TATYASAHEB KORE DENTAL COLLEGE AND RESEARCH CENTRE
NEW PARGAON – 416 113

Tal.: Hatkanangale Dist.:Kolhapur (Maharashtra State)

National Dental Commission

INFORMATION REGARDING INSTITUTIONAL COMPLIANCE

4. Clinical Compliance

4.2 Student clinical work registers are updated regularly.

Mahatma Gandhi Charitable Medical Trust,Warananagar

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE, NEW PARGAON.

RECOGNISED BY DENTAL COUNCIL OF INDIA, NEW DELHI.

AFFILIATED TO MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK.

'SERVICE IS RELIGION'

WARANA HEALTH MOVEMENT Est : 1 9 9 2

ORTHODONTICS & DENTOFACIAL ORTHOPEDICS

CLINICAL RECORD BOOK

NAME Pranjal Bhalchandra Tandale

Permanent Registration No. BAB012020091 9 .

ROLL NO. 02

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE NEW PARGAON

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon Tal. Hatkanangle
Dt. Kolhapur 416 13-

DEPARTMENT OF
ORTHODONTICS & DENTOFACIAL ORTHOPEDICS

CERTIFICATE

This is to certify that this is a bonafide clinical work done in Department of Orthodontics & Dentofacial Orthopedics by Mr./ Miss Pranjal Bhalchandra Tandale

Reg. No. BABO120200919 *student of the year* 2024-25

as prescribed by Maharashtra University of Health Sciences, Nashik.

Professor & Head of the Department

Place : New Pargaon

Date : 2/09/2025

DEPARTMENT OF ORTHODONTICS
& DENTOFACIAL ORTHOPEDICS
TKDC & RC ... NEW PARGAON.

Signature of the Examiners

(1)

(2)

Signature of the Staff Incharge

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New Pargaon, Tal. Hatkanangle
Dist. Kolhapur 416 13...

LIST OF INSTRUMENTS & MATERIALS

1) Young's Universal Plier.
2) Adam's Plier.
3) Wire Cutter.
4) Mc' Intosh Sheet.
5) Graph Paper.
6) Pencil,scale, Eraser, Sharpener, permanent marker.
7) Glass Marking Pencil.
8) Orthodontic Wires

1.0 mm	(19 gauge) -	1 Packet
0.9 mm	(20 gauge) -	1 Packet
0.8 mm	(21 gauge) -	1 Packet
0.7 mm	(22 gauge) -	1 Packet
0.6 mm	(23 gauge) -	1 Packet
0.5 mm	(24 guage) -	1 Packet

9) Dividers
10) Brass Wire
11) Calculator

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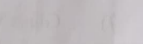
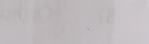
THIRD YEAR POSTING

Sr.No.	Work Done	Page No.	Grade	Wire Used	Staff Signature
1.	Straightening of wire of 15 cms length	1	A A	0.8 mm 0.9 mm	
2.	Triangle of each side 2 inches	1	B++	0.8 mm	
3.	Square of each side 2 inches	2	B+	0.8 mm	
4.	Circle of radius 2.5 cms	2	B+	0.7 mm	
5.	 '5U' of each segment 1 cms	3	B+	0.8 mm	
6.	 '5V' of each segment 1 cms	3	B++	0.8 mm	
7.	'C' clasp with mesial tag arm on 16	5	B	0.9 mm	
8.	'C' clasp with distal tag arm on 26	6	A	0.9 mm	
9.	Jackson's clasp on 16 and 26	8	B++ B++	0.9 mm	
10.	Triangular clasp between 14-15, 15-16, 24-25, 25-26.	9	B++ B++	0.7 mm	

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Principal
T. K. D. C. & Research Centre,
New Pargaon, Tal. Hatkanangle
Dt. Kolhapur 416 13

FINAL YEAR POSTING

Sr.No.	Work Done	Page No.	Grade	Wire Used	Staff Signature
1	Adam's clasp on 16, 26	11	B B+	0.7 mm	ok ok
2.	Adam's clasp on 14	11	B+	0.7 mm	Sri
3.	Adam's clasp on 23	12	B+	0.7 mm	ok
4.	Adam's clasp on 11, 21	12	B+	0.7 mm	ok
5.	Single Cantilever Springs	13	B+	0.6 mm	ok
6.	Double Cantilever Springs	14	A	0.6 mm	ok
7.	Finger Spring for mesial movement	15	B	0.6 mm	ok
8.	Finger Spring for Distal movement	16	B+	0.6 mm	ok
9.	Coffin Spring	17	A	1.0 mm	ok
10.	'U' Loop Canine Retractor	20	AB	0.6 mm	ok
11.	Reverse loop canine Retractor	22	AB	0.6 mm	ok
12.	Buccal self supported canine Retractor	24	B	0.7 mm	ok
13.	Palatal canine Retractor	26	B	0.6mm	ok
14.	Short Labial Bow	28	A	0.8 mm	Sri
15.	Long Labial Bow	28	A	0.8 mm	ok
16.	Fitted Labial Bow	29 a		0.7 mm	ok
17.	Circumferential Labial Bow(Begg's Type)	29 a		0.8 mm	ok
18.	Hawley's Retainer - Short Labial Bow 0.8mm - 2 Adam's clasps- 0.7mm	29 b	B	0.7 mm	ok

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Principal
T. K. D. C. & Research Centre,
New Pargaon Tal. Hatkanangle
Dist. Kolhapur 416 12[illegible]

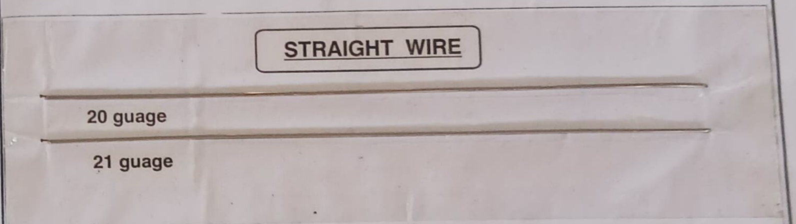
PRE- CLINICAL WIRE BENDING EXCERCISES AND COMPONENTS OF REMOVABLE ORTHODONTIC APPLIANCES

PRE - CLINICAL WIRE BENDING EXERCISES:

1. STRAIGHT WIRE OF LENGTH 15 Centimeters

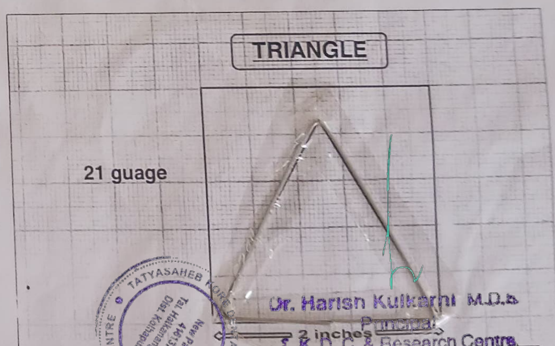
A) 19 guage

B) 20 guage



DATE	EXERCISE	GRADE	SIGN
11/10/23	19 guage	A	Sd/-
12/10/23	20 guage	A	Sd/-

2) TRIANGLE



DATE	EXERCISE	GRADE	SIGN
18/10/23	21 Guage	B++	Sd/-

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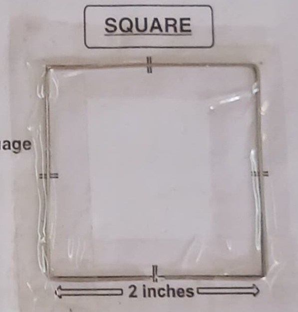
3. SQUARE

SQUARE

21 guage



DATE	EXERCISE	GRADE	SIGN
3/12/24	21 guage	B+	Sgh

4. CIRCLE

CIRCLE

22 guage

DATE	EXERCISE	GRADE	SIGN
19/10/23	21 guage	B+	

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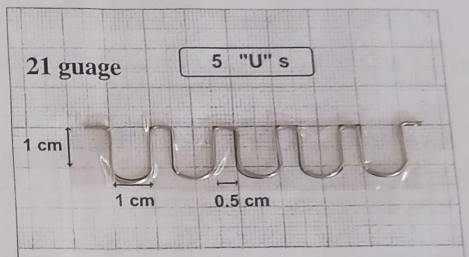
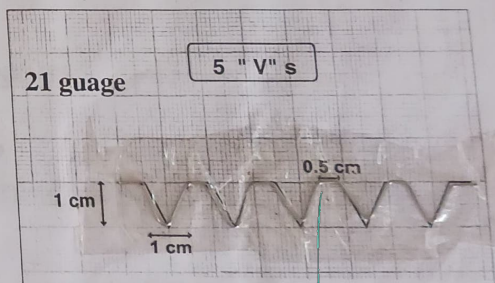
Dr. Harish Kulkarni M.D.S.
Principal
T.K.D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 137

5. PREPARATION OF 'U' LOOPS



DATE	EXERCISE	GRADE	SIGN
3/12/24	21 guage	B	

6. PREPARATION OF 'V' LOOPS



DATE	EXERCISE	GRADE	SIGN
10/12/24	21 guage	B++	

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Principal
K. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12

COMPONENTS OF REMOVABLE ORTHODONTIC APPLIANCES

REMOVABLE ORTHODONTIC APPLIANCES ARE MADE UP OF :

a) RETENTIVE COMPONENTS
b) ACTIVE COMPONENTS
c) BASE PLATE

a) <u>RETENTIVE COMPONENTS INCLUDE :-</u>

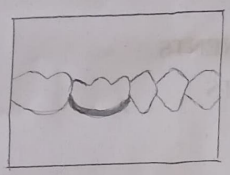
1) CIRCUMFERENTIAL CLASP
2) JACKSON'S CLASP
3) ADAM'S CLASP

b) <u>ACTIVE COMPONENTS :-</u>

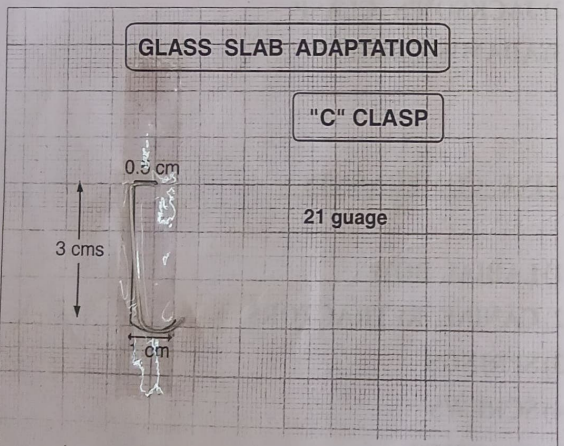
1) LABIAL BOW
2) CANINE RETRACTORS
3) SPRINGS
4) SCREWS
5) ELASTICS

7. 'C' CLASP

MESIAL TAG ARM ON 16 (Diagram)



DISTAL TAG ARM ON 26 (On glass Slab)



DATE	EXERCISE	GRADE	SIGN
27/12/24	21 guage	B	

RETENTIVE COMPONENTS

'C' CLASP

i) **OTHER NAMES :-** The circumferential clasp
Three quarter clasp

ii) **WIRE USED :-** Stainless steel wire
Gauge 21

iii) **MODE OF ACTION :-** They are simple clasps that are de
to engage the bucco cervical undercut. wire is engaged from
Proximal undercut along the cervical margin then carried ove
occlusal embrasure to end as a single retentive arm on th
lingual aspect that gets embedded in the acrylic base pla

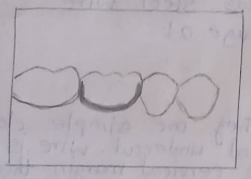
iv) **FUNCTION :-**
Adequate extention of the a removable applienc

v) **ADVANTAGES :-**
Its simplicity of design & Fabrication.

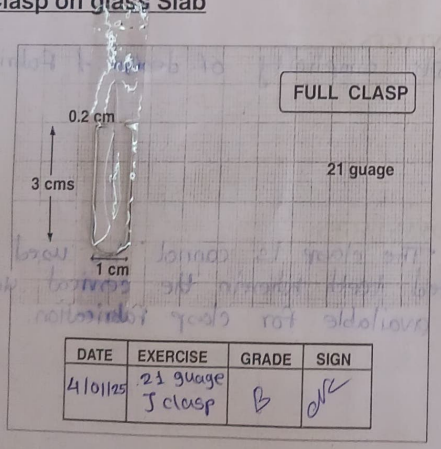
vi) **DISADVANTAGES:-**
The clasp is cannot be used in partia
erupted teeth if the cervical undercut is
not available for clasp retention.

8. JACKSON'S CLASP

Diagram of Jackson's Clasp



Jackson's Clasp on glass Slab



DATE	EXERCISE	GRADE	SIGN
4/01/25	21 guage J clasp	B	

JACKSON'S CLASP :-

i) OTHER NAMES :- Full clasp
'U' clasp

ii) WIRE USED :- Stainless steel wire guage 21

iii) MODE OF ACTION :- This clasp engage the buccocervical - distal Proximal undercuts wire is adapted along the buccocervical mes margin of both these proximal undercut & then carried over tooth the occlusal embrasure to end as retentive arms on both sides of molar.

iv) FUNCTION :-
Adequate retention of a removable appliances.

v) ADVANTAGES :- It is simple to construct & others adequate retention.

vi) DISADVANTAGES :- It offers inadequate retention in partially erupted teeth.

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
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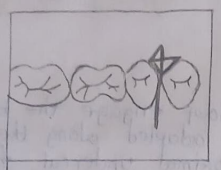
9. DIAGRAM OF TRIANGULAR CLASP



TRIANGULAR CLASP :-

i) OTHER NAMES :-

ii) WIRE USED :- 22 Gauge wire is used.
- Stainless steel wire.

iii) MODE OF ACTION :-
They are engaged proximal undercut of posterior teeth.

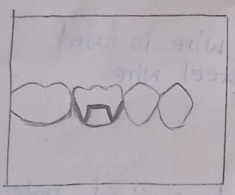
iv) FUNCTION :-
To aid in retention of appliances.

v) ADVANTAGES :-
Provide additional retention where required.

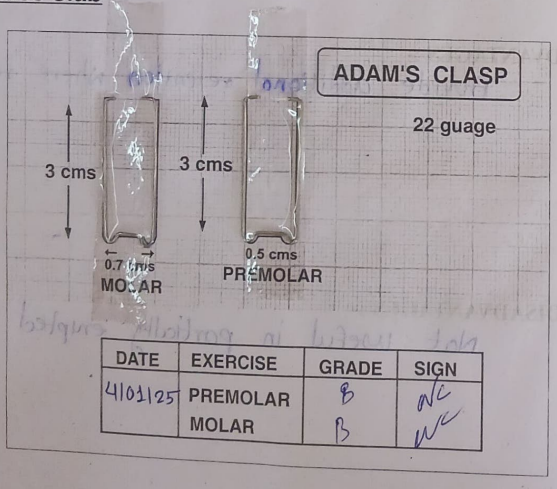
vi) DISADVANTAGES :-
Not useful in partially erupted teeth.

10. ADAM'S CLASP

Diagram of Adam's Clasp



daption on glass Slab



DATE	EXERCISE	GRADE	SIGN
4/01/25	PREMOLAR	B	
	MOLAR	B	

10) ADAM'S CLASP

i) OTHER NAMES :-
- Liverpool clasp
- Universal clasp
- Modified arrow head clasp

ii) WIRE USED :-
Wire used is 0.7 mm stainless steel wire.

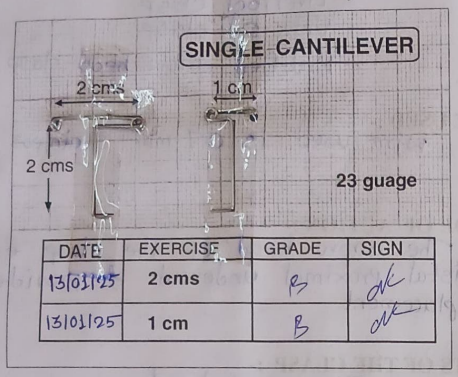
iii) MODE OF ACTION :-
The arrow head of the clasp engage the mesial & distal proximal undercut & provide resistance to displacement.

iv) PARTS OF THE CLASP :-
a. Two arrow heads.
b. Bridge
c. Two retentive arm.

v) ADVANTAGES :-
- Rigid & after excellent retention.
- can be fabricated in decidous as well as permanent teeth.
- It can be used an molars, premolars & incisors

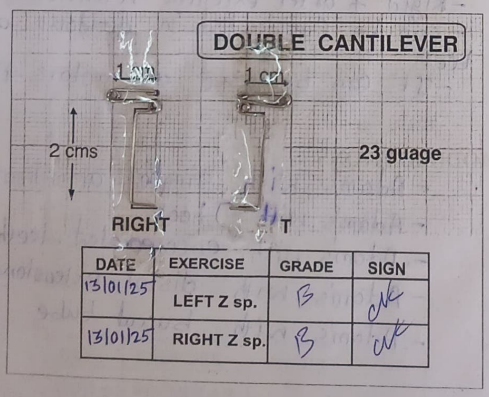
vi) MODIFICATIONS :-
- Adam's with single arrowhead
- Adam's with J hook
- Adam's with encorporated teeth.
- Adam's with distal extensions.
- Adam's with buccal tube

11. SINGLE CANTILEVER SPRING



DATE	EXERCISE	GRADE	SIGN
13/01/25	2 cms	B	
13/01/25	1 cm	B	

12. DOUBLE CANTILEVER SPRING ('Z' Spring)



DATE	EXERCISE	GRADE	SIGN
13/01/25	LEFT Z sp.	B	
13/01/25	RIGHT Z sp.	B	

SPRINGS :-
(Single Cantilever Spring & Double Cantilever Spring)

a) Single Cantilever Spring :-

INDICATIONS :- Minor rotation correction, used for mesiodista movement of teeth.

i) PARTS :- Single-coil helix with internal diameter 3 mm
Retentive arm - 4-8 mm length
Active arm - 12-15 mm length
Small retentive tags.

ii) WIRE USED :-
0.5 mm wire or 0.6 mm hard round stainless steel wire.

iii) ACTIVATION :-
By opening helix by 2-3 mm at a time.

b) Double Cantilever Spring :- 'Z' spring

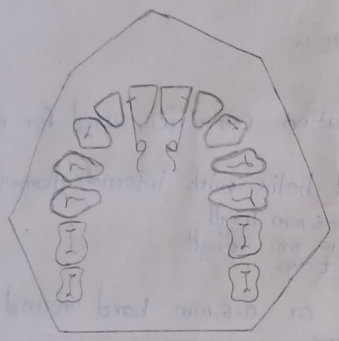
INDICATIONS :- Used for labial movement of incisors. T can abo be used for bringing minor rotation o incisors.

i) PARTS :- Two coils of very small internal diame - Retentive arm of 10-12 mm length thats gets embeded in the acrylic.

