ESTABLISHING VERTICAL JAW RELATIONSHIPS

INTRODUCTION

The recording of jaw relations in the treatment of edentulous patients aims at facilitating the adaptation of the complete dentures to the masticatory system to give them an optimal & comfortable function.

TO ACHIEVE THIS GOAL…..

- The recording must include an appropriate VD of occlusion.
- Stable occlusal contacts in harmony with the existing TMJ & masticatory muscle functions.
- The relationship between the prosthesis & oro-facial soft tissues and musculature.

JAW RELATIONS

- "Any relation of the mandible to the maxilla"

- The three types are :

  →orientation jaw relation

  →vertical jaw relation

  →horizontal jaw relation

CUSTOMISING THE OCCLUSAL RIMS

- LABIAL FULLNESS:

  →Facial esthetics as a guide

  →Phonetics as a guide

- INCISAL VISIBILITY:

  Generally the amount of tooth displayed at rest varies with age.

- FLAT OCCLUSAL PLANE:

  → Shunting effect must be prevented

VERTICAL JAW RELATION

"The length of the face as determined by the amount of separation of the jaws".

VDr = length of the face when the mandible is in its rest position.

VDo = length of the face when the teeth are in contact & the mandible is in CR.

VDR=VDO+FREE WAY SPACE

Vertical Jaw Relations

Rest Vertical Dimension (VDR)

Is the distance measured when the mandible is in the rest position.

Occlusal vertical Dimension (VDO)

Is the distance measured when the occluding rims or teeth are in contact.

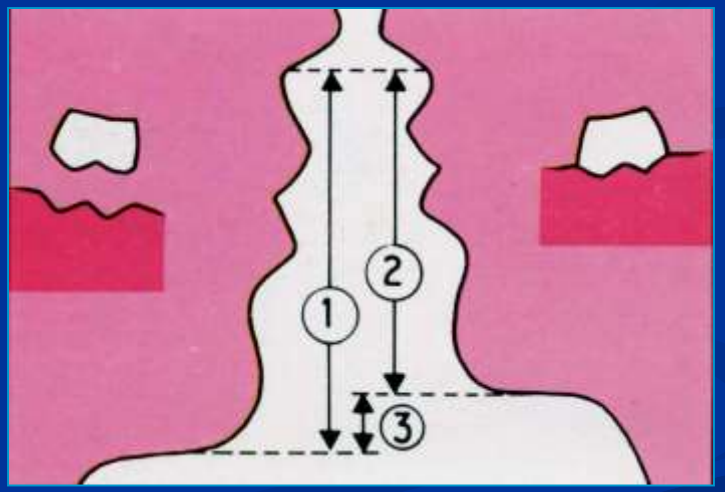
Inter-occlusal Distance

The distance between the occluding surfaces of maxillary and mandibular teeth when the mandible is in the rest position.

For a complete denture patient, it is the difference between VDR and VDO.

VDR – VDO = 4 mm

or VDR – 4 mm = VDO



Inter-occlusal Distance

In natural dentition it ranges from 2-4 mm in the premolar area - the Freeway Space.

METHODS OF RECORDING VERTICAL JAW RELATION

METHODS OF RECORDING VDR

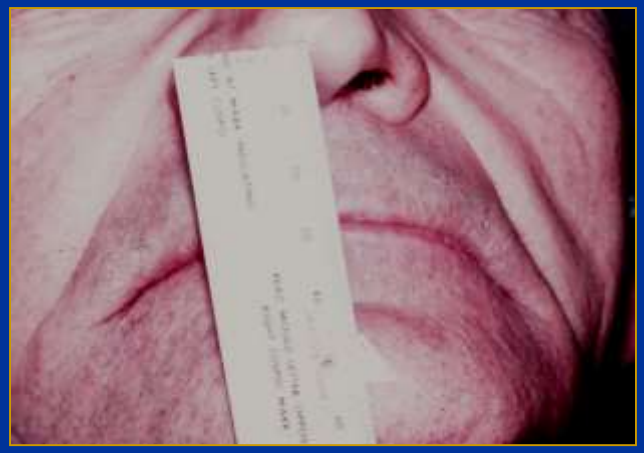
- →Facial measurements after swallowing & relaxing.
- →Tactile sensation
- →Anatomical landmarks
- →Speech
- →Facial expression

FACIAL MEASUREMENTS AFTER SWALLOWING & RELAXING

- Given by SHANAHAN
  - →Patient is asked to sit upright & relax his shoulders
  - →Reference points are marked
  - →Functional movements are made
  - →As the movements are done his mandible comes to its physiological rest position & the distance between the points are marked

Vertical Jaw Relation

The vertical distance between two selected points, one on the fixed (maxilla) and one on the movable member (mandible).



