor

➤ *Positionsof Incisal edge:*

Upper incisal edge position is the most vital determinant in creation of smile as a result of once set, it is areference point to make a decision of the correct tooth proportion and soft tissue levels. [13]

Speech: Acoustics is considered as anmajor aspect of the tooth size and shape. So as to see correct lip, tongue and incisal edge and tooth position, it's necessary that the patient's sitting position should be either straight or standing throughout the speech exercises. [9] the assorted acoustics used measures are as follows:

E sound: The upper incisal edge position ought to be positioned halfway between the higher and lower lip throughout the “E” sound.(fig:11)

F and V sounds: Sounds made by the interaction of the jaw incisal edge with the inner fringe of the mandibular lips' vermilion border. Sounds facilitate to see the faciolingual attachment and area of the upperteeth.(fig:12)

S sound: Throughout pronunciation, the jaw central incisors square measure are positioned one millimeter behind and one millimeter below the upper incisal edge^[7] (fig:13)



Fig:11- Pronunciation of E sound

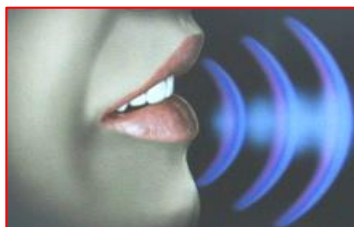


Fig:12- Jaw incisal edge at F and V sound



Fig:13- Pronunciation of S sound

➤ *Tooth dimensions:*

The dimensions of the teeth should be pleasing and geometrically correct. ^[2] The dimension to length magnitude relation of the teeth ought to be somewhere between 4:5 (0.8-1.0); a variety for his or her dimension of 75-80% of their length is the most appropriate percentage. the form and placement of the centrals determines the looks and arrangement of the laterals and canines. ^[9]

➤ *Points at zenith area:*

Points at zenith area are measurement from the foremost top position of the cervical tooth margin wherever the gum tissues most crenate^[3] it's placed slightly distal to the vertical line drawn down the middle of the tooth.(fig:14) Establishing the correct location of celestial points may be a essential step in changes of proximal dimensions^[8]

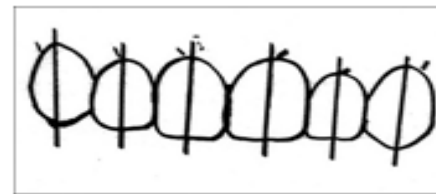


Fig:14- Vertical lines at Zenith points

Interproximal contact space :

1. It's outlined because the wide zone within which two adjacent teeth be in contact .(fig: 15)
2. It displays the 50:40:30 ratio irrelevancy theupper anterior tooth
3. The improved interproximal spaces helps to make the illusion of larger teeth to increase in width and conjointly extend apically to eliminate black triangles^[9]

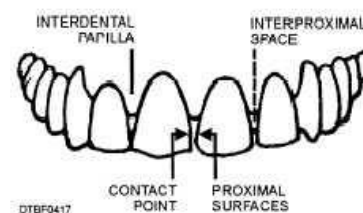


Fig:15-Wide zone between incisors

➤ *Incisal embrasures:*

The incisal embrasures ought to show a natural, progressive increase in size or depth from the central to the canine.(fig:16).^[10] The contact points in their top progression ought to replicate the smile line. Failure to supply adequate depth and variation to the incisal opening can

1. create the teeth seem too uniform and
2. create the contact areas too long and impart to the dentition a box like look. ^[8]

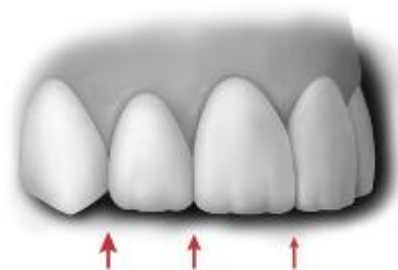


Fig:16- Embrasures of incisor teeth

➤ *Buccal passageway space:*

The area between the corners of the mouth throughout smile kindation and therefore the buccal surfaces of the jaw teeth (particularly the bicuspid and molars) form an area called the buccal passageway. The larger and additional pronounced this negative area becomes, the additional these posterior teeth square measure hid, proscribing the complete breadth of the smile. A full Associate in symmetrical buccal passageway is a crucial component of an estheticsmile.(fig: 17)The buccal passageway shouldn't be utterly eliminated as

a result of a touch of negative area imparts a suggestion of depth to the smile. [1]



