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### RESEARCH ARTICLE

## EMERGING TRENDS IN ESTHETICS IN PROSTHODONTICS.

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### Abstract

There has been an increasing concern in esthetics and appearance amongst the patients. Hence, the fabrication of a life like prosthesis has become the need of the hour when expected. Demands of the patients regarding their looks and esthetics and the ease and the convenience of the clinician is accomplished with the application of digital dentistry as such.

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### Introduction:-

Esthetics is a major concern in today's world. People are spending millions in order to have celebrity looks and shapes. There is an increase rate in patients' demands for esthetics. In dentistry smile designing is an emerging trend that will satisfy patients' needs for a pleasant smile. In order to have an attractive smile, both facial and dental assessments should be carried out. The fundamental criteria for fulfilling esthetics are facial, dentogingival and dental esthetics. In recent years several software programs for digital smile design have been introduced which will improve diagnosis, communication and enhance the treatment predictability.

Facial analysis is performed using reference lines which include both vertical and horizontal reference lines. Horizontal lines are interpupillary and intercommissural lines while vertical reference lines include facial midline, dental midline and mandibular midline. They are crossed against each other to assess symmetry.

Dentogingival analysis includes parameters of gingival health and morphology such as interdental papillae, gingival contour, gingival zenith, buccal corridor, black triangle. Dental analysis includes tooth size, shape and colour of restored tooth. Many theories regarding esthetics which include golden proportion, width to length ratio, pounds theory, law of harmony, dentogenic theory and latest is visagism(1).

### Discussion:-

Advances in ceramic and veneering materials help the dentist to restore function and aesthetics using conservative and minimally invasive technique. Advantages of porcelain veneers are they are extremely natural looking. The porcelain veneer and tooth enamel are white and translucent so they reflect in similar manner. Their smooth glazed surface are stain resistant and durable(2).

Emergence of characterization in the field of prosthodontics lead to a new path of visual treatment. Characterization of denture base means it mimics the natural colour, shading and surface texture of natural oral tissues. Pattanaik et al reported the use of auto polymerised pour type denture base resin and acrylic stain for denture base characterization(3). Denture Base characterization is defined in the glossary of prosthodontics terms by the Academy of Prosthodontics as modification of the form and colour of the denture base and teeth to produce a more life like appearance. Enhancement of white esthetic factors (artificial teeth) modification of shape and size of artificial teeth can be carried out based on patients age, sex and personality and pink esthetic factors (denture base) can be

enhanced by characterization of the denture base. A questionnaire survey was carried out in 2016 on denture esthetics and denture base characterization. The results show that participants gave an importance to denture esthetics and denture gum appearance. Females below 75 yrs demanded for characterization in denture base in order to have natural appearance(4)

Technique available for interim fabrication by clinician is indirect method, direct method. Indirect interim restoration can be made by additive or subtractive methods. Additive methods include layering of different hues, opacities and modification of self cure acrylic resin. Subtractive methods such as indirect sandwich technique in which the dentin shaded self cure is cut back from full contour. It is then characterized internally and veneered with more translucent enamel layer. Direct approach include using of either overimpression templates from diagnostic models and wax ups(5)

Though various treatment modalities have been introduced, implant has become the choice of treatment among patients. But the unfavourable conditions of the alveolar ridge due to atrophy reduce the vertical and horizontal bone volume. The overall gingival contour around the teeth is important for predicting a successful esthetic outcome after replacement of teeth in implant therapy. Advances of CAD/CAM along with highly efficient artistic skills enable to create life like ceramic tooth replacements. Currently used materials for replacement of artificial gingiva are different forms of ceramic, acrylic and composites. Pink ceramic restorations repairs maxillofacial defects and compensate for inadequate maxilla and mandibular relationships. It reduces the need for technique-sensitive surgical procedures thus decreasing cost and time. Despite developments in pink ceramics, there are obviously significant limitations in the colour matching, characterization of pink porcelain, difficulty in handling materials(6).

Advances of electronic technology has provided solutions for shade selection and colour matching in dentistry. Various equipments used for colour matching are

1. Colorimeters
2. Spectrophotometers
3. Digital camera as filter colorimeter
4. Spectrophotometers and spectroradiometers

Advantage of digital shade analysis is that

1. It eliminates the subjectivity of colour analysis and provide correct information for the laboratory fabrication
2. Can be repeatedly verified
3. No influence of external environment
4. Less chair side time
5. The reading can be translated to the materials that can produce exact characteristics(7)
6. Eye fatigue is also reduced

Visagism is designing smile based on persons attitude and behaviour which will make it more life-like. Personality can be determined through various methods but most popular method is self-reporting questionnaire asking the participants to mark the statements that describe their behaviour. This forms the basis of novel concept called visagism. The concept of visagism is derived from French name 'visage' meaning face.

According to Hippocrates, an individual's personality is formed by 4 temperaments: choleric, sanguine, melancholic and phlegmatic.

#### **Choleric/Strong:**

These individuals are characterized by strong leadership qualities and brave. They have rectangular face with well defined angles. The central incisors are rectangular and the long axis of central incisors is perpendicular to horizontal plane. Line connecting the embrasures is horizontal between central and lateral incisors

#### **Sanguine/dynamic:**

They are very active and have angular face. The long axis of maxillary anterior teeth is inclined slightly distally and central incisors are triangular/trapezoidal. Connection lines of the embrasures and incisal plane are descend from the medial plane.

