DIGITAL SMILE DESIGNING

Presented By-
Dr. Ruquaya Bashir
Reader, Dept. of Prosthodontics and Crown & Bridge
Saraswati Dental College and Hospital, Lucknow

INTRODUCTION

"Peace begins with a smile" - Mother Teresa.

- The principles of smile design require an integration of esthetic concepts that harmonize facial esthetics with the dental facial composition and the dental composition.

SMILE DESIGN:
GENDER
PERSONALITY
AGE

DIGITAL SMILE DESIGN (DSD)

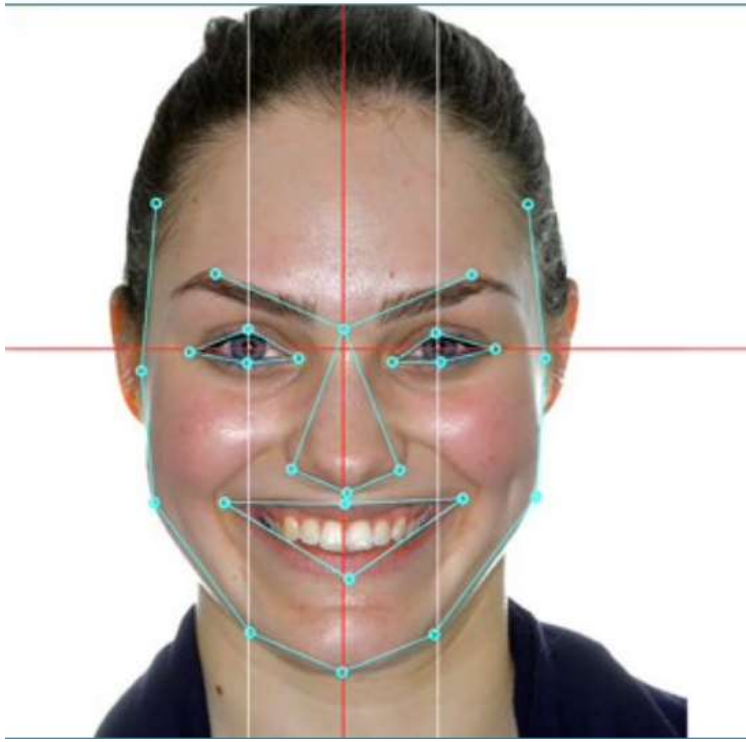
IT WAS INTRODUCED BY AMERICAN TECHNICIAN TURNED DENTIST DR. CHRISTIAN COACHMEN IN 2004

VITAL ELEMENTS OF SMILE DESIGNING

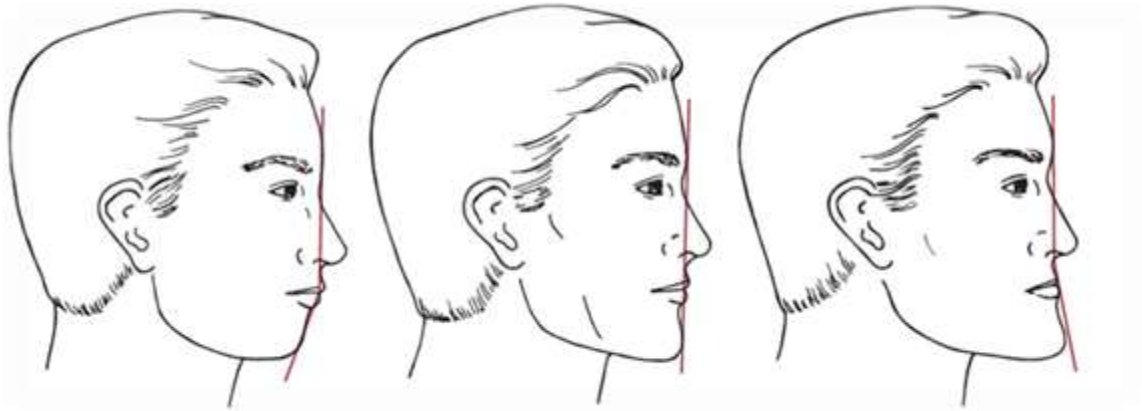
FACIAL FEATURES

facial height
facial shape
facial profile
gender
age.

#The width of the face is typically the width of five ‘‘eyes’’

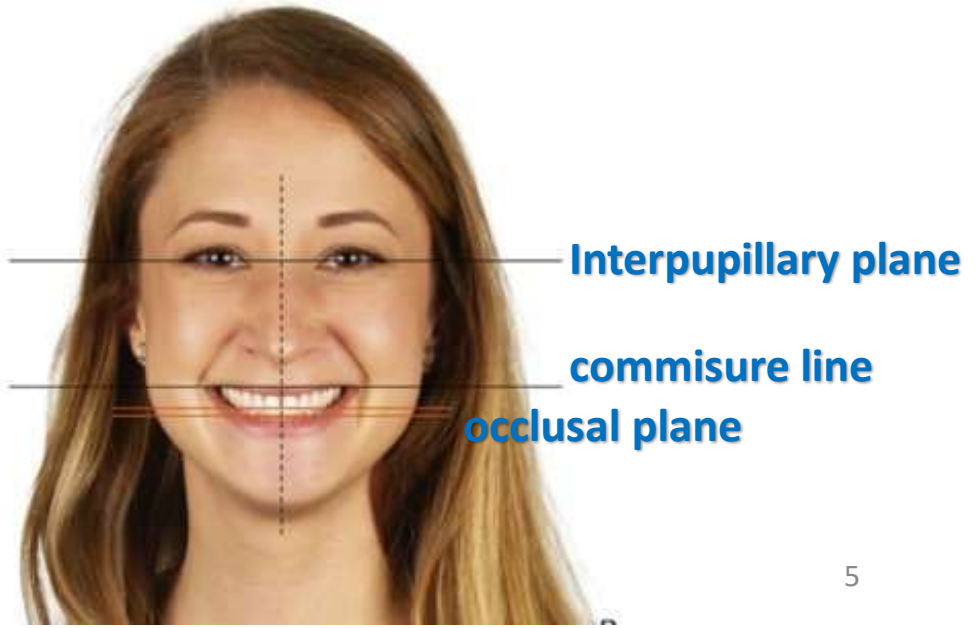


THE FOUR BASIC FACIAL ARE- SQUARE, TAPERING, SQUARE TAPERING, AND OVOID.



Lateral facial profiles

INTERPUPILLARY PLANE
COMMISSURE LINE
OCCLUSAL PLANE
THESE THREE FEATURES MOST STRONGLY INFLUENCE DENTAL–FACIAL COMPOSITION



VITAL ELEMENTS OF SMILE DESIGNING

SOFT TISSUE ELEMENTS

LIP ANALYSIS

In general terms, a smile that is at least half the width of the face, at that level of the face, is considered esthetic.

