Arrangement of Teeth

Introduction -

Complete Denture Prosthodontics involves the replacement of the lost natural dentition and associated structures of the maxilla and mandible for patients who have lost all their remaining natural teeth. Arrangement of teeth for a complete denture is a pivotal step in fabrication of such a prosthesis.

So why do we need to provide acomplete denture?

Natural v/s Artificial Occlusion

- Type of support
- Proprioception
- Response to pressures of occlusion
- Effect of malocclusion
- Effect of non-vertical forces
- Act of incision
- Act of mastication
- Necessity for a bilaterally balanced occlusion.

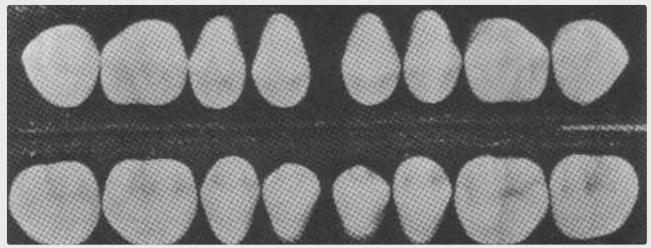
Review of Literature

Prior to **18th century** artificial teeth were made of wood , ivory, animal teeth and human teeth.

1678- 1761 - Pierre Fauchard used human teeth in hippopotamus or elephant ivory dentures .

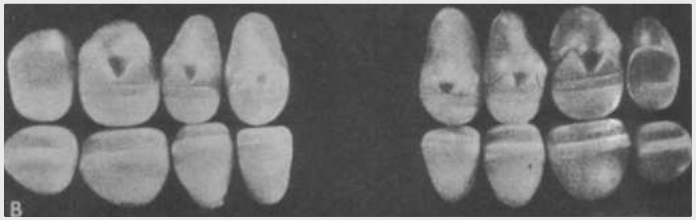
In 19th century – Ash Of England is believed to be the first to to design teeth that occluded properly.

In **1914** - Dr. Alfred Gysi of Switzerland – first anatomic porcelain tooth , were called ***Trubyte*** .



- ***Geometric theory of tooth selection*** – presented by Dr. J. Leon Williams.

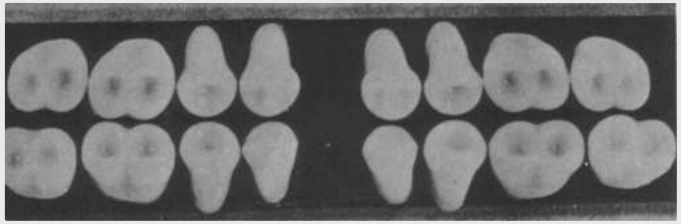
In **1922** - Victor Sears – ***Chewing members*** Tooth .



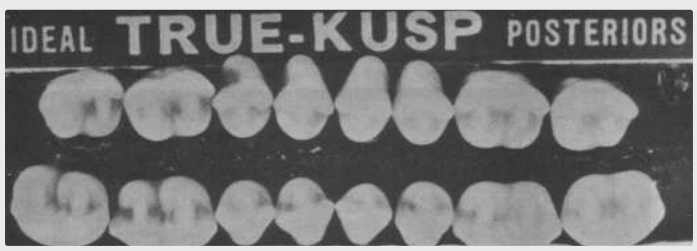
In **1927** - Victor Sears – ***Channel*** Tooth .

Gysi – ***Crossbite*** posterior teeth .

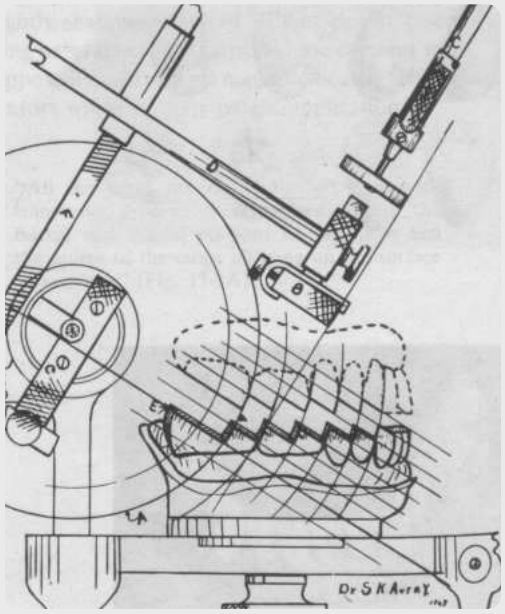
In **1929** - Hall introduced ***Inverted Cusp*** teeth - first flat plane teeth



Myerson shortly introduced ***Truecusp*** – cuspless posterior teeth



In **1930** - Avery Brothers designed the ***Scissor bite*** teeth.

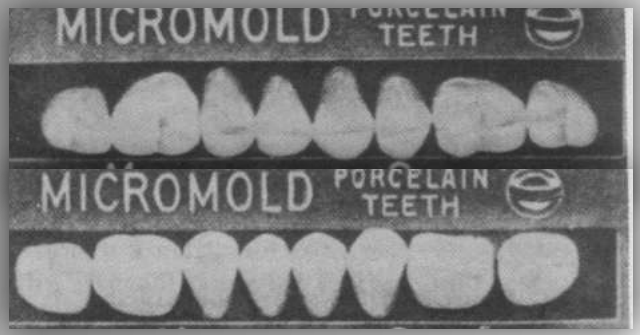


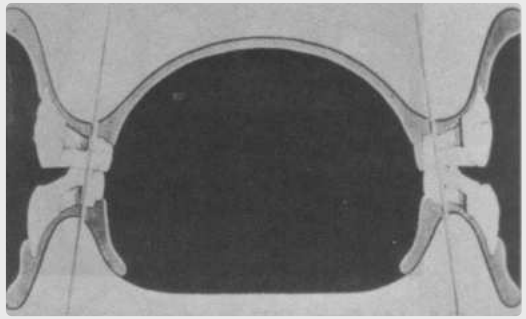
In **1931** - Fish gave concept of a ***Neutral Zone*** in complete denture construction .

In **1932** - ***Pilkington and Turner*** anatomic posterior tooth

In **1934** - Nelson described ***Chopping Blocks*** - flat occlusal surfaces with numerous transverse ridges.

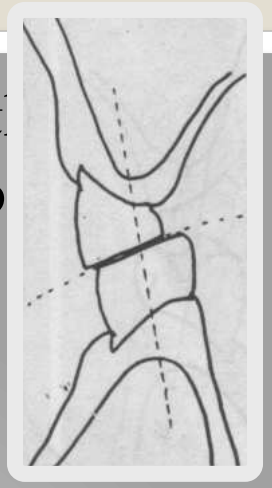
In **1935** - French designed severely modified teeth .



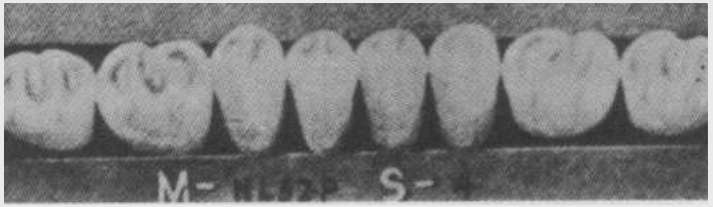


In **1936** - McGrane marketed ***Curved Cusp*** posterior tooth.