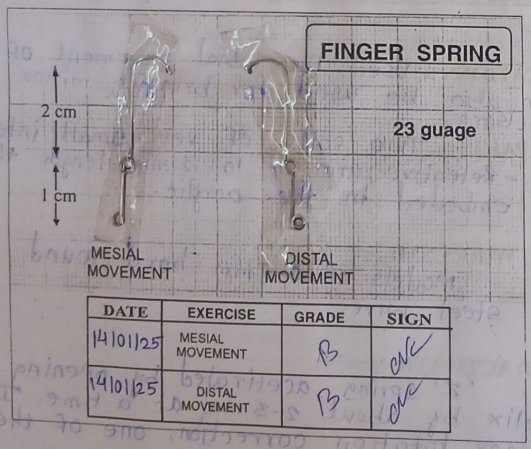
ii) WIRE USED :-
Models of 0.5 mm hard round stainless steel wire.

iii) ACTIVATION :- 'Z' spring activated by opening both th helix by about 2-3 mm at a time case minor rotation correction, one at a is- helix opened.

13. DIAGRAM OF FINGER SPRING



GLASS SLAB ADAPTATION OF FINGER SPRING



DATE	EXERCISE	GRADE	SIGN
14/01/25	MESIAL MOVEMENT	B	
14/01/25	DISTAL MOVEMENT	B	

FINGER SPRING :-

i) INDICATIONS :- Used for mesiodistal movement of teeth It can be used only for those teeth rotated correctly in the bucco-lingual direction. i.e. teeth should be within line of the arch.

ii) PARTS :-
- Active arm
- Helix of 3 mm diameter
- Retentive arm
- Small retentive arm.

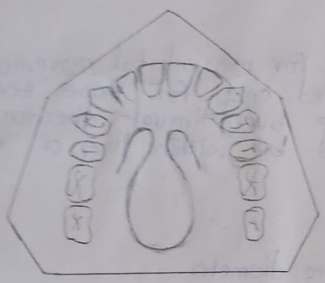
ii) WIRE USED :-
0.5 mm or 0.6 mm hard round stainless steel wire.

iii) PRINCIPLE OF DESIGN:-
To more teeth mesiodistally.

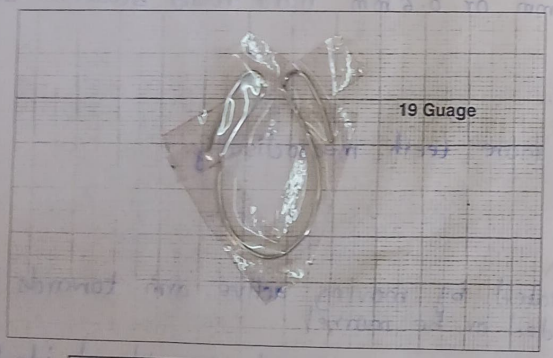
v) ACTIVATION :-
- Activated by moving active arm towards teeth interndeal or be mormel.
- Activation upto 3 mm is considered ideal.

COFFIN SPRING :-

Diagram



Coffin Spring On Glass Slab



DATE	EXERCISE	GRADE	SIGN
20/01/25	19 Guage	B	

14] COFFIN SPRING :-

i) INDICATIONS :- Arch expansion in patients with upper arch expansion (constricted) or where a unilateral crossbite.

ii) PARTS :-
U or Omegas shape wire placed in mesiopalatal region with retentive arm incorporated in the base plate.
- The appliances gain retention from adams clasp on the 1st molar & 1st premolar or deciduous molars

iii) WIRE USED :-
1.2 mm hard stainless steel wire.

iv) ACTIVATION :-
- The coffin spring can be accelerated mesio-buccally by holding both the ends of the region of the clasps.
- Activation of 1-2 mm at a time of the considered appropriate.

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

CANINE RETRACTORS

i) DEFINITION :- Canine retractors are spring that are used to move canine in a distal direction.

ii) CLASSIFICATION :- A) Buccal on location.
- Buccal - Buccally placed
- Palatal - Palatally placed.

B) Based on pressure of loop or helix-
- canine retractor with helix
- canine retractor with loop.

c) Based on mode of action-
- Bush type
- Pull type.

iii) FUNCTION :-
- It is used to move the canine the distal as well as palatal direction.

iv) TYPES :-
1) U- loop canine retractor
2) Helical canine retractor / Reversal loop canine retractor.
3) Buccal canine retractor
4) Palatal canine retractor.

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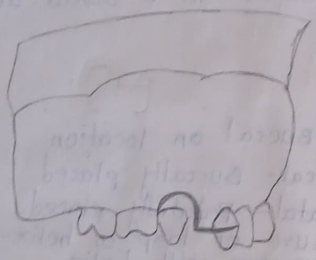
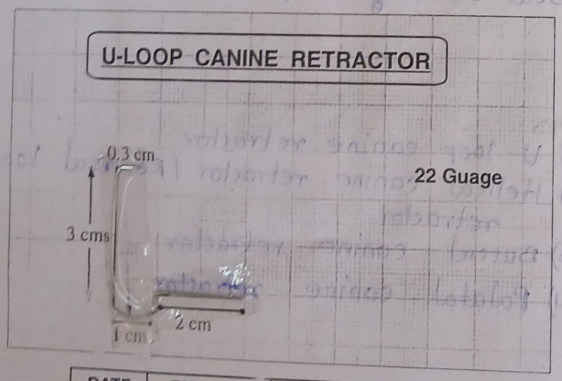
15. DIAGRAM OF U-LOOP CANINE RETRACTOR



'U' LOOP CANINE RETRACTOR ON GLASS SLAB



DATE	EXERCISE	GRADE	SIGN
18/01/25	22 Gauge	B	

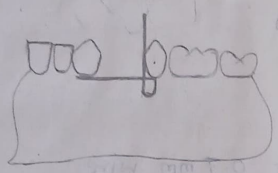
U- LOOP CANINE RETRACTOR

i) PARTS :-
- U-loop
- Active arm
- Retentive arm

ii) WIRE USED :-
- 0.6 mm or 0.7 mm wire.

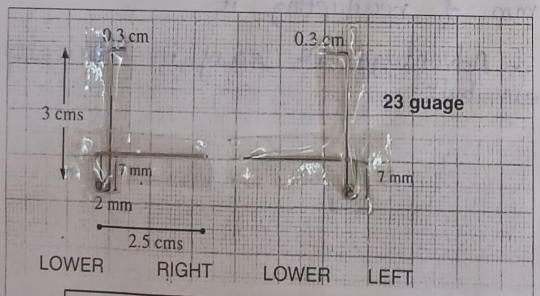
iii) ACTIVATION :-
- Activated by closing loops by 1-2mm or cutting the free end of the active arm by 2mm & readapting it.
- Advantage is easy in fabrication and less bulk.

16. DIAGRAM OF REVERSE LOOP CANINE RETRACTOR



REVERSE LOOP CANINE RETRACTOR ON GLASS SLAB

REVERSE LOOP CANINE RETRACTOR



DATE	EXERCISE	GRADE	SIGN
18/01/25	LOWER LEFT	B	
18/01/25	LOWER RIGHT	B	

REVERSE LOOP CANINE RETRACTOR

i) PARTS :-

- Mesial arm (Retentive arm)
- Coil of 3mm diameter
- Distal arm.

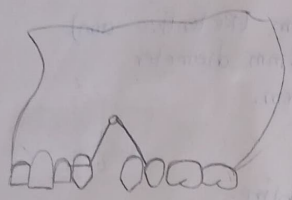
ii) WIRE USED :-

- 0.6 mm wire.

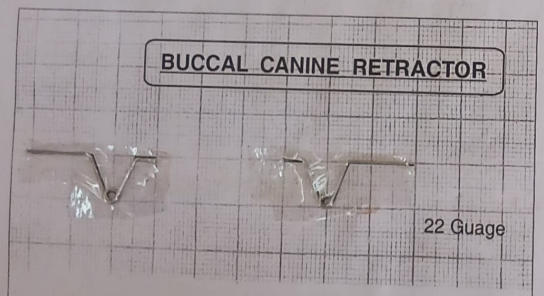
iii) ACTIVATION :-

- By opening helix by 1mm or by cutting 1mm of free end and readapting it around canine.

BUCCAL CANINE RETRACTOR (DIAGRAM)



BUCCAL CANINE RETRACTOR ON GLASS SLAB



DATE	EXERCISE	GRADE	SIGN
18/01/25	LOWER LEFT	B	
18/01/25	LOWER RIGHT	B	

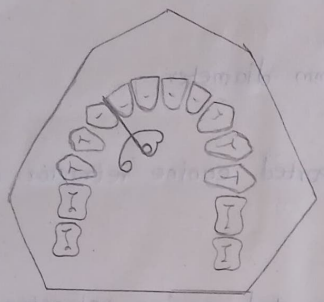
17. BUCCAL CANINE RETRACTOR

i) PARTS :-
- Active arm
- coil of 3 mm diameter.

ii) WIRE USED :-
- Self supported canine retractor 0.7 mm.

iii) ACTIVATION :-
- Self supported canine retractor are activated by closing helix by 1mm cut a time.

PALATAL CANINE RETRACTOR (DIAGRAM)



PALATAL CANINE RETRACTOR ON GLASS SLAB

PALATAL CANINE RETRACTOR

23 guage

DATE	EXERCISE	GRADE	SIGN
18/01/25	UPPER LEFT	B	
18/01/25	UPPER RIGHT	B	

18. PALATAL CANINE RETRACTOR

i) PARTS :-

- Active arm
- coil of 3 mm
- crucide arm.

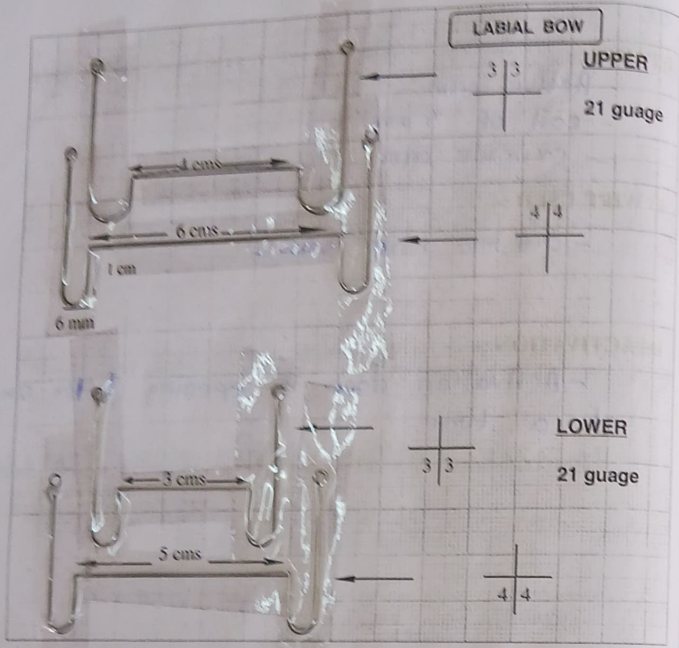
ii) WIRE USED :-

- 0.6 mm wire isussed

iii) ACTIVATION :-

- Activation done by opening helix 2mm at a time.

19. DIAGRAM OF LABIAL BOW
(Short & Long)



DATE	EXERCISE	GRADE	SIGN
10/01/25	3 | 3 (upper)	B	[signature]
10/01/25	4 | 4 (upper)	B	[signature]
10/01/25	3 | 3 (lower)	B	[signature]
10/01/25	4 | 4 (lower)	B	[signature]

ACTIVE COMPONENTS

LABIAL BOW :-

i) DEFINITION :- Bows are active components that are mostly used for incisor retraction.

ii) PARTS :- 1. Bow - That makes contact with the most prominent labial teeth.

2. U Loop - That ends as a retentive arm.

iii) USES :- 1) Retention at termination of final orthodonti[c] therapy.

2) Minor overjet reduction & anterior space closure.

Long Labial Bow :- 1. Minor anterior space closure. 2. Minor overjet reduction. 3. Closure of space dist[al to] canine. 4. Guidance of canine durin[g] canine retraction using palatal retra[ctor].

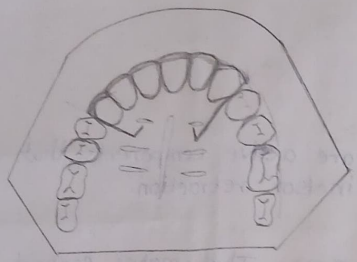
iv) DISADVANTAGES :-

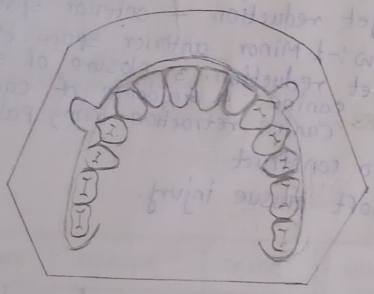
a) Difficult to construct.

b) Risk of soft tissue injury.

v) TYPES :-

1. Short labial bow
2. Long Labial bow
3. Reverse labial bow
4. Robust retractor
5. Mills retractor
6. Split labial bow
7. High labial bow c̄ apron springs.
8. Fitted labial bow.





FITTED LABIAL BOW :-

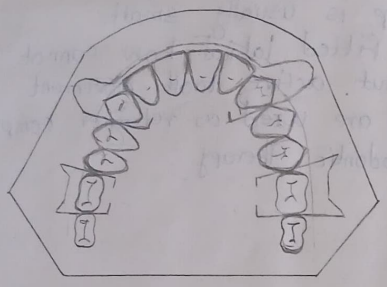
- In this type, of labial bow ~~the~~ wire is adapted to confirm its contour of labial surface.
- U loop is usually small.
- The fitted labial bow cannot be used to bring about active tooth movement.
- They are used as retainer completion of fixed orthodontic therapy.

CIRCUMFERENTIAL LABIAL BOW :-

- The retainer was popularized by P.R. Begg
- consist of labial wire that extends till last erupted molar and curves around it to get embedded in acrylic that spans palate.
- Advantage is that there is no cross overbite between canine & premolar thereby eliminating risk of space opening up.

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]



HAWLEY'S RETAINER

- Hawley's appliance was designed in 1920 by charles hawley.
- It is most frequently used retainer.
- classic hawley's retainer consist of clasp on molar & short labial bow extending from canine to canine having adjustment loops.
- Simple design can be modified in several ways to suit specific requirement.
- Labial bow can be made its extend from one premolar to opposite 1st premolar.
- This design helps in closing space distal to canine.
- Another modification is to solder bow to bridge of Adam's clasp.
- Advantage include ease of fabrication.

DIAGNOSTIC

AIDS

20. DIAGNOSTIC AIDS

i) DEFINITION :-

A diagnostic dental cast is a cast model of a person's teeth that a dental professional uses as a guide in application of corrective or restorative dentistry.

ii) LOGICAL LISTING :-

Essential

1) Case History
2) Clinical Examination
3) ~~clinical~~ study model
4) certain radiographs
   - Periapical
   - Bitewing
   - Panoromic
5) facial photograph

Supplemental

1) Specialized radiograph
   - cephalometric radiograph
   - occlusal intraoral film
   - selected lateral jaw views.
2) Electromyographic Examination of muscle activity.
3) Hand-wrist radiograph
4) Endocrine test/ Estimation of BMR
5) Diagnostic Splint
6) Occlusograms

VARIOUS DIAGNOSTIC AIDS

1. **STUDY MODELS** :- Are accurate plaster production of teeth & their surrounding soft tissue. They are essential diagnostic aids that make it possible to study arrangement of teeth and occlusion from all direction.

2. **RADIOGRAPHS** :- classified as -
   i) Intraoral - IOPA, occlusal radiograph, bitewing radiograph.
   ii) Extra-oral - Panoramic radiograph, cephalometric radiograph, Hand - wrist radiograph.

3. **PHOTOGRAPHIC RECORDS** :- Both extraoral & intraoral photographs are usefull diagnostic records.
   - Frontal view
   - Profile view
   - oblique facial view.
   - Uses - Useful in facial symmetry, Diagnostic records, assessment of progress of treatment.

4. **CASE HISTORY** :-
   - Case history involves eliciting & record of relevant information from patient and parent to aid in overall diagnosis of case.

5. **CLINICAL EXAMINATION** :-
   a) General Examination - Built, Gait, Posture, Height.
   b) Extra-oral Examination - shape of head, facial form, facial symmetry, facial profile.
   c) Intra-oral Examination
   d) Functional Examinati

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE

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T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
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VARIOUS DIAGNOSTIC AIDS

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   b) Extra-oral Examination - shape of head, facial form, facial symmetry, facial profile.
   c) Intra-oral Examination
   d) Functional Examination.

6. MODEL ANALYSIS :- It involves study of maxillary & mandibular dental arches in all 3 planes of space and is valuable tool in orthodontic diagnosis & treatment planning.

i) Carey's analysis
ii) Ashley Howe's analysis
iii) Pont's analysis
iv) Linder Harth index
v) Bolton's analysis.

7. MISCELLANEOUS :-

- Supplemental diagnostic aids -

1) Specialized radiographs :-
   - cephalometrics
   - occlusal intraoral film
   - selected lateral jaw view.
2) Electromyographic Examination
3) Hand-wrist radiographs
4) Endocrine test
5) Estimation of BMR
6) Diagnostic setup
7) Occlusograms.

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13-

CEPHALOMETRY

CEPHALOMETRY

A. DEFINITION :-

Cephalometry is study of growth by examination of standardization of lateral & frontal radiograph of head.

- It is mainly used for diagnosis in orthodontics.

B. STANDARDIZATION :-

- cephalometric radiograph are taken using an appliance that consists of x-ray source & a head holding device called 'cephalostat'.
- It consist of two ear rods that prevents movement of head in horizontal plane.
- Vertical stabilization of head is brought about by orbital pointer that contact lower border of orbit.
- Upper part of face is supported by forehead clamp.
- Distance between x-ray source & mid-sagittal plane of patient is fixed at 5 feet.

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4) Uppper part of face is supported by forehead

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5) Distance between x-ray source & mid-saggital plane of patient is fixed at 5 feet.

CASE NO.1

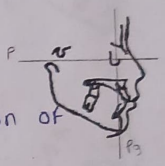
DOWN'S ANALYSIS

PARAMETERS	RANGE	AVERAGE VALUE	MEASURED VALUE
SKELETAL			
1) FACIAL ANGLE	82°-95°	87.8°	80° 85°
2) ANGLE OF CONVEXITY	-8.5°-10°	0°	0° 4°
3) A-B PLANE ANGLE	-9°-0°	-4°-6°	-5° 8'
4) MANDIBULAR PLANE ANGLE	17°-28°	21.9°	20° 25°
5) Y- AXIS ANGLE	53°-66°	59°	54° 65°
DENTAL			
1) CANT OF OCCLUSAL PLANE	1.5°-14°	9.3°	8° 5°
2) INTERINCISAL ANGLE	130°-150.5°	135.4°	134° 104°
3)INCISOR OCCLUSAL PLANE ANGLE	3.5°-20°	14.5°	14° 22°
4) INCISOR MANDIBULAR PLANE ANGLE	-8.5°-7°	1.4°	1.4° 20°
5) UPPER INCISOR TO A-POG LINE	-1·5 mm	2.7 mm	14 mm.