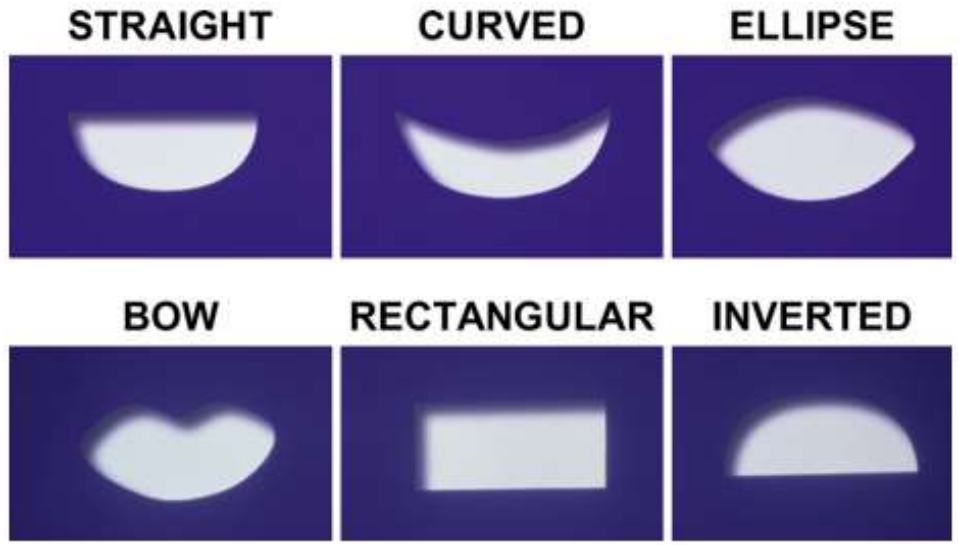
An average lip line exposes the maxillary teeth and only the interdental papillae.

Average Lip Line

Low Lip Line

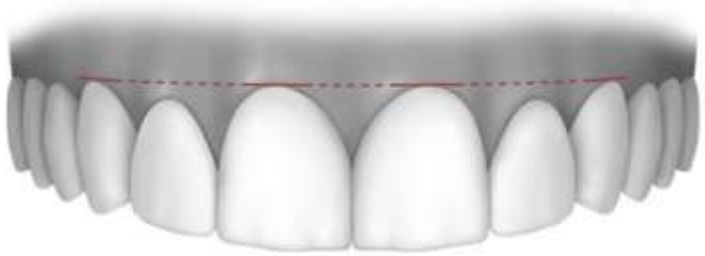
High Lip Line
(Gummy Smile)

The space that includes the teeth and tissues is called the **smile zone.**

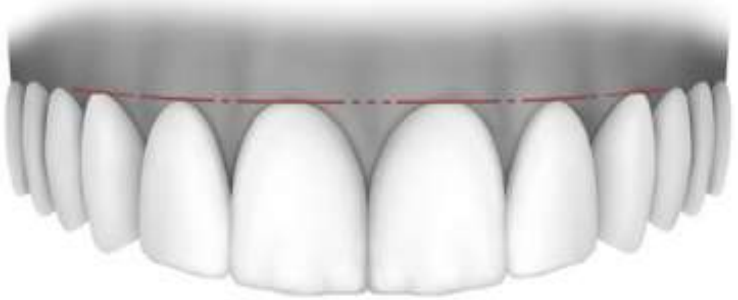


Gingival Health, Symmetry, And Architecture Are Key Yet Often Overlooked In Smile Design.

An unfilled interdental space creates an unattractive black triangle in the gingival embrasure



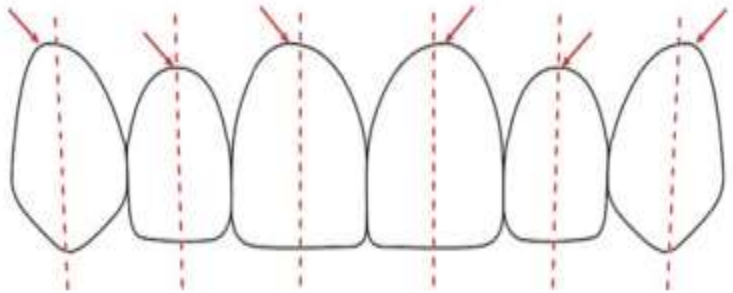
Ideal



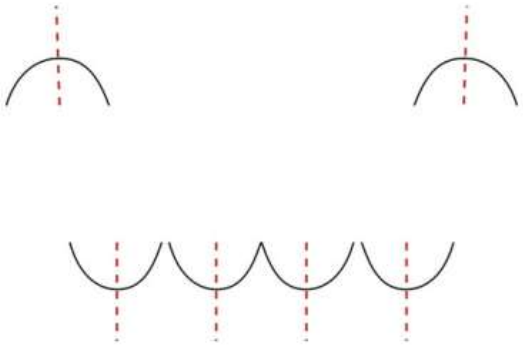
Aesthetically acceptable

Aesthetically unacceptable

The gingival zenith is usually distal to the long axis on maxillary centrals and canines.

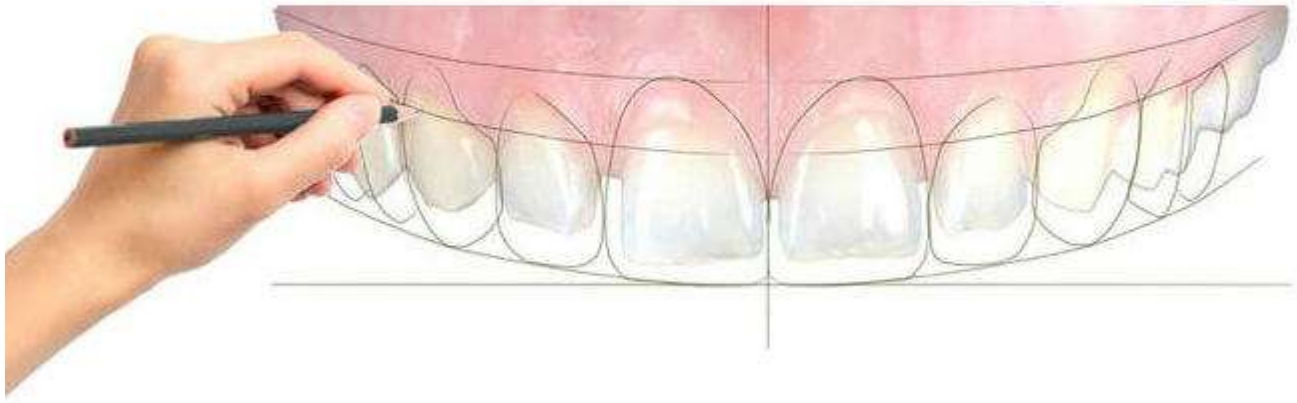


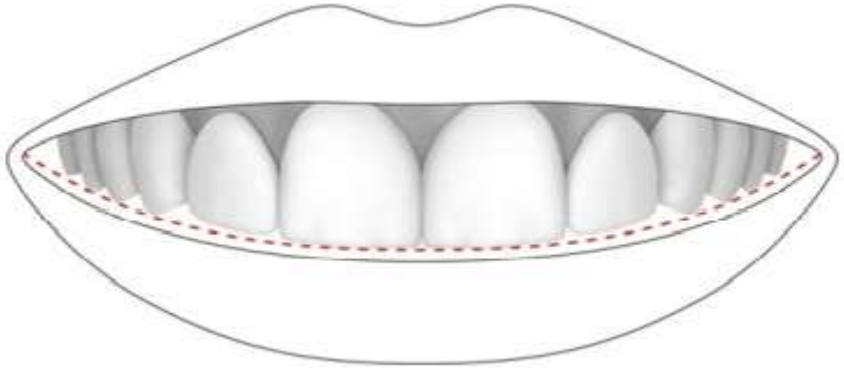
For maxillary laterals and mandibular incisors, the zenith aligns with the tooth's long axis.