In **1937** - Max Pleasure proposed to modify t occlusal surfaces of lower posterio teeth to a ***Reverse Curve*** by tilting tooth buccally.



In **1939** Swenson designed ***Nonlock*** posteriors with Sluice ways for shredding and allowing food to clear the occlusal table.



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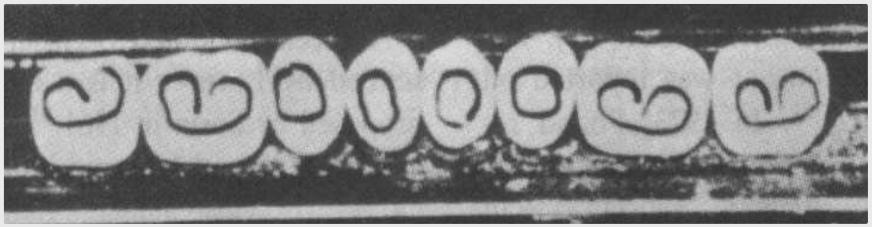
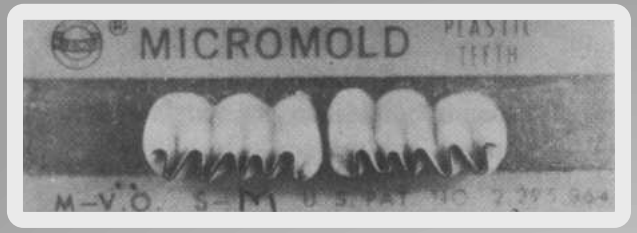
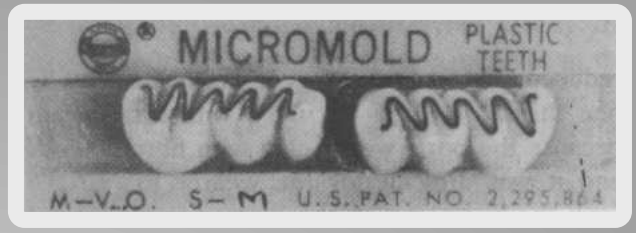
In **1942** - John Vincent introduced a change in materials by using **metal inserts** in resin posteriors.

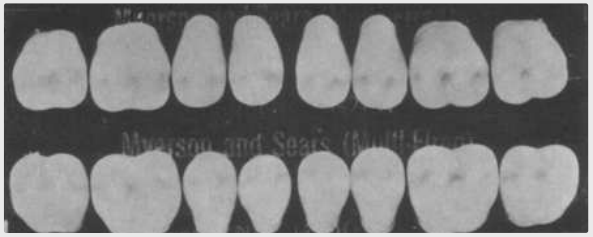


In **1946** - Hardy designed metal insert upper and lower posterior - ***Vitallium Occlusal*** - **'VO'** .



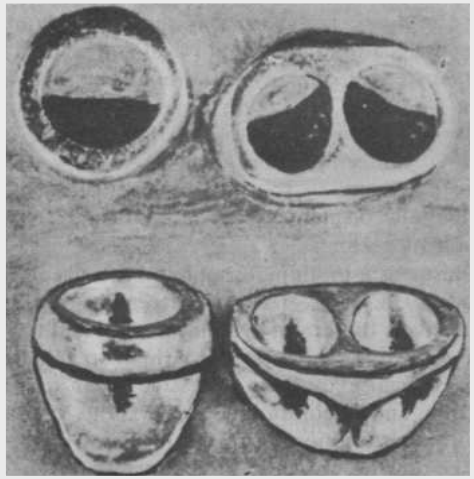


In **1951** - Myerson Tooth Corporation introduced the first cross-linked acrylic teeth in a flat occlusal scheme called the ***Shear Cusp*** tooth.



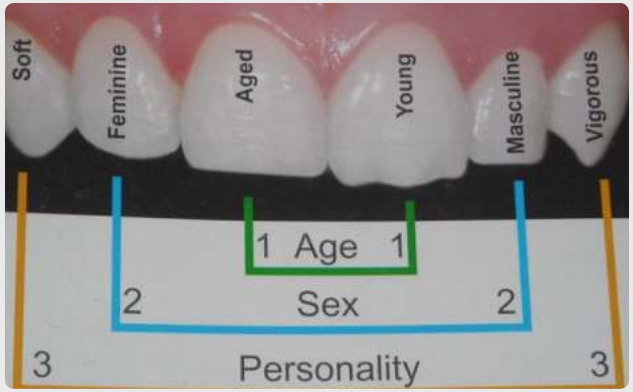
sal **surfaces.**

In **1952** - ***Coe Masticators*** designed by Cook.

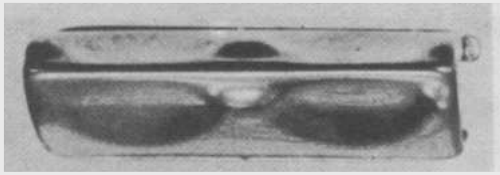


In **1954** - Earl pound stressed on the principle of **esthetics** – '*replacing the teeth in the natural position from which they came*'.

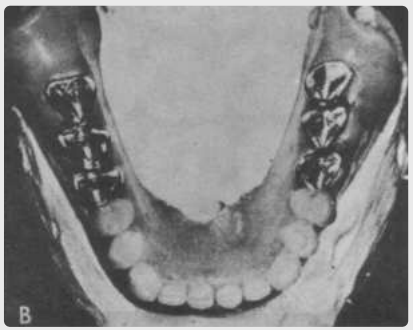
In **1956** - John P Frush And Roland D Fisher introduced the word "***Dentogenic***" in prosthetic dentistry for the selection of anterior teeth in complete denture prosthodontics based on sex, age and personality.



In **1957** - Bader introduced ***cutter bar scheme*** by opposing upper porcelain cuspless teeth with a metal cutting bar replacing 2nd premolar, molars .



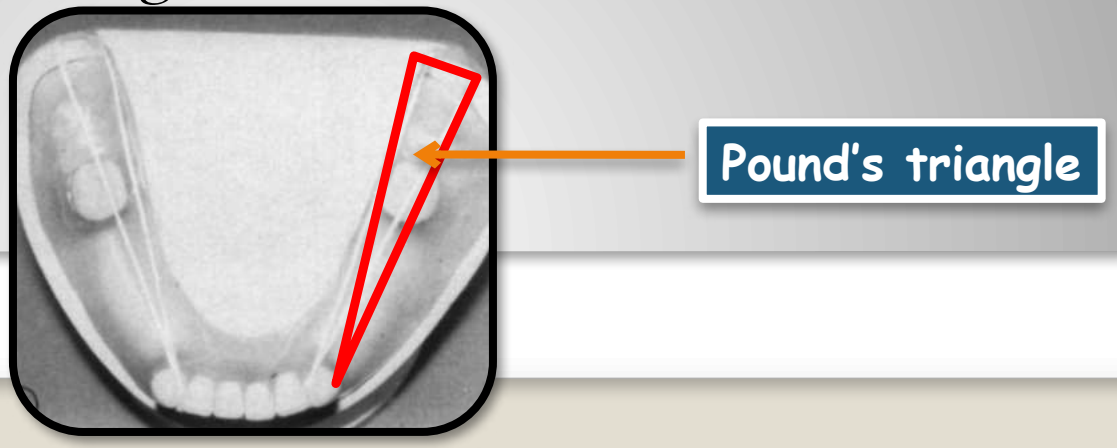
in **1961** - Sosin replaced maxillary second bicuspid and molars with cleat shaped vitallium forms called ***cross-blades.***



In **1961** - Wright et al believed that posterior mandibular denture teeth should be arranged directly over the center of the denture stress-bearing area.