DOWN'S ANALYSIS

Down's analysis is frequently used cephalometric analysis.

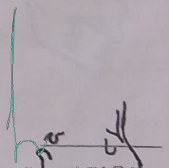
A. SKELETAL PARAMETERS:-



i) FACIAL ANGLE
It is an angle formed by intersection of N-Pog plane & F-H plane.
- Average = 87.8°
- It is given anterior-posterior relation of maxilla & mandible.

ii) ANGLE OF CONVEXITY
- Angle between intersection of point A to nasion & point A to pogonion.
- Average - 8.5° to 10°
- Reveals convexity or concavity of facial profile.

iii) AB PLANE ANGLE
- Angle between point A & point B & line joining nasion & pogonion.
- Average - 0.9 - 0°
- It is usually negative.



iv) MADIBULAR PLANE ANGLE
- It is formed by intersection of mandibular plane & F-H plane.
- Average - 17°-28°
- Decides vertical growth.

v) **Y-AXIS** This angle is obtained by joining sella - ganthion with F-H plane.

- Mean = +59°
- It is larger in class II facial pattern than patient exhibiting class III pattern.

B. DENTAL PARAMETERS :-

i) INTER - INCISAL ANGLE

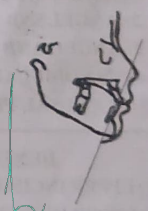
- Angle between long axis of upper & lower incisors.
- Average - 135.4°
- Angle is determined in class I relationship.

ii) INCISOR-OCCLUSAL PLANE ANGLE

- This angle is formed by intersection between long axis of lower central incisor & occlusal plane.
- Average - 14.5°
- Increase in angle suggest increased lower incisor proclination.

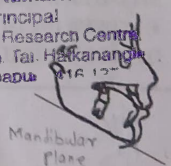
iii) UPPER INCISOR TO N - POG LINE

- Linear measurement between incisal edge of maxillary central Incisor & line joining point A to Pog.
- Average - 2.7 mm.



iv) INCISOR- MANDIBULAR PLANE ANGLE

- Angle between lower incisor & mandibular plane.
- Average - 14.5°



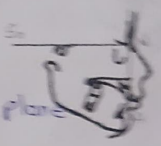
STEINER'S ANALYSIS

PARAMETERS	NORMAL VALUE	MEASURED VALUE
SKELETAL		
1) ANGLE SNA	82°	85°
2) ANGLE SNB	80°	80°
3) ANGLE ANB	2°	5°
4) MANDIBULAR PLANE ANGEL	32°	30°
5) OCCLUSAL PLANE ANGEL	14.5°	15°
DENTAL		
1) UPPER INCISOR-NA ANGEL	22°	20°
2) UPPER INCISOR-NA (LINEAR)	4mm	7mm
3) LOWER INCISOR-NB ANGEL	25°	40°
4) LOWER INCISOR-NB (LINEAR)	4mm	7mm
5) INTER INCISAL ANGEL	130°-131°	97°

STEINER'S ANALYSIS

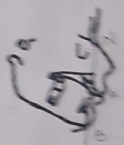
It is derived into 3 parts -
- Skeletal
- Dental
- Soft tissue

A. SKELETAL PARAMETERS :-



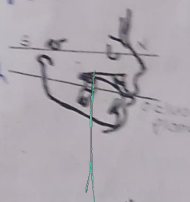
i) ANGLE SNA
It is an angle formed by S-N plane & line joining nasion to point A.
- Mean - 82°
- Indicates A-P relationship of arches.

ii) ANGLE SNB
Angle formed between SN plane & Point B.
- Mean - 80°
- Indicates A-P position.

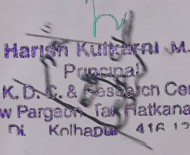


iii) ANGLE ANB
This angle is formed by interaction of line joining nasion to point A & Point B.
- Mean - 2°

iv) OCCLUSAL PLANE ANGLE
It is formed between occlusal plane & S-N plane.
- Mean value - 14.5°
- It represent line passing through overlapping cusp of premolar & 1st molar.



v) MANDIBULAR PLANE ANGLE
Angle formed between S-N plane & mandibular plane.
- Average - 32°



STEINER'S ANALYSIS

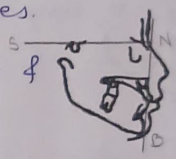
PARAMETERS	NORMAL VALUE	MEASURED VALUE
SKELETAL		
1) ANGEL SNA	82°	85°
2) ANGEL SNB	80°	80°
3) ANGEL ANB	2°	5°
4) MANDIBULAR PLANE ANGEL	32°	30°
5) OCCLUSAL PLANE ANGEL	14.5°	15°
DENTAL		
1) UPPER INCISOR- NA ANGEL	22°	20°
2) UPPER INCISOR -NA (LINEAR)	4mm	7mm
3) LOWER INCISOR-NB ANGEL	25°	40°
4) LOWER INCISOR- NB (LINEAR)	4mm	7mm
5) INTER INCISAL ANGEL	130°-131°	97°

STEINER'S ANALYSIS

It is derived into 3 parts -
- Skeletal
- Dental
- Soft tissue.

A. SKELETAL PARAMETERS :-

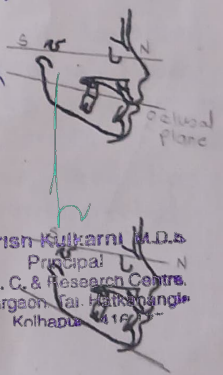
i) ANGLE SNA
It is an angle formed by S-N plane & line joining nasion to point A.
- Mean - 82°
- Indicates A-P relationship of arches.



ii) ANGLE SNB
Angle formed between SN plane & Point B.
- Mean - 80°
- Indicates A-P position.

iii) ANGLE ANB
This angle is formed by interaction of line joining nasion to point A & Point B.
- Mean - 2°

iv) OCCLUSAL PLANE ANGLE
It is formed between occlusal plane & S-N plane.
- Mean value - 14.5°
- It represent line passing through overlapping cusp of premolar & 1st molar.

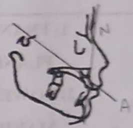


v) MANDIBULAR PLANE ANGLE
Angle formed between S-N plane & mandibular plane
- Average - 32°

B. DENTAL PARAMETRS

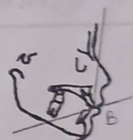
i) UPPER INCISOR TO NA (ANGULAR/LINEAR)

- It is an angle formed by interaction of long axis of upper incisor & line joining nasion to point A.
- Average - 22°
- Linear value - 4 mm



ii)UPPER INCISOR TO NB (ANGULAR /LINEAR)

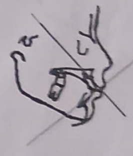
- Angle formed between NB plane & long axis of upper incisor.
- Mean value - 25°
- It indicates inclination of lower central incisor.
- Linear value - 4 mm.



iii) INTERINCISAL ANGLE

It is angle formed between long axis of upper & lower central incisor.

- Mean value - 130-131°.

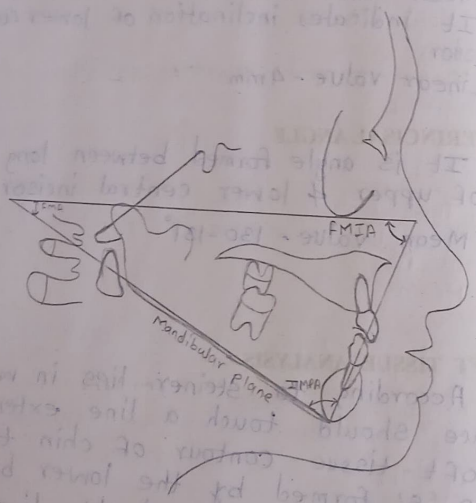


C. SOFT TISSUE ANALYSIS

- According to steiner, lips in well balanced face should touch a line extending from soft - tissue contour of chin to middle of an 'S' formed by the lower border of nose
- If lips are beyond this line, then lips are said to be protrusive & interpreted as convex profile.

TWEED'S ANALYSIS

PARAMETERS	NORMAL VALUE	MEASURED VALUE
1) FRANKFORT MANDIBULAR PLANE ANGLE	25°	35°
2) LOWER INCISOR MANDIBULAR PLANE ANGLE	90°	70°
3) FRANKFORT LOWER INCISOR PLANE ANGLE	65°	40°

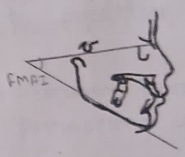


TWEED'S ANALYSIS

- 3 planes
  i) FH plane
  ii) Mandibular plane
  iii) Long axis of lower incisor.

i) FRANKFORT- MANDIBULAR PLANE ANGLE

- It is an angle formed by intersection of F-H plane & mandibular plane.
- Average - 25°.

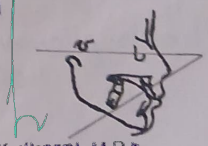


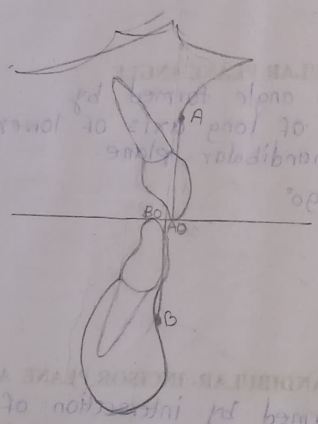
ii) INCISOR-MANDIBULAR PLANE ANGLE

- It is an angle formed by intersection of long axis of lower incisor & mandibular plane.
- Average - 90°

iii) FRANKFORT- MANDIBULAR- INCISOR PLANE ANGLE

- Angle formed by intersection of long-axis of lower incisor & F-H plane.
- Mean - 65°





Wit's Appraisal

WIT'S APPRAISAL

- The wits appraisal is measure of extent to which the maxilla & mandible are related to each other in A-P or sagittal plane.

- It is used in case where A-N-B angle is considered not so relatable due to position of nasion & rotation of jaws.

- A functional occlusal plane is drawn through the overlapping cusps of first premolars & first molars.

- Perpendicular line drawn to the occlusal plane from point A and B.

- The point of contact of those perpendicular line on occlusal plane is named AO & BO.

- Distance between AO and BO is AP relationship.

- In case of males :-
  Point BO is ahead of AO by 1 mm.

- In case of females :-
  Point AO & BO coincides.

- In case of class II :- BO is usually behind AO.

- In case of class III :- BO is usually ahead of AO.

MODEL ANALYSIS

MODEL ANALYSIS

CASE NO. 1 – 19

1) Arch Perimeter Analysis :

Total Arch length - 81 mm

Total tooth material - 77 mm

Discrepancy = Total arch length - Total tooth material

= 81 - 77

= 4 mm.

Inference -

As discrepancy is bet^{n} 2.5 - 5

i.e. it is 4.

- It indicates extraction of 2nd premolar.

2) Carey's Analysis :

Total Arch length = 72

Total tooth material = 71.5

Discrepancy = Total arch length - total tooth material

= 72 - 71.5

= 0.5

Inference -

As discrepancy is less

i.e. 0.5 ; it indicates stripping

	Maxillary		Mandibular	
	Right	left	Right	left
Central Incisor	9	9	6.5	7
Lateral Incisor	7.5	7	6	6
Canine	8	8	7.5	7
1st Pre-molar	7.5	7	8	8
2nd Pre-molar	7	7	8	7.5
1st molar	11	10	13	12

3) Ashley Howe's Analysis

Total tooth material - sum of mesio-distal of all teeth anterior to 2nd Premahant molar

= 98 mm.

- Premolar Diameter Arch width

= 41.5 mm.

- Premolar Basal Arch width = 42 mm.

- Inference - As premolar basal arch width is greater than premolar diameter arch width bet^n tips of buccal cusp of 1st premolar. Expansion is possible.

- Premolar basal arch width % = $\frac{PBAW}{TM} \times 100 = \frac{42}{98} \times 100$

= 42.85%.

- Inference - since premolar basal arch width is bet^n 37-44%. it is a borderline case.

4) Pont's Analysis :

Determination of sum of Incisors = 32.5 mm.

Measured premolar value = 38 mm

Measured molar value = 49 mm

calculated premolar value = $\frac{SI \times 100}{80}$

= $\frac{32.5 \times 100}{80}$

= 40.62 mm.

- Inference -

As measured value is less than calculated value it indicate there is need for expansion.

calculated molar value = $\frac{SI \times 100}{80}$ $\frac{32.5 \times 100}{80}$ = 40.75 mm.

- Inference -

- As measured value is less than the calculated

- As measured value is less than the calculated indicates need for expansion.

5) Bolton's Analysis -

Sum of mandibular 12 = 96.5 mm

Sum of maxillary 12 = 98 mm.

$$\text{Overall ratio} = \frac{\text{sum of mandibular 12}}{\text{sum of maxillary 12}} \times 100$$

$$= \frac{96.5}{98} \times 100$$

$$= 98.46 \text{ mm.}$$

- Inference -

As overall ratio is greater than 91.3 it indicates that mandibular teeth material is excess.

$$\text{Mandibular 12} - \frac{\text{Maxillary 12}}{100} \times 91.3$$

$$= 96.5 - \frac{98}{100} \times 91.3$$

$$= 7.03 \text{ mm.}$$

- Inference -

- Mandibular overall teeth material is excess by 7.03 mm.

$$\text{Anterior Ratio} = \frac{\text{sum of mandibular 6}}{\text{sum of maxillary 6}} \times 100$$

$$= \frac{40}{48.5} \times 100$$

$$= 82.47 \text{ mm.}$$

- Inference -

- As anterior ratio is greater than 77.2 it indicates mandibular tooth material is excess

5) Bolton's Analysis :

$$\text{Mandibular 6} - \frac{\text{Maxillary 6}}{100} \times 77.2$$

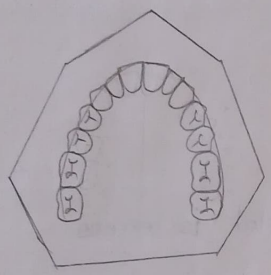
$$= 40 - \frac{48.5}{100} \times 77.2$$

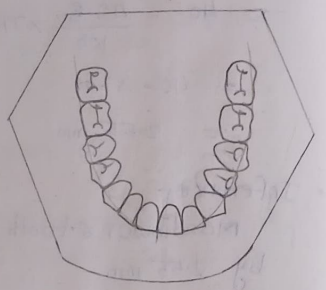
$$= 40 - 37.44$$

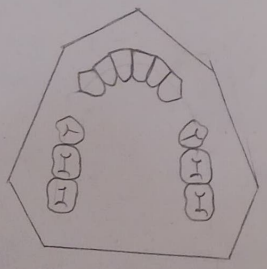
$$= 2.55 \text{ mm.}$$

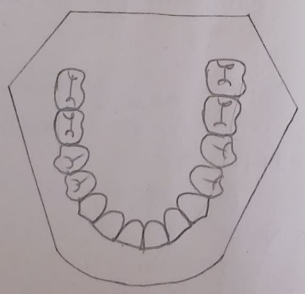
- Inference -

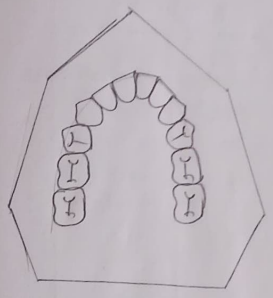
Mandibular 6 tooth material is excess by 2.55 mm.

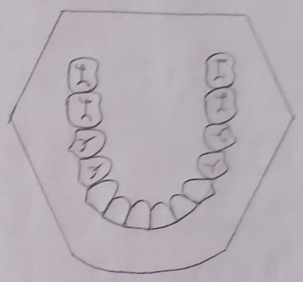


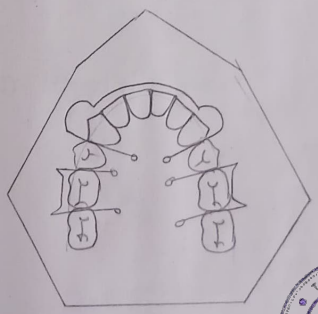


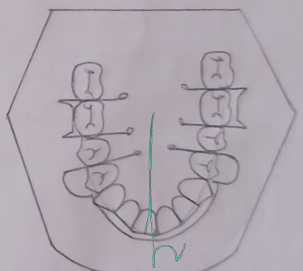












Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 137

MODEL ANALYSIS

CASE NO. 2 32

1) **Arch Perimeter Analysis :**

Total tooth material = 83 mm

Arch length = 87 mm

Discrepancy = Arch length - total tooth material

= 87 - 83

= 4 mm

Inference -

since, the discrepancy is betn 2.5 - 5 i.e it is 4 mm.

It indicates for extraction of 2nd premolar

2) **Carey's Analysis :**

Total tooth material = 75 mm

Arch length = 79 mm

Discrepancy = Arch length - total tooth material

= 7.9 - 7.5

= 4 mm.

Inference -

As the discrepancy is betn 2.5 - 5 mm is 4 mm. it indicates extraction of 2nd premolar.

	Maxillary		Mandibular.	
	Right	left	Right	left
Central Incisor	10	10	6.5	6
L.I	7.5	8	7	7.5
canine	8.5	9	8	8
1st Premolar	8	8	8	7.5
2nd Premolar	7	7	9	7.5
1st Molar	12	12	13	13

3) Ashley Howe's Analysis :

Total tooth material = ₹ 107mm

Premolar Diameter · Arch width = 40 mm.

bet^n tips of buccal cusp of 1st Premolar.

Premolar diameter Basal Arch width = 44 mm.

Inference -

As premolar basal arch width is greater than the premolar diameter. Arch width, it is indicates expansion is possible.

$$\text{Premolar Basal arch width percentage} = \frac{\text{PMBAW}}{\text{TTM}} \times 100$$

$$= \frac{44 \times 100}{107}$$

$$= 41.12\%.$$

Inference,

As premolar basal arch width is bet^n 37-44%.

i.e. it is 41.12% ; its is borderline case.

4) Pont's Analysis :

Determination of sum of incisors = 35.5 mm

Measured premolar value = 35 mm

Measured molar value = 44.5 mm.

$$\text{calculated premolar value} = \frac{\text{S.I} \times 100}{80}$$

$$= \frac{35.5 \times 100}{80}$$

$$= 55.46 \text{ mm}$$

Inference -

As measured molar value is less than the calculated molar value it indicates expansion is needed.

5) Bolton's Analysis -

Sum of mandibular 12 = 101 mm

Sum of maxillary 12 = 107 mm.

Overall ratio = $\frac{\text{sum of mandibular 12}}{\text{sum of maxillary 12}} \times 100$

$= \frac{101 \times 100}{107}$

$= 94.39$ mm.

Inference -

As overall ratio is greater than 91.3; it indicates mandibular tooth material is excess.

Mandibular 12 - $\frac{\text{Maxillary 12}}{100} \times 91.3$

$= 101 - \frac{107 \times 91.3}{100}$

$= 3.31$ mm.

Inference -

Mandibular overall tooth material is excess by 3.31 mm.