**Melancholic/sensitive:**

This personality is characterised by kindness. They have oval face with rounded features. The central incisors are oval in shape and the long axis of maxillary anterior teeth is distally inclined. An inverted incisal plane is formed by the connection lines of embrasures descending from medial line.

**Phlegmatic/peaceful:**

These individuals are kind, cautious and diplomatic. They have round or square face. The central incisors are small and square shaped and the long axis of maxillary anterior teeth is perpendicular to the horizontal plane. Connection lines of the embrasures are straight.

According to a study by Anuradhasharma, a photographic study was planned to find

1. Correlation between tooth form and temperament.
2. Position of long axis of maxillary anterior teeth to horizontal plane in each temperament
3. Connection lines of the embrasures

The results show that there is definite correlation found between temperament and different parameters of smile. Visagism is a novel concept that applies principles of visual art to the composition of customized smile. Using this method we can design a smile which will correlate with patients physical appearance and attitude. (8)

Different DSD programs include Photoshop CS6, Keynote, Smile Designer PRO (SDP), Aesthetic Digital Smile Design (ADSD - Dr Valeiro Bini), Serec S W 4.2, Planmeca Romexis Smile Design (PRSD), VisagiSMile, DSD app by Coachman. Photoshop CS6 and keynote are not specifically made for DSD but it is used by many dentists which has reported in several studies too. SDP and ADSD are popularised as specialised digital design programs. Cerec SW 4.2 and PRSD are CAD/CAM designs that can be used for anterior restoration which requires frontal photograph and intraoral digital impression

**Table 4** Total score of facial, dentogingival and dental analysis features found in the analyzed DSD programs.

Software	Score out of 20
Photoshop CS6	20
Keynote	19
Aesthetic Digital Smile Design	18
Cerec 4.2 software	13
DSD App by Coachman	10
Smile Designer Pro	10
VisagiSMile	10
Planmeca Romexis Smile Design	10

This table shows the total scored by different DSD programs after analysing the facial, dentogingival and dental features. Here the maximum is scored by Photoshop CS6 and Keynote which can be used for orthodontic and surgical reconstruction. Disadvantage is that training skills are required to use these software for smile design. ADSD is the only dentist specific program that includes a comprehensive facial analysis to complement dentogingival and dental analysis. Cerec SW 4.2 could construct a 3D digital model of the patient's face to have control over digitally designed restoration. Concept of visagism is used in VisagiSMile (1)

With the advance of 3 dimensional intraoral scanner, it helps to produce a design that closely represents definitive smile for patient evaluation and trial restoration. They also help to make digital impression of the prepared tooth, to process the restoration in computer aided design and computer aided manufacturing and allow complete digital workflow.

Martins et al in 2017 described a case report describing disharmony of anterior teeth. Smile design was developed using software (3 shape dental system). Final design was concluded using vertical and horizontal lines according to symmetry and proportion. The final design was printed to make trial restoration. Teeth were minimally prepared for

receiving veneers which is cemented using light polymerising resin cement. Result shows that the virtual design contributed to a satisfactory and predictable outcome(9)

### **Conclusion:-**

Esthetics is an advancing field in prosthodontics. Level of esthetic requirement in clinical practice is increased over the past decade. It has made it necessary for the dentist to explore this field to satisfy the existing demands of the patients. Introduction of digital tools has contributed to satisfactory and predictable esthetic outcomes. Dentist and dental technicians should be aware of the emerging trends and be able to use it to the advantage of patients

### **References:-**

1. Omar D, Duarte C. The application of parameters for comprehensive smile esthetics by digital smile design programs: A review of literature. The Saudi Dental Journal. 2017 Sep 23.
2. AlJehani YA, Baskaradoss JK, Geevarghese A, AlShehry MA. Current Trends in Aesthetic Dentistry. Health. 2014 Aug 6;6(15):1941.
3. Pattanaik B, Pattanaik S. Characterization of a denture base using autopolymerized pour-type denture base resin and acrylic stain. Journal of prosthodontic research. 2013;57(2):145-6
4. Matsuda, Ken-ichi et al. A questionnaire survey on denture esthetics and denture base characterization. Journal of Prosthodontic Research, Volume 60, Issue 3, 224 – 226
5. Chris barwacz et al. direct extrinsic characterization .maximum esthetics for fixed interim restorations. Journal of cosmetic dentistry .spring 2013;vol 29;number 1
6. Shruthi Eshwar., et al. "Pink Ceramic in Esthetic Soft Tissue Reconstruction – A Case Report". EC Dental Science 9.2 (2017): 60-64.
7. Smitha AJ, Savitha PN. Shade Matching in Aesthetic Dentistry–From Past to Recent Advances. J Dent Oral Care Med. 2017;3(1):102.
8. Sharma A, Luthra R, Kaur P. A photographic study on Visagism. Indian Journal of Oral Sciences. 2015 Sep 1;6(3):122.
9. Martins AV, Albuquerque RC, Santos TR, Silveira LM, Silveira RR, Silva GC, Silva NR. Esthetic planning with a digital tool: A clinical report. Journal of Prosthetic Dentistry. 2017 Dec 1;118(6):698-702.