

INTRODUCTION AND HISTORY OF ORTHODONTICS

Presented By:-

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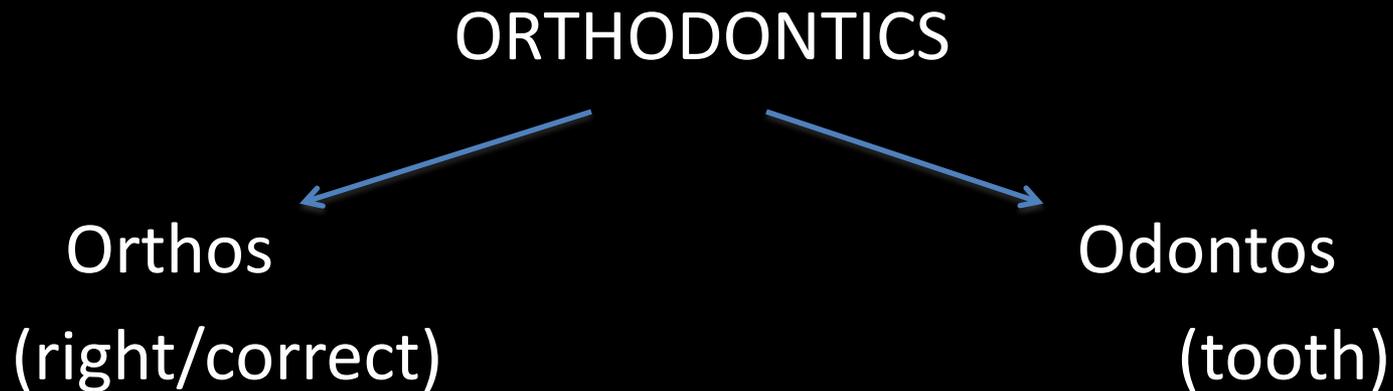
- Ancient civilization
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INTRODUCTION

- Humans have attempted to straighten teeth for thousands of years before orthodontics became dental specialty in late 19th century.

DERIVATION OF THE TERM

TERM ORTHODONTICS WAS FIRST COINED BY “Le FELON” IN 1839



- **WHY PROPER ALIGNMENT IS ESSENTIAL ??**

- Esthetics
- Function
- Overall preservation of dental health

- **UNFAVORABLE SEQUELAE OF MALOCCLUSION !**

- Poor facial appearance
- Poor oral hygiene maintenance
- Risk of dental caries
- Risk of periodontal disease
- Abnormalities of function
- Psychosocial problems
- Risk of trauma to teeth
- TMJ problems

DEFINITION

- NOYES, 1911
 - First definition of orthodontics
 - *“the study of the relation of the teeth-to the development of the face-and the correction of arrested and perverted development”*

- THE BRITISH SOCIETY OF ORTHODONTICS- 1922

- *“Orthodontics include the study of growth and development of jaws and face particularly, and the body generally, as influencing the position of teeth; the study of action and reaction of internal and external influences on the development, and the prevention and correction of arrested and perverted development”*

- AMERICAN BOARD OF ORTHODONTICS (ABO) and
AMERICAN ASSOCIATION OF ORTHODONTICS
(AAO)

– *“orthodontics is that specific area of dental practice that has, as its responsibility, the study and supervision of the growth and development of the dentition and its related anatomical structures from birth to dental maturity, including all preventive and corrective procedures of dental irregularities, requiring the repositioning of teeth by functional or mechanical means to establish normal occlusion and pleasing facial contours”*

WHAT IS MALOCCLUSION

- The term 'malocclusion' was coined by "Guilford"
- It refers to any irregularities in occlusion beyond the accepted range of normal
- It must be noted that not all malocclusion needs treatment.
- Malocclusion that are mildly unaesthetic and does not harm the teeth and their supporting structures may not need treatment.

AIMS OF ORTHODONTIC TREATMENT Jackson's Triad

- Functions like mastication and phonation
- t/t should enhance the efficiency of the functions performed.

**FUNCTIONAL
EFFICIENCY**

- t/t not only affects teeth but also the soft tissues and associated skeletal structures.
- t/t should maintain balance between these.

**STRUCTURAL
BALANCE**

- t/t should enhance the overall esthetic appeal of the individual.
- Aim is to get result which go well with patient's personality and make him look appealing.

**ESTHETIC
HARMONY**

BRANCHES OF ORTHODONTICS

• PREVENTIVE ORTHODONTICS

- defined as “ action taken to preserve the integrity of what appears to be the normal occlusion at the specific time.”
- Actions taken prior to onset of malocclusion to prevent anticipated development of malocclusion.
- They include
 - Care of deciduous dentition
 - Restoration of carious lesion in deciduous
 - Monitoring eruption and shedding
 - Elimination of oral habits
 - Removal of retained deciduous teeth
 - Maintenance of space

• INTERCEPTIVE ORTHODONTICS

– Defined as

- *“ that phase of the science and art of orthodontics employed to recognize and eliminate potential irregularities and malpositions in the developing dentofacial complex”*

– Implies that

- When the action is taken, malocclusion already exists.

– Includes

- Serial extractions
- Correction of developing anterior crossbite
- Control of oral habits
- Removal of supernumerary teeth
- Elimination of bony barriers

- **CORRECTIVE ORTHODONTICS**

- Like interceptive, it is also undertaken after the manifestation of malocclusion
- It employs certain technical procedures to reduce, correct or eliminate malocclusion.
- Includes
 - Removable or fixed mechanotherapy
 - Functional or orthopedic appliances
 - Surgical approach

SCOPE OF ORTHODONTICS

- Orthodontic t/t can bring about changes in
 - Dentition
 - Skeletal system
 - Enveloping soft tissue
- ALTERATION IN TOOTH POSITION
 - Malocclusion involving dental system
- ALTERATION IN SKELETAL PATTERN
 - Malocclusion related with skeletal disharmony i.e Maxilla and mandible (size, position)
- ALTERATION IN SOFT TISSUE PATTERN

BENEFITS OF ORTHODONTIC TREATMENT

- Improved confidence
- Well aligned teeth that are easier to clean
- Ideally positioned teeth, which lessen the chances of gingivitis and advanced diseases
- Better functions like speech and mastication

HISTORY

- From the earliest times, humans have been plagued by dental problems & have sought a variety of means to alleviate them.
- First dental healers were physicians.
- Middle ages – Barber-surgeons of Europe.
- Learned by trial, error & observation.



ANCIENT CIVILIZATION

- Hippocrates
- Aristotle
- Aulus Cornelius Celsus

MIDDLE AGE – 17TH CENTURY

- Paulus Aeginata
- Ambrose Pare

18TH CENTURY

- Pierre Fauchard
- John Hunter

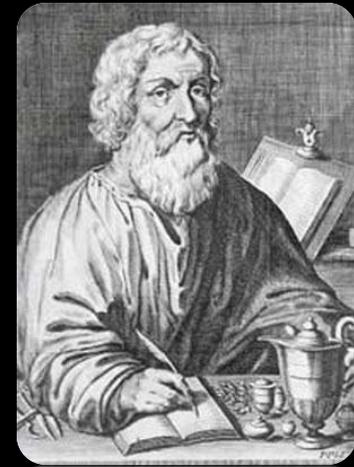
19TH CENTURY

- William lintott
- J.S Gunnell
- Emerson C Angel
- William And Magill
- John Nutting Farrar
- Norman Kingsley
- Henry A. Baker

ANCIENT
CIVILIZATION

➤ Hippocrates (460 to 377 BC)

- the Greek physician
- His text, Corpus hippocraticum –
- many references to the “crooked teeth” and the tissues of the jaws as part of the medical text.



➤ Aristotle (384 to 322 BC)

- the Greek philosopher
- The first comparative dental anatomist
- His famous work entitled *De Partibus Animalium (On the Parts of Animals)*
- Compared the various dentitions of the known species of animals of that time.



➤ Aulus Cornelius Celsus (25 BC to 50 AD)

- Described finger pressure to move teeth in his work “De Re Medicina”



MIDDLE AGE

(476 – 1450)

Little reference to dentition during this period

➤ Paul of Aegina (625 – 690 AD)

– First person to mention supernumerary teeth.



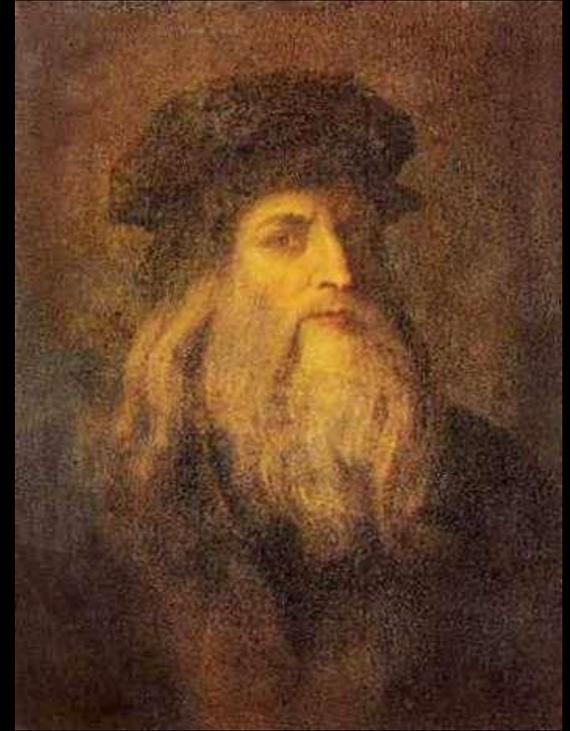
PERIOD BETWEEN

(1470-1800)

renaissance period

➤ Leonardo da Vinci (1452 –1519 AD)

- First to recognize tooth form
- First to realize that each tooth was related to another tooth and to the opposing jaw
- Described maxillary and frontal sinuses and established their relationship to facial height



➤ Andreas Vesalius (1514 – 1564 AD)

- a Belgian physician and anatomist.
- in his classic work, *On the Fabric of the Human Body*- described the minute anatomy of the teeth, particularly the dental follicle and subsequent pattern of tooth eruption.



➤ Ambrose Pare (1517 – 1590 AD)

- paid specific attention to dentofacial deformities, especially to the cleft palate.
- first to devise an *obturator* for treatment.



➤ Pierre Dionis (1658 – 1718 AD).

- Advocated “***operators for the teeth***”;
- “***To open or widen the teeth when they are set too close together***”.
- considered at length the etiology of dental irregularity and corrective therapy.



➤ Matthau's Gottfried Purmann (1692)

- + First time mention about casts in dentistry
- + The impressions were taken in wax but the method was not described.