Anterior Ratio -

Sum of Mandibular 6 = 43 mm

Sum of Maxillary 6 = 53 mm.

Anterior Ratio = $\frac{\text{sum of mandibular 6}}{\text{sum of maxillary 6}} \times 100$

$= \frac{43 \times 100}{53}$

$= 31.13$ mm.

~~5) Bolton's Analysis~~ :

Inference -

As anterior ratio is greater than 77.2 it indicates mandibular tooth material excess.

Mandibular 6 - $\frac{\text{Maxillary 6}}{100} \times 77.2$

$= 43 - \frac{53}{100} \times 77.2$

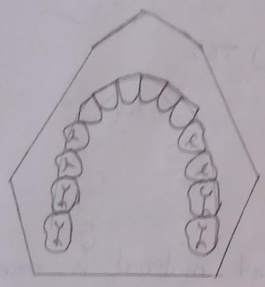
$= 2.09$ mm.

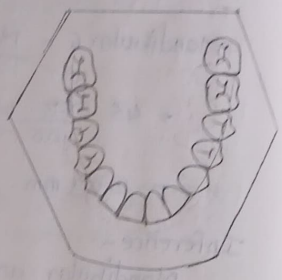
Inference -

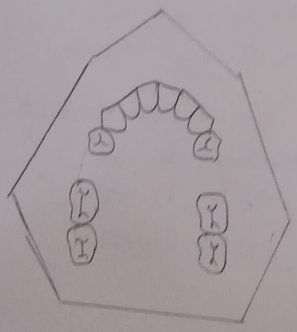
Mandibular anterior tooth material is excess by 2.09 mm.

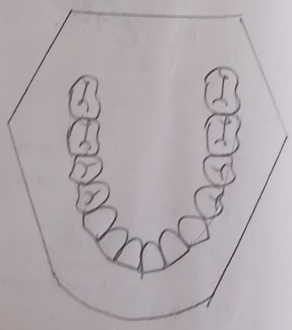
TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE

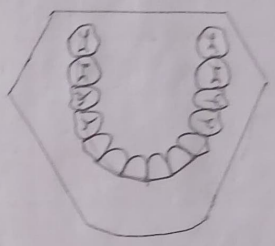
Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13-

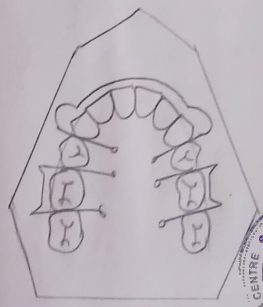


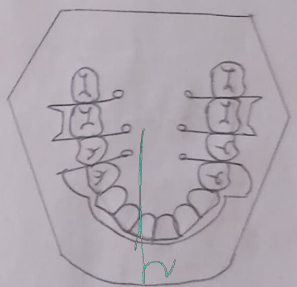












TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE
Near Pargaon Tal. Hatkanangle Dist. Kolhapur

Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre,
New Pargaon, Tal. Hatkanangle
Dt. Kolhapur 416 13[illegible]

MODEL ANALYSIS

CASE NO. 3 23

1) Arch Perimeter Analysis :

Total tooth material = 70.5 mm

Arch length = 82 mm.

Discrepancy = Arch length - total tooth material

= 82 - 70.5

= 11.5 mm.

Inference -

As discrepancy is more than 5mm ; ie. it is 11.5mm . it indicates extraction of 1st premolar.

2) Carey's Analysis :

Total tooth material = 75 mm.

Arch length = 79 mm.

Discrepancy = Arch length - Total tooth material

= 79 - 75

= 4 mm.

Inference -

As discrepancy is less than 5mm. ie. it indicates extraction of 2nd premolar.

	Maxillary		Mandibular	
	Right	left	Right	left
central Incisor	8.5	8.5	6	6
Lateral Incisor	7	6.5	7.5	7
Canine	7	7.5	8	8.5
Premolar 1st	6.5	7	8	8
2nd Premolar	6	6	8	8
1st molar	10	9.5	12.5	13.5

3) Ashley Howe's Analysis :

Total tooth material = 90 mm.

Premolar diameter Arch width = 42 mm

Premolar basal arch width = 43 mm.

Inference -

As Premolar basal Arch width is greater than Premolar diameter arch width. expansion is possible.

Premolar Basal Arch width % = $\frac{43 \times 100}{90}$

= 47.7 mm.

Inference -

Since, premolar basal arch width is 44% or more i.e. it is 47.7%.; treatment is by non-extraction.

4) Pont's Analysis :

Determination of sum of incisors = 30.5 mm.

Measured premolar value = 37 mm.

Measured Molar value = 45.5 mm.

calculated premolar value = $\frac{S.I. \times 100}{80}$

= $\frac{30.5 \times 100}{80}$

= 38.12 mm.

calculated Molar value = $\frac{S.I \times 100}{64}$

= $\frac{30.5 \times 100}{64}$

= 47.65 mm.

Inference -

As measured premolar value is less than calculated Premolar value it indicates expansion is needed.

As measured molar value is less than calculated molar value; it indicates expansion is needed.

5) Bolton's Analysis -

Overall Ratio

Sum of Mandibular 12 = 101 mm

sum of maxillary 12 = 90 mm.

$$\text{overall ratio} = \frac{\text{sum of maxillary 12}}{\text{sum of mandi 12}} \times 100$$

$$= \frac{101 \times 100}{90}$$

$$= 112.2 \text{ mm}.$$

Inference -

As overall ratio is greater than 91.3 it indicate mandibular tooth material is excess.

$$\text{Mandibular 12} - \frac{\text{Maxillary 12} \times 91.3}{100}$$

$$= 101 - \frac{90 \times 91.3}{100}$$

$$= 18.8 \text{ mm}.$$

Inference -

Mandibular overall tooth material excess by 18.8 mm.

Anterior Ratio -

Sum of mandibular 6 = 43 mm

Sum of maxillary 6 = 45 mm.

$$\text{Anterior ratio} = \frac{\text{sum of mandibular 6}}{\text{sum of maxillary 6}} \times 100$$

5) Bolton's Analysis :

$$= \frac{43}{45} \times 100$$

$$= 95.5 \text{ mm}.$$

Inference -

As the anterior ratio is greater than 77.2 it indicates mandibular tooth material is excess.

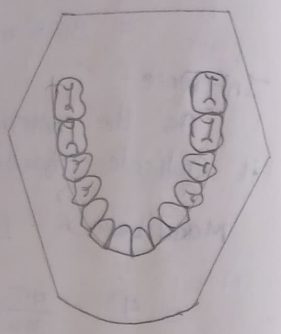
$$\text{Mandibular 6} - \frac{\text{Maxillary 6} \times 77.2}{100}$$

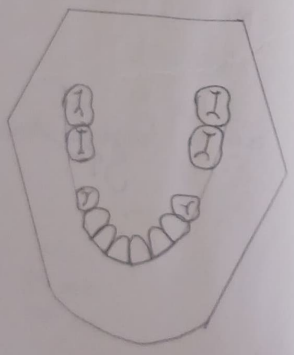
$$= 43 - \frac{45 \times 77.2}{100}$$

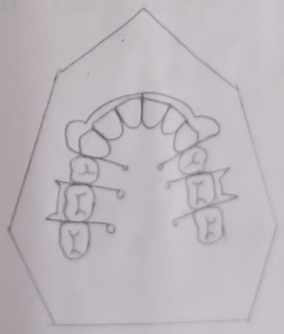
$$= 8.26 \text{ mm}.$$

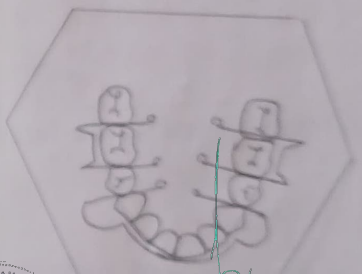
Inference -

Mandibular anterior tooth material is excess by 8.26 mm.









Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 137

MODEL ANALYSIS

CASE NO. 4 23

1) **Arch Perimeter Analysis :**

Total tooth material = 70.5 mm.

Arch length = 82 mm.

Discrepancy = Arch length - total tooth material

= 82 - 70.5

= 11.5 mm.

As Inference -

As discrepancy is more than 5mm ; i.e. it is 11.5 mm. it indicates extraction of 1st Premolar.

2) **Carey's Analysis :**

Total tooth material = 75mm.

Arch length = 79 mm.

Descrepancy = Arch length - Total ~~total~~ tooth material

= 79 - 75

= 4mm.

Inference ,

As discrepancy is less than 5mm , i.e it is 4mm ; it indicates retraction of 2nd premolar.

	Maxillary		Mandibular.	
	Right	left	Right	left
C.I	8.5	8.5	6	6
L.I	7	6.5	7.5	7
Canine	7	7.5	8	8.5
1st Premolar	6.5	7	8	8
2nd Premolar	6	6	8	8
1st molar	10	9.5	12.5	13.5

3) **Ashley Howe's Analysis :**

Total tooth material = 90 mm

Premolar Diameter Arch width = 42 mm

Premolar basal arch width = 43 mm.

Inference,

As premolar basal arch width is greater than premolar diameter arch width, expansion is possible.

Premolar Basal Arch Width % $= \frac{43 \times 100}{90}$

$= 47.77$ mm.

Inference -

Since premolar basal arch width is 44% or more i.e. it is 47.77%; treatment is by non-extraction.

4) **Pont's Analysis :**

Determination of sum of incisors = 30.5 mm.

Measured premolar value = 37 mm.

Measured Molar value = 45.5 mm.

Calculated premolar value $= \frac{S.I \times 100}{80}$

$= \frac{30.5 \times 100}{80}$

$= 38.12$ mm.

Inference - As measured premolar value is less than calculated premolar value, it indicates expansion is needed.

calculated molar value $= \frac{S.I \times 100}{64} = \frac{30.5 \times 100}{64}$

$= 47.65$ mm

Inference,

As measured molar value is less than calculated molar value; it indicates expansion is needed.

5) Bolton's Analysis -

Overall Ratio

Sum of mandibular 12 = 101 mm.

Sum of maxillary 12 = 90 mm.

$$\text{Overall Ratio} = \frac{\text{sum of maxi 12}}{\text{sum of mandi 12}} \times 100$$

$$= \frac{101 \times 100}{90}$$

$$= 112.2 \text{ mm.}$$

Inference,

As overall ratio is greater than 91.3 ; it indicates mandibular tooth material is excess.

$$\text{Mandibular 12} - \frac{\text{Maxillary 12}}{100} \times 91.3$$

$$101 - \frac{90 \times 91.3}{100}$$

$$18.83 \text{ mm.}$$

Inference :- As anterior ratio is greater than 77.2 it indicates mandibular tooth material is excess.

$$\text{Mandibular 6} - \frac{\text{Maxillary 6}}{100} \times 77.2$$

$$= 43 - \frac{45}{100} \times 77.2$$

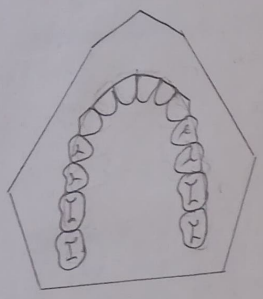
$$= 8.26 \text{ mm.}$$

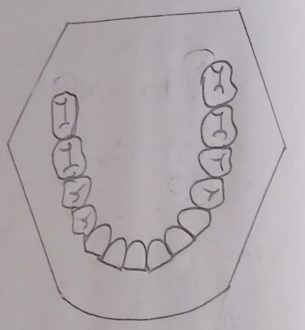
Inference -

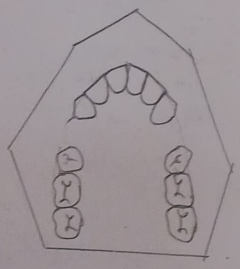
Mandibular anterior tooth material is excess by 8.26 mm.

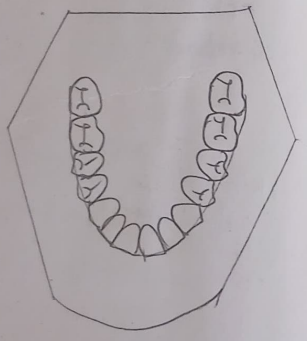
5) **Bolton's Analysis :**

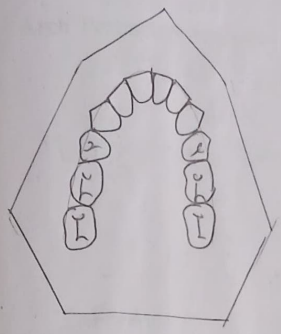
Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13[illegible]

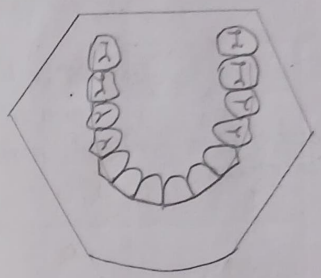


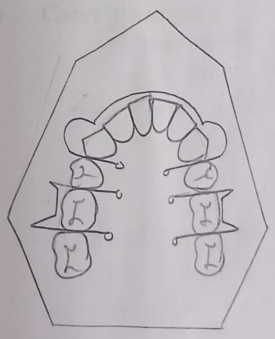


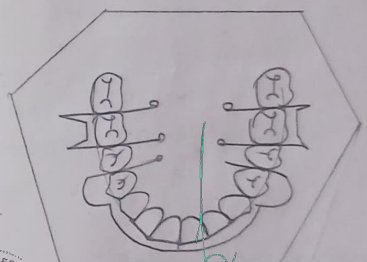












Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13

MODEL ANALYSIS

CASE NO. 5 2

1) **Arch Perimeters Analysis :**

Total tooth material = 74 mm

Arch length = 80 mm

Discrepancy = ~~Total tooth~~ Arch length - total tooth material

= 80 - 74

= 6 mm.

Inference,

As discrepancy is 6 mm i.e. it is 7.5 mm it indicates for extraction of 1st premolar.

2) **Carey's Analysis :**

Total tooth material = 67.5 mm.

Arch length = 66 mm.

Discrepancy = total tooth material - Arch length

= 67.5 - 66

= 1.5 mm.

Inference, As discrepancy is less than 2.5 mm i.e. it is 1.5 mm it indicates proximal stripping.

	Maxillary		Mandibular	
	Right	left	Right	left
C.I.	8.5	8.5	6	6
L.I	8	7	6	6.5
canine	8	7.5	7	7
1st premolar	7.5	7	7	7.5
2nd premolar	8	6	7	7.5
1st molar	10	10	10.5	11

3) Ashley Howe's Analysis :

Total tooth material = 94mm.
Premolar Diameter Arch width = 34mm.
Premolar Basal Arch width = 40 mm.

Inference, As premolar basal arch width is greater than premolar diameter arch width; expansion is possible.

Premolar Basal Arch width % $= \frac{40 \times 100}{94}$

$= 42.55\%$

Inference,
Since premolar basal arch width percentage is betn 37 to 44 i.e. 42.55% it is a borderline case.

4) Pont's Analysis :

Determination of sum of Incisors = 32 mm.
measured premolar value = 33.5 mm.
Measured molar value = 42 mm.
calculated PM value = $SI \times \frac{100}{80}$

$= \frac{32 \times 100}{80}$

$= 40$ mm.

As measured PM value is less than calculated PM value, it indicates expansion is needed.

calculated molar value = $SI \times \frac{100}{64}$

$\frac{32 \times 100}{64} = 50$ mm

Inference,
As measured molar value is less than calculated molar value; it indicates expansion is needed.

5) Bolton's Analysis -

Sum of mandibular 12 = 89 mm.

Sum of maxillary 12 = 94 mm.

$$\text{overall ratio} = \frac{\text{sum of mandibular 12}}{\text{sum of maxillary 12}} \times 100$$

$$= \frac{89}{94} \times 100$$

$$= 94.68 \text{ mm.}$$

Inference,

As overall ratio is greater than 91.3 it indicates mandibular tooth material is excess.

$$\text{Mandibular 12} - \frac{\text{Maxillary 12}}{100} \times 91.3$$

$$89 - \frac{94}{100} \times 91.3$$

$$= 3.18 \text{ mm.}$$

Inference :-

Mandibular overall tooth material is excess by 3.18 mm.

$$\text{Anterior ratio} = \frac{\text{sum of mandibular 6}}{\text{sum of maxillary 6}} \times 100$$

$$= \frac{38.5 \times 100}{47.5}$$

$$= 81.05 \text{ mm.}$$

5) Bolton's Analysis :

Inference :-

As anterior ratio is greater than 77.2 it indicates mandibular tooth material is excess.

$$\text{Mandibular 6} - \frac{\text{Maxillary 6}}{100} \times 77.2$$

$$38.5 - \frac{47.5}{100} \times 77.2$$

$$= 1.83 \text{ mm.}$$

Inference :-

Mandibular Anterior tooth material is excess by 1.83 mm.