In **1966** - Wright described tongue function and its relation to the occlusal plane and mandibular denture stability.

In **1973** - Pound recommended that the lingual surfaces of mandibular posterior denture teeth should occupy an area called Pound's Triangle.



Basic principles of teeth arrangement

❖Imaginary root of maxillary anterior teeth are expected to pass through the crest of the ridge.

❖Overjet and Overbite

❖Arch form –curvature of upper anteriors

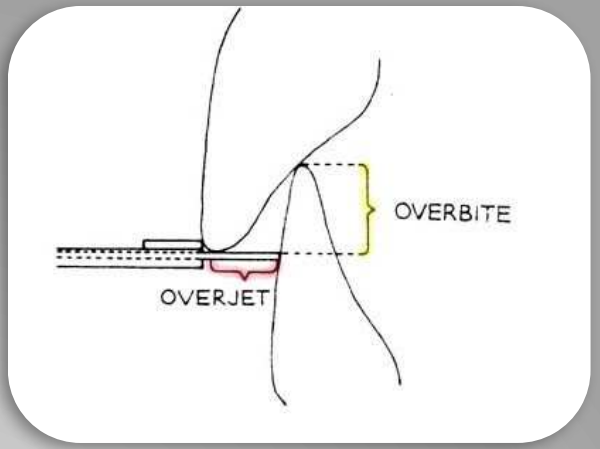
❖Alignment of posterior teeth

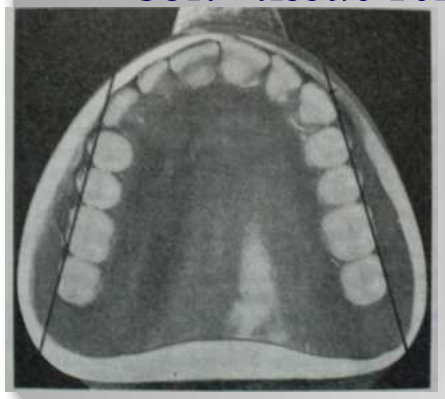
❖Orientation with the plane of occlusion

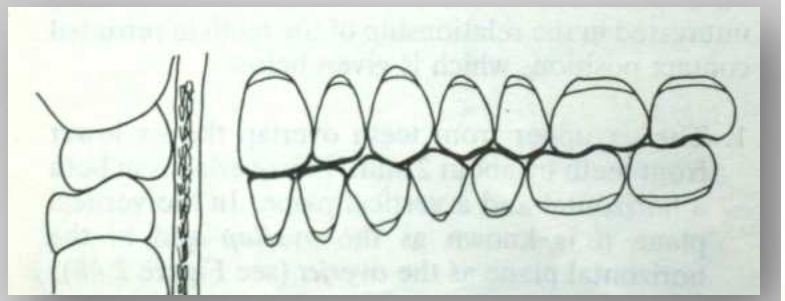
❖Incisive papilla

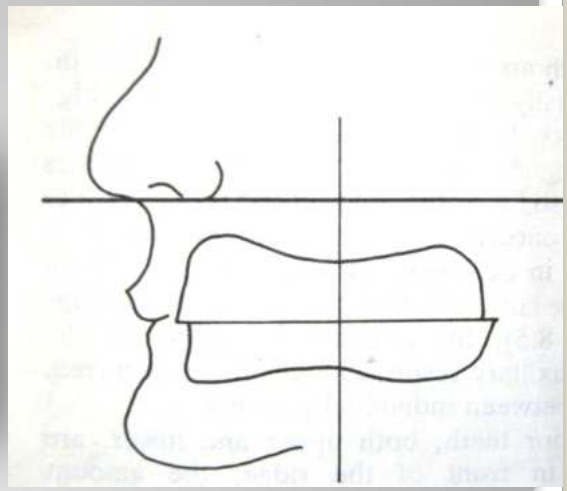
❖Soft- tissue reflection

} As a guide to placement of anterior teeth



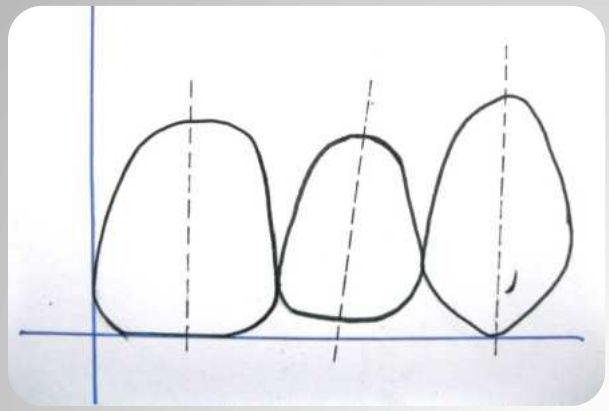


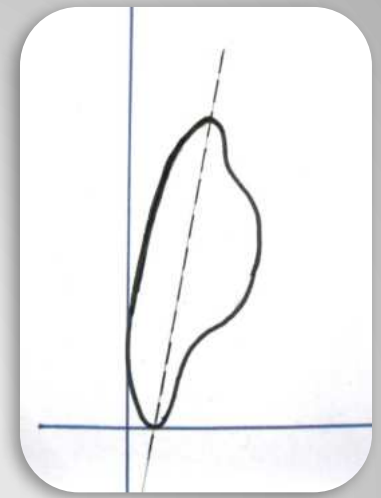




Arrangement Of Maxillary Central Incisor

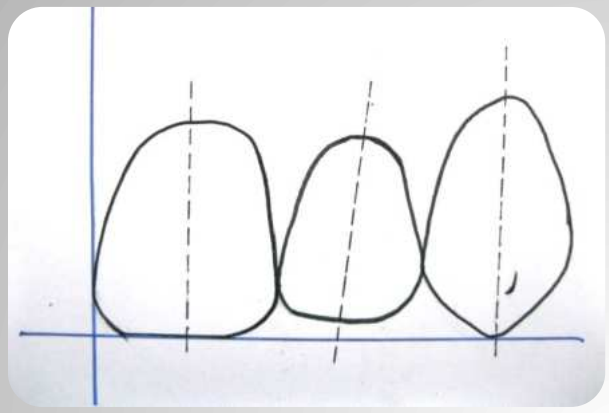
Labiolingual inclination	Mesiodistal inclination	Arch relation	Plane relation	Position
Slight incisal tilt	Perpendicular	Along curve of arch- 85degree	In contact with plane of occlusion	(According to type of arch) Square arch ; tapered arch ; ovoid arch .