➤ Phillip Pfaff (1756)

- + First reported the use of plaster of Paris for impressions

18TH CENTURY

➤ PIERRE FAUCHARD

- **France** became the leader in dentistry throughout the world in the **18th** century
- Primarily attributed to one man *Pierre Fauchard*
- Referred to as the “founder of modern dentistry”
- His two-volume book *The surgeon Dentist, A Treatise on the Teeth*, completed in 1723 and published in 1728.



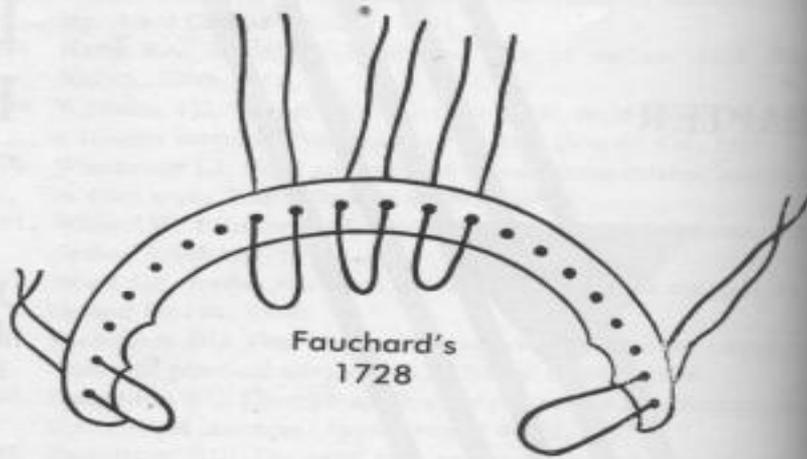
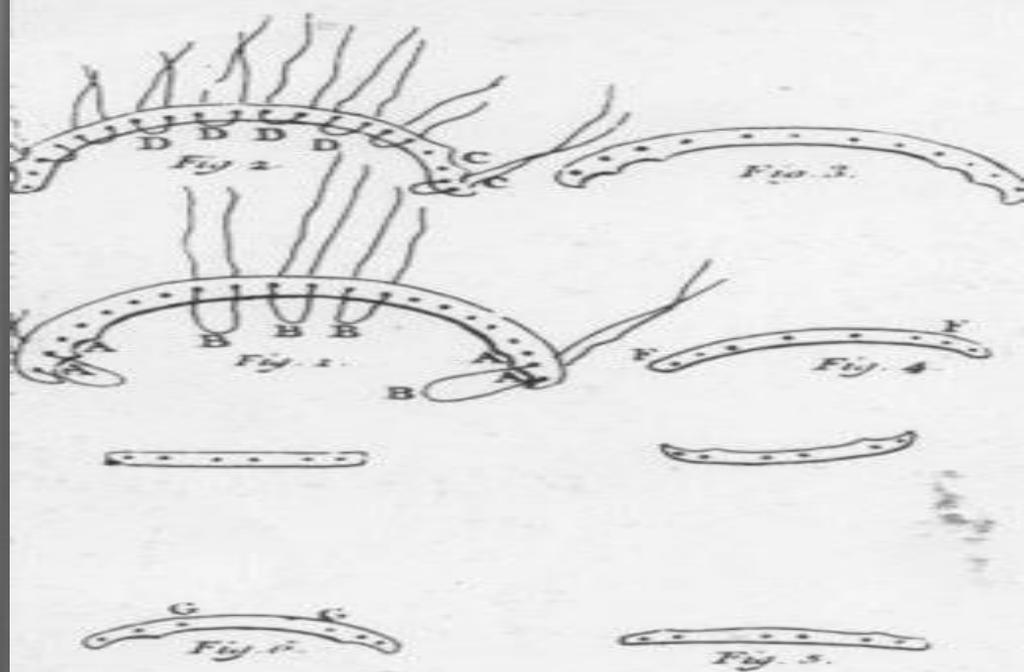
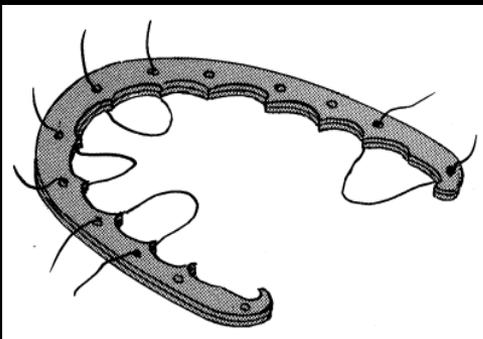


Fig. 11-3 Pierre Fauchard's orthodontic appliance, 1728. (From Angle EH: *Treatment of malocclusion of the teeth*, Philadelphia, 1907, SS White Dental Manufacturing, p. 196.)



- Bandelette – for expansion of dental arches.

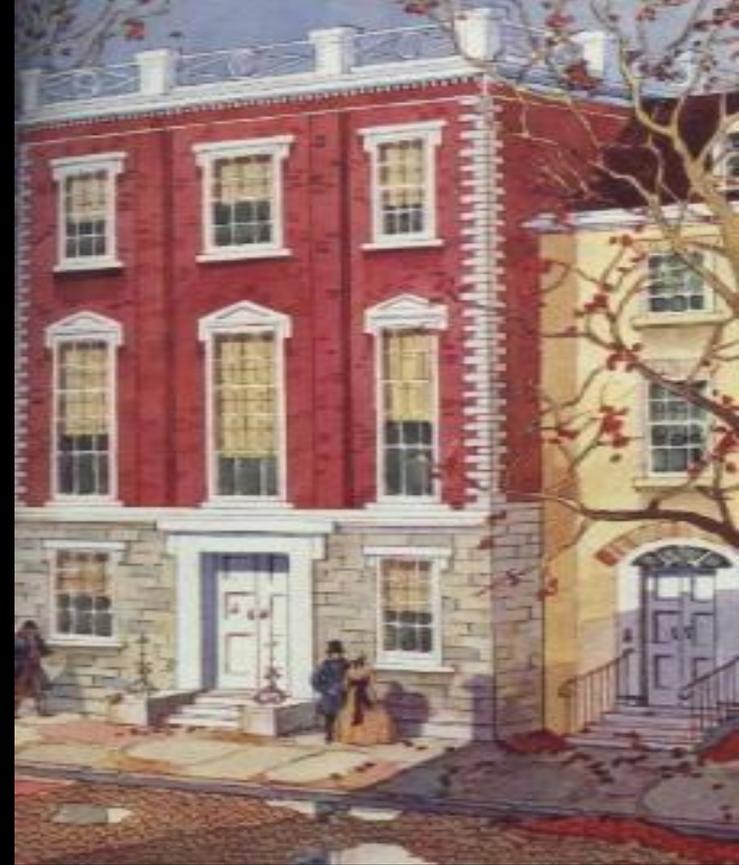


- If teeth are much out of line and cannot be corrected by means of thread, it is necessary to use a band of silver or gold
- Width should be less than height
- Band should neither be stiff nor too flexible.
- Two holes are made at each end. A thread passing partially through forms a loop
- Works By the pressure and support given by the band



- **Pierre Fauchard** through his treatise 'Le Chirurgien dentiste' established dentistry as a true profession.
- the field was based on sound rational & scientific principles.

- Baltimore College of Dental Surgery – first dental college in the world – opened its doors to a class of 5 students on Nov 3rd, 1840.



➤ Robert Bunon (1702 – 1788 AD).

French dental surgeon

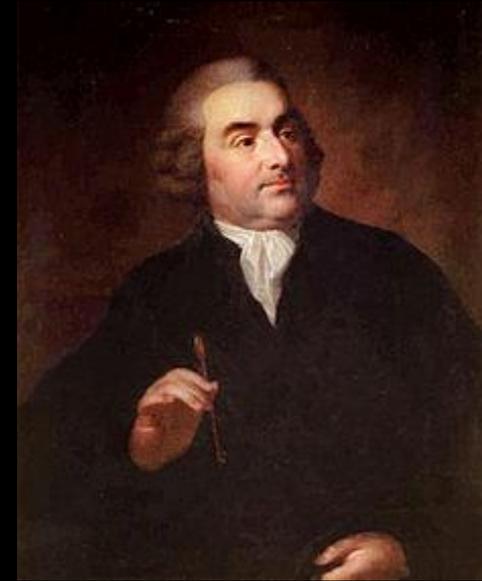
- Advocated serial extraction
- First used the term orthopedics in connection with the correction of malocclusion.

➤ Etienne Bourdete (1757)

- Recommended only gold strips on the labial surface for the upper arch and on the lingual surface for the lower arch.
- Recommended the extraction of the first premolars to preserve the symmetry of the jaws.
- In children who had protruding chins, advocated extraction of the mandibular first molars shortly after eruption

➤ Petrus Camper (1722-1823AD)

- A Flemish artist and anatomist
- Used a series of primate skulls and heads represented in lateral view and constructed a method of measuring prognathism, Camper's line and Camper's angle.
- Provided illustrations indicating a progression of skeletal prognathic types, from monkeys to apes, and finally to humans.



➤ John Hunter (1728-1793)

- Anatomy teacher in England
- He had a valuable series of publications,
- One of which was “*the natural history of human teeth: explaining their structure, use, formation, growth and diseases*”
- He demonstrated growth, development and articulation of maxilla and mandible with attached musculature
- Also outlined the internal structure of teeth *enamel and dentin* and their separate function.

1800-1840

➤ Weinberger

- **Weinberger** classifies orthodontics in the United States as
 - (1) **Early Orthodontia**, 1839 – 1880, or from Harris to Kingsley
 - From 1880 – 1900, or from Kingsley to the establishment of Angle School of Orthodontia and the organization of American Society of Orthodontists
 - (2) **Modern Orthodontics**, from 1900 to the present time.

➤ Samuel S. Fitch (1829)

- book entitled “*A System of Dental Surgery*” is considered the first definitive work on dentistry in this country,
- devoted a significant amount of information to irregularities of the teeth. He was the first to classify malocclusion.

- *Orthodontics was part of prosthetic dentistry, and the literature on the subject described orthodontics in the area of partial and total replacement of missing teeth*

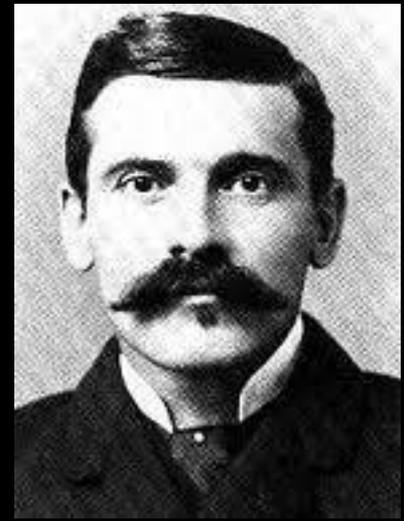
• CLASSIFICATION OF MALOCCLUSION ACCORDING TO FITCH:

- ① When one central incisor is turned in and the under teeth come before it whilst the other central incisor keeps its proper place standing before the under teeth.
- ② When both the central incisors are turned in and both go behind the under teeth and lateral incisors are in its place
- ③ When central incisors are placed properly and lateral incisors are turned in and when the mouth is shut, the under teeth project before them and keep them backwards
- ④ When all the incisors of upper are turned in and those of under jaw show before them

1840-1875

➤ Chapin A. Harris (1840)

- One of the most influential dental surgeons during this period, published the first modern classic book on dentistry, *The Dental Art*, in 1840.
- Gave much attention to various orthodontic treatment procedures
- His personal technique included the use of gold caps on molars to open bite and knobs soldered to a band for tooth rotations.