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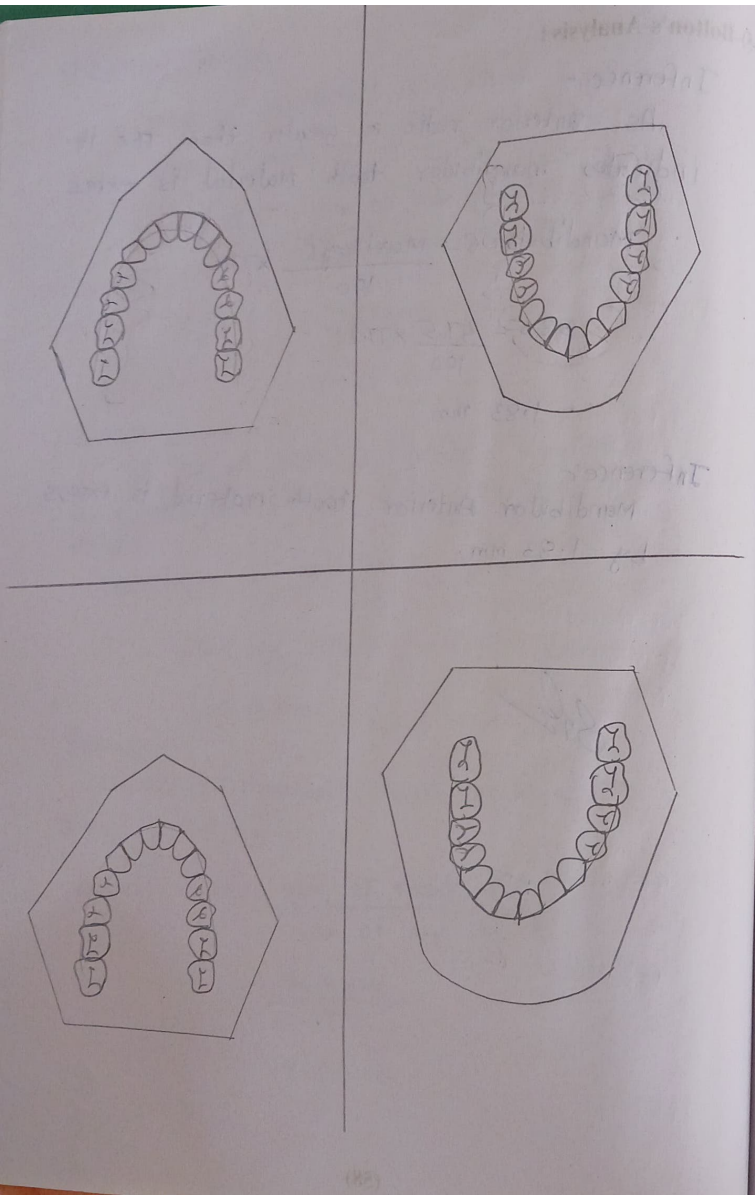
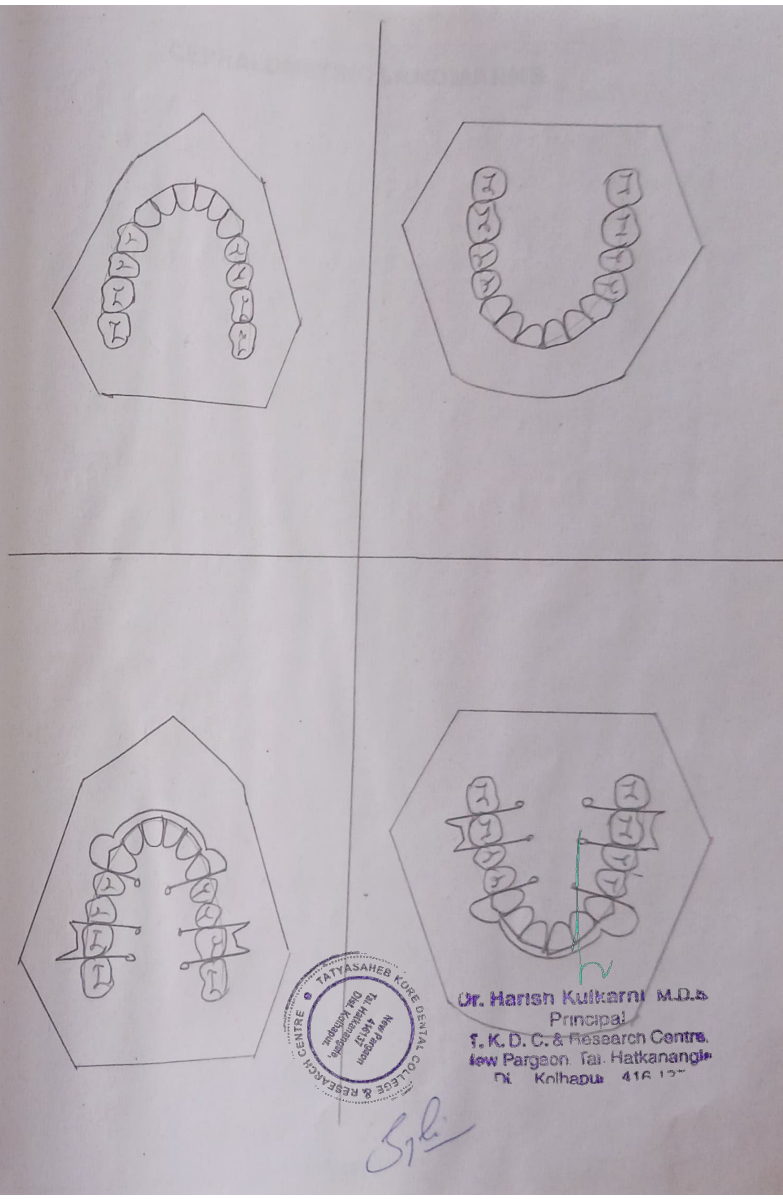
Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13-





CEPHALOMETRIC LANDMARKS

1) Nasion - The most anterior point midway between frontal and nasal bones on frontonasal suture.

2) Orbital - The lowest point on inferior bony margin of orbit

3) Porion - The highest bony part point on upper margin of external auditory meatus

4) Sella - Point repeating midpoint of pituitary fossa

5) Point A - Deepest point in midline between anterior nasal spine & alveolar crest between 2 central incisors

6) Basion - Median point of anterior margin of foramen magnum.

7) Bottom - Highest point at post. condylar notch of occipital bone

8) Anterior nasal spine - Anterior tip of sharp bony process of maxilla in midline of lower margin of anterior of anterior nasal opening.

9) Gronion - Constructed point of bony chin in midline planes

10) Pogonion - Most anterior point of bony chin in midline

11) Menton - Most inferior point Symphysis

12) Articular - Point at foramen junction of post. border of ramus of inferior border of basilar part of occipital bone.

13) condylion - Most superior point on head of condyle.

14) Protrution - lower & most anterior point on alveolar bone in midline between upper central Incisor.

15) Interdental

16) Brodbent point.

17) Ptm point

18) Glabella

19) Subnasal

20) Posterior nasal spine.

CEPHALOMETRIC PLANES & ANGLES

DOWN'S ANALYSIS: Skeletal Parameter -

a) Facial angle - It is inside inferior angle formed by intersection of nasion - Pogonion plane.

b) Angle convexity - Angle formed by intersection joined from point A & Pogonion.

c) AB plane - Angle formed by point A & B connecting & line joining nasion & Poggnion.

d) Mandibular plane angle formed by intersection of mandibular plane.

e) Y axis - obtained by joinng sella - gnattion line CEN

TWEED'S ANALYSIS: plane.

A) FH mandibular plane angle It is angle between FH plane & mandibular plane.

B) Incisor mandibular plane angle.

C) FH mandibular incisor plane - Angle formed by intersection of long axis of lower incisor FH plane mean value 65°.

STEINER'S ANALYSIS:

A) SNA angle - Angle formed by SN plane - nasion & point A.

B) ANB angle

C) SNB angle

D) occlusal plane formed by the intersection of occlusal plane & SN plane

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AFFILIATED TO MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK.

'SERVICE IS RELIGION'

WARANA

HEALTH MOVEMENT

Est : 1 9 9 2

ORTHODONTICS & DENTOFACIAL ORTHOPEDICS

CLINICAL RECORD BOOK

NAME ARCHISHMATI ARUN TALWAR

Permanent Registration No. _____

ROLL NO. _____

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Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

DEPARTMENT OF
ORTHODONTICS & DENTOFACIAL ORTHOPEDICS

CERTIFICATE

This is to certify that this is a bonafide clinical work done in the Department of Orthodontics & Dentofacial Orthopedics by Mr. / Miss Archishmati Arun Talwar
Reg. No. 267257 *student of the year* 2024-25
as prescribed by Maharashtra University of Health Sciences, Nashik.

Professor & Head of the Department

Place : New Pargaon
Date :

DEPARTM... ...HODONTICS
& D...NT... ...THOPAEDICS
T.D.C & R.C, NEW PARGAON.

Signature of the Examiners

(1)

(2)

Signature of the Staff Incharge

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon Tal. Hatkanangle
Dist. Kolhapur

LIST OF INSTRUMENTS & MATERIALS

1) Young's Universal Plier
2) Adam's Plier
3) Wire Cutter
4) Mc' Intosh Sheet
5) Graph Paper
6) Pencil, scale, Eraser, Sharpener, permanent marker
7) Glass Marking Pencil
8) Orthodontic Wires

1.0 mm	(19 gauge) -	1 Packet
0.9 mm	(20 gauge) -	1 Packet
0.8 mm	(21 gauge) -	1 Packet
0.7 mm	(22 gauge) -	1 Packet
0.6 mm	(23 gauge) -	1 Packet
0.5 mm	(24 gauage) -	1 Packet

9) Dividers
10) Brass Wire
11) Calculator

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
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THIRD YEAR POSTING

Sr. No.	Work Done	Page No.	Grade	Wire Used	Staff Signature
1.	Straightening of wire of 15 cms length	1	A	1.0 mm 0.8 mm	
2.	Triangle of each side 4 cms length	1	B	0.9 mm	
3.	Square of each side 4 cms length	2	B+	0.9 mm	
4.	Circle of radius 3 cms	2	B	0.7 mm	
5.	 '5U' of each segment 2 cms	3	B+	0.8 mm	
6.	 '5U' of each segment 2 cms	3	B	0.8 mm	
7.	'C' clasp with mesial tag arm on 16	5 - 6	B++	0.9 mm	
8.	'C' clasp with distal tag arm on 26	5 - 6	B++	0.9 mm	
9.	Jackson's clasp on 16 and 26	7 - 8	B++	0.9 mm	
10.	Triangular clasp between 14-15, 15-16, 24-25, 25-26	9 - 10	B+++	0.7 mm	

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon, Tal. Hatkanangle
Dt. Kolhapur 416 13

FINAL YEAR POSTING

Sr. No.	Work Done	Page No.	Grade	Wire Used	Staff Signature
1.	Adam's clasp on 16, 26	11 - 12	B B+	0.7 mm	OK OK
2.	Adam's clasp on 14	11 - 12	B+	0.7 mm	OK
3.	Adam's clasp on 23	11 - 12	B+	0.6 mm	OK
4.	Adam's clasp on 11, 21	11 - 12	B+	0.6 mm	OK
5.	Single Cantilever Springs	13 - 14	B++	0.6 mm	OK
6.	Double Cantilever Springs	13 - 14	A	0.6 mm	OK
7.	Finger Spring for mesial movement	15 - 16	B+	0.6 mm	OK
8.	Finger Spring for Distal movement	15 - 16	A	0.6 mm	OK
9.	Coffin Spring	17 - 18	B+	1.0 mm	OK
10.	'U' Loop Canine Retractor	20 - 21	B	0.6 mm	OK
11.	Reverse loop canine Retractor	22 - 23	B	0.6 mm	OK
12.	Buccal canine Retractor	24 - 25	B	0.6 mm	OK
13.	Palatal canine Retractor	26 - 27	B	0.6 mm	OK
14.	Short Labial Bow	28 - 29	A	0.7 mm	B+
15.	Long Labial Bow	28 - 29	B++	0.7 mm	OK
16.	Fitted Labial Bow	30	B	0.8 mm	
17.	Begg's Labial Bow	30	B	0.8 mm	
18.	Hawley's Retainer - Short Labial Bow - 2 Adam's clasps	31	A	0.7 mm	OK

Dr. Harish Kulkarni M.D.S.
Principal
K.D.C. & Research Centre,
New Pargaon Tal. Hatkanangle
Dist. Kolhapur 416 12

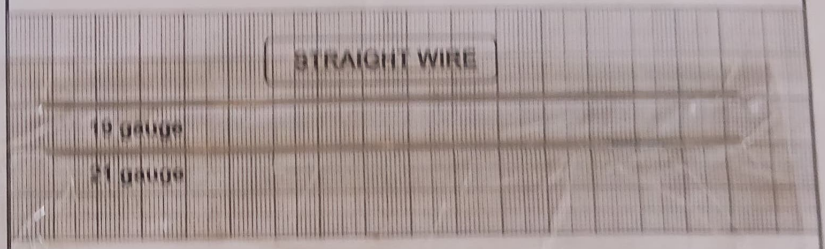
PRE-CLINICAL WIRE BENDING EXERCISES AND COMPONENTS OF REMOVABLE ORTHODONTIC APPLIANCES

PRE - CLINICAL WIRE BENDING EXERCISES

1. STRAIGHT WIRE OF LENGTH 6 INCHES

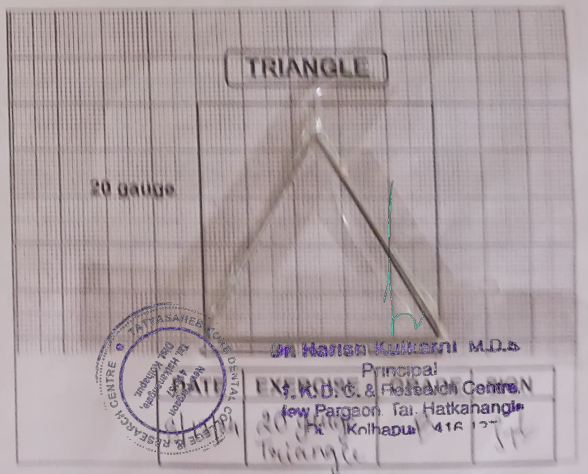
A) 19 gauge

B) 21 gauge



DATE	EXERCISE	GRADE	SIGN
3/10/23	19 guage	A	
	21 guage	A	

2) TRIANGLE



Dr. Harish Kulkarni M.D.S
Principal
K.L.E.S.'s D.C. & Hospital Centre
New Pargaon, Tal. Hatkanangle
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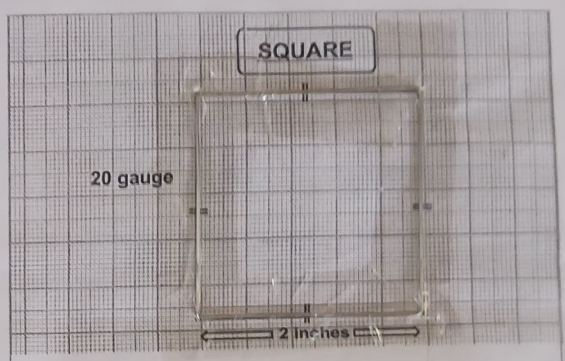
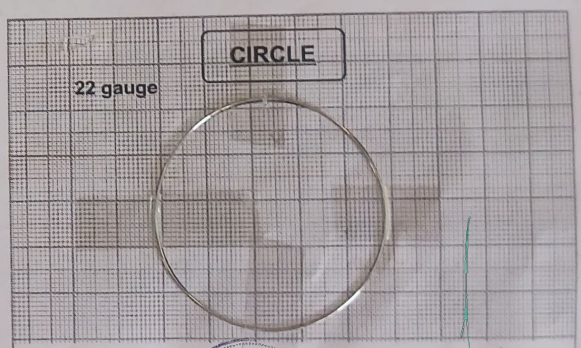
DATE	EXERCISE	SIGN
	Triangle	

3. SQUARE



DATE	EXERCISE	GRADE	SIGN
3/12/24	20 gauge square	B+	Sph

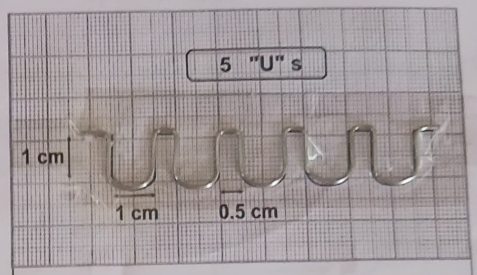
4. CIRCLE



DATE	EXERCISE	GRADE	SIGN
1/1/25	22 gauge Circle	B	

5. PREPARATION OF 'U' LOOPS

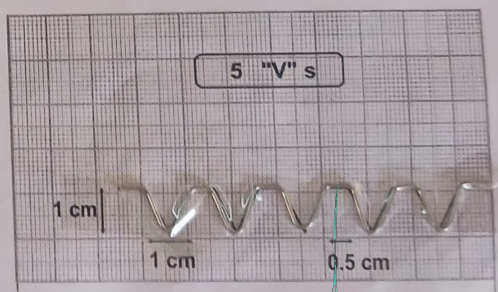
21 gauge



DATE	EXERCISE	GRADE	SIGN
1/1/25	21 gauge	B+	Rohit

6. PREPARATION OF 'V' LOOPS

21 gauge



DATE	EXERCISE	GRADE	SIGN
1/1/25	21 gauge	B+	Rohit

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Principal
T.K.D.C. & Research Centre,
New Pargaon, Tal. Hatkanangle
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COMPONENTS OF REMOVABLE ORTHODONTIC APPLIANCES

REMOVABLE ORTHODONTIC APPLIANCES ARE MADE UP OF :

a) RETENTIVE COMPONENTS
b) ACTIVE COMPONENTS
c) BASE PLATE

a) <u>RETENTIVE COMPONENTS INCLUDE :-</u>

1) CIRCUMFERENTIAL CLASP
2) JACKSON'S CLASP
3) ADAM'S CLASP

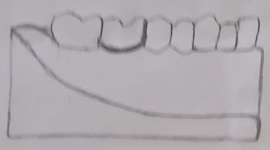
b) <u>ACTIVE COMPONENTS :-</u>

1) LABIAL BOW
2) CANINE RETRACTORS
3) SPRINGS
4) SCREWS
5) ELASTICS

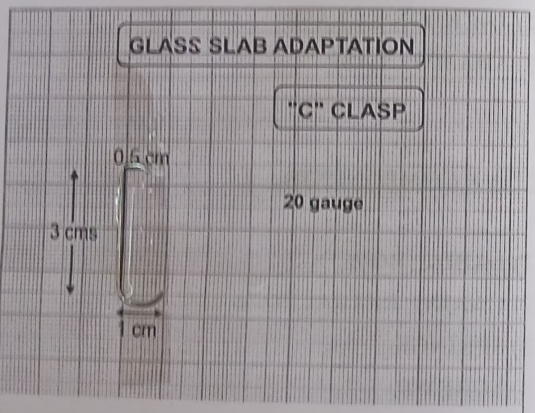
Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13-

7. 'C' CLASP

MESIAL TAG ARM ON 16 (Diagram)



DISTAL TAG ARM ON 26 (On glass Slab)



DATE	EXERCISE	GRADE	SIGN
7/1/25	20 gauge	B	dk

RETENTIVE COMPONENTS

'C' CLASP

i) OTHER NAMES :- The circumferential clasp,
Three quater clasp

ii) WIRE USED :- Stainless steel wire
Gauge 21

iii) MODE OF ACTION :- They are simple clasps that are designed to engage the bucco cervical undercut. Wire is engaged from one proximal undercut along the cervical margin then carried over the occlusal embrasure to end in a single retentive arm on the lingual aspect that gets embedded in the acrylic base plate

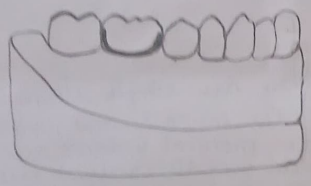
iv) FUNCTION :-
Adequate extension of a removable appliances.

v) ADVANTAGES :-
Its simplicity of design & fabrication

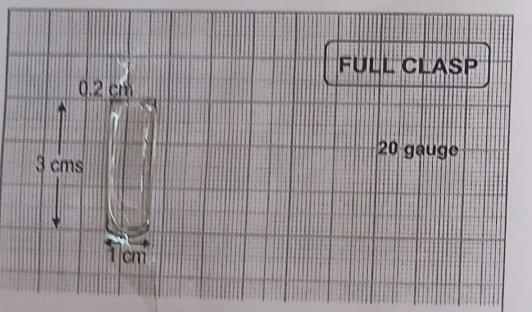
vi) DISADVANTAGES :-
The clasp cannot be used in partially erupted teeth where in the cervical undercut is not available for clasp fabrication.