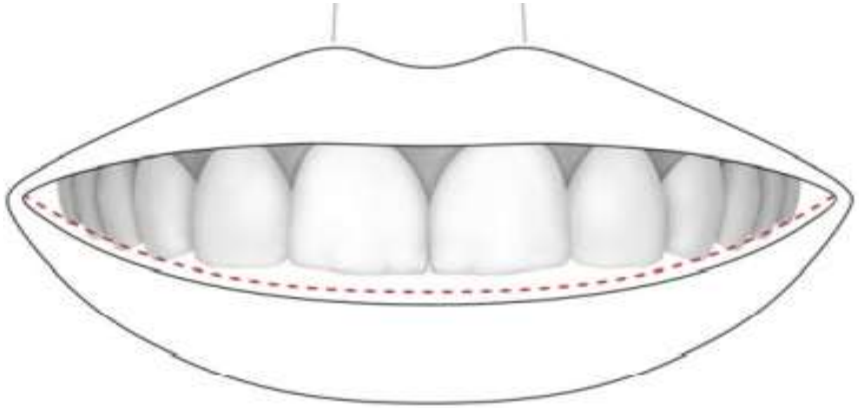


VITAL ELEMENTS OF SMILE DESIGNING

DENTAL ELEMENTS

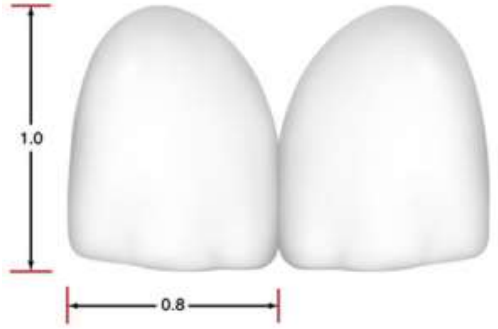






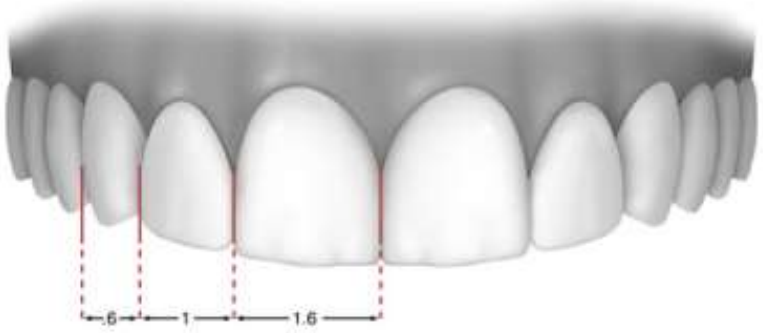
- **An attractive smile line follows the lower lip curve, with centrals slightly longer than cuspids; a reverse smile line looks aged.**

- **Central incisor height is ~1/16 facial height, W/H ratio 4:5, too long if lip interference occurs, too short if below molar-cuspid line**



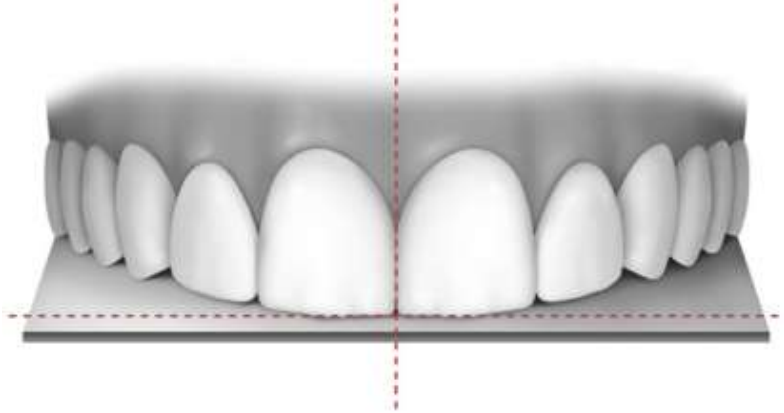
<u>VARIOUS GUIDELINES FOR ESTABLISHING CORRECT PROPORTIONS IN AN ESTHETICALLY PLEASING SMILE ARE-</u>

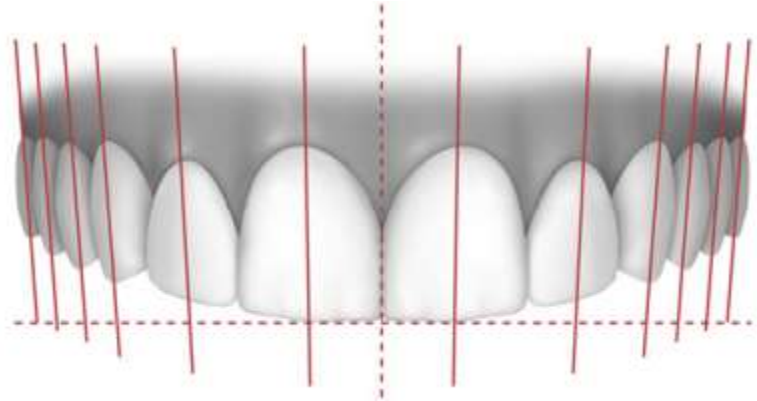
1. Golden proportion (lombardi),
2. Recurring esthetic dental proportions (ward),
3. M proportions (methot)
4. Chu's esthetic gauges.



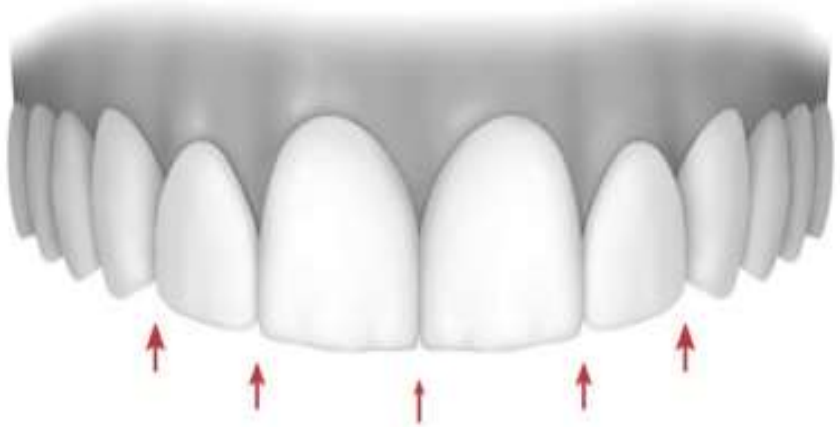
THE GOLDEN PROPORTION SUGGESTS AN IDEAL MATHEMATICAL PROPORTION OF 1:1.618.