Fig:17-Shadowing effect buccal corridor



Fig:18-properly treated buccal corridor

V. TEETH SELECTION INFLUENCING FACTORS

➤ *Size Of Teeth:*

➤ *Pre extraction records:*

1. Facial photographs: Offers general data regarding the dimension and description type of anterior teeth. The interpupillary distance of patient in icon and personally with the tooth dimension in icon, the particular dimension of the anterior tooth are often calculated. [10]
2. Diagnostic casts: Casts of patients natural or rehabilitated dentition provides data, that is beneficial to pick the dimensions and type of anterior teeth.(fig:19)
3. X-rays: they will offer data relating to the dimensions and type of teeth.
4. Extraction: Provides data on the dimensions and shouldn't be used for choosing color.
5. Previous denture: Patients previous dentures area unit used as Associate in Nursinging aid in choosing anterior teeth. The colour, size and form of previous dental plates helps in new denture process, [8]

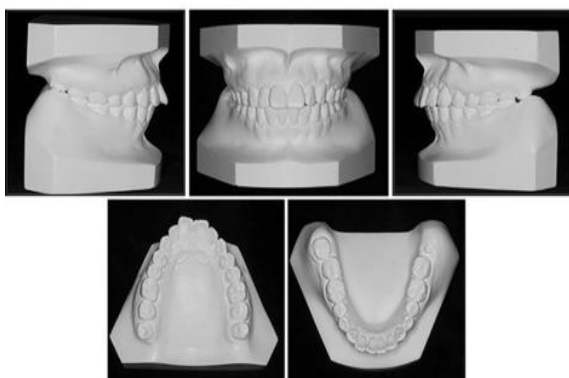


Fig:19- Diagnostic casts

Size of UpperArch :. Measurements area unit made up from the top position of the incisive papilla to the hamular notches and from either side of the two hamular notches. The measurements of the three legs of Triangulum in

millimetres is employed as the selector. The measurements area unit made up of the sheet of the jaw occlusal rim to the distal of the canine prominence.[9] (fig:20)

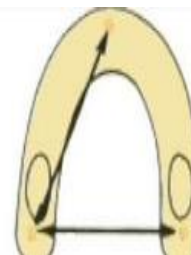


Fig:20- Length from incisive papilla to hamular notch

➤ *Incisive Papilla and the Canine Prominence:*

With a pointy marker, mark at the corner of the lips. The vertical line drawn from this mark coincides with the pupil of the eye of the patient. the gap between the marks following the arch marked in millimetres is that the combined dimension of six jaw anterior teeth.[6]



Fig:21- Arch length measured with ruler

➤ *Contour of the Residual Ridge :*

The artificial teeth ought to be placed to follow the shape and size of the residual ridges that existed between the natural tooth. [3] .As organic process happens there's changes within the shape and size of the ridges.(fig:22)



Fig:22- Stages of Residual Ridge Resorption

➤ *Lips:*

Facial surface of the upper incisor teeth supports the lips at rest. oftentimes tip of the incisors extends slightly below the lip margin.(fig:23)When the teeth area unit in proper arrangement and lips closed the facial third of the jaw anterior teeth supports the upper border of the lower lip. During phonetics, incisal tip of jaw anterior teeth contacts the lower lip at the junction of the damp and dry surfaces of the vermilion border-[8]

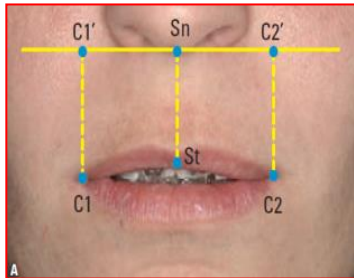


Fig:23- Position of lip

➤ Nasal dimension:

Hoffman et al remarked the index of nasal dimension as a comparison to esthetics because it relates alar dimensions offered for setting the anterior teeth.^[9] (fig:24)

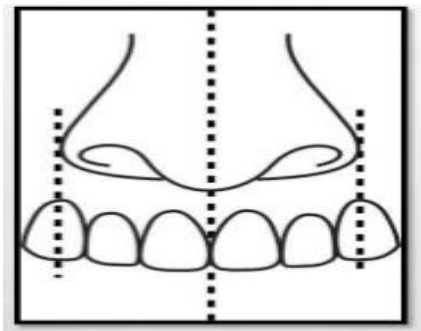


Fig:24- Markings from ala of nose

➤ Inner Canthal Distance as a Guide :