8. JACKSON'S CLASP

Diagram of Jackson's Clasp



Jackson's Clasp on glass Slab



DATE	EXERCISE	GRADE	SIGN
3/1/25	20 gauge	B	

JACKSON'S CLASP

i) OTHER NAMES :- Full Clasp
"U" Clasp

ii) WIRE USED :- Stainless steel wire
guage 21

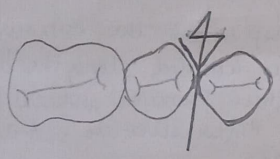
iii) MODE OF ACTION :- This clasp engage the buccocervical-disto Proximal undercuts wire is adapted along the buccocervical mesial margin of both these proximal undercut is then covered over the occlusal embrasure to end as retentive arm on both sides of molar.

iv) FUNCTION :-
Adequate retention of a removable appliance.

v) ADVANTAGES :- Its simple to construct & others adequate retention.

vi) DISADVANTAGES :- It offers inadequate retention in partially erupted teeth.

9. DIAGRAM OF TRIANGULAR CLASP



TRIANGULAR CLASP

i) OTHER NAMES :-

ii) WIRE USED :- 22 Gauge wire is used Stainless steel wire.

iii) MODE OF ACTION :- They are engaged proximal undercut of posterior teeth.

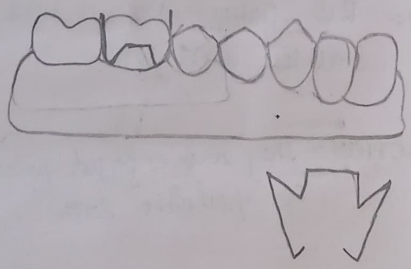
iv) FUNCTION :- To aid in retention of appliances.

v) ADVANTAGES :- Provide additional retention where required

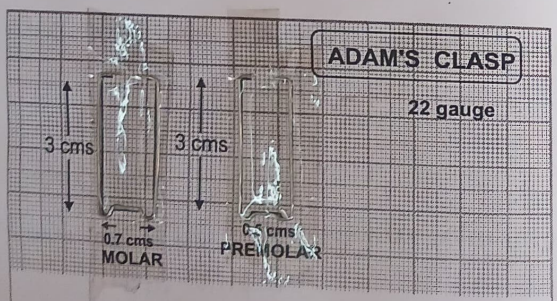
vi) DISADVANTAGES :- Not useful in partially erupted teeth.

10. ADAM'S CLASP

Diagram of Adam's Clasp



Adaption on glass Slab



DATE	EXERCISE	GRADE	SIGN
7/1/25	PREMOLAR	B	ak
	MOLAR	B	ak

10 ADAM'S CLASP

i) OTHER NAMES :- Liverpool clasp
Universal Clasp
Modified arrow head clasp.

ii) WIRE USED :- Wire used is 0.7 mm

iii) MODE OF ACTION :- The arrow head of the clasp engages the mesial or distal proximal undercut or provide resistance to displacement

iv) PARTS OF THE CLASP :-
a. Two arrow heads.
b. Bridge
c. Two retentive arm

v) ADVANTAGES :-
- Rigid or after excellent retention
- Can be fabricated in deciduous as well as permanent teeth
- It can be used on molars, premolars or incisors

vi) MODIFICATIONS :-
- Adam's with single arrowhead
- Adam's with "J" hook
- Adam's with [illegible] incorporated teeth
- Adam's with distal extension
- Adam's with [illegible] buccal [illegible]

Dr. Harish Kulkarni M.D.S
Principal
K.D.C. & Research Centre,
New Pargaon. Tal. Hatkanangle
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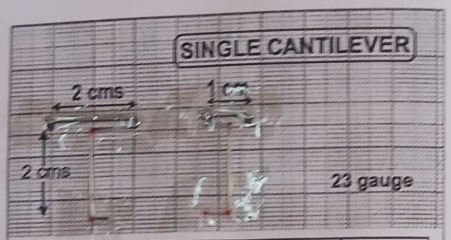
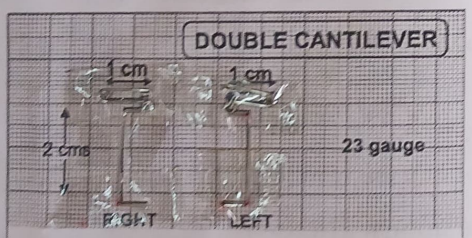
11. SINGLE CANTILEVER SPRING



DATE	EXERCISE	GRADE	SIGN
9/1/25	2 cms	B	
9/1/25	1 cm	B	

12. DOUBLE CANTILEVER SPRING ('Z' Spring)



DATE	EXERCISE	GRADE	SIGN
9/1/25	LEFT Z sp.	B	
9/1/25	RIGHT Z sp.	B	

SPRINGS

(Single Cantilever Spring & Double Cantilever Spring)

a) SINGLE CANTILEVER SPRING :-

INDICATIONS :- Minor rotation correction, used for mesio distal movement of teeth

i) PARTS :- Single - coil helix with internal diameter 3mm. Retentive arm - 4-8 mm length & active arm - 12-15 mm long. Small retentive tags.

ii) WIRE USED :- 0.5 mm wire or 0.6 mm hard round stainless steel wire.

iii) ACTIVATION :- By opening helix by 2-3 mm at a time.

b) DOUBLE CANTILEVER SPRING :-

"Z" spring.

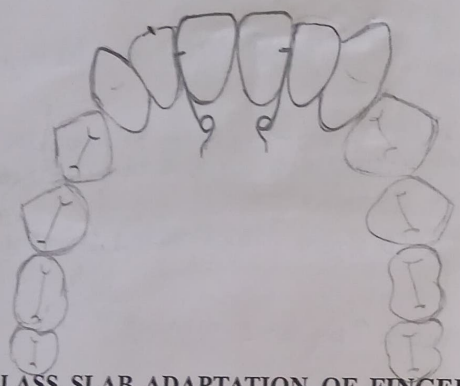
INDICATIONS :- Used for labial movement of incisors. They can also be used by bringing minor rotation of incisors

i) PARTS :- Two coils of very small internal diameter - Retentive arm of 10-12 mm length that gets embedded in the acrylic

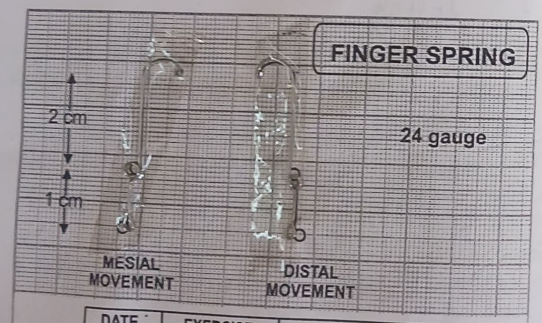
ii) WIRE USED :- Models of 0.5 mm hard round stainless steel wire.

iii) ACTIVATION :- "Z" spring active by opening both the helix by about 2-3 mm at a time for rotation correction opened.

13. DIAGRAM OF FINGER SPRING



GLASS SLAB ADAPTATION OF FINGER SPRING



DATE	EXERCISE	GRADE	SIGN
11/1/25	MESIAL MOVEMENT	B	
11/1/25	DISTAL MOVEMENT	B	

FINGER SPRING

i) INDICATIONS :- Used for mesiodistal movement of teeth. It can be used only for those teeth rotated. correctly in the bucco-lingual direction i.e. teeth should be within line of the arch.

ii) PARTS :-
- Active arm.
- Helix of 3mm diameter.
- Retentive arm.
- Small retentive arm.

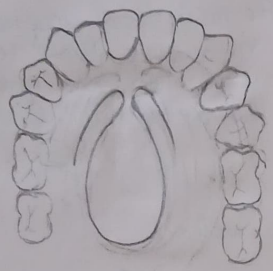
iii) WIRE USED :-
0.5 mm or 0.6 mm hard round stainless steel wire.

iv) PRINCIPLE OF DESIGN :-
To move teeth mesiodistally.

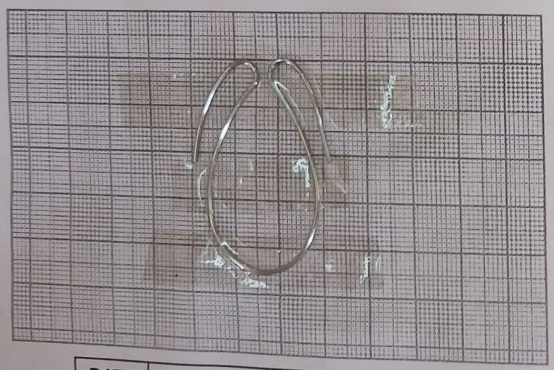
v) ACTIVATION :-
Activated by moving active arm towards teeth intended to be moved.
Activation upto 2mm is considered ideal.

COFFIN SPRING

Diagram



Coffin Spring On Glass Slab



DATE	EXERCISE	GRADE	SIGN
13/1/25	19 gauge	B	

14 COFFIN SPRING :-

i) INDICATIONS :- Arch expansion
where upper arch is considered
Unilateral crossbite.

ii) PARTS :-
U or Ω shape.
Retentive arm - 2.

iii) WIRE USED :-
1.2 mm hard round
Staenless steel wire.

iv) ACTIVATION :-
- Manually by holding both ends at the region of clasp of pulling sides gently apart.
- 1.2 mm considered appropriate at a time.

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

CANINE RETRACTORS :-

i) DEFINITION :- Canine retractors are spring that are used to move canines in a distal direction

ii) CLASSIFICATION :- A) Based on location.
(i) Buccal - buccally placed.
(ii) Palatal - Palatally placed.

B) Based on prsience of loop or helix.
i) Canine retractor with helix
ii) Canine retractor with loop

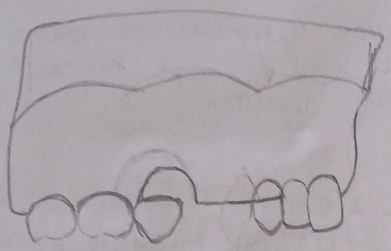
C) Based on mode of Action
i) Push type
ii) Pull type.

iii) FUNCTION :-
Its used to move the canine in distal as well as in palatal direction.

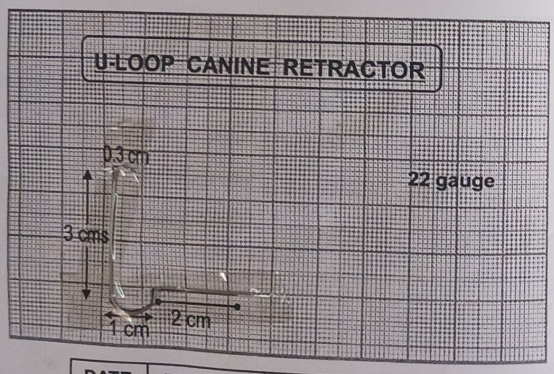
iv) TYPES :-
1) U loop canine retractor
2) Helical Canine retractor / Reverse loop Canine retractor
3) Buccal canine retractor
4) Palatal canine retractor.

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

15. DIAGRAM OF U-LOOP CANINE RETRACTOR



'U' LOOP CANINE RETRACTOR ON GLASS SLAB



DATE	EXERCISE	GRADE	SIGN
16/1/25	22 gauge	B	

U-LOOP CANINE RETRACTOR

i) PARTS :-

U loop.
- Retentive arm.
- Active arm

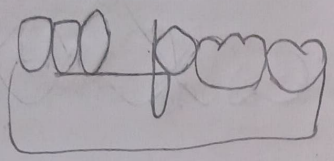
ii) WIRE USED :-

0.6 mm & OR 0.7mm wire used.

iii) ACTIVATION :-

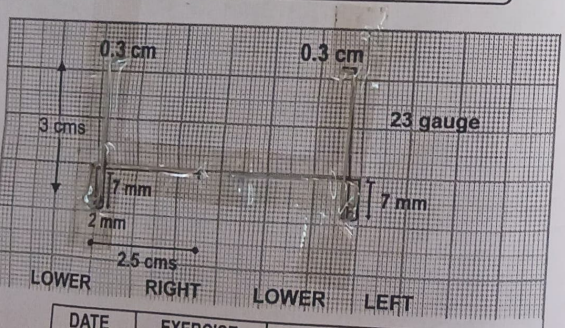
Activated by closing loop by 1-2mm or Cutting free end of active arm by 2 mm & readapting it.

16. DIAGRAM OF REVERSE LOOP CANINE RETRACTOR



REVERSE LOOP CANINE RETRACTOR ON GLASS SLAB

REVERSE LOOP CANINE RETRACTOR



DATE	EXERCISE	GRADE	SIGN
18/1/25	LOWER LEFT	B	
18/1/25	LOWER RIGHT	B	

REVERSE LOOP CANINE RETRACTOR

i) PARTS :-

- Mesial arm (Retentive arm)
- coil of 3mm diameter
- Distal arm.

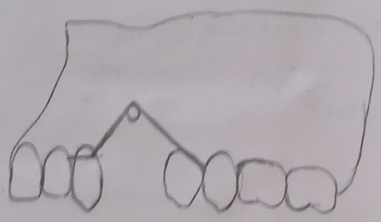
ii) WIRE USED :-

0.6 mm wire

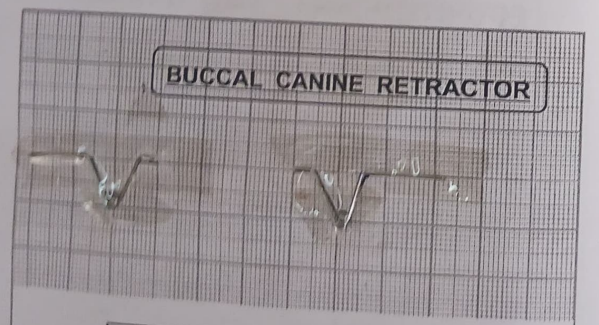
iii) ACTIVATION :-

- By opening helix by 1mm or by cutting 1mm of free end at readapting it around canine.

BUCCAL CANINE RETRACTOR (DIAGRAM)



BUCCAL CANINE RETRACTOR ON GLASS SLAB



DATE	EXERCISE	GRADE	SIGN
20/1/25	LOWER LEFT	B	
20/1/25	LOWER RIGHT	B	

17. BUCCAL CANINE RETRACTOR

i) PARTS :- Active arm
- Coil of 3mm diameter
- ~~Re~~tive Retentive arm.

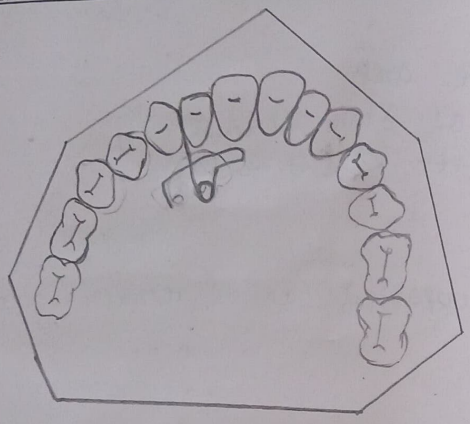
ii) WIRE USED :-

Self supported canine retractor 0.7mm.

iii) ACTIVATION :-

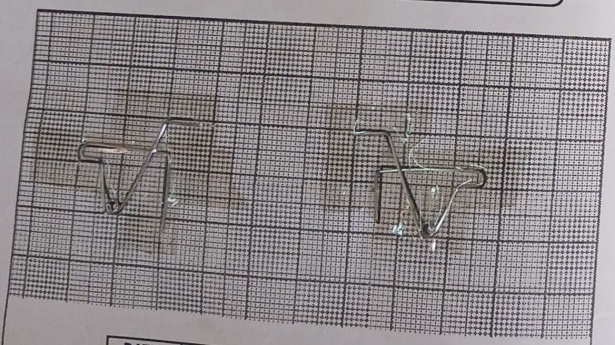
Self supported canine retractor are activated by closing helix by 1mm at a time.

PALATAL CANINE RETRACTOR (DIAGRAM)



PALATAL CANINE RETRACTOR ON GLASS SLAB

REVERSE LOOP CANINE RETRACTOR



DATE	EXERCISE	GRADE	SIGN
21/1/25	LOWER LEFT	B	
21/1/25	LOWER RIGHT	B	

18. PALATAL CANINE RETRACTOR

i) PARTS :-
- ~~Active~~ Active arm.
- coil of 3mm
- Guide arm.

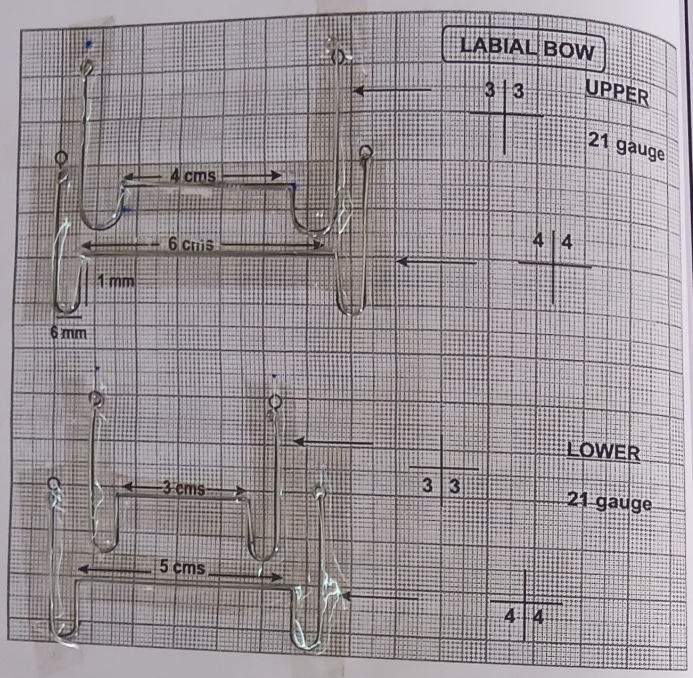
ii) WIRE USED :-

0.6 Mm wire is used.

iii) ACTIVATION :-

Activation done by opening helix 2mm at a time.

19. DIAGRAM OF LABIAL BOW
(Short & Long)



DATE	EXERCISE	GRADE	SIGN
22/1/25	3 | 3	B	
22/1/25	4 | 4	B	
22/1/25	3 | 3	B	
22/1/25	4 | 4	B	

ACTIVE COMPONENTS

LABIAL BOW :-

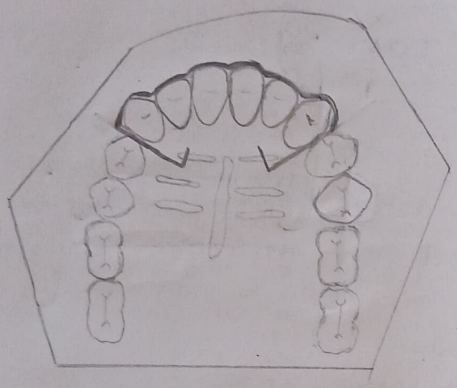
i) DEFINITION :-
Bows are active component that are mostly used for retraction of incisors.