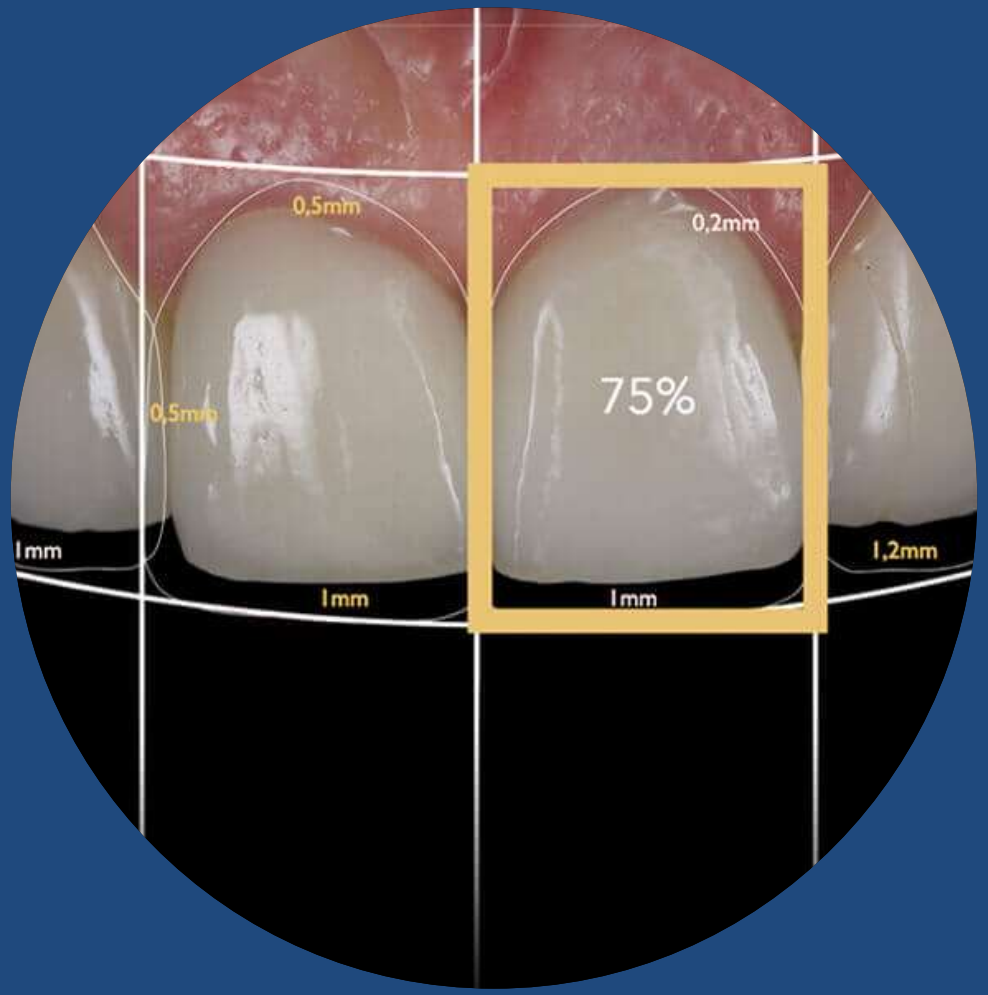
The smile midline aligns the face and teeth, allowing a maximum 2 mm deviation.





Incisal embrasures increase from central to canine, with apically moving contacts; too shallow looks boxy, too deep looks pointed, proper variation ensures harmony.





DIGITAL SMILE DESIGN

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

Types of software for DSD-

1. KEY-NOTE SOFTWARE (IWORK)
2. PHOTOSHOP CS6 (ADOBE SYSTEMS INCORPORATED),
3. MICROSOFT POWERPOINT (MICROSOFT OFFICE, MICROSOFT, REDMOND, WASHINGTON, USA).
4. SMILE DESIGNER PRO (SDP) (TASTY TECH LTD),
5. AAESTHETIC DIGITAL SMILE DESIGN (ADSD - DR. VALERIO BINI),
6. CEREC SW 4.2 (SIRONA DENTAL SYSTEMS INC.),
7. PLANMECA ROMEXIS SMILE DESIGN (PRSD) (PLANMECA ROMEXIS®), VISAGISMILE (WEB MOTION LTD),
8. DSD APP BY COACHMAN (DSDAPP LLC),
9. GUIDED POSITIONING SYSTEM (GPS)
10. DSS (EGSOLUTION)
11. NEMODSD (3D)
12. EXOCAD DENTALCAD 2.3

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

1. The Cross-

Two lines must be placed on the center of the slide, forming a cross.

The facial photograph with the teeth apart should be positioned behind these lines.