➤ J. S. Gunnell (1840)

- Introduced the **chinstrap** as **occipital anchorage** for the treatment of **mandibular protrusion**.

➤ William Lintott (1841)

- + Introduced the use of **screws**.
- + Described the **premature loss of deciduous teeth as a cause of malocclusion**.
- + Recommended that **treatment begin at the age of 14 or 15 years**.
- + Described a **bite-opening appliance**
 - ✗ Consisted of a labial arch of a light bar of gold or silver passed around the front surfaces of the teeth by means of ligatures (known as **Indian twist**), and the necks of the irregular teeth with pressure applied for movement.





➤ J. M. A. SCHANGÉ (1841)

- Introduced modification of the screw, called the crib.
- Also introduced the use of the **clamp band**
- For retention “use a rubber band attached to some hooks on the appliance surrounding the molars”



➤ **Simon HULLIHAN (1848)**

- Performed the first successful **Orthognathic surgery**, a **partial autoplatic resection of a prognathic mandible.**

➤ **William DWINELLE (1849)**

- Introduced the **jack screw.**

➤ Thomas W. Evans (1854)

– Published requirements for an appliance in dental newsletter

- ① A firm support which shall not loosen or in any way injure the teeth to which it is attached
- ② Steady and sufficient pressure
- ③ Great delicacy in construction so that appliance may be as light as possible
- ④ Mechanism as simple as possible.

➤ Emerson C. Angell (1860)

- Probably the first person to advocate the opening of the median suture to provide space in the maxillary arch, since he took a strong stand against extraction.

➤ James D. White (1860)

- Perfected a **removable vulcanite appliance with a hinge in a split palate**

➤ George J. Underwood (1864) of New York

- Presented his **graduation thesis** at the *Pennsylvania College of Dental Surgery* (Philadelphia) entitled "*Orthodontia.*"

➤ **O. A. Marvin** (1828 to 1907 AD)

➤ in 1866, outlined the objectives of orthodontic treatment:

1. **the preservation of correct facial expression**
2. **the restoration of such expression**
3. **the proper articulation of the teeth for better mastication**
4. **their orderly arrangement, with a view to preventing**

- **William E. Magill (1871)**
 - cemented bands on the teeth.
- The period of the last three decades of the nineteenth century is studied in the framework of individual dentists and their contributions.
- Each practitioner developed his own theory and practice, some to a greater degree of excellence than others.

1875-1900

➤ John Farrar - (1839-1930)

- John Farrar could be referred to as the *Father of American Orthodontics.*
 - Investigated the physiologic and pathologic changes occurring in animals as the result of orthodontically induced tooth movement (1975)
 - Published a series of articles between 1881 and 1887 in the *Dental Cosmos*, one of the leading dental journals, enunciating the principle that *"in regulating teeth, the traction must be intermittent and must not exceed certain fixed limits.*

- Also published ***Irregularities of the Teeth and Their Correction, Vol. 1 in 1888 and Vol. 2 in 1889***, in which he demonstrated the many uses of the screw as the motivating attachment and the basis of what he referred to as a “***system of orthodontia***”
- He stressed the *"importance of the observance of the physiologic law which governs tissues, during movement of the teeth, the subject being to prevent pain."*

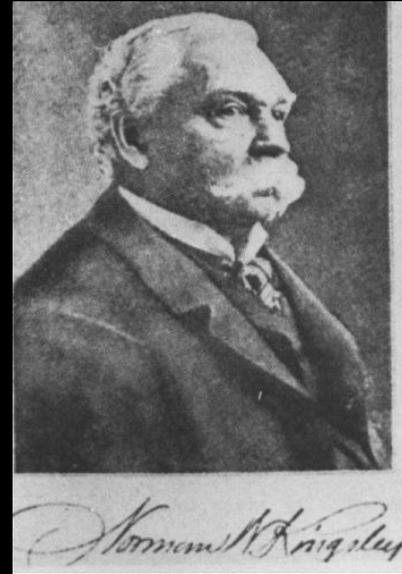
◎ He was the originator of the theory of intermittent force, and the first person to recommend root or bodily movement of the teeth.

• Piezoelectric Theory by FARRAR (1876)

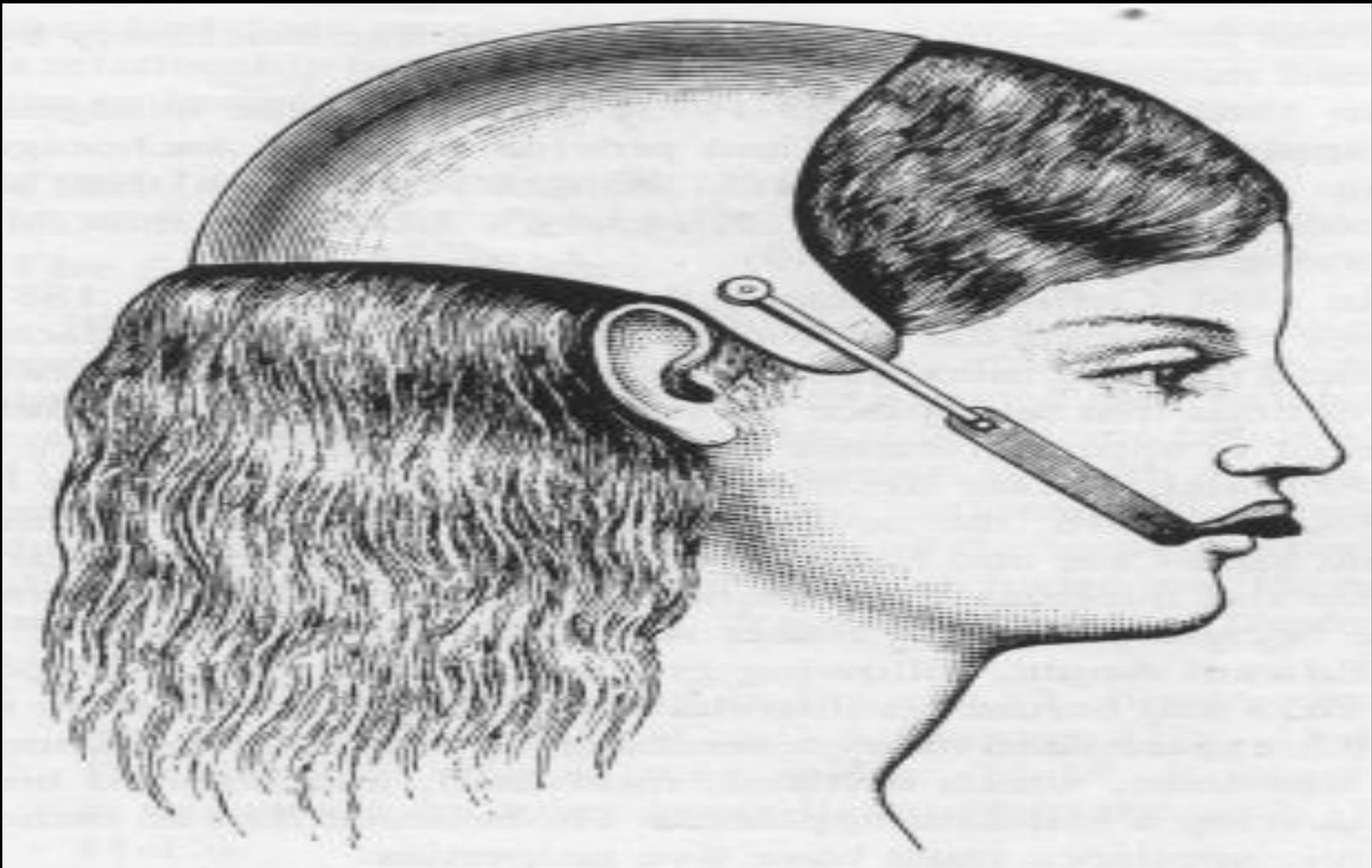
- When orthodontic force is applied to teeth, it causes deformation or bending of alveolar bone.
- This deformation causes bone to become electrically charged and exhibits a phenomenon called **piezoelectricity**
- Many crystalline substance exhibit piezoelectricity.
- Both hydroxyapatite and collagen fibers present in bone are crystalline material with piezoelectricity
- Deformation of the crystal structure produce a flow of current as a result of displacement of electrons from one part of crystal lattice to other.

➤ Norman W. Kingsley (1866)

- He experimented with appliances for the correction of cleft palate
- Associated with a technique known as **jumping the bite** with the use of a **bite plate**. It was the treatment for protrusion of the maxilla, not necessarily with extractions, shaping the dental arches to be in harmony with each other.
- He used **vulcanite in conjunction with ligatures, elastic bands made of rubber, jackscrews, and the chin cap.**



© Among the first to use **extraoral force** to correct protruding teeth. He introduced the **terms bite plane and occipital anchorage in year 1861.**



- 1880 published A *Treatise on Oral Deformities*, which remained a textbook for many years.
- Emphasized the importance of the relationship between mechanics and biology as the principle on which orthodontics should be based.
- His book was the first to recommend that etiology, diagnosis, and treatment planning were the acceptable bases of practice. "*Much success in treating irregularities will depend upon a correct diagnosis and prognosis.*"

➤ Isaac B. Davenport, (1881)

- developed a theory that the masticatory apparatus was subject to the laws of nature, that imperfect occlusion was deleterious to the dentition, that extraction of teeth in treatment could affect the efficiency of the masticatory apparatus.

➤ Walter Coffin

- In 1881, **Coffin** Plate was introduced.

➤ L.E Cluster

- The principles of resorption and deposition of alveolar bone during tooth movement were discussed by **L. E. Custer** (Ohio) in March, 1888.