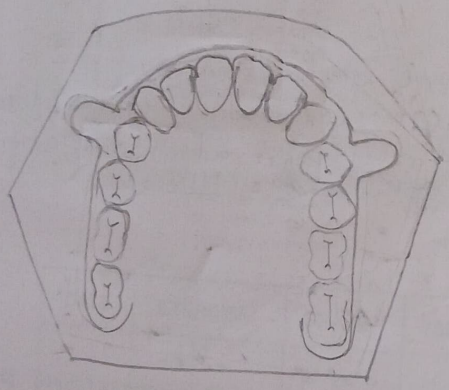
ii) PARTS :- Bow,
A U Loop
Retentive arm.

iii) USES :- - In case of minor overjet reduction of anterior space closure.
- Also in retention at termination of fixed orthodontic therapy.

iv) DISADVANTAGES :-

v) TYPES :-
1) Short labial bow
2) Long labial bow
3) Split labial bow
4) Reverse labial bow
5) Robert retractor
6) Mill's retractor
7) High labial bow with apron springs
Fixed labial bow.



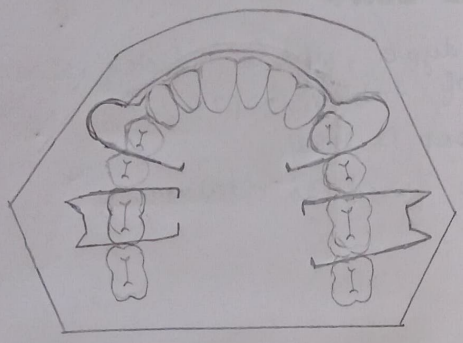


FITTED LABIAL BOW :-

- In this type, wire is adapted to confirm Contours of labial surface.
- The U-loop is small
- They are used as retainer

BEGG'S LABIAL BOW :-

In this case, wire is adapted to confirm to Contours of labial surface. The U loop is large.



HAWLEY'S RETAINER

- Hawley's appliance was designed in 1920 by Charles Hawley's
- It's most frequently used retainer.
- Consists of clasps on molars and short labial bow extending from canine to canine having adjustment loops.

Advantages.

1) Ease of fabrication due to simple design & minimum point discomfort due to reduced bulk.
2) Many modifications can be done.

DIAGNOSTIC AIDS

20. DIAGNOSTIC AIDS

i) DEFINITION :-

A diagnostic dental cast is a cast made of a person's teeth that a dental professional uses as a guide in application of corrective or restorative dentistry.

ii) LOGICAL LISTING :-

Essential.

1) Case History
2) Clinical Examination
3) study models
4) Certain radiography
   - Periapical
   - Bitewing
   - Panoramic.
5) facial Photograph.

Supplemental.

1) specialised radiograph.
   - cephalometric radiograph.
   - occlusal intraoral film.
   - selected lateral jaw view
2) Electromyographic Examination of muscle activity.
3) Hand-wrist radiograph
4) [illegible]
5) [illegible]
6) Diagnostic setup.
7) Occlusograms.

VARIOUS DIAGNOSTIC AIDS

1. STUDY MODELS :- Are accurate plaster production of teeth & their surrounding soft tissue they are essential diagnostic aids that make it possible to study arrangement of teeth and occlusion from all direction.

2. RADIOGRAPHS :- Classified as.

1) Intra oral - IOPA, occlusal radiograph, bitewing radiograph.
2) Extra oral - Panoramic radiograph, Cephalometric radiograph, Hand-wrist radiograph.

3. PHOTOGRAPHIC RECORDS :-

Both extraoral & intra oral photographs are useful diagnostic records.
Front view, profile view, oblique facial view.
Use : useful in facial symmetry, Diagnostic record assessment of progress of treatment.

4. CASE HISTORY :-

Case history involves eliciting and recording of relavent information from patient or Parent to aid in overall diagnosis of case.

5. CLINICAL EXAMINATION :-

a) General examination : Built, Gait, Posture, Height
b) Extraoral Examination : Shape of head, facial form, facial Symmetry, facial profile.
c). Intra-oral Examination
d) functional examination

6. MODEL ANALYSIS :- It involves study of maxillary and mandibular dental arches in all 3 planes of space as is valuable tool in orthodontic diagnosis & treatment planning

1) Carey's analysis.
2) Ashley Howe's analysis.
3) Pont's analysis.
4) Linder Harth index.
5) Bolton's analysis.
6) K.

7) MISCELLANEOUS :-

Supplemental diagnostic aids

1) Specialised radiographs.
   - cephalometrical
   - occlusal intraoral film.
   - Selected lateral jaw view.
2) ~~Tel~~ Electromyographic examination
3) Hand - wrist radiographs.
4) Endocrine test.
5) Estimation BMR.
6) Diagnostic set up.
7) Occlusogram

CEPHALOMETRY

CEPHALOMETRY

A. DEFINITION :-

- Cephalometry is study of growth by examination of standardization of lateral & frontal radiograph of head.
- It's mainly used for diagnosis of orthodontic

B. STANDARDIZATION :-

- Chephalometric radiographs are taken using an appliance that consists of x-ray source at a head holding device called 'cephalostat'.
- It consists of two ear rods that prevent movement of head in horizontal plane.
- Vertical stabilization of head is brought about by orbital pointer of face that contact lower border of orbit.
- Upper part of face is supported by fore head of clamp.
- Distance between ... source at mid sagittal plane of patient is fixed at 5 feet.

C. TECHNIQUE

1) Cephalometric radiograph are taken using an apparatus that consists of x-ray source & head holding device called cephalostat.

2) Two ear rods that prevent movement of head in horizontal plane.

3) Vertical stabilization of head is brought about by orbital pointer touching lower border of orbit.

4). Upper part of face is supported by forehead.

~~5) Distance part of face is supra~~

5) Distance between x-ray source & mid sagittal plane of patient is fixed at 5 feet.

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13

CASE NO. 1

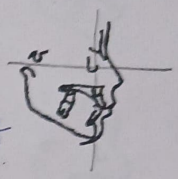
DOWN'S ANALYSIS

PARAMETERS	RANGE	AVERAGE VALUE	MEASURED VALUE
SKELETAL			
1) FACIAL ANGLE	82° – 95°	87.8°	83°
2) ANGLE OF CONVEXITY	-8.5° – 10°	0°	4°
3) A-B PLANE	-9° – 0°	-4° - 6°	8°
4) MANDIBULAR PLANE ANGLE	17° – 28°	21.9°	25°
5) Y-AXIS ANGLE	53° – 66°	59°	65°
DENTAL			
1) CANT OF OCCLUSAL PLANE	1.5° – 14°	9.3.°	5°
2) INTERINCISAL ANGLE	130° – 150.5°	135.4°	104°
3) INCISOR OCCLUSAL PLANE	3.5° – 20°	14.5°	22°
4) INCISOR MANDIBULAR PLANE	-8.5° – 7°	1.4°	20°
5) UPPER INCISOR TO A-POG LINE	-1 – 5 mm	2.7 mm	14mm

DOWN'S ANALYSIS

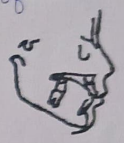
Down's cta analysis is frequently used cephalometric analysis.

A. SKELETAL PARAMETERS :-



i) FACIAL ANGLE

Its an angle formed by intersection of N- Pog plane & F-H plane.
Average - 87.8° ~~5to~~
Its given anterioşe - posterioşe relation of maxilla & mandible.

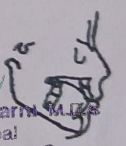


ii) ANGLE OF CONVEXITY

Angle between intersection of point A to nasion & point A to pogonion.
Average - 8.5 to 10°
Reveals convexity or concavity of facial profile.

iii) A-B PLANE ANGLE

Angle Between point A & point B.
& line joining nasion & Pogonion
Avg - 0.9 - 0°
Its usually negative.

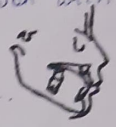


iv) MANDIBULAR PLANE ANGLE

Its formed by intersection of mandibular plane with F - H plane.
Avg - 17 - 28°
Decides Vertical Flower.

v) Y-AXIS

This angle is obtained by joining sella-gonion with F-H plan
Mean - + 59°
It is larger in class II facial pattern than patient exhibiting class III pattern.



B. DENTAL PARAMETERS :-

i) INTER - INCISAL ANGLE

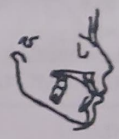
Angle between long-axis of upper & lower incisors.
Avg - 135.4°
Angle is determined by in class I relationship.

ii) INCISOR - OCCLUSAL PLANE ANGLE

Lineae measurement between incisal edge of max C.I & line joining point A to POG
Avg - 2.7 mm.

iii) UPPER INCISOR TO N - POG LINE

Lineae measurement between incisal edge of max CI & line joining point A to POG.
Avg - 2.7 mm



iv) INCISOR - MANDIBULAR PLANE ANGLE

Angle between long axis of incisor & mandibular plane
Avg - 14.5°

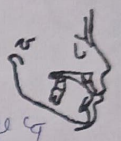
STEINER'S ANALYSIS

PARAMETERS	NORMAL VALUE	MEASURED VALUE
SKELETAL		
1) <SNA	82°	85°
2) <SNB	80°	80°
3) <ANB	2°	5°
4) MANDIBULAR PLANE ANGLE	32°	30°
5) OCCLUSAL PLANE ANGLE	14.5°	15°
DENTAL		
1) UPPER INCISOR - N - A (ANGLE)	22°	20°
2) UPPER INCISOR - N - A (LINEAR)	4 mm	7mm
3) LOWER INCISOR - N - B (ANGLE)	25°	40°
4) LOWER INCISOR - N - B (LINEAR)	4 mm	7mm
5) INTER INCISAL ANGLE	130° - 131°	97°

STEINER'S ANALYSIS

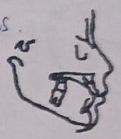
It is derived into 3 parts
Skeletal
Dental
soft tissue

A. SKELETAL PARAMETERS :-



i) ANGLE SNA

It's an angle formed by S-N plane & line joining nasion to point A.
Mean - 82°
Indicates A-P relationship of arches.



ii) ANGLE SNB

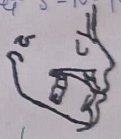
Angle formed between SN plane & point B
Mean - 80°
Indicates A-P position.

iii) ANGLE ANB

This is formed by interaction of 2 line joining nasion to point A & point B.
mean 2°

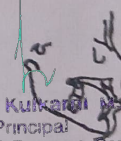
iv) OCCLUSAL PLANE ANGLE

It's formed between occlusal plane & S-N plane
Mean value - 14.5°
It represents line passing through overlapping cusp of Premolare & 1st molar.



v) MANDIBULAR PLANE ANGLE

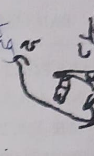
Angle formed between S-N plane & Mandibular plane
Avg - 32°



B. DENTAL PARAMETERS :-

i) UPPER INCISOR TO N - A (ANGULAR / LINEAR)

Its an angle formed by interaction of long axis of upper incisors line joining nasion to point A.



Avg - 22°

Linear value - 4 mm.

ii) UPPER INCISOR TO N - B (ANGULAR / LINEAR)

angle formed between NB plane & long axis of upper incisor.

mean value - 25°

It indicates inclination of lower C.I.

linear value - 4mm.

iii) INTERINCISAL ANGLE

It's angle fromed betwen long axis of upper & lower central incisor.

Mean value - 130 - 131°

C. SOFT TISSUE ANALYSIS

- According to steiner, lips in well balaced face should tough a line extending from soft tissue ~~coun~~ contour of chin to middle of "S" formed by the lower border of nose

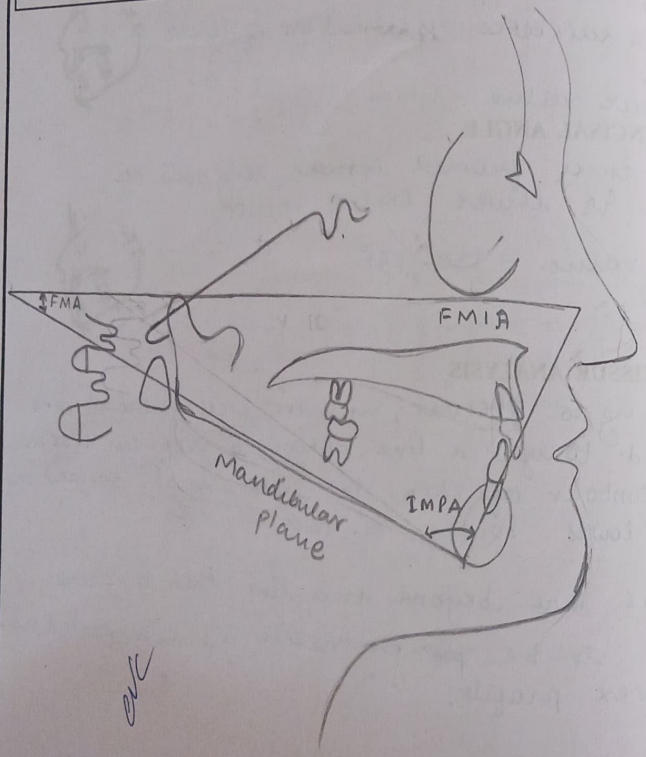
- If lips are beyond this line then lips are said to be ~~pro~~ protrusive or interpreted as convex profile.

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE
New Pargaon 416137 Tal. Hatkanangale, Dist. Kolhapur.

Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Di. Kolhapur 416 137

TWEED'S ANALYSIS

PARAMETERS	NORMAL VALUE	MEASURED VALUE
1) FRANKFORT - MANDIBULAR PLANE ANGLE	25°	35°
2) LOWER INCISOR - MANDIBULAR PLANE ANGLE	90°	70°
3) FRANKFORT - LOWER INCISOR PLANE ANGLE	65°	40°



TWEED'S ANALYSIS

3 planes – 1) F-H plane
2) Mandibular plane
3) Long axis of lower incisor

i) FRANKFORT - MANDIBULAR PLANE ANGLE

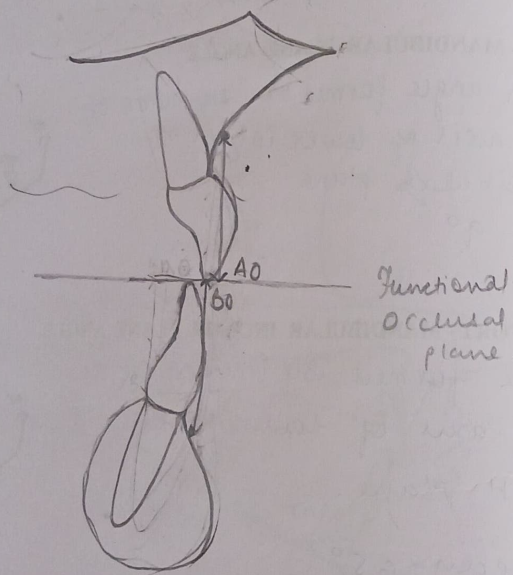
It's an angle formed by intersection of F-H plane & mandibular plane.
Average - 25°

ii) INCISOR - MANDIBULAR PLANE ANGLE

It's an angle formed by intersection of long axis of lower incisor & mandibular plane.
Avg - 9°

iii) FRANKFORT - MANDIBULAR INCISOR PLANE ANGLE

Angle formed by intersection of long-axis of lower incisor & F-H plane.
Mean - 65°



Wit's Appraisal.

WIT'S APPRAISAL

- The wits apprasial is measure of extent to which the maxilla & mandible are related to each other in A-P or sagittal plane.
- It's ~~consid~~ is used in case where A-N-B angle is considered not so reliable due to position of nasion & rotation of jaws
- A functional occlusal plane is drawn through the overlapping cusps of first premolars & first molars.
- Perpendicular line drawn to the occlusal plane from point A & B.
- The point of contact of those perpendicular line on occlusal plane is named AO & BO
- Distance between AO & BO is AP relationship.
- In case of males -
  Point BO is ahead of AO by 1mm.
- In female:
  Point ~~AO is ahed of~~ A & BO coincides.
- In case of Class II - BO is usually behind AO.
- In case of Class III BO is usually ahead of AO.

MODEL ANALYSIS

MODEL ANALYSIS

CASE NO. 1 32

1) ARCH PERIMETER ANALYSIS :

Total tooth material = 83 mm

Arch length = 87 mm

Discrepancy = 4 mm.

Inference = since the discrepancy is between 2.5 - 5 i.e its 4 mm.

It indicates for extraction of 2nd Premolar.

2) CAREY'S ANALYSIS :

Total tooth material = 75 mm

Arch length = 79 mm

Discrepancy = 4 mm.

Inference ⇒ is between 2.5 - 5

It indicates extraction of 2nd premolar

	Maxillary		Mandibular	
	Right	left	Right	left
Central Incisor	10	10	6	6
Lateral Incisor	8	8	7	7
Canine	9	9	8	8
1st Premolar	8	8	8	8
2nd Premolar	7	7	9	8
Molar	12	12	13	13

3) ASHLEY HOWE'S ANALYSIS :

Total tooth material = 107 mm

Premolar Diameter Arch width = 40 mm.
between tips of buccal cusp of 1st Premolar

Premolar diameter Basal Arch width = 44 mm

Inference :

As Premolar Basal arch width is greater than the premolar diameter. Arch width; it indicates expansion is possible.

Premolar Basal arch width percentage = 41.12 %

Inference is B/W 37-44 % i.e. 41.12 %.
its Borderline case.

4) PONT'S ANALYSIS :

Determination of sum of Incisors = 35.5 mm

Measured Premolar value = 35 mm

Measured Molar Value = 44.5 mm

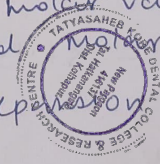
Calculated premolar Value = $S \frac{I \times 100}{80}$

= 55.46 %

Inference -

As measured molar value is less than the calculated Molar value.

It indicates expansion is indicated.



Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

5) Bolton's Analysis:

Sum of mandibular 12 = 101 mm.

Sum of maxillary 12 = 107 mm

Overall ratio = 94.39 mm

Inference -

As overall ratio is > 91.3% it indicates mandibular tooth material is excess

mandibular 12 - $\frac{\text{maxillary 12}}{100}$ x 91.3

= 3.31 mm

Inference:

Mandibular over all tooth material is excess by 3.31 mm.

Anterior Ratio

Sum of mandibular 6 = 43 mm

Sum of maxillary 6 = 53 mm.

Anterior ratio = 31.13 mm.

5) BOLTON'S ANALYSIS :

Inference:

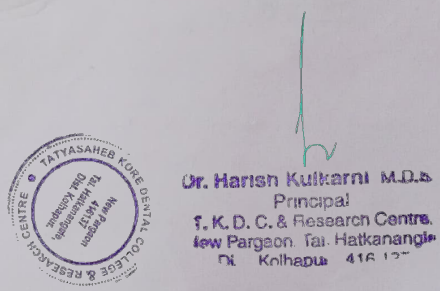
As anterior ratio is >17.2 it indicates mandibular tooth material excess

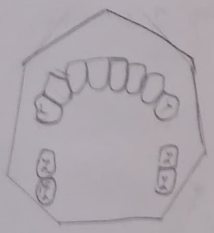
mandibular 6 - $\frac{\text{Maxillary 6}}{100}$ x 77.2

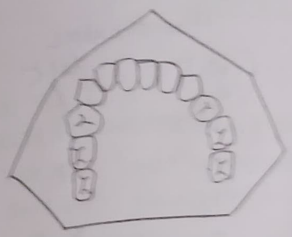
= 2.09 mm

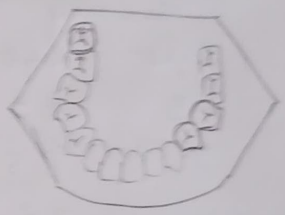
Inference.