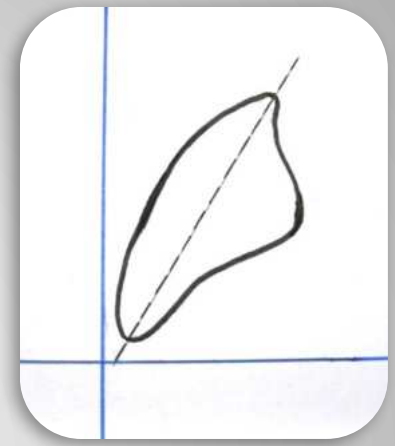




Arrangement Of Maxillary Lateral Incisor

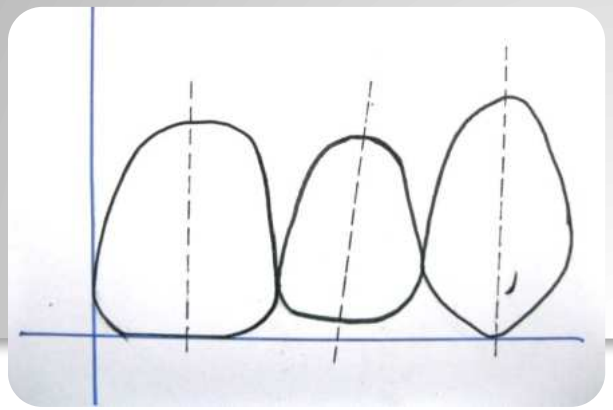
Labiolingual inclination	Mesiodistal inclination	Arch relation	Plane relation	Position
Definite labial tilt – neck is depressed	Slight distal tilt	Distal half rotated lingually 45-55degree	Above the plane	(According to type of arch) Square arch ; tapered arch ; ovoid arch .

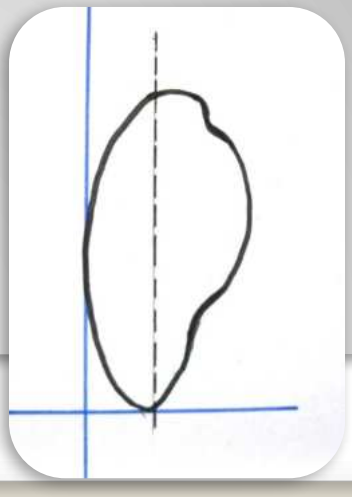




Arrangement Of Maxillary Canine

Labiolingual inclination	Mesiodistal inclination	Arch relation	Plane relation	Position
Upright, perpendicular -neck prominent	Upright, parallel to midline	Turning point of arch -30 degree	Tip of canine contact plane	(According to type of arch) Square arch ; tapered arch ; ovoid arch .





Arrangement Of Mandibular Central Incisor

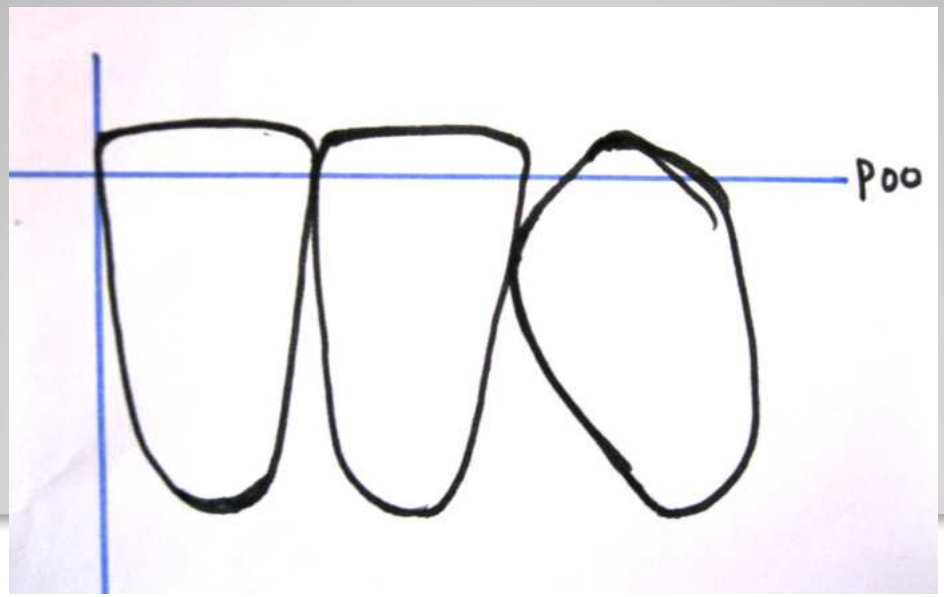
Labiolingual inclination	Mesiodistal inclination	Arch relation	Plane relation
Vertical , erect	Perpendicular	Parallel to curve of arch- 90	All teeth are slightly above the plane of occlusion and are placed lingual to the maxillary anteriors.

Arrangement Of Mandibular lateral Incisor

Labiolingual inclination	Mesiodistal inclination	Arch relation	Plane relation
Vertical , erect	Slight distal tilt at the neck	Along the curve of arch- 45-55	All teeth are slightly above the plane of occlusion and are placed lingual to the maxillary anteriors.

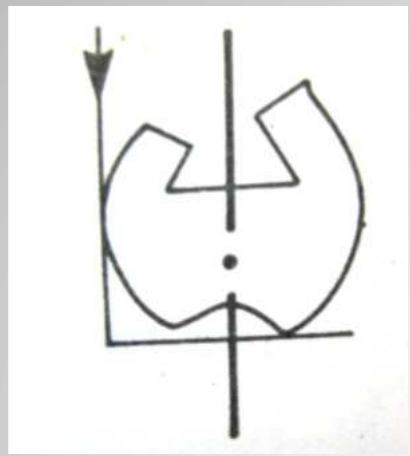
Arrangement Of Mandibular canine

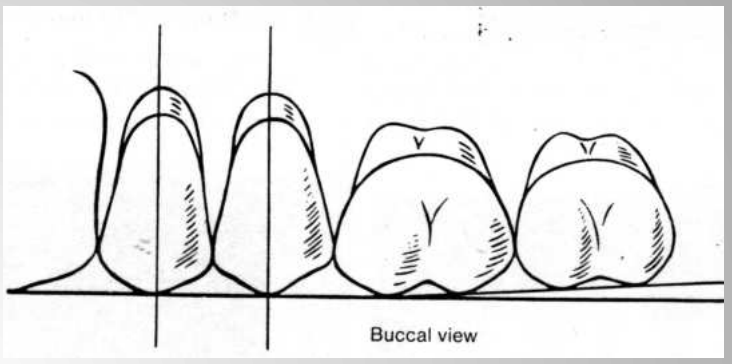
Labiolingual inclination	Mesiodistal inclination	Arch relation	Plane relation
Vertical , erect- neck slightly prominent	Distally tilted; leans towards the midline	Turning point of arch ~30	All teeth are slightly above the plane of occlusion and are placed lingual to the maxillary anteriors.