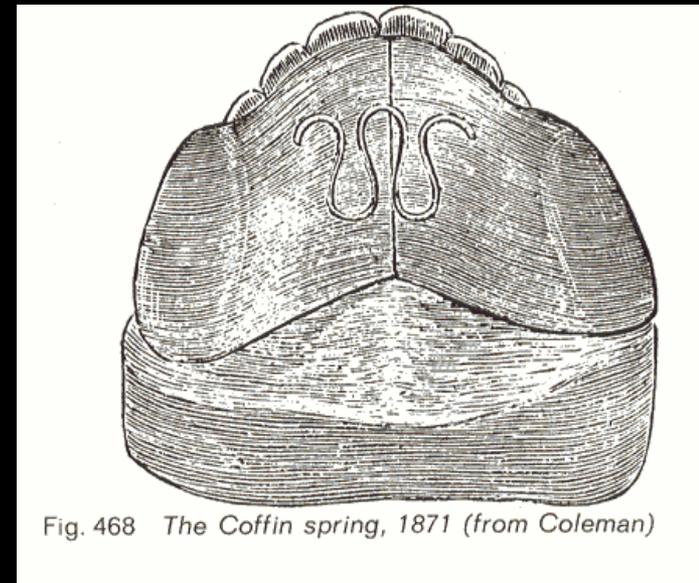


Fig. 468 The Coffin spring, 1871 (from Coleman)

➤ Henry A. Baker (1893)

–introduced the **Baker anchorage**, or the use of *intermaxillary elastics* with rubber bands.

–The introduction of intermaxillary elastics was interpreted by some practitioners to mean the elimination of the need for extraction.

- In 1899 the *Items of Interest* was the first dental journal to devote a section of each issue to orthodontia because of the recommendation of its editor, **R. Ottolengui** (1861 to 1937 AD).

➤ Clark Goddard

- Gave acceptance of an expansion screw for the forcible separation of the maxilla.
- Also attempted to classify malocclusion, which included 15 separate types of irregularities.

➤ Eugene S. Talbot

- He stressed the study of the causes of malocclusion to be the key to treatment.
- He advised close attention to disproportion in the size of the maxilla and mandible, *"general contour and profile of the face,"* and *"the family history including hereditary factors."*

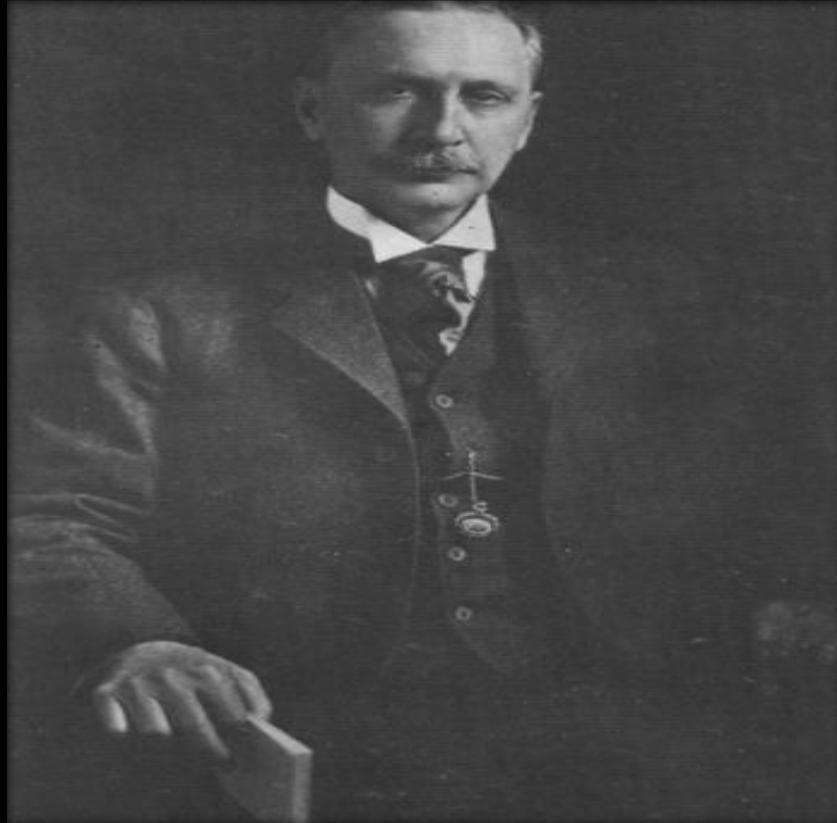
- He was one of the first to recommend the *surgical exposure of impacted canines*.
- Also, he was the first to use **X- rays for orthodontic diagnosis**.
- In 1891, demonstrated intraoral measurements on casts with such instruments as the registering calipers and the T-square with graduated sliding indicator. This was one of the earliest attempts applying specific analysis of casts that reflected measurements of the jaws.

1900-1910

ERA OF MODERN ORTHODONTICS

- The year 1900 is arbitrarily selected as a *date for the beginning of the **oldest specialty of dentistry***
 - Because it was in that year that the Angle School of Orthodontia was founded and in the following year that the **American Society of Orthodontists** was formed.

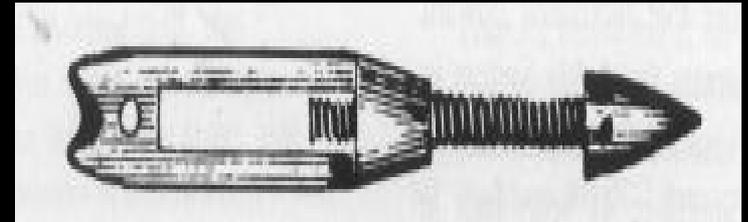
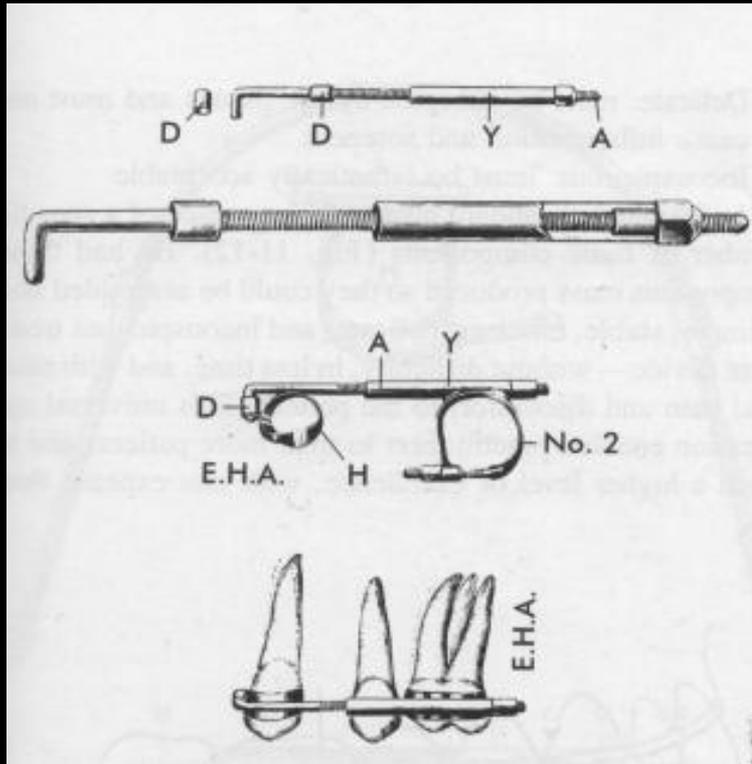
Edward Hartley Angle (1855-1930)



FATHER OF ORTHODONTICS

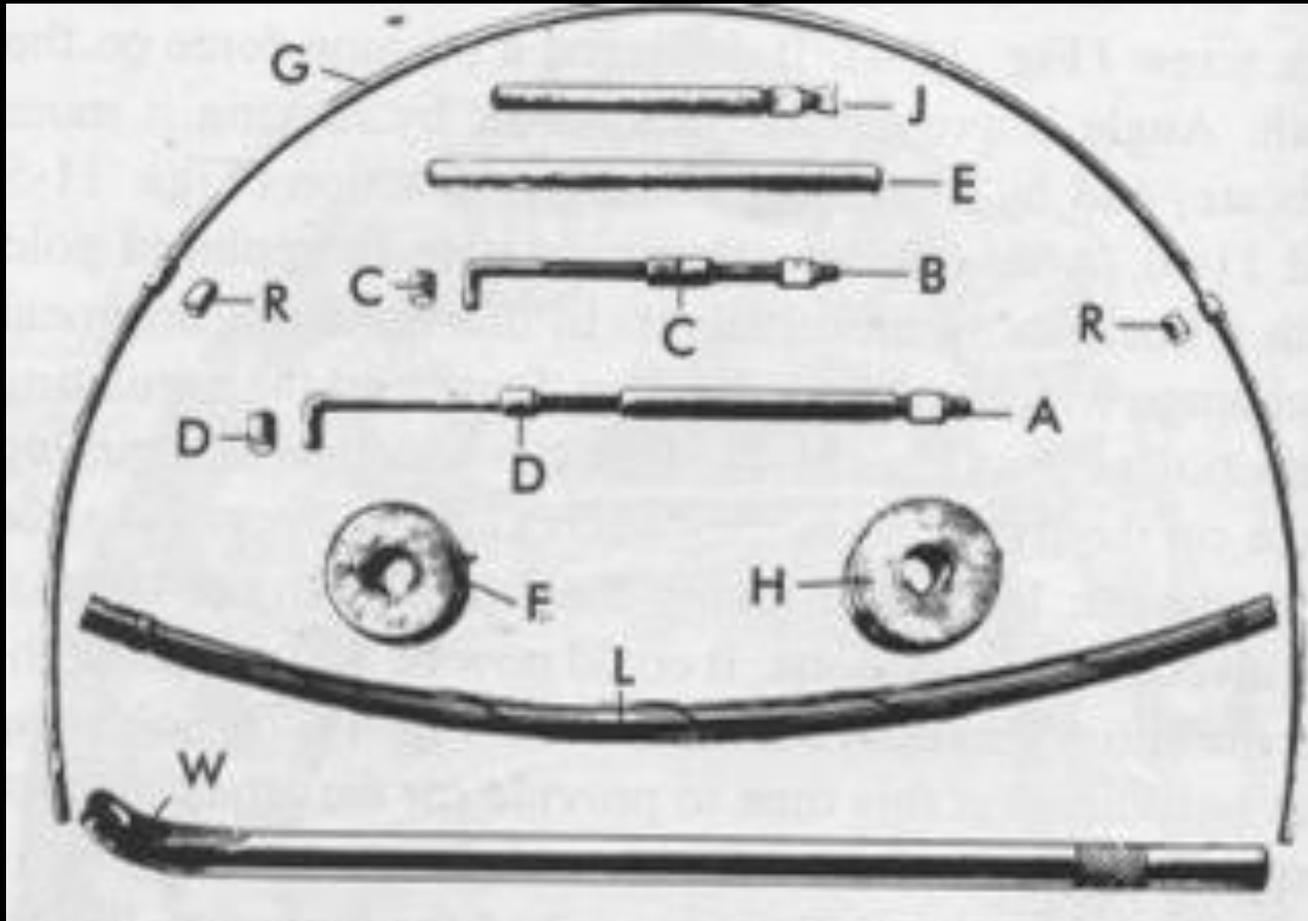
- The most *dominant, dynamic, and influential figure* in the specialty of orthodontics.
- Through his leadership, orthodontics was separated from the other branches of dentistry (e.g., crown and bridge, prosthetics), and the result was the specialty of orthodontics.
- Angle was the **first to limit his practice to orthodontics.**

- 1880 – “First real appliance” – the jack & traction screw with pushing action.