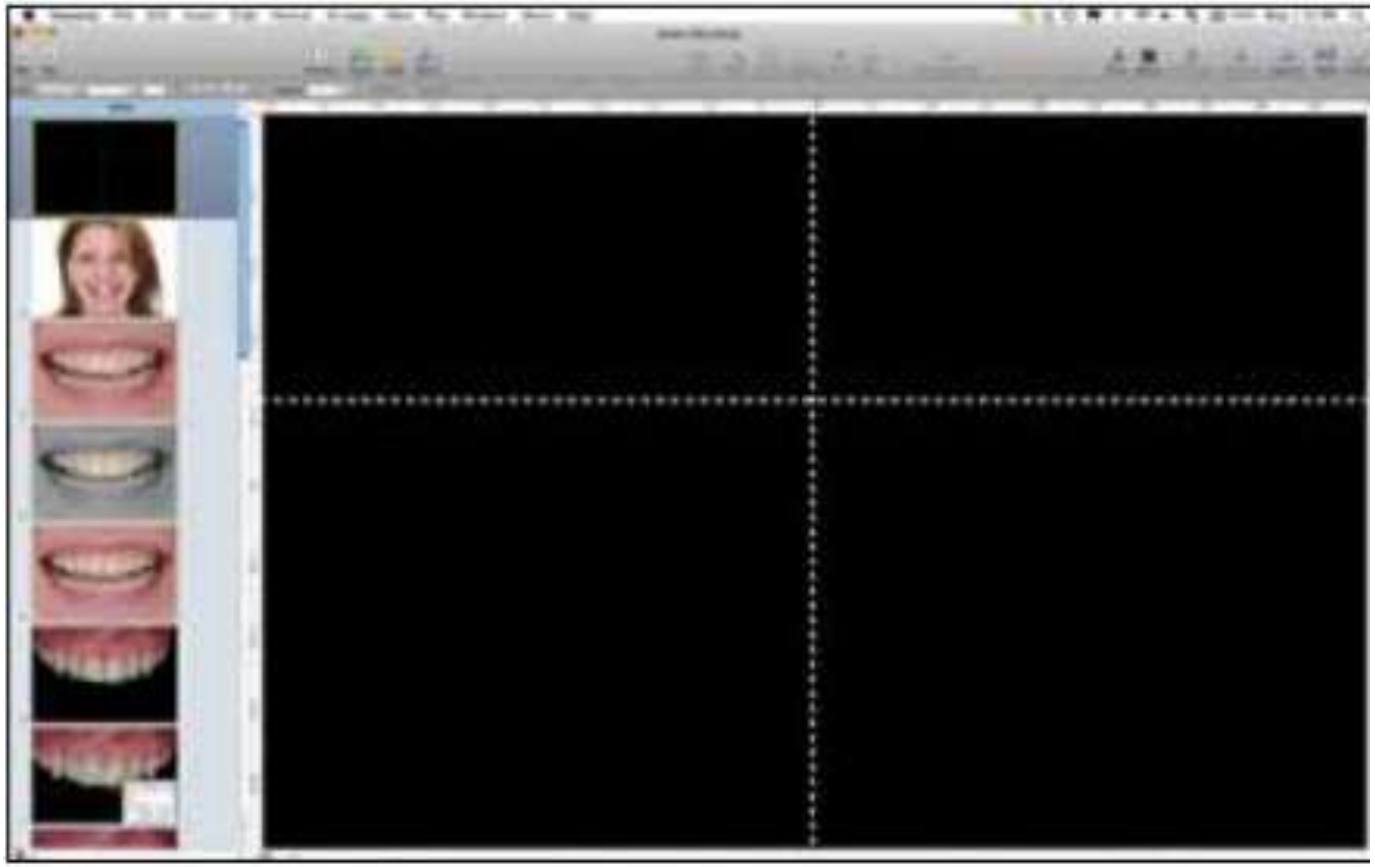


Fig 1 Slide presentation software (Keynote, iWork, Apple) with crossing lines placed on the middle of the slide.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

DSD WORKFLOW

Essential Photographic Views

- Photos needed: full-face at rest, full-face with wide smile, and retracted maxillary arch with teeth apart.

Recommended Video

- A short video capturing the patient's concerns, expectations, and all smile and dental positions, including 45° and profile views.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

2. Digital Facebow-

The interpupillary line sets the horizontal plane, then the facial midline is outlined using the glabella, nose, and chin

Fig 2 The facial photograph with a wide smile and the teeth apart is moved behind the cross to determine the ideal horizontal plane and vertical midline (ie, the digital facebow).

3. Smile Analysis-

Dragging the horizontal line over the mouth helps evaluate smile alignment and detect midline or occlusal plane canting.

facial photograph with a wide smile and the
t is moved behind the cross to determine the
ontal plane and vertical midline (ie, the digital

Fig 3 Transferring the cross to the smile: grouping the lines with the facial photograph and zooming in to analyze the relationship between the facial lines, lips, teeth, and gingiva.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

4. Smile simulation-

Simulations can be performed to fix the incisal edge position, canting, shifting, tooth proportions, and soft tissue outline

5. Transferring the cross to the intraoral images-

Line 1: canine tip to contralateral canine tip
Line 2: central incisor edge to contralateral central edge
Line 3: dental midline from interdental papilla to incisal embrasure

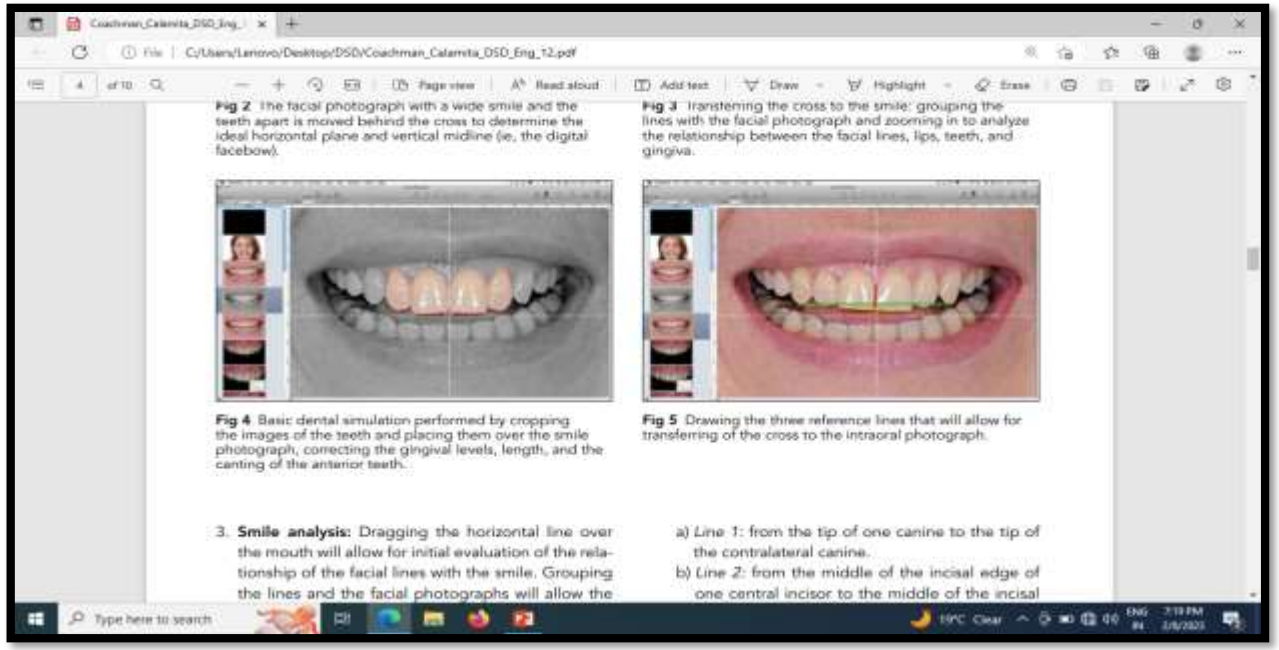


Fig 2 The facial photograph with a wide smile and the teeth apart is moved behind the cross to determine the ideal horizontal plane and vertical midline (ie, the digital facebow).