Arrangement Of Maxillary First premolar

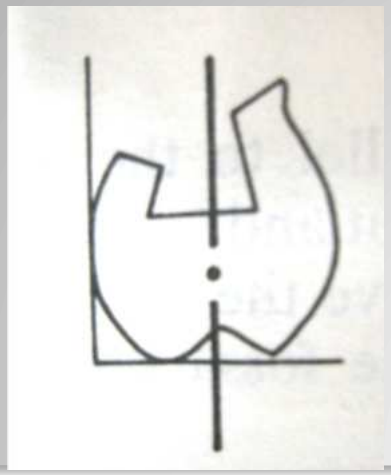
Plane relation	Relation with vertical axis	Arch relation	Position
Buccal cusp contact plane of occlusion ; palatal cusp 1mm above .	Parallel to vertical axis	Along crest of residual alveolar ridge .	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards

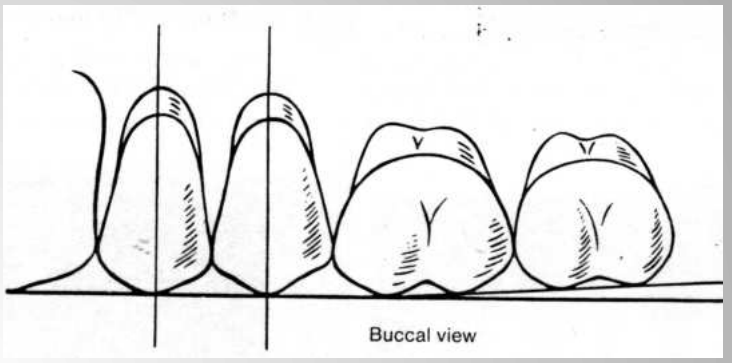




Arrangement Of Maxillary second premolar

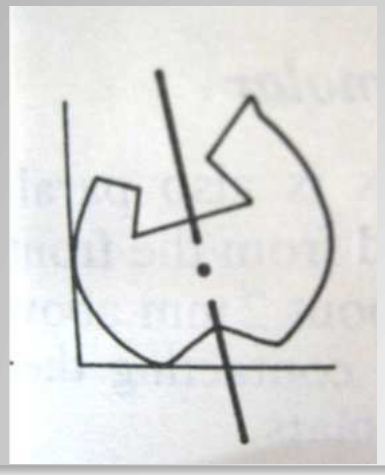
Plane relation	Relation with vertical axis	Arch relation	Position
Buccal and palatal cusp contact plane of occlusion	Parallel to vertical axis	Along crest of residual alveolar ridge .	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards

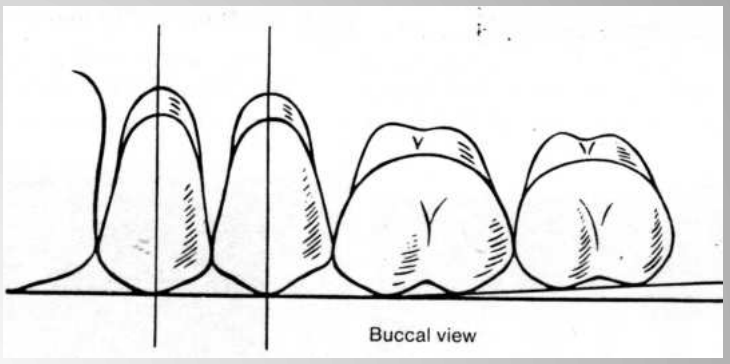




Arrangement Of Maxillary First molar

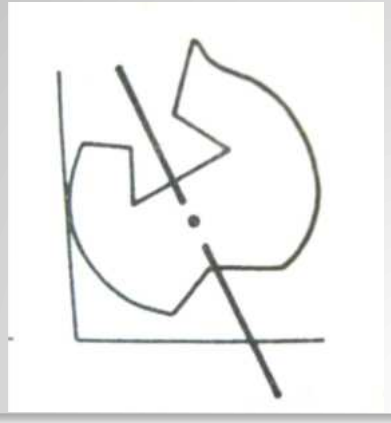
Plane relation	Relation with vertical axis	Arch relation	Position
mesiopalatal cusp contacts plane of occlusion	Slopes Distally and buccally	Along crest of residual alveolar ridge .	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards

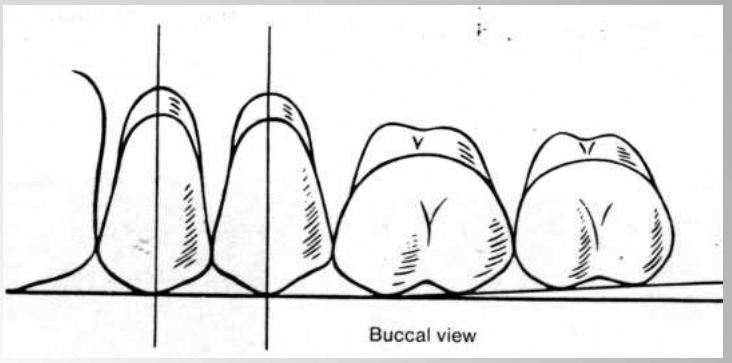




Arrangement Of Maxillary second molar

Plane relation	Relation with vertical axis	Position
All four cusps are clear of occlusal plane but mesiopalatal cusp is nearest .	Slopes more steeply -distally and buccally	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards





Arrangement Of Mandibular First premolar

Plane relation	Relation with vertical axis	Arch relation	Position
Buccal cusp above plane of occlusion; palatal cusp below.	Parallel to vertical axis	Along crest of residual alveolar ridge .	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards

Arrangement Of Mandibular Second premolar

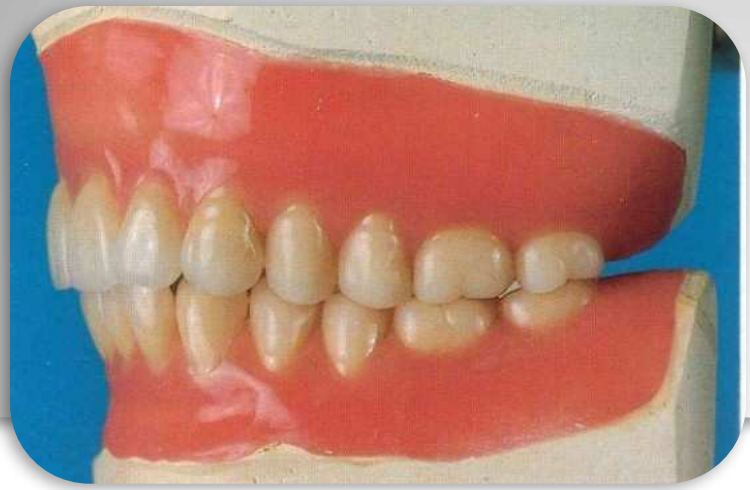
Plane relation	Relation with vertical axis	Arch relation	Position
Buccal and palatal cusp above plane of occlusion ~ 2mm	Parallel to vertical axis	Along crest of residual alveolar ridge .	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards