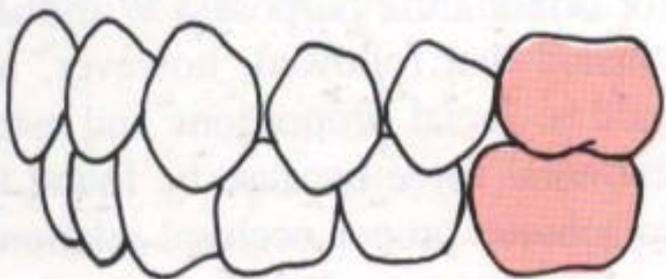


- Combination of adjustable clamp band of Schange & regulating screw of Dwinelle.

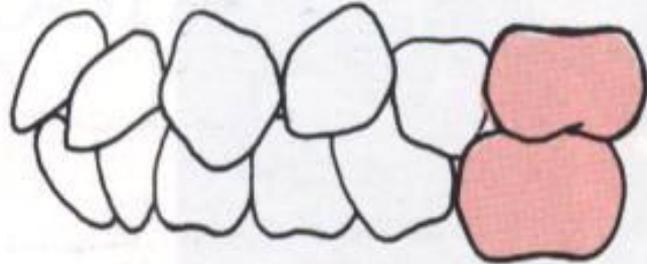
- 1887 – introduced the Angle System.



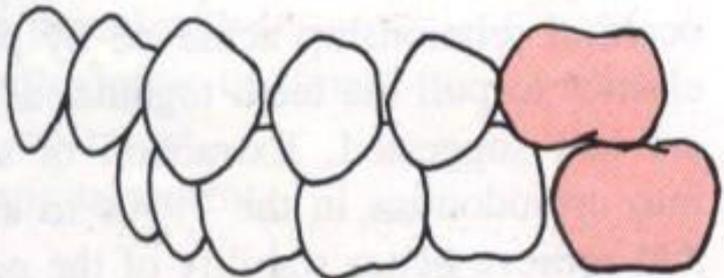
- Angle's classification has 4 classes:



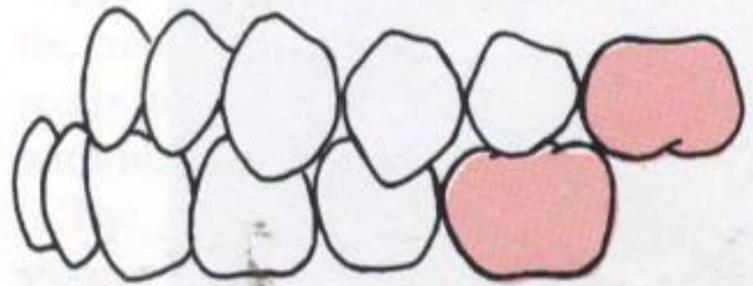
Normal Occlusion



Class I Malocclusion



Class II Malocclusion



Class III Malocclusion

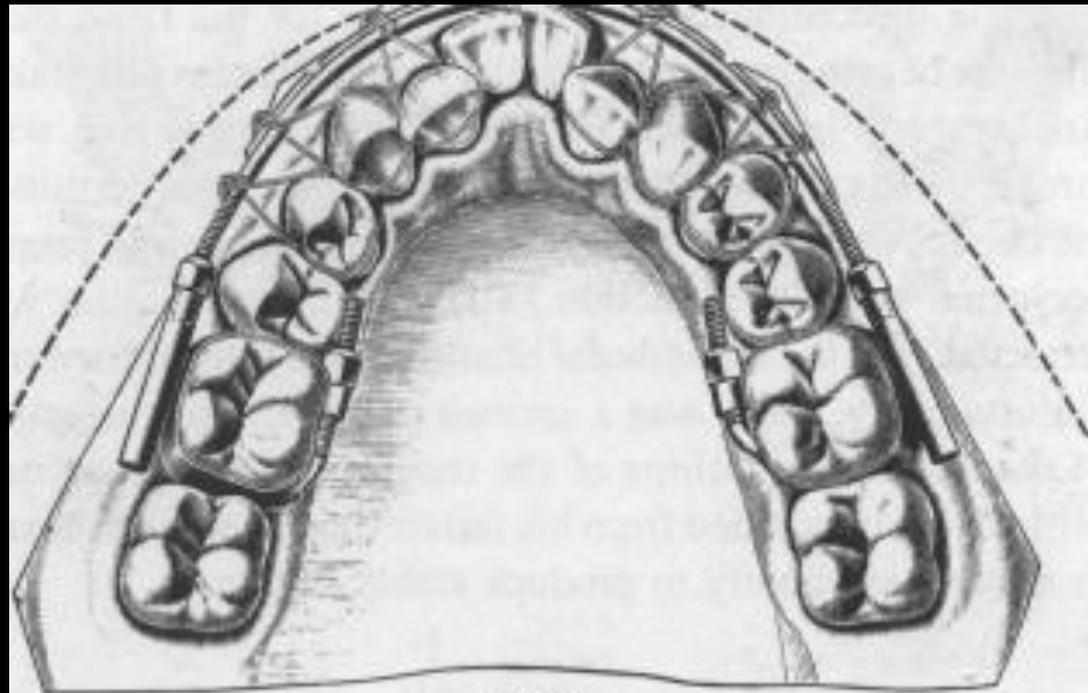
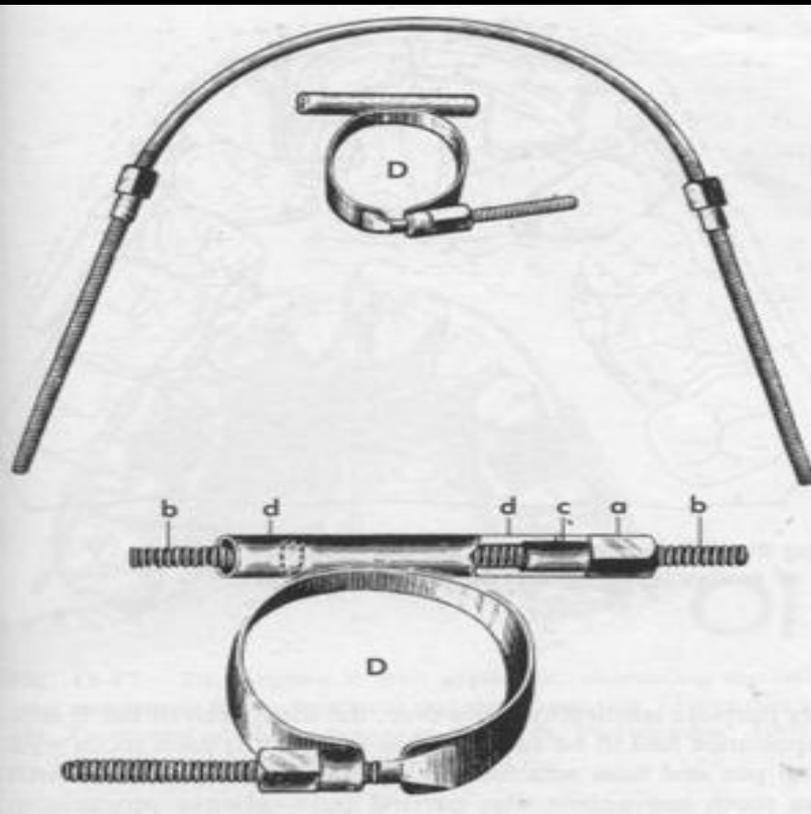
1907-E -Arch Appliance

E-arch appliance depends on rigid framework to which teeth were attached.

Only caused tipping movement

Only Molars are Banded

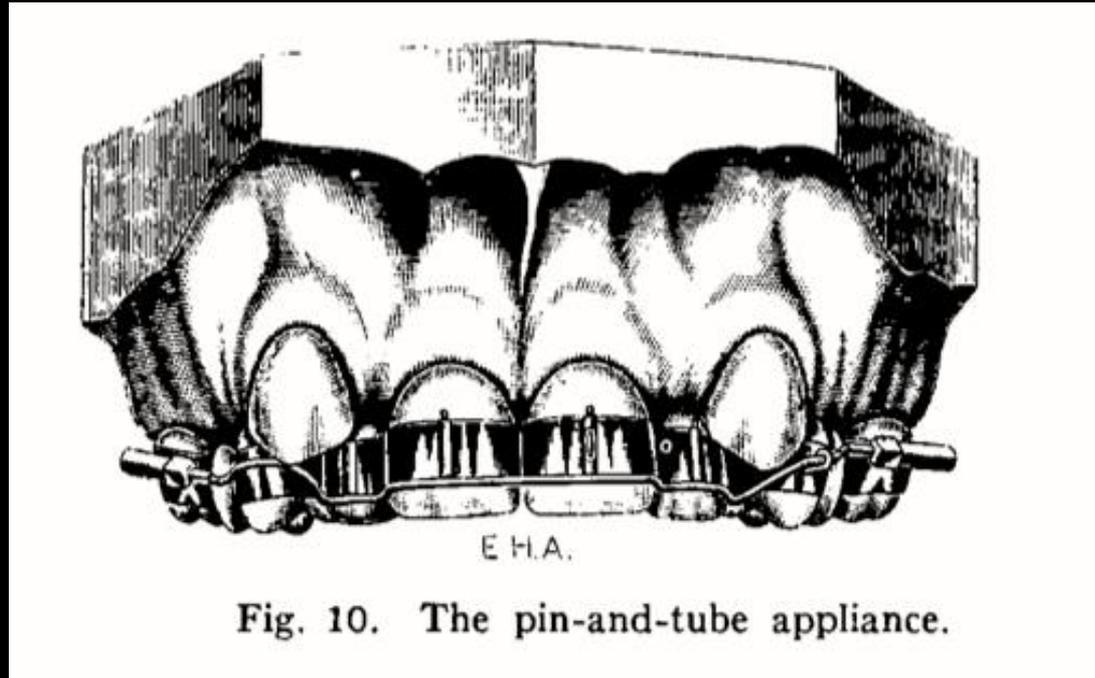
Heavy force .



E.H.A.