TACTILE SENSATION

- Given by LYTLE

  →Pt. is asked to open his mouth wide till he feels discomfort

  →And close slowly & stop closing when he feels that his muscles are relaxed and comfortable

  →The distance between 2 reference points is recorded & compared with the swallowing method

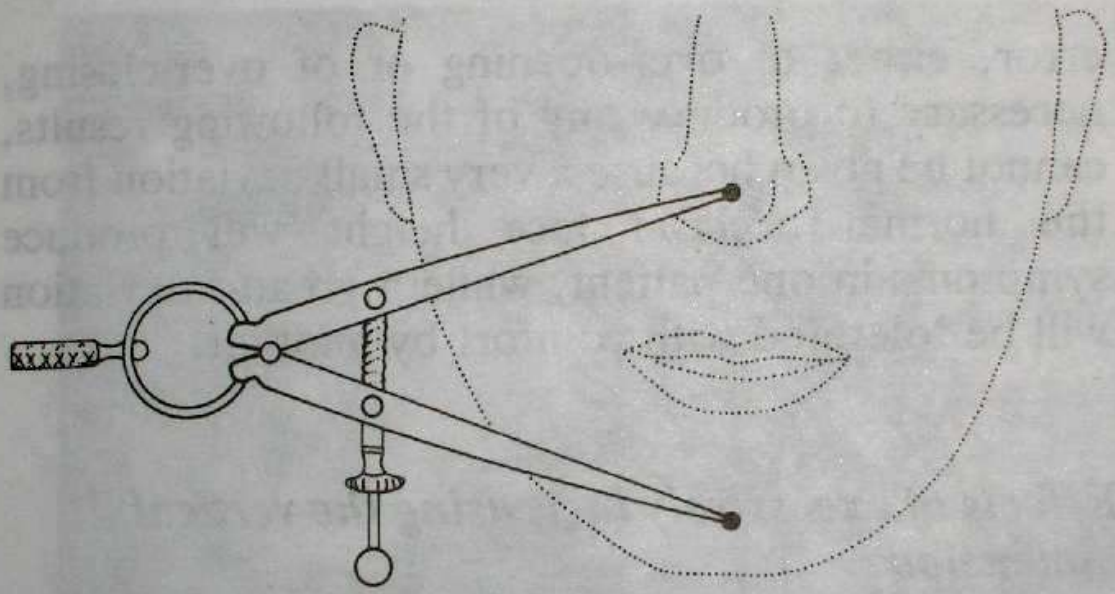


Figure 6.19 Measuring the distance between the marks with dividers with the mandible at rest

ANATOMIC LANDMARKS

- Given by WILLIS

  →The distance between the pupil of the eye & the rima oris & the distance between anterior nasal spine and the lower border of mandible is measured using Willis guide

  →If both the distances are equal, the jaws are considered at rest

SPEECH

- Ask the pt. to repeatedly pronounce the letter "M"
- Measure the distance between the reference points after a conversation

FACIAL EXPRESSION

- Skin around the eyes & chin should be relaxed
- The lips should have a slight contact in a single plane
- The nostrils are relaxed

METHODS OF RECORDING VDO

- MECHANICAL METHODS :

→Ridge relations

→Pre-extraction records

- PHYSIOLOGICAL METHODS :