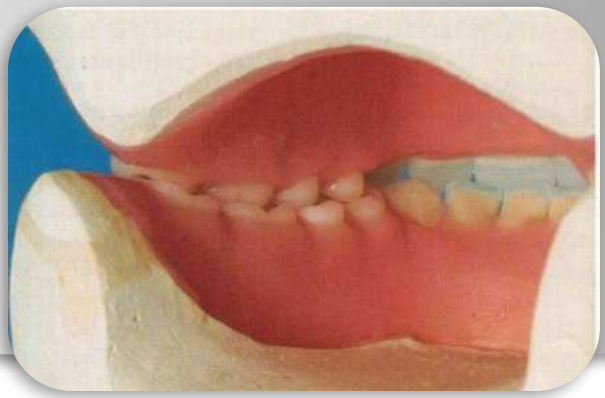
Arrangement Of Mandibular first molar

Plane relation	Relation with vertical axis	Arch relation	Position
All four cusps are above of occlusal plane - B,D cusps higher than M,L cusps	Slopes mesially and lingually	Along crest of residual alveolar ridge .	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards

Arrangement Of Mandibular second molar

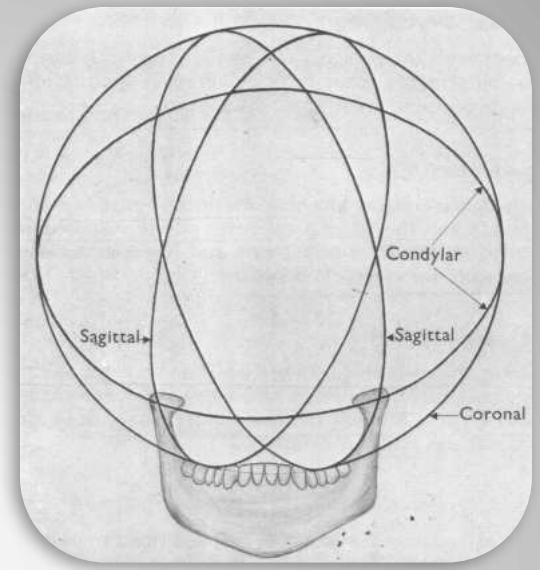
Plane relation	Relation with vertical axis	Position
All four cusps are above of occlusal plane, more than first molar.	Slopes more steeply -mesially and lingually	The buccal surfaces of all posterior teeth make contact with a straight-edge laid from the labial surface of the canine backwards





Compensating curves

Compensating curves are the artificial curves introduced into the denture in order to facilitate the production of balanced articulation. They are the artificial counterparts of the curve of spee and curve of monsoon which are found in the natural dentition.

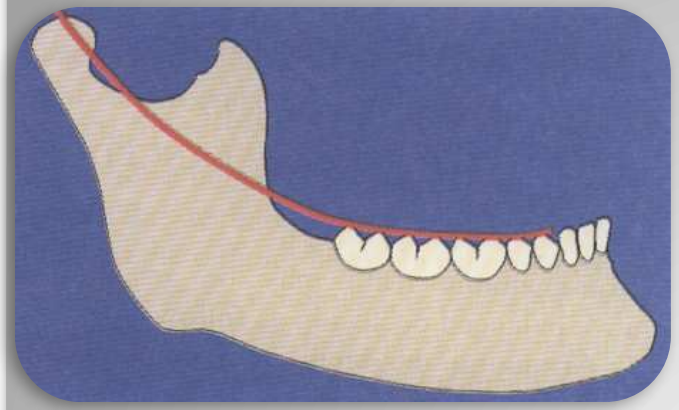


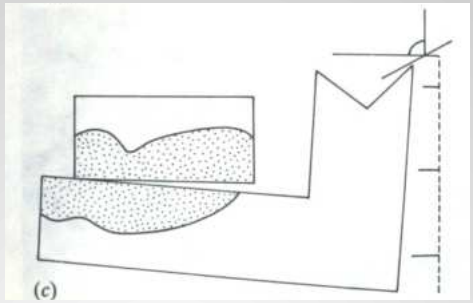
Anteroposterior curve

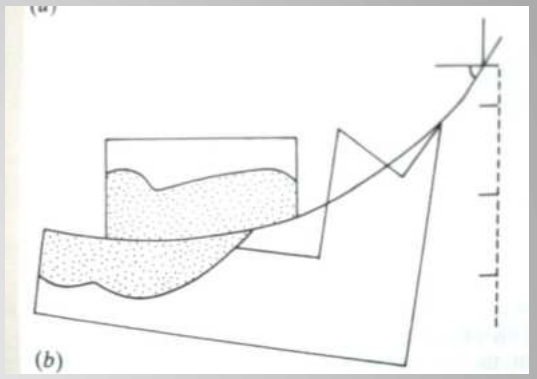
Compensates for the **Curve Of Spee** in natural dentition.

CURVE OF SPEE is defined as '***Anatomic curvature of the occlusal alignment of the natural teeth beginning at the tip of the lower canine and following the buccal cusps of the natural premolars and molars , continuing to the anterior borders of the ramus is called Curve Of Spee'.***

- Graf Von Spee.



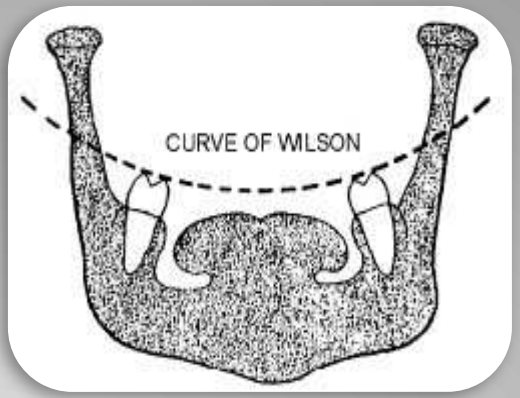


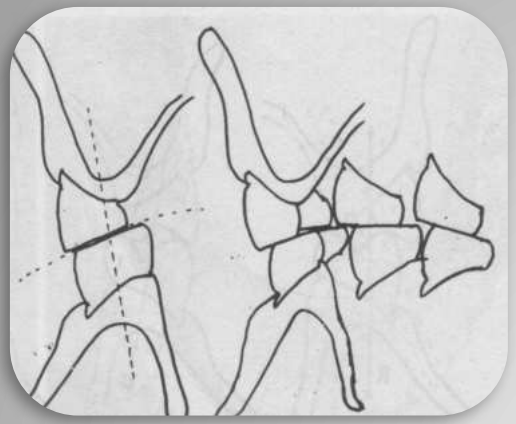


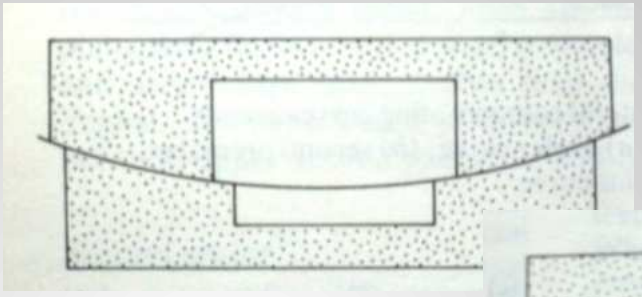
Lateral curves

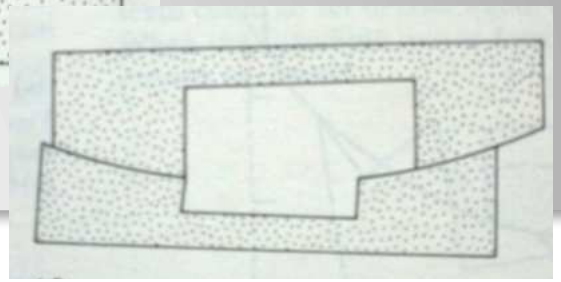
These curves run transversely from one side of the arch to the other .The following curves come in this category –