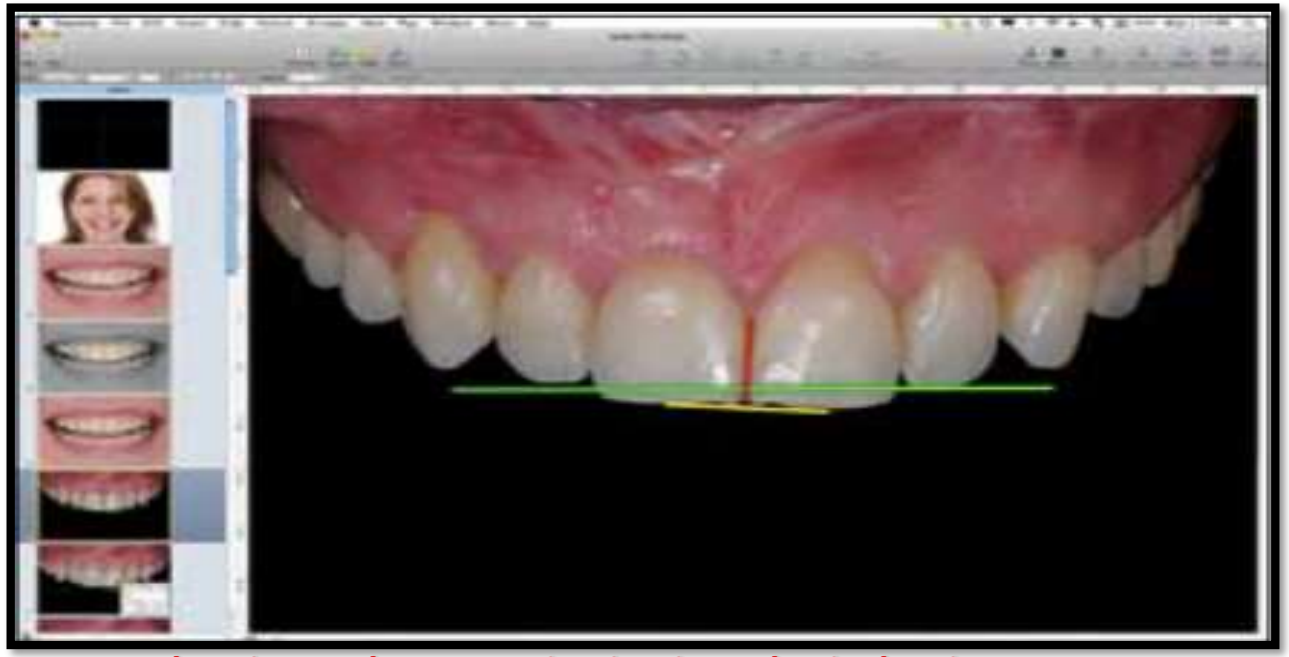
Fig 3 Transferring the cross to the smile: grouping the lines with the facial photograph and zooming in to analyze the relationship between the facial lines, lips, teeth, and gingiva.

Fig 4 Basic dental simulation performed by cropping the images of the teeth and placing them over the smile photograph, correcting the gingival levels, length, and the canting of the anterior teeth.

Fig 5 Drawing the three reference lines that will allow for transferring of the cross to the intraoral photograph.

3. **Smile analysis:** Dragging the horizontal line over the mouth will allow for initial evaluation of the relationship of the facial lines with the smile. Grouping the lines and the facial photographs will allow the

a) *Line 1:* from the tip of one canine to the tip of the contralateral canine.
b) *Line 2:* from the middle of the incisal edge of one central incisor to the middle of the incisal



Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

6. Measuring the tooth proportions-

Measuring the width/ length proportion of the central incisors is the first step toward understanding how to best redesign the smile.

7. Tooth Outline-

Tooth outlines can be drawn over the photograph, or premade tooth outlines can be copied and pasted.

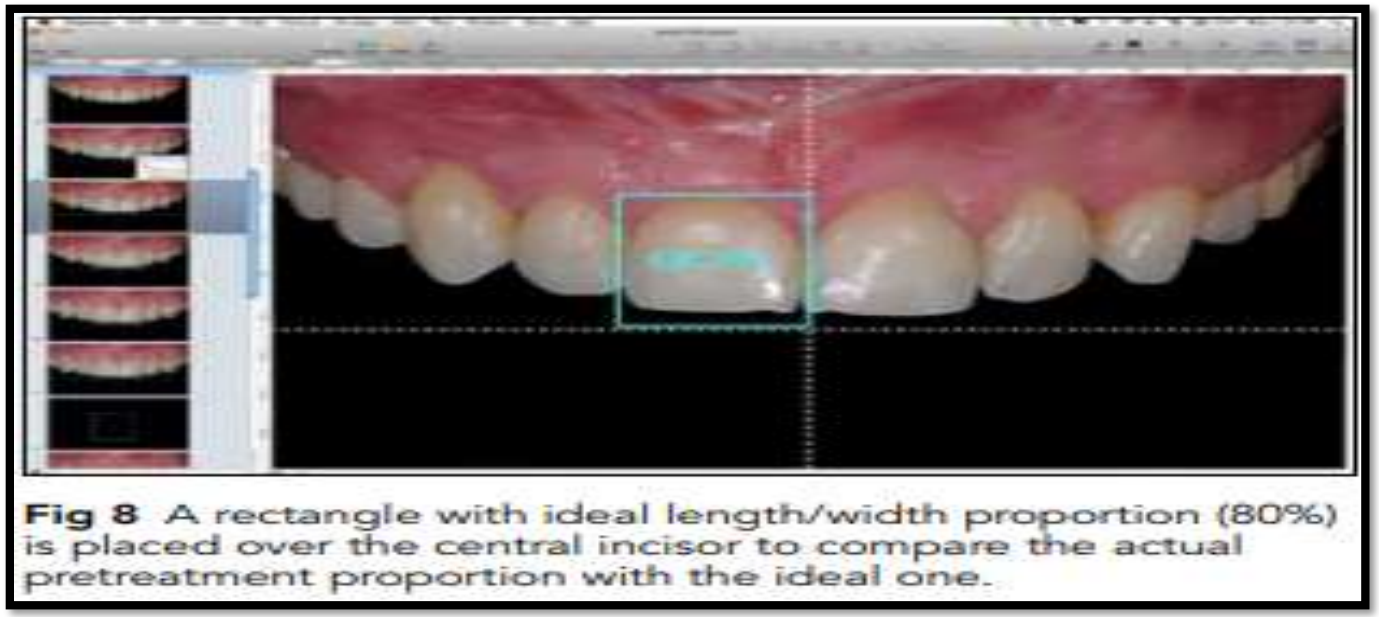


Fig 8 A rectangle with ideal length/width proportion (80%) is placed over the central incisor to compare the actual pretreatment proportion with the ideal one.