→Physiological rest position

→Phonetics

→F,V,S-speaking ant.tooth relations

→Swallowing threshold

Contd…

→Tactile sensation

→Patient reported perception of comfort

→Boos bimeter

→Parks theory of determining VD

RIDGE RELATION

Distance from the incisive papilla to the mandibular incisors

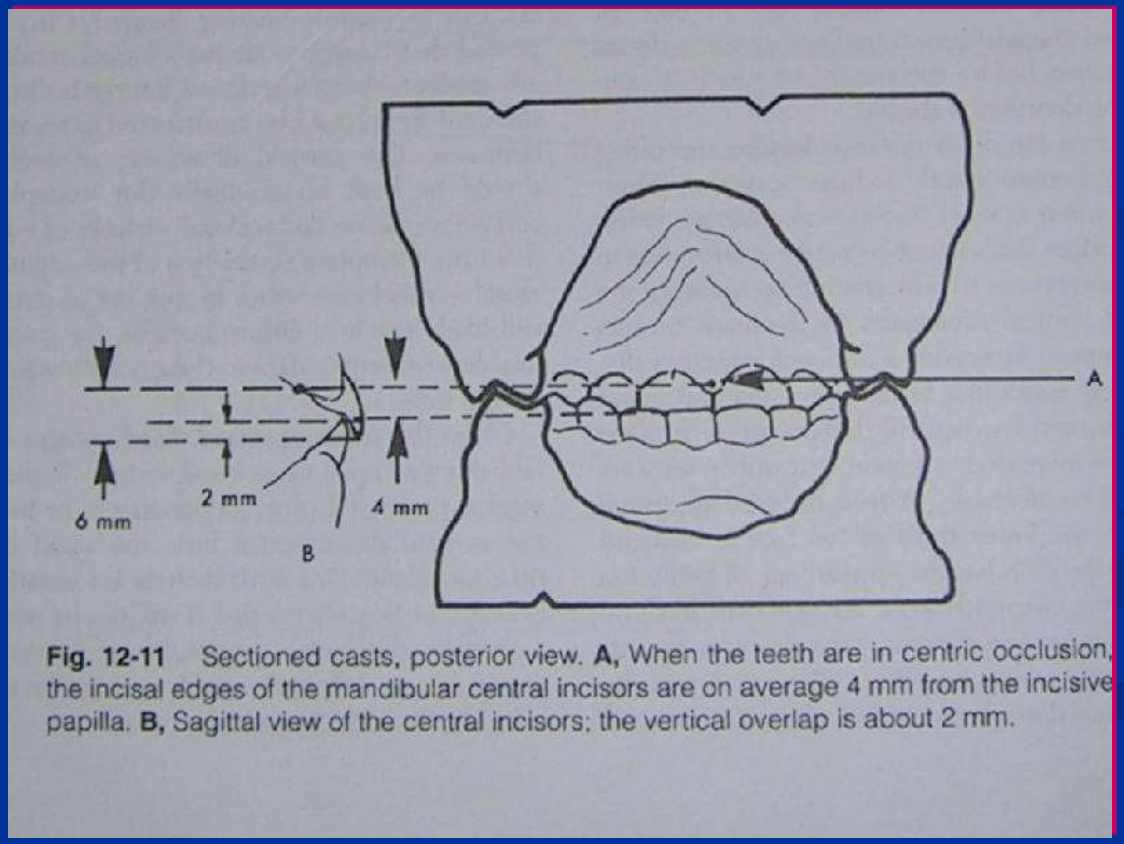
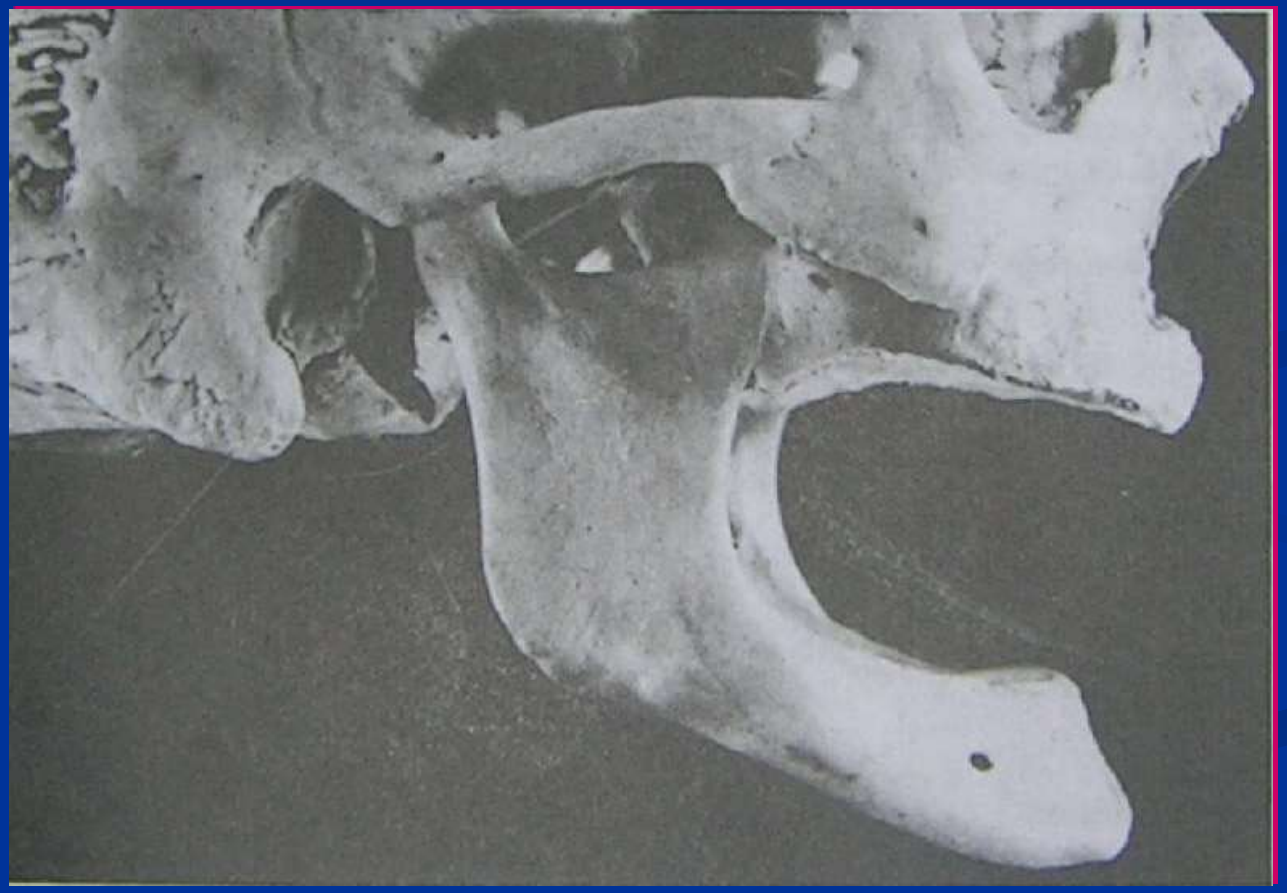