The inner canthal distance is outlined because the distance between the medial angles of the palpebral fissures. The combined dimension of jaw central incisors is considered to be smaller than the width of ICD. so the ICD was increased by 0.618. ^[8] (fig:25)

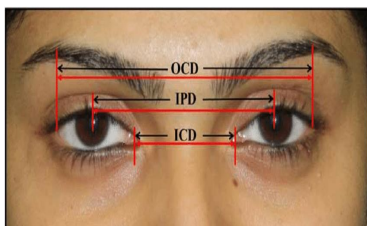


Fig:25- Distance between canthus

➤ Form Of Teeth:

Form and Contour of the Face : Leon Williams stated that the dimensions of the maxillary anteriors correlates with the form of the face. Human faces are classified into three types: square, tapering and ovoid forms. The operator imagines 2 lines, one on either aspect of the face, running concerning a pair of 0.5 cm ahead of the cartilaginous structure of the ear and through the angle of the jaw. ^[2]

1. Square--lines are nearly parallel.
2. Tapering--lines meet towards the chin.
3. Ovoid--lines does not meet towards the chin^[9]. (fig:26)

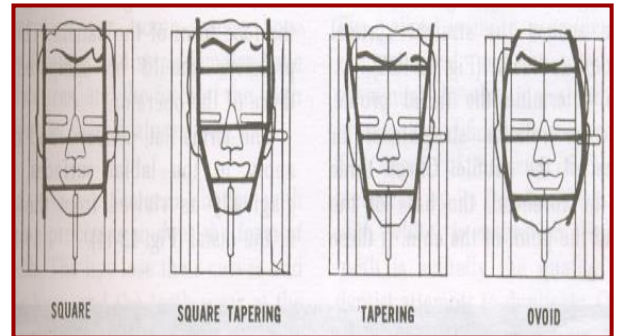


Fig:26- Facial forms

Facial Profile : The facial profile is decided by 3 points. The forehead, the bottom of the nose and therefore the distinguished purpose of the chin^[8] these styles of facial profiles. (fig:27)

➤ Straight profile

Retrognathic or lenticular profile
 prognathous or cotyloid profile

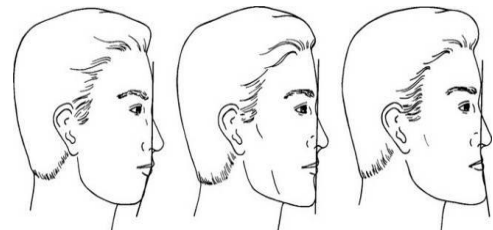


Fig:27- Facial profiles

➤ Color Of Teeth:

Basic color system: the colour chart is that the basic tool for combining colours. the primary circular color diagram was designed by Sir Isaac Newton in 1666.(fig:28) Over the years, several variations of the basic style are created, however the foremost common version may be a wheel of twelve colours, the first colours being red, yellow and blue. 3 secondary colours (green, orange and purple) area unit created by compounding 2 primary colours. ^[10]

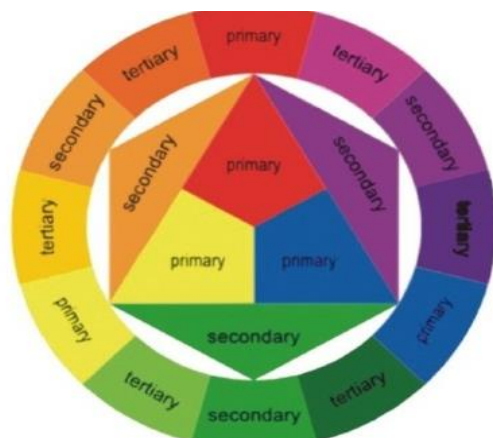


Fig:28- Color wheel

VI. THREE DIMENSIONS OF COLOR

1. Hue: "It is the quality that has a tendency to distinguish one color from other, as red from yellow, inexperienced from blue or purple". Hue may be a physiological and psychological interpretation of a total of wavelengths. [3]

2. Value: "Value," or brightness, is that the quantity of sunshine came back from Associate in Nursing object. Munsell delineated price as a white-to-black grey scale. Bright objects have lower amounts of gray and low price objects have larger amounts of gray and can seem darker. The brightness of a crown is sometimes increased in 2 ways: by lowering intensity or by increasing the reflectivity of the surface. Lowering price means that less lightweight returns from the lighted object and therefore the remaining lightweight is being absorbed or scattered elsewhere. [2]