- Monsoons curve
- Wilsons / anti-monsoon curve
- Pleasure curve









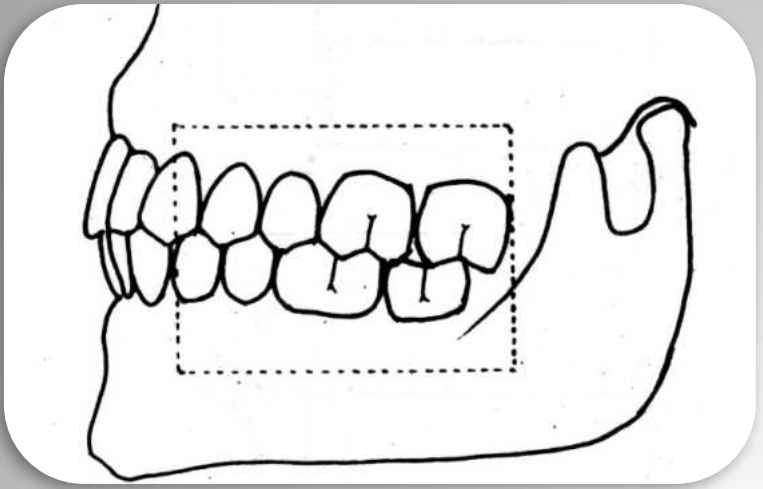
ARRANGEMENT OF TEETH

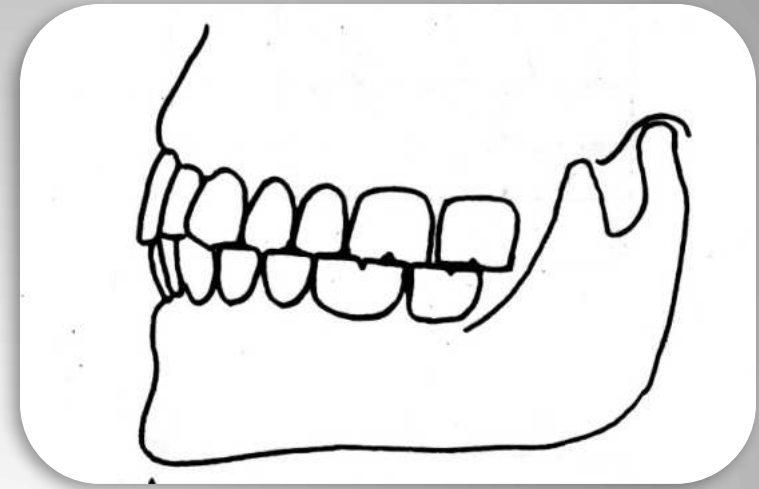
1. Anatomic Vs Non-anatomic teeth
2. Resin Vs porcelain teeth
3. Abnormal jaw relations
4. Neutral zone
5. Teeth arrangement and phonetics

Types Of Posterior Teeth

(based on anatomy of occlusal surface)

1. The anatomic teeth
2. The nonanatomic



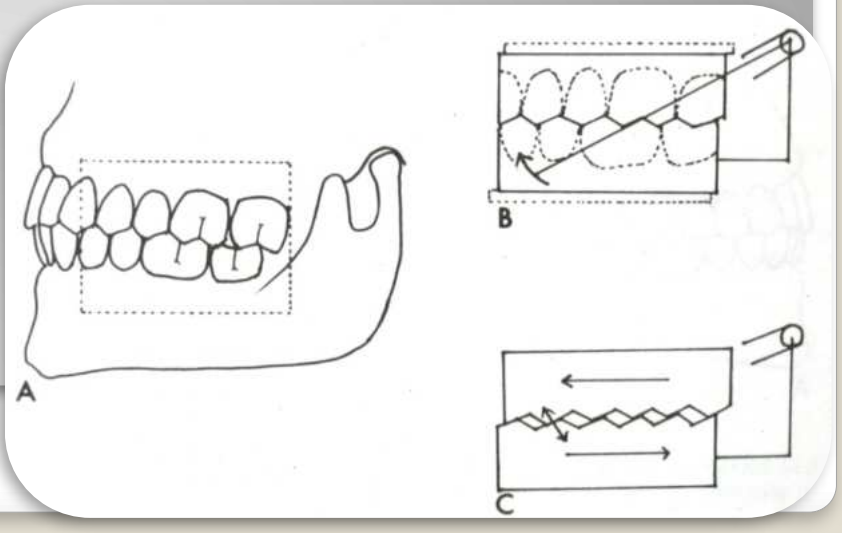


Anatomic teeth

- Cuspal anatomy is similar to the natural tooth
- In case of natural tooth -?
- In an edentulous mouth , situation differes
- Difficulty encountered in-
  - Harmonious Balanced occlusion
  - Horizontal forces generated

Feature – efficient in grinding food

❖Hence, certain mandatory requirements

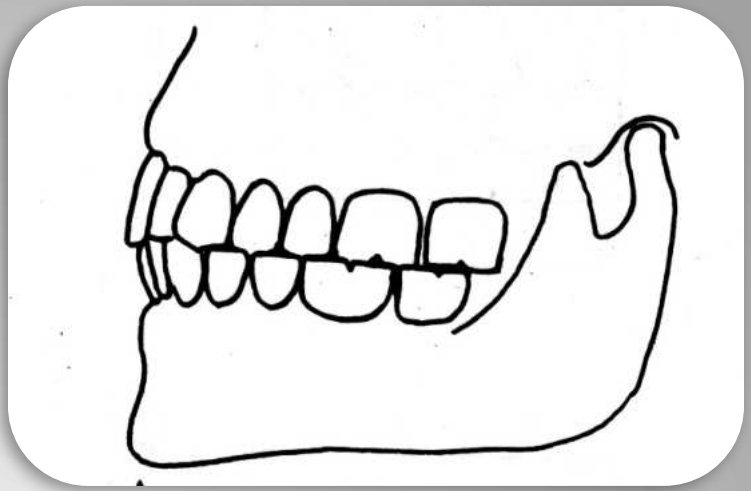


Non - Anatomic Teeth

PRIMARY OBJECTIVE – preservation of tissues

Main advantage~

- Freedom of movement
- Lack of interferences
- No horizontal forces



Drawbacks~

Indications ~

- Flat ridges
- Knife edge ridge
- Large interridge space
- Milling type of chewing pattern with broad excursions
- Improper neuromuscular coordination.