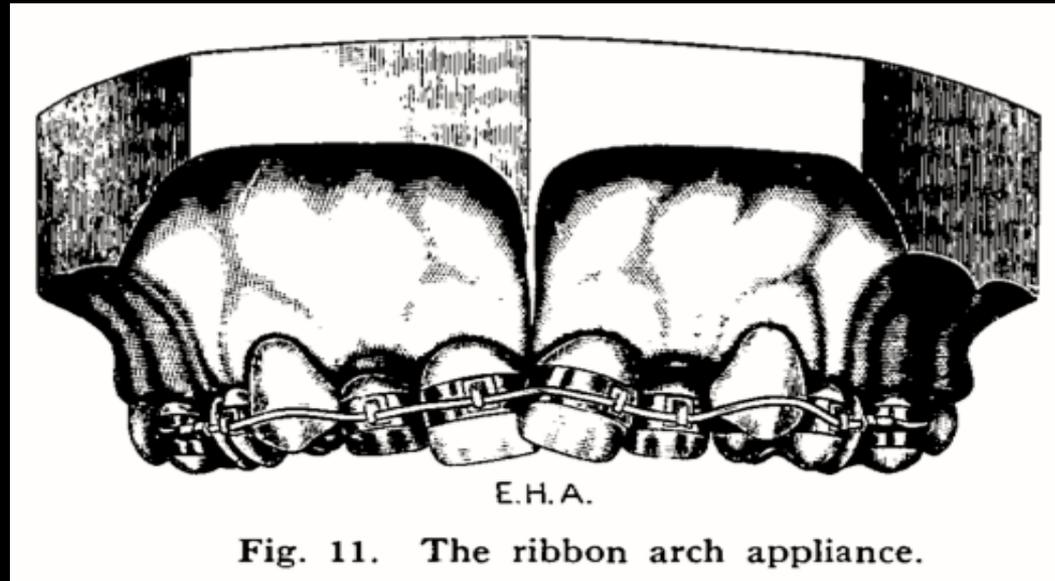
1912-Pin and Tube Appliance

- Bands on teeth
- Teeth other than the molars also banded .
- Vertical tube soldered to band and pin to wire
- This pin is repositioned from time to time



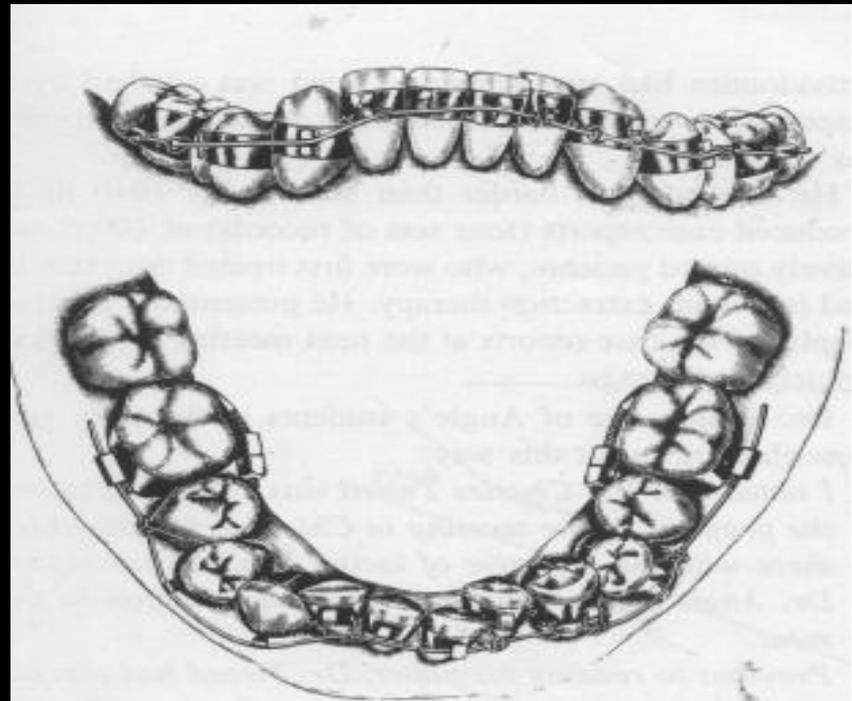
1915-Ribbon Arch Appliance

- Better spring qualities .
- Poor control of root resorption
- rectangular gold wire held firmly with Pins
- Vertically positioned rectangular slots



1928-Edgewise Appliance

- First to move the teeth in all 3 planes Simultaneously
- Re-oriented the slots from vertical to horizontal and inserted a rectangular wire



- In **1878**, Angle received his **DDS degree** from the **Pennsylvania College of Dental Surgery**.
- ***In 1887 he was appointed to the chair of orthodontia in the Dental Department of the University of Minnesota.***
- He read his "**revolutionary ideas**" at the **ninth International Medical Congress (District of Columbia)**, which received wide attention. The paper was entitled "**Notes on Orthodontia with a New System of Regulation and Retention.**" It was later published in the ***Ohio Journal of Dental Science (1887)***.

- In **1888**, during a lecture to the *Iowa State Dental Society* on his "**system of orthodontia**," Angle **demonstrated for the first time the expansion arch and its auxiliaries**.
- In **1894** he was appointed the first professor of orthodontia at Marian Sims College, receiving the MD degree from that college the following year.

- His classification of malocclusion was published in the *Dental Cosmos* in 1899.
- The next year, he organized the first school of orthodontia— *The Angle School of Orthodontia at St. Louis.*
- The course of instruction included art (taught by artist *Edmund Wuerpel*), *rhinology, embryology, histology, comparative anatomy, and dental anatomy, in addition to his appliances.*

Angle's postulates

- ① *Upper first molars are the key to occlusion.*
- ② *Most remarkably stable landmark in craniofacial anatomy – upper first molars.*
- ③ *Upper & lower molars should be related so that the mesiobuccal cusp of the upper molar occludes in the buccal groove of the lower molar.*
- ④ *Line of occlusion – The line with which, in form & position according to type, the teeth must be in harmony if in normal occlusion.*

His office in 1900



- the members organized the first orthodontic society - "*The Society of Orthodontists.*"
- In 1935, the society adopted the name it bears today: *The American Association of Orthodontists (AAO).*
- They also established the magazine, a quarterly titled *The American Orthodontist*, which we read today as the *American Journal of Orthodontics*

➤ **1903 - Dr. Anna Hopkins**

was elected the Society's first secretary.

- She completed one of the early Angle courses, but was never to practice orthodontia.
- In **1906** she became **Mrs. Edward Hartley Angle**.



- In **1907**, Angle started a school in **New York City**, and then, from **1908 to 1911**, his school was in **New London, Conn.**, where **6-week sessions were offered at tuition of \$200.**
- In 1916 Angle moved again, this time to **Pasadena, Calif.**, for reasons of health.
- From 1924 to 1927, his course was extended for 1 year.

Edward Hartley Angle (1855-1930)



School at Pasadena, CF

- Angle had an uncompromising position against extraction. It was his credo that

"the best balance, the best harmony, the best proportions of the mouth in its relation to the other features require that there shall be a full complement of teeth, and that each tooth shall be made to occupy its normal position— i.e., normal occlusion."

- Angle filed 32 patents, the first was in 1889 and the last was in 1934, after his death.
- His 30 patents focused on arches, on tools to modify them, and on the best means of engaging banded teeth.
- His first patent was a *regulating screw, with an ingenious push-type jackscrew for increasing width.*
- His other patents include *E-arch appliance, pin and tube appliance, ribbon arch appliance, and edgewise appliance.*
- He also introduced *soldering and a nickel-silver alloy* to orthodontics.

➤ Calvin Case - 1847-1923

- His interest in orthodontics, devising original appliances and the use of intermaxillary elastics (a technique for which both he and Baker were to claim originality).



His special attention to the *cleft palate patient* was a pioneering work,

He developed a *classification of malocclusion* that included 26 divisions.

- He was the *leader of the group* that advocated *extraction of teeth*.
- It was his reintroduction of the concept that the removal of certain teeth will enable the correction of malocclusion and improve general health and comfort that proved to be a *"bombshell."*
- It met with *great opposition* from many practitioners, especially those influenced by Angle.

- In **1921** Case published his major work, ***A Practical Treatise on the Technics and Principle of Dental Orthopedia and Prosthetic Correction of the Cleft Palate.***
- Case was a strong advocate of the relationship of malocclusion to facial improvement. **Facial improvement** was a guide to treatment.
- He developed a technique for ***root movement, introduced the use of rubber elastics, pioneered the use of retainers and was the first to use thinner and resilient wires for tooth movement.***
- He introduced the use of ***plaster casts of the face*** to illustrate different kinds of facial features.

CASE/ANGLE
CONTRAVERSY

Originally, Case was a genuine admirer of Angle. In fact, he gave up the general practice of dentistry because of Angle's influence.

EDWARD HARTELY ANGLE

- *Angle attributed the origin of the use of intermaxillary elastics to Baker*
- *Angle's thesis was that "there shall be a full complement of teeth, and that each tooth shall be made to occupy its normal position"*

CALVIN S. CASE

- *Case thought that he should have received that credit.*
- *Case defended the discreet use of extraction as a practical procedure, while Angle believed in nonextraction*

➤ Martin Dewey

- The extraction story was continued into 1911 with **Martin Dewey** (1881-1933) an ardent champion of ***nonextraction***. He modified Angle's classification of malocclusion.
- The climax of this conflict was a ***debate in 1911*** at the annual meeting of the National Dental Association (former name of the ADA).