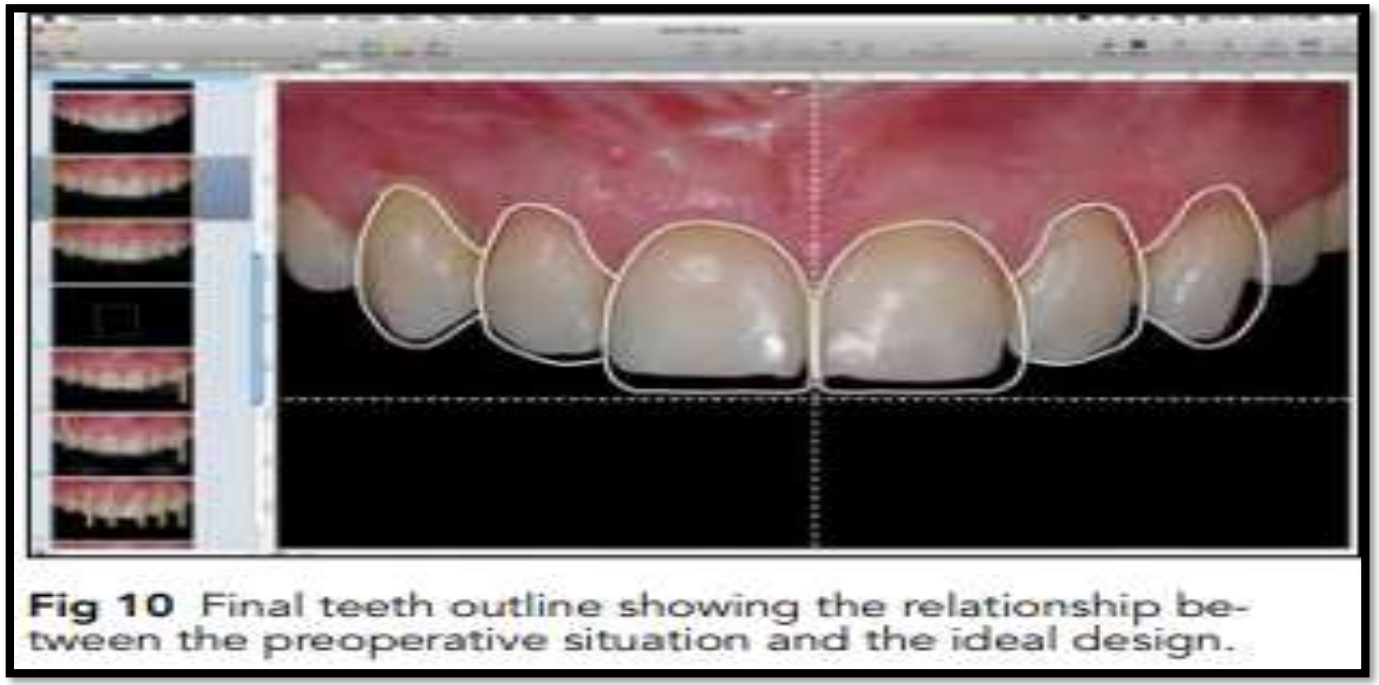


Fig 10 Final teeth outline showing the relationship between the preoperative situation and the ideal design.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

8. White & Pink esthetic evaluation-

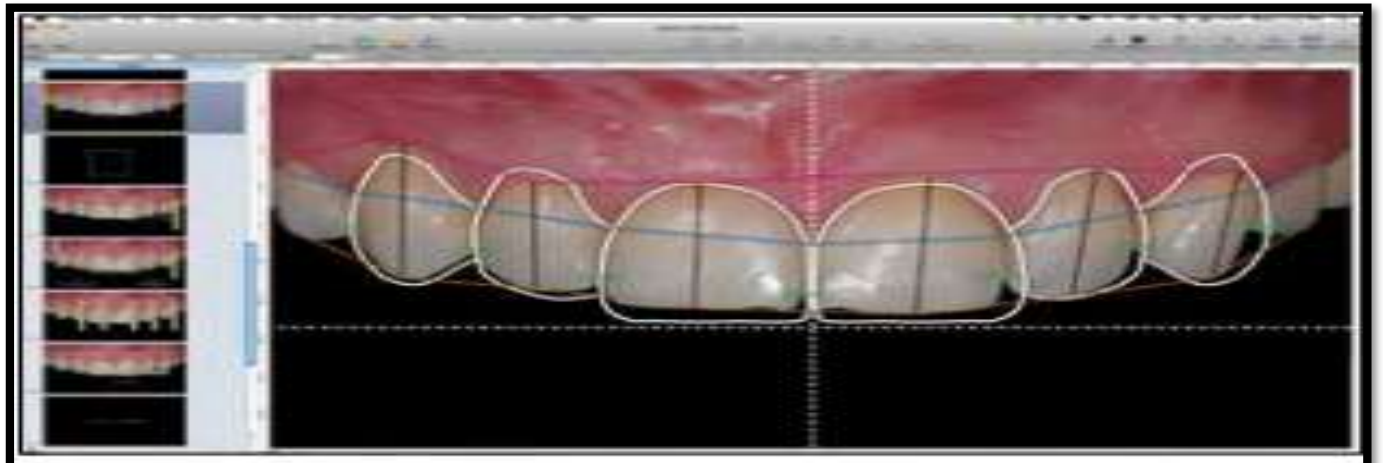


Fig 11 Other drawings and lines can be added as needed to help visualize the esthetic issues and improve the efficiency of communication.

9. Digital ruler calibration-

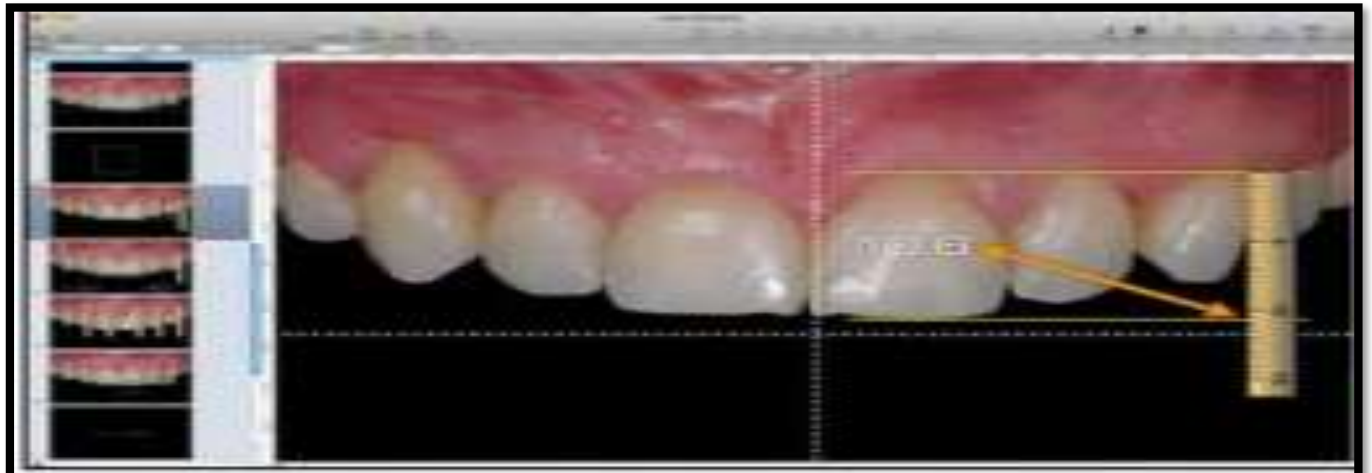


Fig 13 Calibrating the digital ruler on the slide by shrinking/stretching until it matches the measurement done on the cast. The digital ruler is a photograph of a ruler (JPEG file) that is dragged on top of the slide and can be positioned as necessary.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