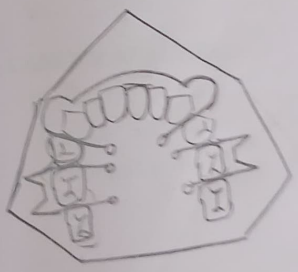
Mandibular Anterior tooth material is excess by 2.09 mm.











TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE
New Pargaon
Tal. Hatkanangle
Dist. Kolhapur

Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

	Maxillary		Mandibular	
	Right	left	Right	left
C I	8.5	8.5	6	6
L I	7	6.5	7.5	7
Canine	7	7.5	8	8.5
1st PM	6.5	7	8	8
2nd PM	6	6	8	8
1st M	10	9.5	12.5	13.5

MODEL ANALYSIS

CASE NO. 2 23

1) ARCH PERIMETER ANALYSIS :

Total tooth material = 70.5 mm

Arch length = 82 mm

Discrepancy = Arch length – total tooth material.

= 11.5 mm

As inference :

As discrepancy is more than 5mm; it's 11.5 mm it indicates esctraction of 1st PM.

2) CAREY'S ANALYSIS :

Total tooth material = 75 mm.

Arch length = 79 mm

Descrepancy = Arch length – Total tooth material

= 79 – 75

= 4 mm.

Inference

As discrepancy is less than 5mm; i.e. its indicates extraction of 2nd PM.

3) ASHLEY HOWE'S ANALYSIS :

Total tooth material = 40 mm

Premolar Diameter Arch width = 42 mm

Premolar Basal arch width = 43 mm

Inference

As premolar basal arch width is > PM diameter arch width expansion is possible

Premolar Basal Arch width % $= \frac{43 \times 100}{90.}$

$= 47.77$ mm.

Inference : Since Premolar Basal arch width is 44% or more i.e. its 47.77% ; treatment is by non extraction.

4) PONT'S ANALYSIS :

Determination of sum of incisors = 30.5 mm

Measured Premolar value = 45.5 mm.

Measured Molar value = 38.12 mm.

Inference - As measured premolar value is < Calculated Premolar value ; it indicates expansion is needed.

Calculated molar value = 47.65 mm.

Inference, Less than calculated molar value, it indicates expansion is needed.

5) BOLTON'S ANALYSIS :

over all Ratio.

Sum of mandibular 12 = 101 mm.

Sum of maxillary 12 = 90 mm

over all Ratio = 912.2 mm.

Inference.

over all ratio is > 91.3.

⇒ Mandibular tooth material is excess.

= 18.83 mm.

Inference.

As anterior ratio is > 77.2 it indicates mandibular tooth material. is excess

= 8.26 mm.

Inference.

Mandibular Anterior tooth material is excess by 8.26 mm.

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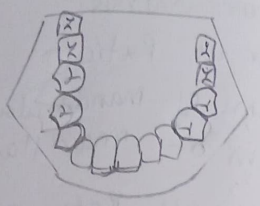
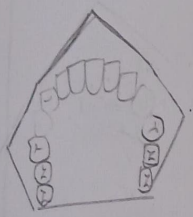
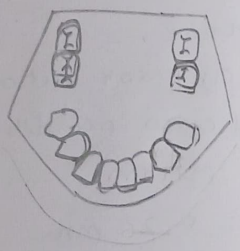
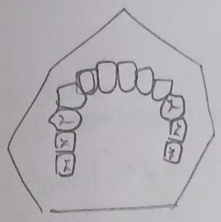
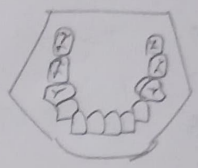
Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 137

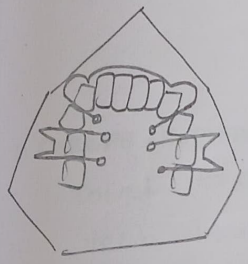


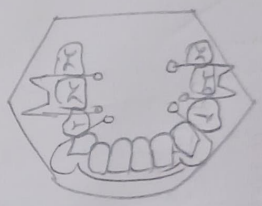












Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12

	Maxillary		Mandibular	
	Right	left	Right	left.
	8	8	6	6
CI	7	7	7	7
CI	7	7	8	8
Canine	6	7	8	8
1st PM	6	6	8.5	8
2nd PM	10	9	12.5	13
1st M				

MODEL ANALYSIS

CASE NO. 3 23

1) ARCH PERIMETER ANALYSIS :

Total tooth material = 70.5 mm.
Arch length = 82 mm
Discrepancy = 11.5 mm

Inference =
As discrepancy is > 5mm
i.e its 11.5 mm it indicates extraction of 1st PM.

2) CAREY'S ANALYSIS :

Total tooth material = 75 mm.
Arch length = 79 mm.
Discrepancy = Arch length - Total tooth material
= 79 - 75
= 4 mm

Inference :
As discrepancy is
Indicates extraction of 2nd PM

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon, Tal. Hatkanangle
Dist. Kolhapur 416 12[illegible]

3) ASHLEY HOWE'S ANALYSIS :

Total tooth material = 90 mm

Premolar diameter Arch width = 42 mm

Premolar basal arch width = 43 mm.

Inference

As Premolar basal Arch width is > than. Premolar diameter arch width ' expansion is possible.

Premolar Basal Arch width % = 47.7 mm.

Inference.

Since, PM basal arch width is 44% or more i.e. it's 47.7%, treatment is by non-extraction.

4) PONT'S ANALYSIS :

Determinant of sum of incisors = 30.5 mm.

measured PM value = 37 mm

measured M value = 45.5 mm

calculated PM value = 38.12 mm

calculated M value = 47.65 mm

Inference =

As measured PM value is less than calculated PM value it indicates expansion is needed.

5) BOLTON'S ANALYSIS :

overall Ratio

sum of mandibular 12 = 101 mm
sum of maxillary 12 = 90 mm
over all Ratio. = 112.2 mm.

Inference -

As overall ratio is > 91.3 it indicate mandibular tooth material is excess.

Mean = 18.8 mm.

Inference -

mandibular overall tooth material excess by 18.8 mm.

Anterior Ratio

Sum of mandibular 6 = 43 mm
Sum of maxillary 6 = 45 mm.

Anterior ratio = 95.5 mm

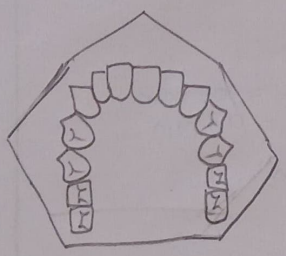
Inference:

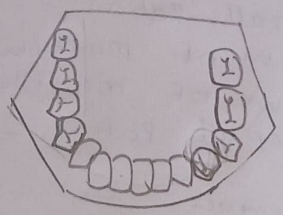
As the anterior ratio is > 77.2 it indicates mandibular tooth material is excess

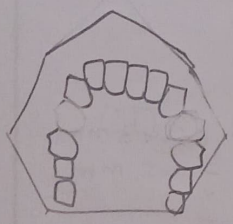
= 8.26 mm

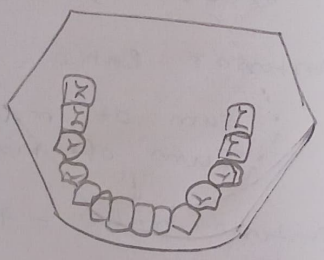
Inference:

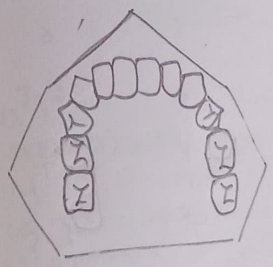
mandibular anterior tooth material is excess by 8.26 mm

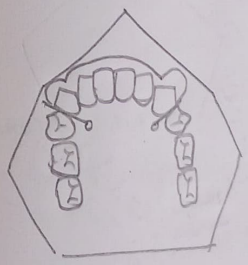


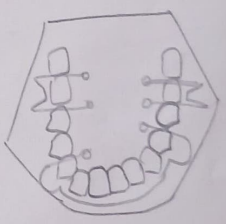












Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12

	Maxillary		Mandibular	
	Right	left	Right	left.
CI	8.5	8.5	6	6
LI	8	7	6	6.5
Canine	8	7.5	7	7
1st PM	7.5	7	7	7.5
2nd PM	8	6	7	7.5
1st M.	10	10	10.5	11

MODEL ANALYSIS

CASE NO. 4 2 .

1) ARCH PERIMETER ANALYSIS :

Total tooth material = 74 mm

Arch length = 80 mm.

Discrepancy = Arch length - Total tooth material.

= 80 - 74

= 6 mm

Inference

As discrepency is 6 mm i.e. it is ≥5 mm. it indicates for extraction of 1st PM.

2) CAREY'S ANALYSIS :

total tooth material = 67.5 mm

Arch length = 66.

Discrepancy = 1.5 mm.

Inference, As discrepency is ≤ 2.5 mm i.e 1.5 mm it indicates proximal stripping

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 1..

3) ASHLEY HOWE'S ANALYSIS :

Total tooth material = 94 mm
Premolar Diameter Arch width = 34 mm
Premolar Basal Arch width = 40 mm.

Inference, As PMBA width is > than PM Diameter arch width expansion is possible.

Premolar Basal Arch width % = 42.55 %.

Inference,
Since PM Basal arch width % is B/w 37 to 44 i.e 42.55 % it is a Borderline case.

4) PONT'S ANALYSIS :

Determination of sum of Incisors = 32 mm
measured PM value = 33.5 mm
measured M value = 42 mm
calculated PM value = 40 mm.

As measured PM value is > calculated PM value, it indicates expansion is needed.
calculated M value = 50 mm.

Inference;
As measured PM value is than calculated value, it indicates expansion is needed.

5) BOLTON'S ANALYSIS :

sum of mandibular 12 = 89 mm

Sum of Maxillary 12 = 96 mm

over all ratio = 94.68 mm.

Inference.

As overall ratio is > 91.3 it

indicates mandibular tooth material

is excess = 3.18 mm.

Inference :

mandibular Overall tooth material is

excess by 3.18 mm

Anterior ratio = 81.05 mm.

Interece :

As anterior ratio is o > 77.2 it

Indicates mandibular tooth material

is excess = 1.83 mm

Inference

mandibular anterior tooth

material

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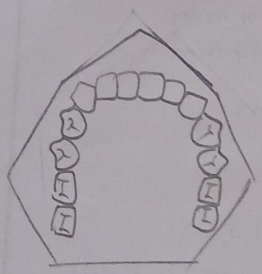
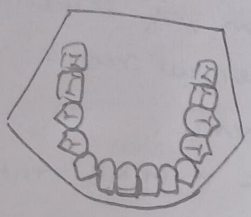
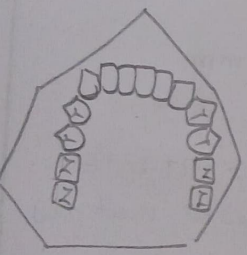
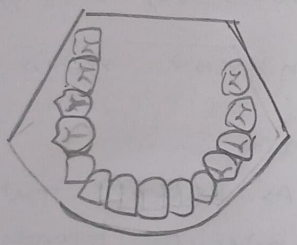
New Pargaon Tal. Hatkanangle Dist. Kolhapur

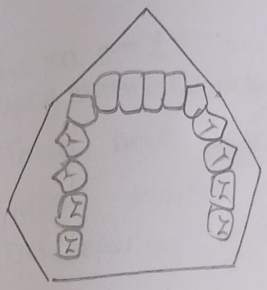
Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

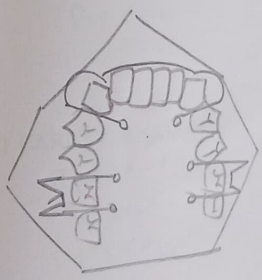


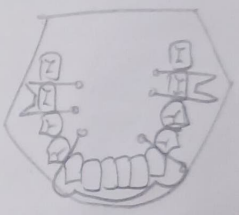












Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12

MODEL ANALYSIS

CASE NO. 5 19.

1) ARCH PERIMETER ANALYSIS :

Total Arch length = 81mm

Total tooth material = 77mm

Discrepancy = 4mm.

Inference -
As discrepancy is between 2.5 - 5
i.e it is 4
It indicates extraction of 2nd Premolar.

2) CAREY'S ANALYSIS :

Total Arch length = 72

Total tooth material = 71.5

Discrepacy = Total arch legth - Total tooth material.

= 0.5.

Inference.
As discrepency is > 2.5.
ie. 0.5 [illegible] dicates for proximal stripping

	Maxillary		Mandibular	
	Right	left	Right	left.
I	9	9	7	7
I	7	7	6	6
nine	8	8	7	7
PM	7	7	8	8
9 PM	7	7	8	7
m	11	10	13	12

3) ASHLEY HOWE'S ANALYSIS:

Total tooth material – Sum of mesio-distal of teeth anterior to 2nd PM.
98 mm.

Premolar Diameter Arch width = 46.5 mm
premolar Basal Arch width = 42 mm

- Inference: As premolar Basal arch width is > Premolar diameter arch width bet tips of buccal cusp of PM. Expansion of possible.
- PM basal Arch width % = 42.85%
- Inference: Since PM Basal arch width is B/w 37-44% it is a borderline case

4) PONT'S ANALYSIS:

Determination of sum of Incisors = 32.5 mm
measured Premolar value = 38 mm.
measured molar value = 49 mm.
Calculated Premolar value = 40.62 mm.

Inference:
As measured value is > < calculated value it indicates there is need for expansion
Calculated [illegible] value = 50.45 mm.

Inference
As measured value is [illegible] Calculated value, it indicates [illegible] expansion

BOLTON'S ANALYSIS :

Sum of Mandibular 12 = 96.5 mm

Sum of maxillary 12 = 98 mm

overall ratio = 98.46 mm

Inference :

As overall ratio is > 91.3 it indicates that mandibular teeth material is excess = 7.03 mm

Inference :

Mandibular overall teeth material is excess by 7.03 mm.

Anterior ratio = 82.47 mm (mandibular)

Inference

As anterior ratio is > 77.2 it indicates mandibular tooth material is excess.

Mandibular = maxillary 6 × 77.2

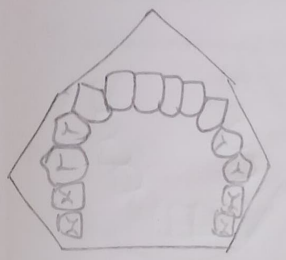
=

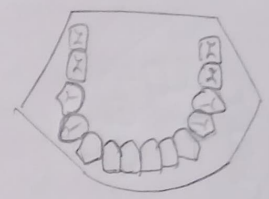
Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 137

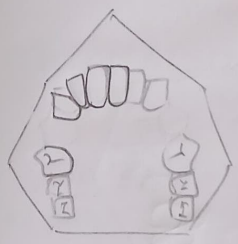
TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE, New Pargaon, Tal. Hatkanangale, Dist. Kolhapur 416137

Inference -

mandibular 6 tooth material is excess by 2.55 mm.







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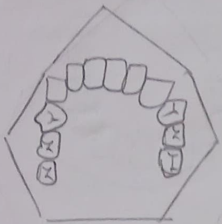
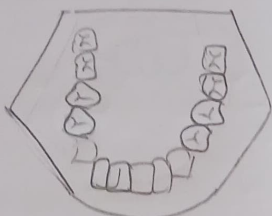
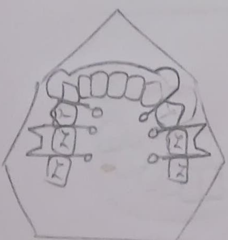
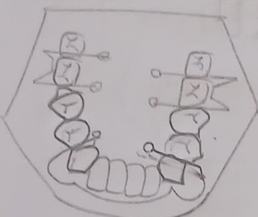
Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre,
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]









CEPHALOMETRIC LANDMARKS

1) Nasion - The most anterior point midway between frontal and nasal bones on frontonasal suture.

2) Orbital - The lowest point on inferior bony margins of orbit

3) Porion - The highest bony part point on upper margin of external auditory meatus.

4) Sella - Point repeating midpoint of Pituitary fossa.

5) Point A - Deepest point in midline between anterior nasal spine at alveolar crest between 2 central incisors.

6) Basion - medial point of anterior margin of foramen magnum

7) Bolton - Highest point at post. condylar notch of occipital bone.

8) Anterior nasal Spine - Anterior tip of sharp bony process of maxilla in midline lower margin of anterior of anterior nasal opening.

9) Gonion - constructed point of bony ... in mandible line

10) Pogonion - ... anterior point of bony chin ... plane

Dr. Harish Kulkarni M.D.S.
Principal
T. K. D. C. & Research Centre.
New Pargaon, Tal. Hatkanangle
Dist. Kolhapur 416 137

TATYASAHEB KORE DENTAL COLLEGE & RESEARCH CENTRE New Pargaon Tal. Hatkanangale, Dist. Kolhapur 416137

CEPHALOMETRIC LANDMARKS

11). Menton - Most inferior point on mandibular symphysis.

12) Articular - Point at foramen junction of Post. border of ramus of inferior border of basilar part of Occipital bone.

13) Condylion - Most superior point on head of condyle.

14). Protrution - lower and most anterior Point on alveolar bone in midline between upper central incisor

15) Interdental.

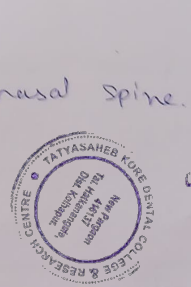
16) Broadbent point.

17) Ptm point.

18) Glabella.

19) Subnasal.

20) Posterior nasal spine.



Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 12[illegible]

CEPHALOMETRIC PLANES & ANGLES

DOWN'S ANALYSIS : Skeletal parameter.

a) Facial angle - It's inside inferior angle formed by intersection of nasion - Pogonion plane.

b) Angle convexity - Angle formed by intersection joined from point A & Pogonion.

c) AB plane - Angle formed by point A & Point B. Connecting & line joining nasion & Pogonion

d) mandibular plane angle formed by intersection

e) y-axis - obtained by joining sella-gnathion line (EM

TWEED'S ANALYSIS :

A) FH mandibular plane angle - It's angle between FH plane & mandibular plane.

B) Incisor mandibular plane angle.

C) FH mandibular incisor plane - Angle formed by intersection of long axis of lower incisor FH plane mean value is 65°

STEINER'S ANALYSIS :

A) SNA angle - Angle formed by SN plane - nasion Point A.

B) ANB angle

C) SNB angle

D) Occlusal plane formed between occlusal plane & SN Plane.

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Dr. Harish Kulkarni M.D.S
Principal
T. K. D. C. & Research Centre.
New Pargaon. Tal. Hatkanangle
Dt. Kolhapur 416 13