Fig. 12-11 Sectioned casts, posterior view. **A,** When the teeth are in centric occlusion, the incisal edges of the mandibular central incisors are on average 4 mm from the incisive papilla. **B,** Sagittal view of the central incisors; the vertical overlap is about 2 mm.

CONTD……

Parallelism of the ridges – SEARS theory



PRE EXTRACTION RECORDS

PROFILE RADIOGRAPHS

- They were used initially, but because of radiation risks they cannot be considered adequate today for routine clinical practice.

CASTS OF TEETH IN OCCLUSION

- It is a simple method of recording
- The size & shape of the teeth can be noted
- It gives an indication of the amount of space required between the ridges for the teeth of this size

PROFILE PHOTOGRAPHS

- Given by WRIGHT

  →These are made before extraction & taken in maximum occlusion

- Wright's formula

  Inter pupillary distance : brow-chin distance of pt. & photo pt. & photo

PROFILE SILHOUETTES

- An accurate silhouette is made with cardboard
- It can be used as a template
- As it is taken from pre extraction photograph which shows the VD at rest
- When positioned on patient's face while recording the VD at occlusion, the chin should be atleast 2mm above the level of the lower border of the silhouette
- Lead wires can also be used

FIG. 156

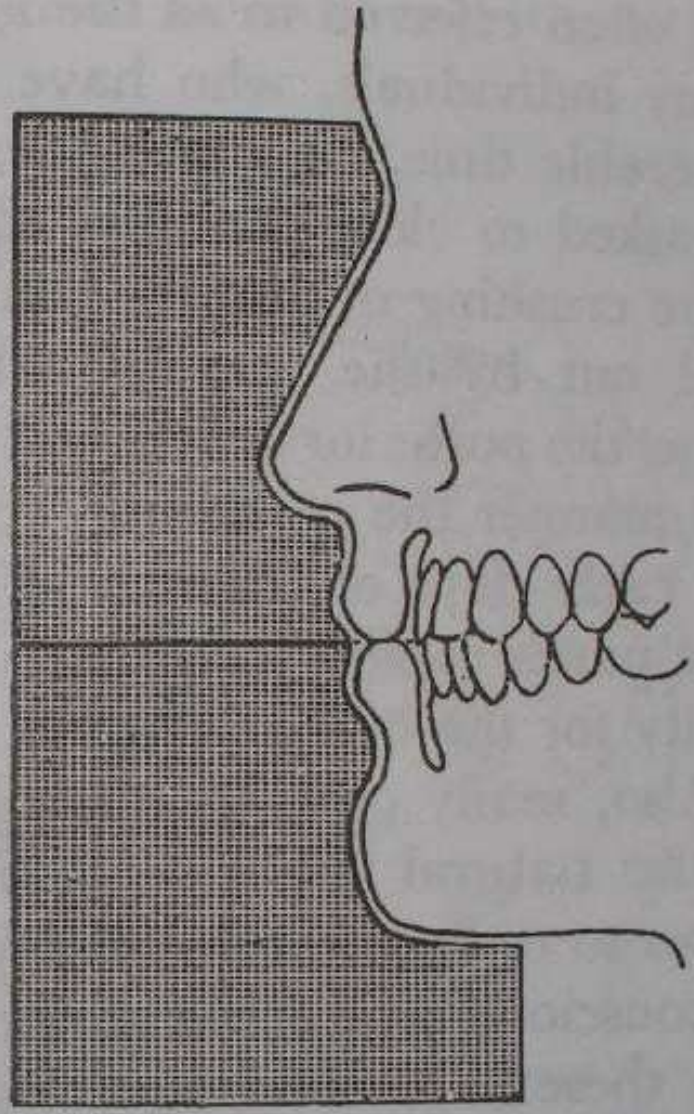


FIG. 157

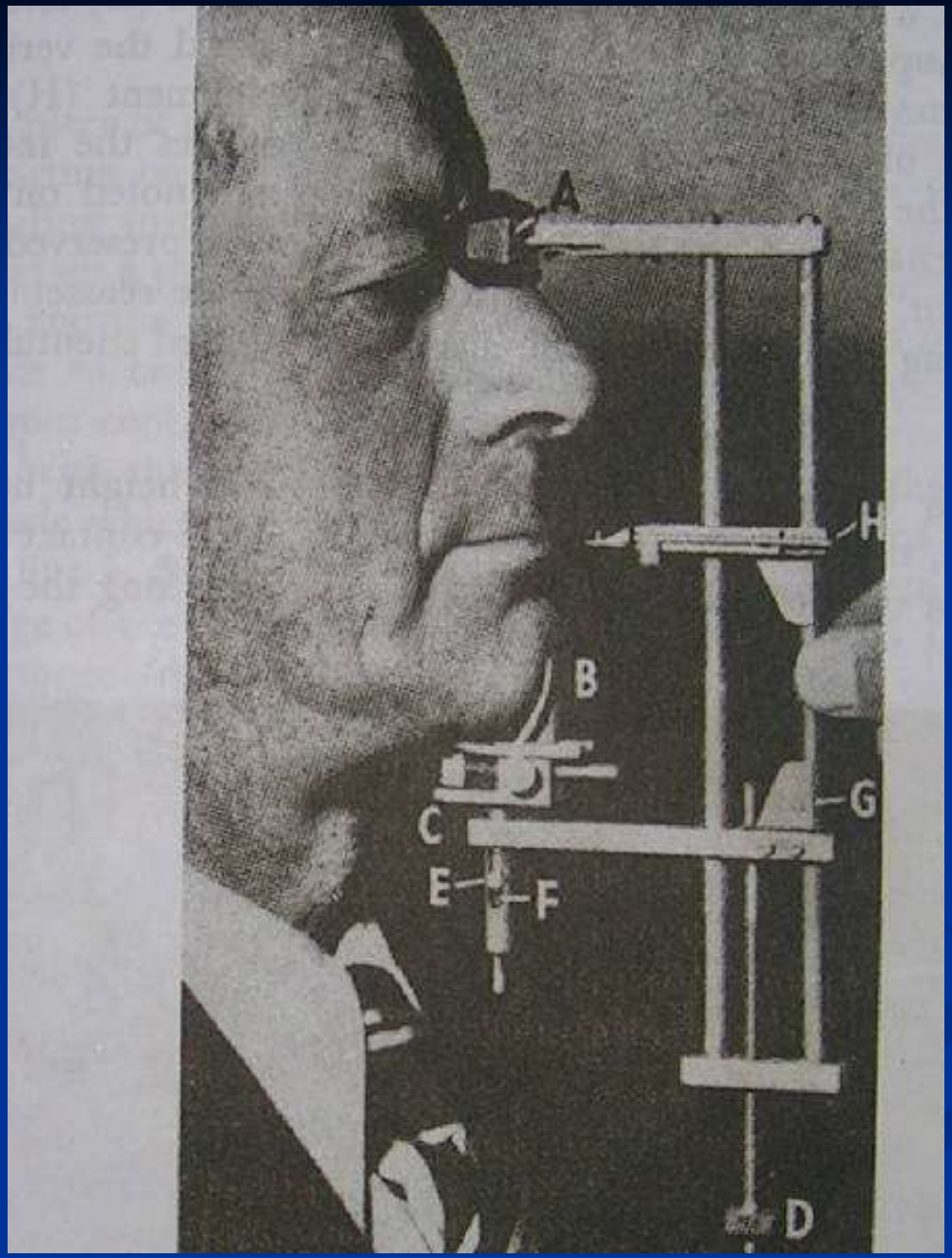
MEASUREMENT FROM FORMER DENTURES

- Pts. existing denture is a valuable pre extraction record

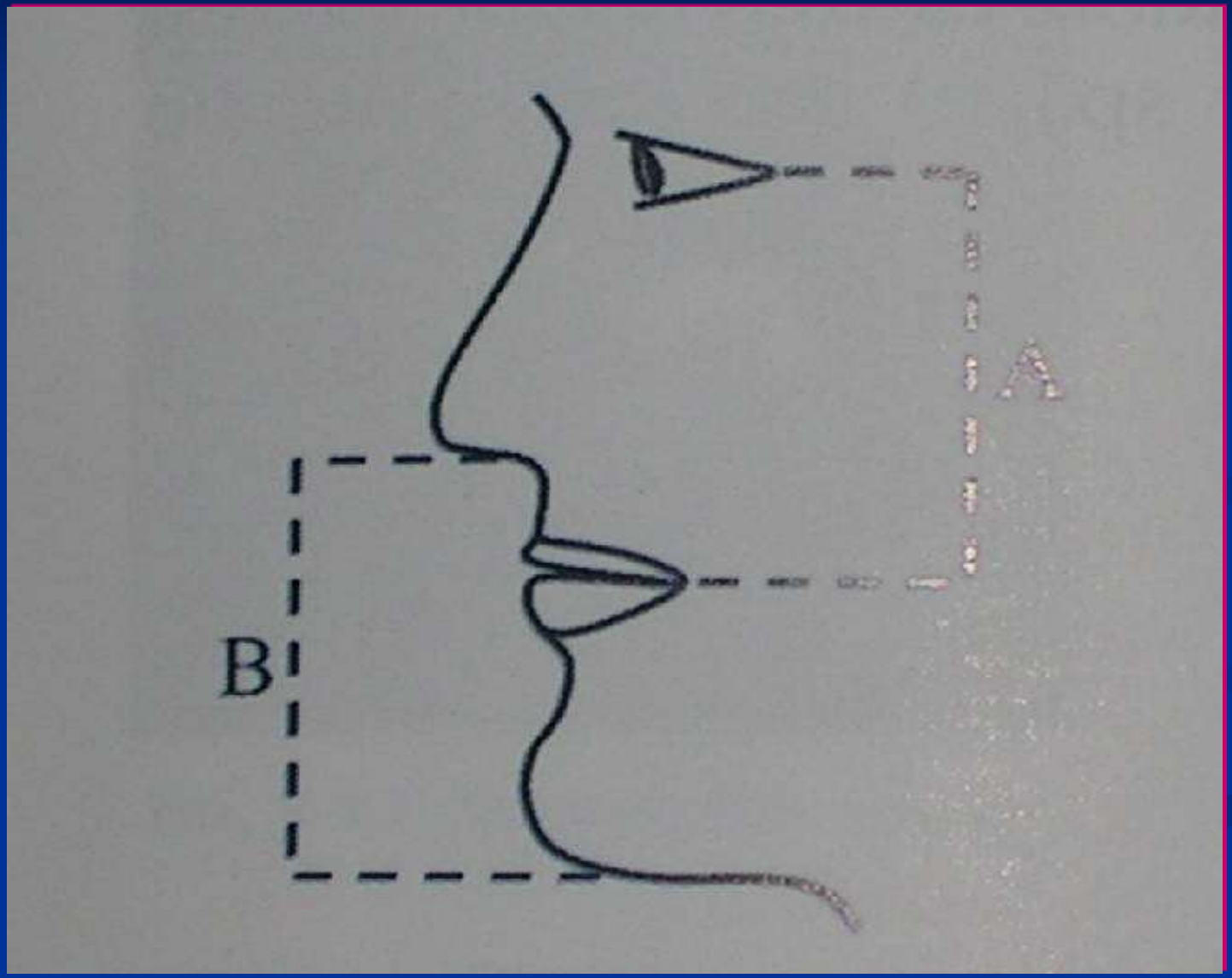
- A BOOLEYS GAUGE is used to measure the distance between the border of the maxillary & the mandibular denture when both these dentures are in occlusion

FACIAL MEASUREMENTS

- Facial measurements can be measured by the following :
  - →Dakometer
  - →Willis gauge
  - →Sorensons profile guide
  - →Swensons method


A
H
B
G
C
E
F
D

WILLIS GAUGE



SWENSONS METHOD

- An ACRYLIC FACE MASK is made before extraction using a facial impression and a cast.

- This method is not practical.

PHYSIOLOGICAL METHODS

- Physiological rest position
- Phonetics
- F,V,S speaking anterior tooth relation
- Swallowing threshold
- Tactile sense
- Pt. reported perception of comfort
- Boos bimeter

PHYSIOLOGICAL REST POSITION

- Given by NISWONGER (1934)
  THOMPSON (1946)

→The pt. is asked to sit upright with his head unsupported

→Upper & lower occlusal rims are inserted & the pt. is asked to swallow and relax

→When the relaxation is obvious there will be space present between the rims

→Its called as FREEWAY SPACE

CONTD…..

- It is about 2-4 mm
- VD at rest =VD at occlusion + freeway space
- If the freeway space is > 4mm, then the VD at occlusion is considered to be small
- If the freeway space is < 2mm, then the VD at occlusion may be too great