➤ George C. Ainsworth 1904

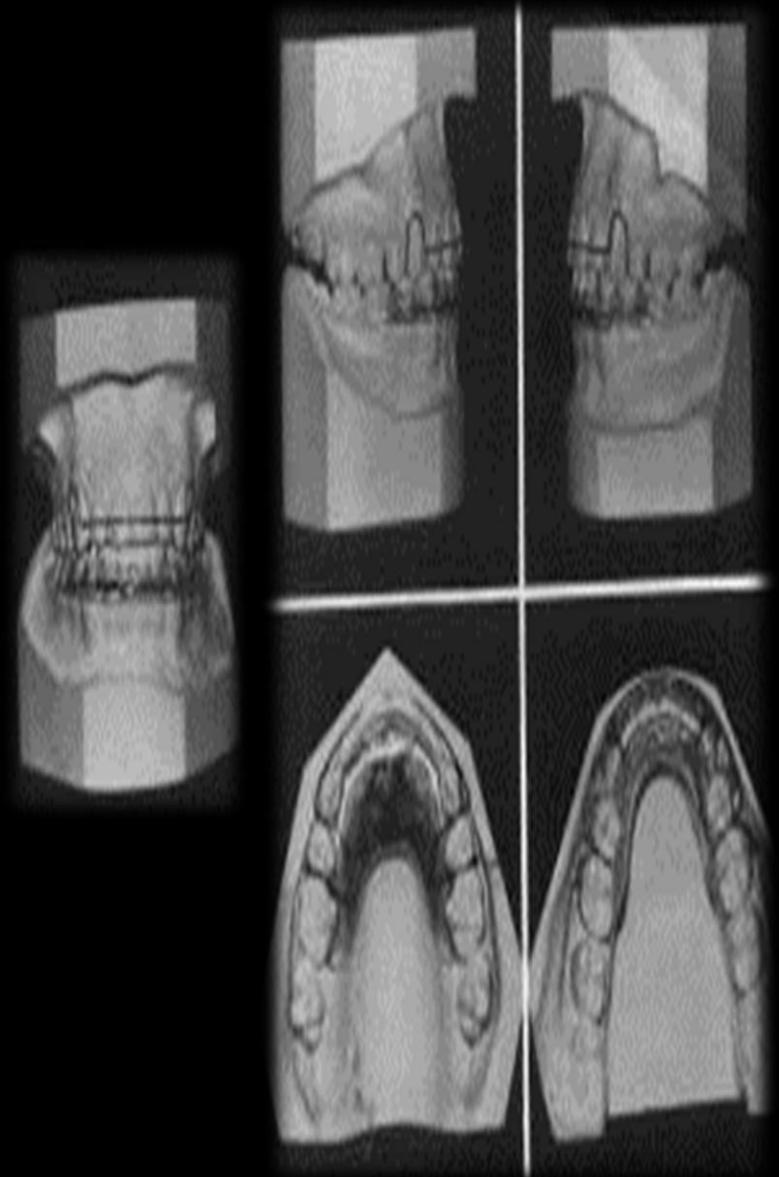
- patented a *regulating appliance that used vertical tubes and the principle of the loop wire.*

➤ Victor H. Jackson (1850-1929)

- Devised a specially designed appliance known as the *Jackson crib*, which incorporated the use of an *auxiliary spring (finger)* as an aid in tooth movement.
- His appliance was one of the first "*systems*" of treatment to influence the development of modern orthodontics.

➤ Charles Hawley - 1861-1929

- Used a *celluloid sheet* containing a geometric figure that, when adapted to a model, **determined the extent of proposed tooth movement (1905)**
- Introduced the *retainer appliance* that bears his name **(1908)**.



➤ Benni Lischer - 1876-1959

- In **1907** founded the *International School of Orthodontia*
- in **1912**, he published *Principles and Methods of Orthodontia.*
- He was an advocate of *early treatment.*
- He introduced the terms *neutro-occlusion, disto-occlusion and mesio-occlusion* to describe the varieties of malocclusion
- Gave the suffix "***version***" to describe the ***wrong position of individual tooth.***

1910-1920

➤ Albin Oppenheim (1911)

- The serious study of tissue changes during orthodontic tooth movement
- Beginning of a major interest in diet, nutrition, and genetics as reflected in orthodontic diagnosis .

➤ Alfred Rogers (1918)

- Introduced the concept of myofunctional therapy

➤ John V. Mershon (1867-1953 D)

- Introduced the removable lingual arch based on the principle that teeth must be free and unrestricted for adaptation to normal growth.

➤ Albert H. Ketcham (1930)

a devoted researcher, was one of the first to introduce the roentgenogram and photography into orthodontic practice.

- Under the guidance of **Albert H. Ketcham**, the American Board of Orthodontics was created in 1929 and incorporated in 1930.



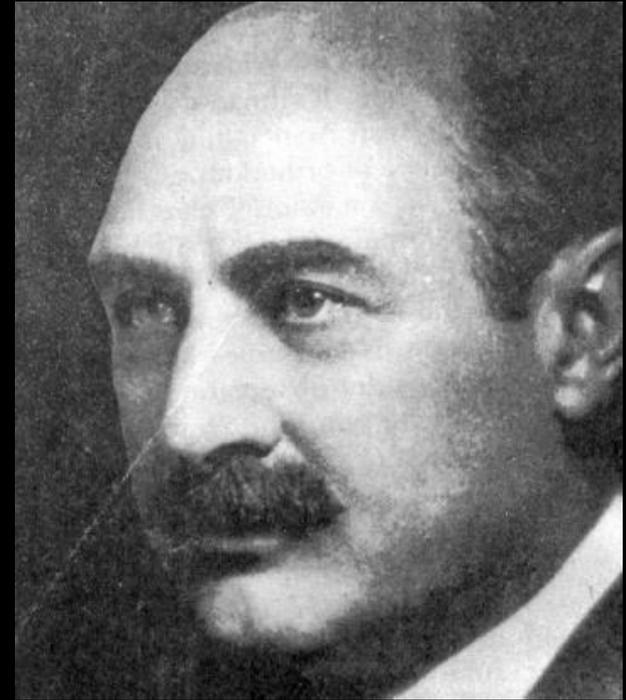
He did studies on **root resorption**

➤ A. LeRoy Johnson

- *reemphasized the biologic concept in orthodontics.*

Milo Hellman – 1935

- Research in the *science of anthropology and its relation to the growth and development of the human dentofacial complex.*
- *Introduced craniometric measurements and a classification of dental development (1935).*
- He coined the term '*divergence of face*'
- His motto was *“Perfection in the Goal, Adequacy in the Standard.*



- Demonstrated a high percentage of upper first molar rotation and warned against categorizing malocclusion without first checking this rotational tendency and mentally replacing the tooth.
- pioneered in the use of **hand and wrist X-rays to determine the growth age and status for patients.**

- **The INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY** was started in **1915**.
- Decade of the 1920's was noted for the introduction of several new appliances:
 - Open tube by **James D. McCoy (1922)**
 - Removable appliance with springs **George Crozat (1928)**
 - Introduction of stainless steel to appliance fabrication by- **Lucien de Coster**
 - **Spencer Atkinson** introduced Universal appliance – a combination of ribbon arch appliance & edgewise appliance using a flat wire & round wire in combination.

1920-1940

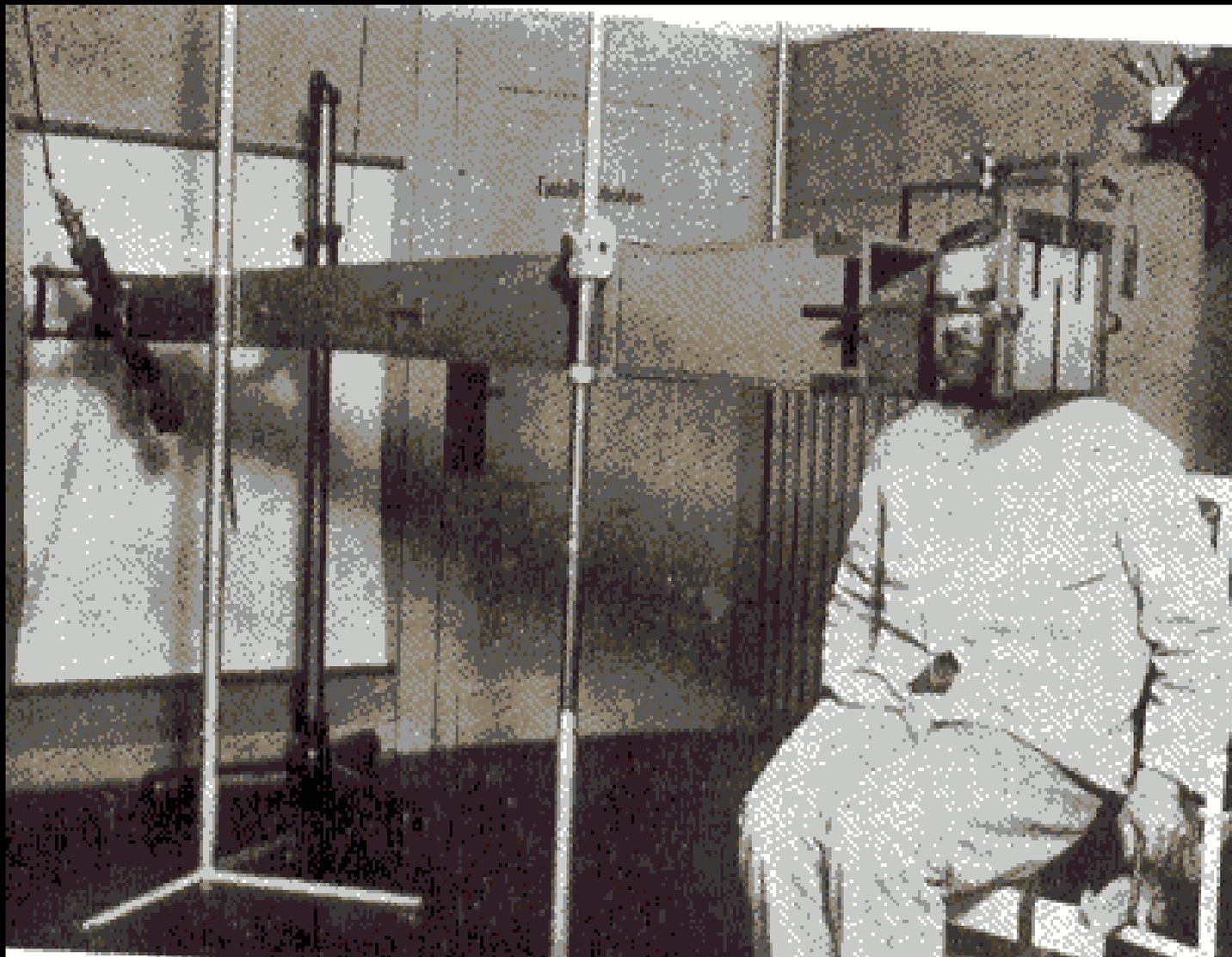
➤ Pacini (1922)

- Introduced a method for standardized head radiography. The disadvantage was the high amount of distortion because of head movement during prolonged exposure time.

➤ B. Holly Broadbent (1931)

- Published an article in the first issue of the new *Angle Orthodontist* entitled "A New X-ray Technique and Its Application to Orthodontia."
- It was the introduction to the specialty and to dentistry of **cephalometric roentgenography** and of course, **cephalometric tracing and evaluation.**





**Broadbent's Radiographic
Cephalometer(1931)**

➤ Hofrath (Germany)

- In the same year independently introduced a **standardized cephalometric technique** using a high-powered X-ray machine and a head holder called a *cephalostat or cephalometer*.

➤ Broadbent

- Devised the **roentgenographic cephalometer**, which is the instrument that accurately positions the head relative to the film and x-ray source.
- His study, supported by the **Bolton family**, consisted of a longitudinal study of 3500 schoolchildren from birth to adulthood. In honor of his sponsor,
- Established a new point of reference on the skull, known as the Bolton point.