3. Chroma: "Chroma" is that the saturation, intensity or strength of the Hue. If any dye say red) is supplementary into a glass of water and therefore the same dye is supplementary once more and once more, the intensity will increase, however the colour remains an equivalent (hue). As a lot of dye is supplementary, the mixture seems darker; so, the rise in intensity features a corresponding modification in price. As intensity is increased, is decreased: intensity and value area unit reciprocally connected. [5]

➤ *Selection of artificial teeth:*

In practice, appearances and purposes are often closely connected. appearance play a vital role inchoosing of artificial teeth. Artificial teeth are manufactured in a variety of shapes, sizes, and colors. The looks of the Denture is a blend of art and science. The operators experience is most significant for the selection and characterization of denture teeth. [4]

Based on cuspal morphology:

- a) Nonanatomic teeth b) 2 anatomic teeth c) Semi-anatomic teeth

➤ *Nonanatomic teeth:*

They are also known as cusplless teeth. They decreasesidewise forces applied on the denture, thereby makes the dental appliance more sturdy. Cusplless teeth can be balanced through the use of balancing ramps. (fig:29)

• *Uses:*

- 1.Minimize the sideways destabilizing forces.
- 2.Balanced occlusion is not necessary.
- 3.In unnatural jaw relationships.

• *Advantages:*

- 1.For free occlusal movement from centric to eccentric position.
- 2.Elimination of inclined forces.
- 3.Absence of interfaces when the denture is at work.

• *Disadvantages:*

- 1. They are not as esthetic looking as the cusped teeth
- 2.Balance is not obtained. [7]



Fig:29- Non anatomic teeth

➤ *Anatomic teeth:*

• *Indications:*

- 1.Aproper configured ridges gives good support and retention.(fig.30)
- 2.Balanced occlusion is executed.
- 3.It is possible to replicate and applyexact jaw relationships to the articulator.

• *Advantages:*

- 1. Balance of the occlusion obtained.
- 2.Chewing efficiency is more because of escapes for the food.
- 3.They look more alike to natural teeth. [1]



Fig:30- Anatomic teeth

➤ *Semi anatomic teeth:*

When the cusp incline is less steep (fig.31) than the conventional anatomic tooth forms of 33 degree it can be classified as modified or semi anatomic teeth(20 degree). [6]



Fig:31- Semi anatomic teeth

Based on material used:

- a) Acrylic teeth
- b) Porcelain teeth
- c) Porcelain acrylic combination

- **Acrylic teeth:**

Most widely used teeth material for complete dentures.

- **Indications:**

1. When the opposite arch teeth have gold crowns or inlays.
2. Decreases inter arch distance; the resin teeth help to grind and accommodate into the free space.
3. In removable partial denture, the contacting teeth with the clasps may need grinding.

- **Advantages:**

1. Less expensive.
2. Grinding and adjusting are easier.
3. Occlusal stresses are easily distributed.
4. Bonds chemically to the denture crown.

- **Disadvantages:**

1. Teeth surface abrades off quickly.
2. Vertical distance may be lost because of abrasion.
3. Discolours with time. ^[8]



Fig:32- Acrylic teeth

- **Porcelain teeth:**

These teeth do not fix chemically to the denture base, rather physically retained to the base material with the help of pins or channels within the teeth.

- **Indications**

1. When interridge space is present.
2. Well configured ridges
3. When high appealing look is required.

- **Contraindications:**

1. Poor mandibular ridges
2. When opposite arch teeth are present.

- **Advantages:**

1. Pleasing appearance
2. Does not discolour easily
3. Does not abrade.

- **Disadvantages:**

1. Clicking sound on contact.
2. Hard to grind and adjust.
3. Requires appropriate interridge width and length. ^[1]



Fig:33 – Porcelain teeth

VII. CONCLUSION

The appearance and functional tooth arrangement makes the complete denture compatible. Proper placement of teeth should be appealing to improve the mentality of the patient. The selection of anterior teeth must be purposely and carefully incorporate into the treatment plan by dentist^[8]. The science behind the denture fabrication helps the aged patient in maintaining functional and mental health. The selection of teeth mainly depends on the type of patient and the condition of the supporting tissues. The selection of teeth is the responsibility of the dentist which he acquires through knowledge and experience^[4]

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