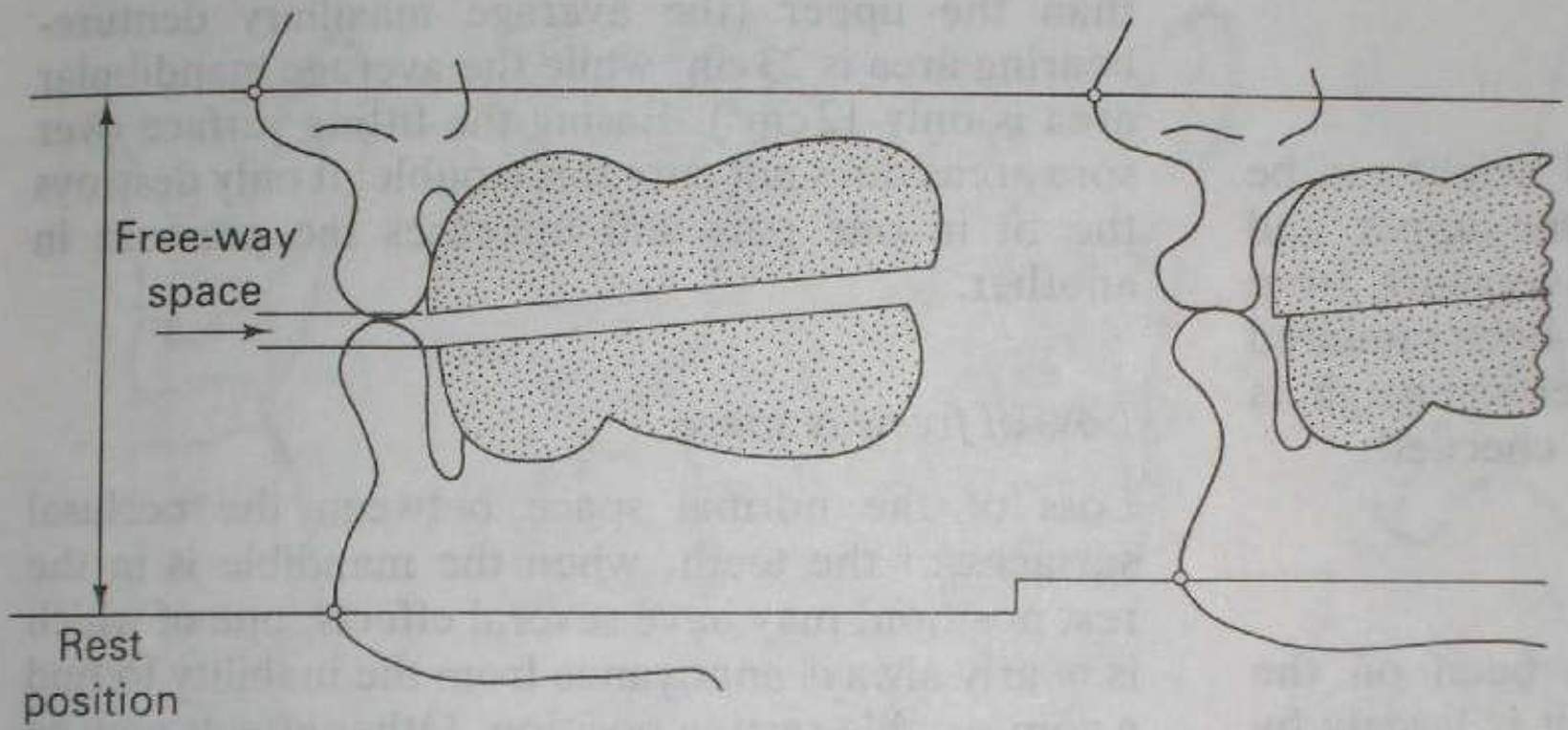


Figure 6.20 The freeway space. The first diagram illustrates the rest position of the mandible showing the rims parted. The second diagram illustrates the small upward movement of the chin which occurs when the rims occlude

PHONETICS

SILVERMANS CLOSEST SPEAKING SPACE

→It measures the VD when the mandible is in function

→When sounds like ‘ch’, ‘s’, ‘j’ are pronounced, the upper & lower teeth reach their closest relationship without contact

→The minimal amount of space between the teeth in this position is called the Silvermans closest speaking space

ITS NOT THE FREEWAY SPACE

CLOSEST SPEAKING SPACE

- Suggested by Silverman
- It is dynamic & functional
- Values are :

  Normal : 1.5-3.0 mm

  Class II : 3.0- 6.0 mm

  Class III: 0.5- 1.0 mm

FREE WAY SPACE

- Proposed by Niswonger & Thompson
- It is static
- Values are :

  Class I : 2.0-4.0 mm

  Class II: > 4.0 mm

  Class III: 1.0 mm

THE "F", "V", "S" SPEAKING ANTERIOR TOOTH RELATION

- Given by POUND & MURREL
- The position of the anterior teeth is determined by the position of the maxillae when the pt. pronounces words beginning with "F" or "V"
- The position of the lower anterior teeth is determined by the position of the mandible when the pt. pronounces words beginning with the letter "S"

PATIENT REPORTED PERCEPTION OF COMFORT

- Simple method
- Here, record bases with excessively tall occlusal rims are inserted into the pts. mouth
- The excess base plate wax is removed stepwise till the pt. perceives that occlusal height as comfortable