10. Transferring the cross to the cast-

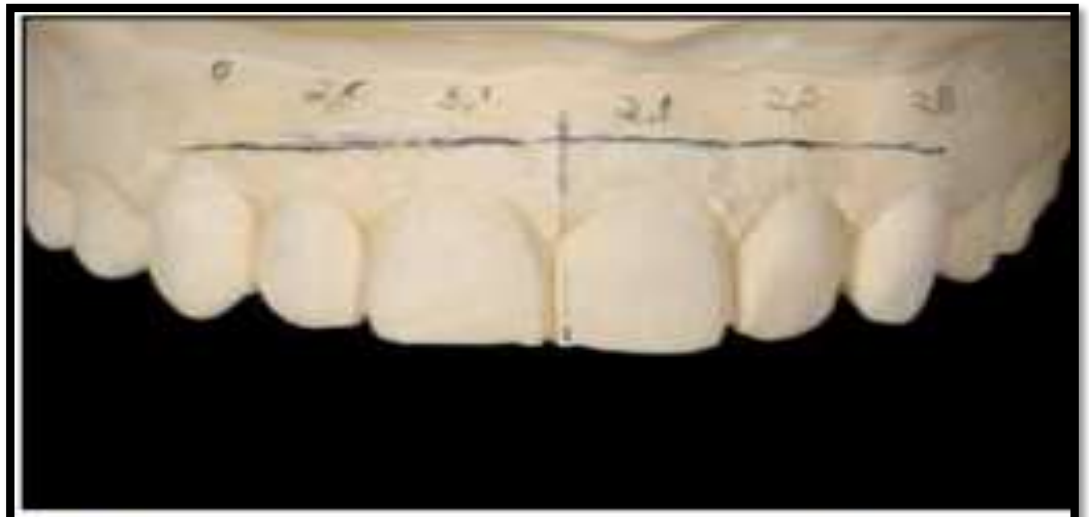


Fig 17 All the measurements are transferred to the cast, and the cross is drawn.

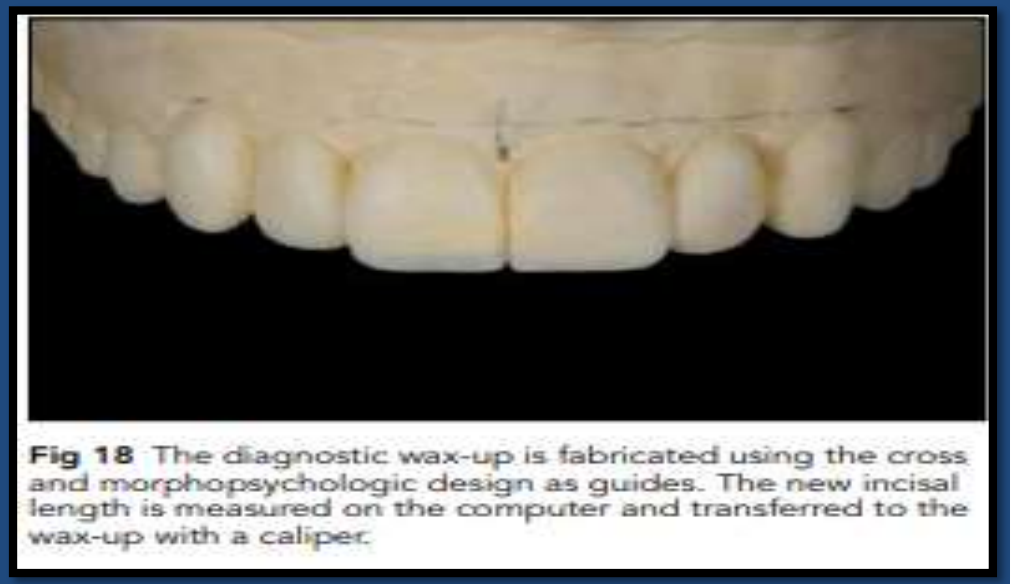


Fig 18 The diagnostic wax-up is fabricated using the cross and morphopsychologic design as guides. The new incisal length is measured on the computer and transferred to the wax-up with a caliper.

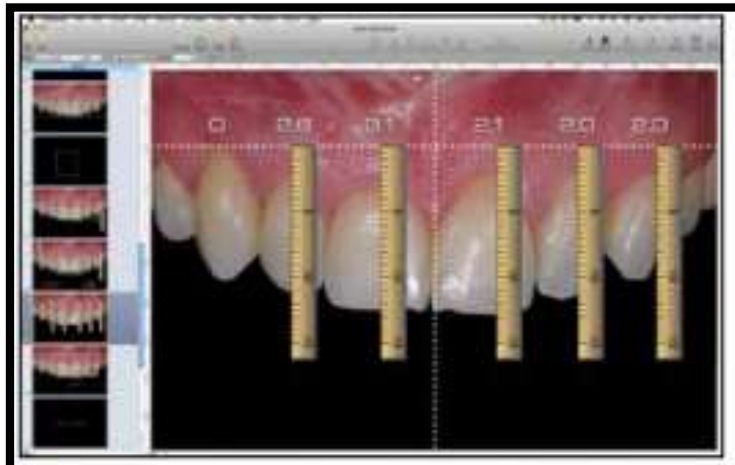


Fig 15 The horizontal line is placed randomly above the gingival margin of the anterior teeth. This distance is then measured and transferred to the stone cast using the digital ruler.

Fig 16 Measuring the discrepancy between the facial midline and dental midline.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

11. Test Drive-

Fig 19 Try-in provisional made with bis-acrylic resin is obtained from a silicone index fabricated on top of the diagnostic wax-up.

12. Tooth preparation & Fabrication of prosthesis-

Fig 20 Final minimally invasive tooth preparation guided by the silicone indexes.

Fig 20 Final minimally invasive tooth preparation guided by the silicone indexes.

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

13. Cementation of prosthesis-

Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2018 Apr;35:103-11.

Conclusion

The Digital Smile Design is a multi-use tool that can assist the restorative team throughout treatment, improving the dental team's understanding of the esthetic issues and increasing patient acceptance of the final result

REFERENCES

1. Bhuvaneswaran M. Principles of smile design. J Conserv Dent 2010;13:225-32 3).
2. Davis NC Smile Design. Dent Clin N Am. 2007;51:299-318.
3. Coachman C., Yoshinaga L., Calamita M., Sesma N. Digital smile design concepts. The Technologist. 2014
4. Coachman C., Calamita M. Digital smile design: a tool for treatment planning and communication in aesthetic dentistry. Quintessence Dent Technol. 2012;35:103– 111.
5. Chu, Stephen J, and Mark N Hochman. “A biometric approach to aesthetic crown lengthening: part I--midfacial considerations.” Practical procedures & aesthetic dentistry : PPAD vol. 20,1 (2008): 17-24; quiz 26.

THANK YOU...