Acrylic teeth

- Significant wear
- Fracture toughness
- Retention – chemical bond
- Easily ground
- Silent on contact
- Minimal abrasion
- Discolours
- Dimensional change

Porcelain teeth

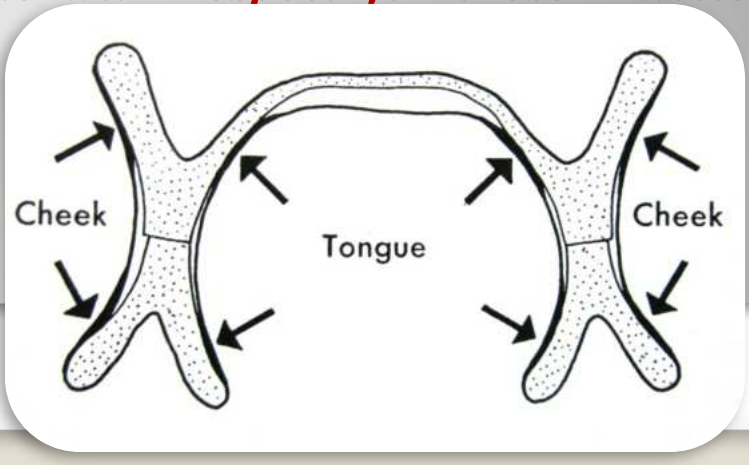
- Insignificant Wear
- Britlle
- Retention – Mechanical
- Difficult To Grind
- Sharp Impact Sound
- Abrasion Of Opposing Natural Teeh
- Colour is stable
- Dimensionally Stable

Neutral zone

- Position of each tooth
- Outward force Vs inward force
- Potential denture space

Neutral zone is ***the area between the tongue on one side and the cheeks and lips on the other, where opposing soft tissue displacing forces create a zone of neutral or minimal muscular force, the teeth should be placed as far as possible with respect for these muscle forces.***

- Neutral zone affects - 7

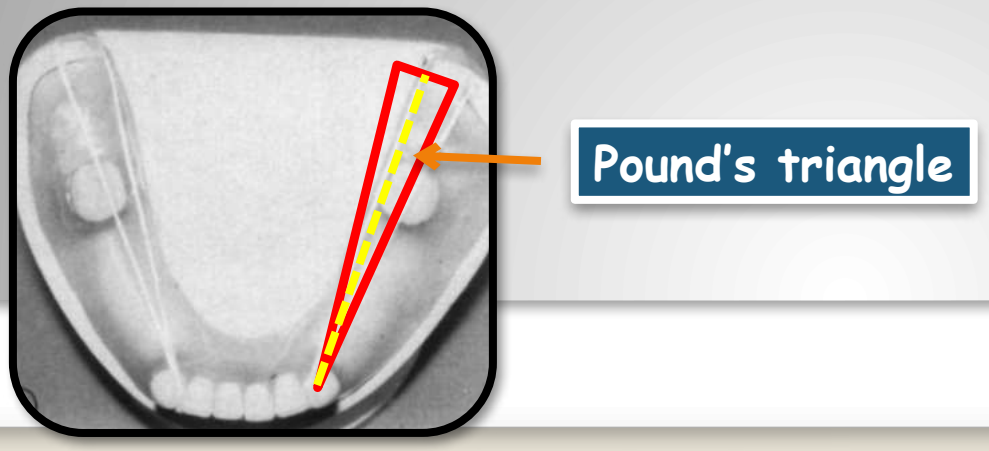


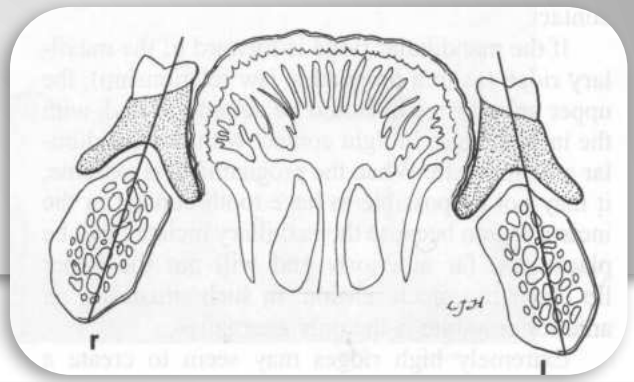
In **1931** - Fish gave concept of a ***Neutral Zone*** in complete denture construction .

In **1966** - Wright described tongue function and its relation to the occlusal plane and mandibular denture stability.

In **1973** - Pound recommended that the lingual surfaces of mandibular posterior denture teeth should occupy an area called ***Pound's Triangle.***

- Modification by Halperin





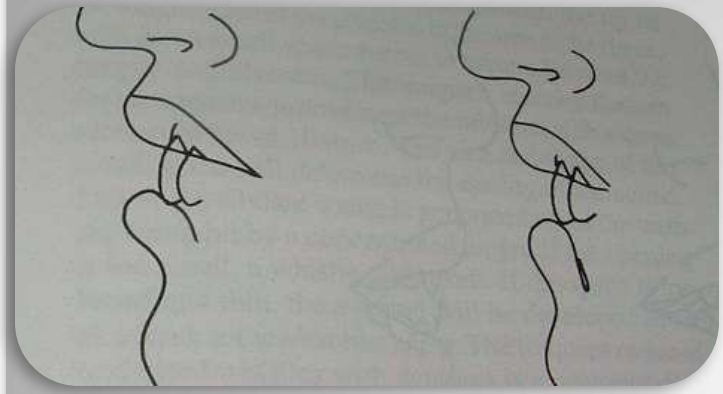
Arrangement Of Teeth In Abnormal Jaw Relations

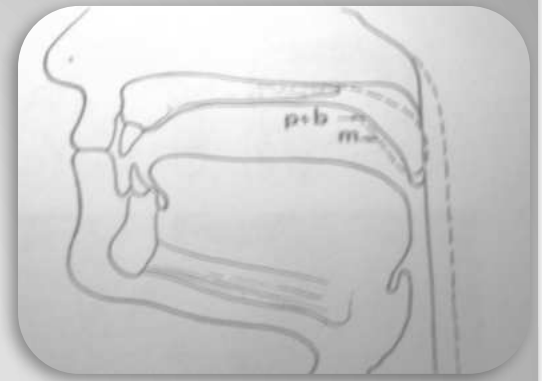
- Class II jaw relation –
  - Maxillary protrusion
  - Wider upper arch
- Class III jaw relation –
  - Mandibular protrusion
  - Wider upper lower arch

Teeth Arrangement and Phonetics

SOUNDS ~

bilabial	labiodental	linguodental	alveolar	palatal
p	F	n	t	Sh
b	v	l	d	Ch
m			s	J
			r	z





Conclusion

The nature of the supporting structures for complete dentures and the forces directed to them by occlusion creates a special biomechanical problem . Therefore considering the biologic, physiologic and mechanical principles is of utmost importance while arranging teeth for such a man-made occlusion.

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Thank you