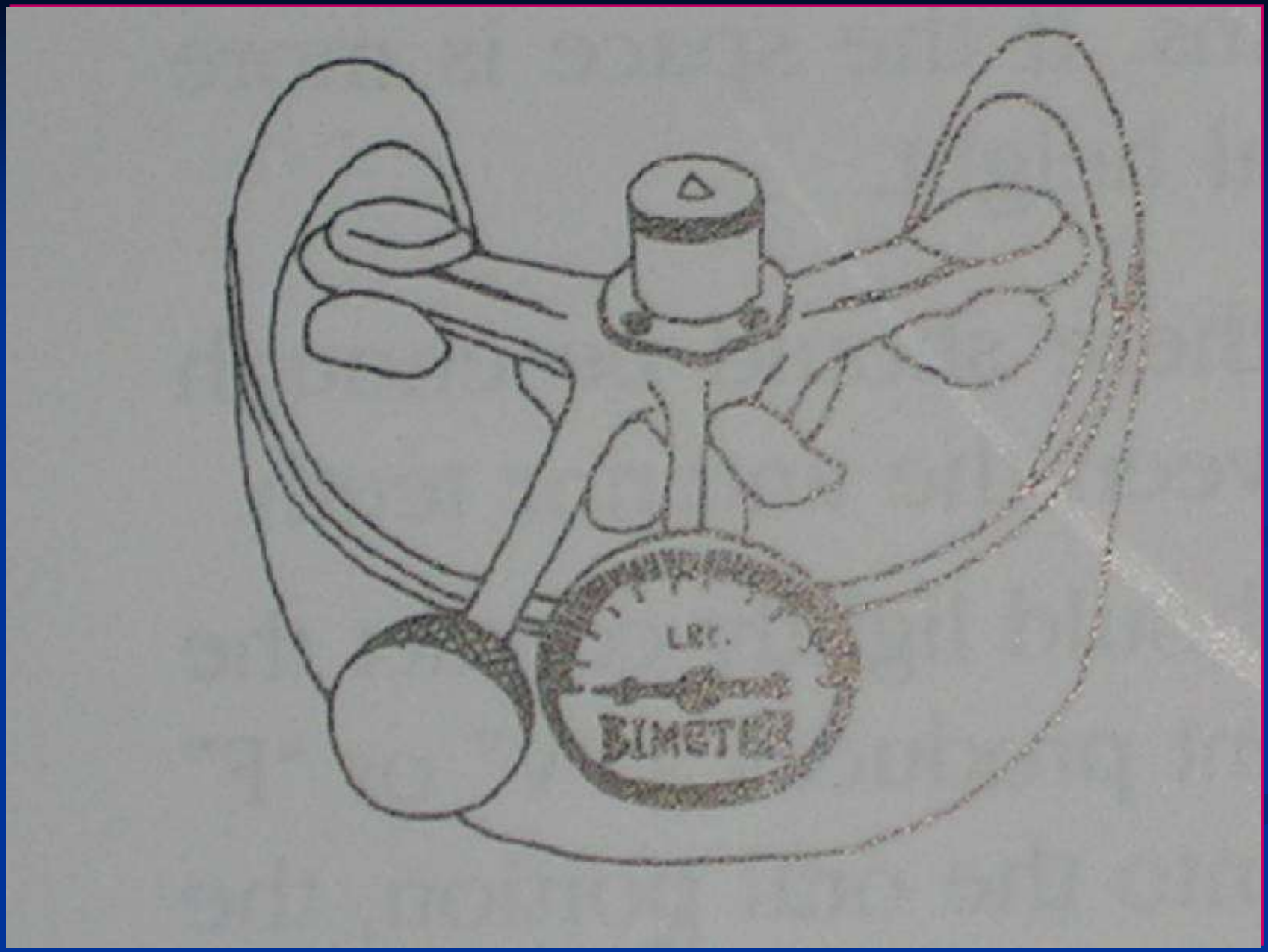
BOOS BIMETER

- Given by RALPH BOOS – 1940

  →The maximum biting force occurs at the occlusal VD

  →A device that measures the biting force (bimeter) is attached to the mandibular record base & a metal plate (central bearing point) to the maxillary

  →A screw is turned to adjust the vertical relation


LRC.

FACTORS AFFECTING REST POSITION

- Head position
- Time
- Neuromuscular disturbances
- Position in space

EFFECTS OF ↑ VD

- ↑ Trauma to the denture bearing area
- ↑ Lower facial height
- Difficulty in swallowing & speech
- Pain & clicking in the TMJ
- Clicking of teeth
- Stretching of facial muscles, leading to a stretched appearance of the face.

EFFECTS OF ↓ VD

- ↓ Lower facial height
- Angular cheilitis due to folding of the corner of mouth
- Cheek biting
- Pain, clicking & discomfort to the TMJ
- Loss of lip fullness
- Obstruction of the opening of the eustachian tube due to the elevation of the soft palate due to elevation of the tongue.


(b)


(c)


THANK YOU