- **Schwartz (1932)**

- described the **pressure-tension theory** to explain the movement of teeth during orthodontic treatment.
- defined the **optimum orthodontic force** as **28 g per sq. cm of root surface.**



- *The principle of panoramic radiography was described by **Numata (1933)** and independently by **Paatero (1948)**.*

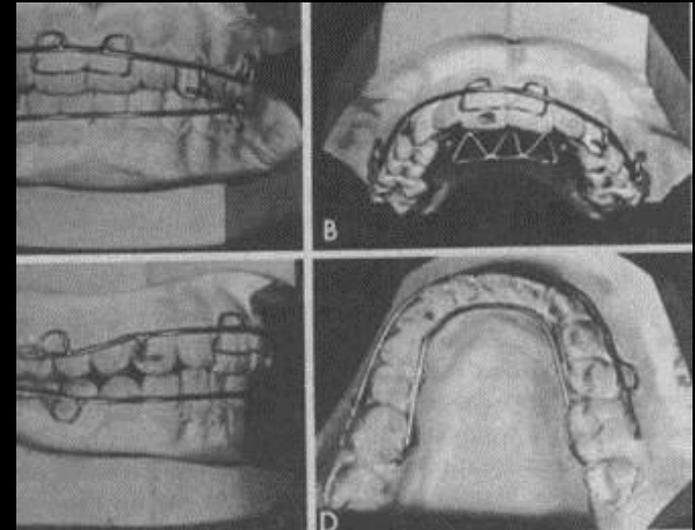
➤ Oren A. Oliver (1887-1965)

– Established the labiolingual appliance (1940).

➤ Robert R. W. Strang (1881-1982)

Founded a postgraduate school in Connecticut

His book, *A Textbook of Orthodontia* (1933), was widely used and became a guide to the "*Strang technique.*"



1940-1950

➤ Wilton M. Krogman (1903-1987)

- Applied the principles of *physical anthropology to the dentofacial complex with craniometry and roentgenographic cephalometry.* (1940's)

➤ Allan G. Brodie

- Contributed to the *study of the growth patterns of the human head from the third month of life to the eighth year.*

➤ Weinmann and Sicher (1940's)

- The Sutural theory of growth control

➤ Charles S. Tweed - 1895-1970



- In 1941 introduced into the literature an *"edgewise" appliance, based on the basal bone concept.*
- Developed the concept of *uprighting the teeth over the basal bone with emphasis on the mandibular incisors.*
- Made the extraction of teeth for the Orthodontic correction acceptable and popularize the **extraction of first premolars.**

- Enhanced the **clinical application of Cephalometrics.**
- Developed **diagnostic facial triangle.**
- Developed the concept of *orderly treatment procedures and introduced the concept of anchorage preparation as a major step.*
- Developed **serial extraction of primary and permanent teeth.**

➤ H. D. Kesling (1945)

- introduced his philosophy of tooth movement by using a **rubber tooth-positioning device** in which the teeth were moved into a more ideal cuspal relationship after major correction had been accomplished

➤ William Wilding (1940's)

- received a **basic patent for the use of alginate as a dental impression material.**

➤ Adolf Marten

- A German metallurgist introduced **martensitic stainless steel**.

➤ **Elgin Watch Company**

- Also in 1950's the developed a complex alloy whose primary ingredients were **cobalt, chromium, iron and nickel**. This alloy was marketed as ***Elgiloy*** by **Rocky Mountain Orthodontics**.

➤ Cephalometric analysis introduced by

➤ **William B. Downs (1899-1966)**. Its significance was that it presented an objective method of portraying many factors underlying any malocclusion and that there could be a variety of causes of malocclusion exclusive of the teeth (1948).

– **Wendell L. Wylie (1913-1966)**, whose research was directed to some underlying determinants of facial pattern applied to the anteroposterior relationships, called **assessment of anteroposterior dysplasia**.

- . Other analyses were presented by
 - *C. C. Steiner (1953)*
 - *C. H. Tweed (1953)*
 - *S. E. Coben (1955)*
 - *R. M. Ricketts (1966)*
 - *V. Sassouni (1969)*
 - *H.D. Enlow (1969)*
 - *R. Jarrabak (1970)*
 - *A. Jacobson (1975)*

➤ James Scott (1950's)

➤ ***The nasal septum theory*** to explain growth control, which states that cartilage is the primary determinant of skeletal growth, while bone responds secondarily and passively.

➤ Melvin Moss (1960)

– ***The functional matrix theory*** of growth, which stated that the *soft tissue matrix in which the skeletal elements are embedded is the primary determinant of growth, and both bone and cartilage are secondary followers.*

➤ Buonocore (1955)

- Introduced of the acid etch technique

➤ Bowen (1962)

- Developed *BIS-GMA system* by combining *acrylic and epoxy resin*.

➤ Newmann (1965)

- introduced *bonding in orthodontics*.

• Wilson and Kent (1972)

- Introduced *glass ionomer cement*

➤ White (1986)

– Popularized glass ionomer cement in orthodontics.

➤ Maijer and Smith (1979)

– introduced *crystal growth theory for promoting bonding between resin and enamel by using sulfated polyacrylic acid solution.*

➤ Silverman (1995)

– introduced *light cure GIC* in orthodontic bonding procedure.

➤ Percival Raymond Begg(1898-1983)

introduced his **multiple-loop light-force wire appliance** in 1954, which continues to be in use today.

- In **1924** he was **accepted** at the **Angle School of Orthodontia** in **Pasadena, California**.
- He **worked with Angle** from **March 1924** to **November 1925**.



- In **November 1925** he returned to **Australia** and began to use **edgewise mechanism**.
- In February 1928 he began, when indicated, to remove teeth and/ or reducing their widths by stripping.
- In the early 1940s, **Begg** met **Arthur J. Wilcock**, a metallurgist at the University of Melbourne. After many years of research, Wilcock produced a ***cold-drawn, heat-treated wire that combined a balance between hardness and resilience with the unique property of zero stress relaxation.***



- In 1954, Begg summarized this work on attritional occlusion in a classic paper entitled “*Stone Age Man’s Dentition*”, at the end of which he described his new ‘*round wire*’ *technique* featuring the use of **.018”** *round stainless steel wire in modified ribbon arch brackets*.

◎ In 1956 Begg introduced the concept of differential force. In his 1956 article, Begg also reported that more than 200 patients could be treated each year demonstrated that his technique and theories of treatment were able to produce acceptable results in unbelievably short treatment times for all types of malocclusions.

◎ H.D. Kesling and Robert Rocke introduced *Begg concept in the United States*.





KESLING & ROCKE LIGHT WIRE COURSE, JUNE 1959

*1959- first course in Begg technique at
Kesling & Rocke Orthodontic Centre*

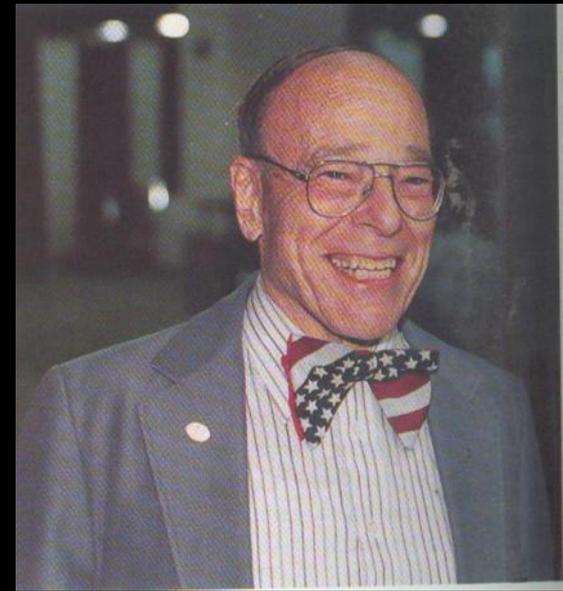
➤ Levern Merrifield

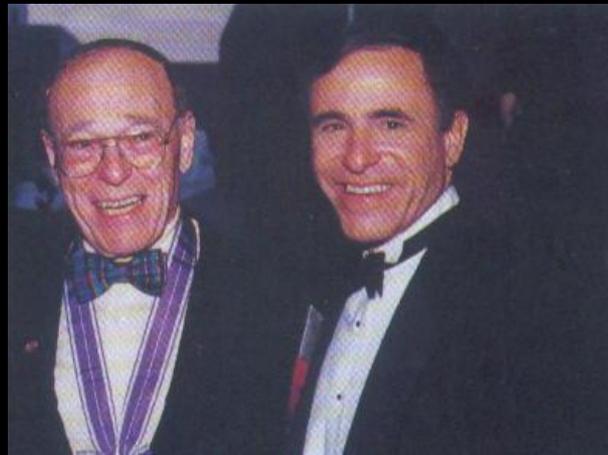
- Tweed course in 1953.
- 1970 – Course director.
- Reliable, precise, efficient & practical protocol of diagnosis & treatment.
- Sequential Directional Force Technology.
- 7th objective of Tweed-Merrifield philosophy – clinical objectives pursued in ethical, moral & compassionate manner with concern for public's welfare.



➤ T.M. Graber

- Born in St.Louis on May 17th 1917.
- Graduation – Washington University, St.Louis.
- Army Medical Regiment in II World War.
- Orthodontics – Northwestern University.
- 1950 – First PhD to Dentist by Northwestern University Medical School.





- 20 textbooks, 22 chapters in other textbooks, 180 publications in journals & 930 book & journal abstract reviews.
- 1964 – Kenilworth Dental Research Foundation.
- Editor-in-chief of AJO for 15 years.
- Changed to AJO-DO.

➤ Enlow (1965)

- *The area relocation theory* to explain craniofacial growth.

➤ Alexandre Petrovic (1970's)

- Servo system theory of craniofacial growth.
- He reasoned that it is the interaction of a series of casual change and feedback mechanism, which determines craniofacial growth.
- *The control of primary cartilage takes a cybernetic form of command whereas that of secondary cartilages has the direct effect of cell multiplication.*

➤ van Limborgh (1970)

- Multifactorial theory to explain craniofacial growth.
- He suggested that *intrinsic genetic factors, local epigenetic factors, general epigenetic factors, local environmental factors and general environmental factors control growth.*

➤ Hounsfield (1972)

- Announced the invention of the *first CT technique, which he called computerized axial transverse scanning.*
- Recently, dedicated *three-dimensional CT scans for the maxillofacial area has been introduced (NEWTOM –9000).*

➤ Lawrence Andrew

- In 1972, developed ***Straight Wire appliance***.
- It was a ***modification of edgewise appliance, in which the brackets are fully pre-programmed to accomplish the desired tooth movement in all the three planes of space.***
- This is considered a major advancement in improving orthodontic treatment results with **minimal possible wire bending.**



➤ Peter Kesling (1980)

- introduced tip-edge appliance, as a combination of Begg and the straight wire appliances.

- The history of archwire starts from piano wire, passes through stainless steel and cobalt-chromium to nickel-titanium wires.

- **George Andreasen** (1970's) *nickel-titanium alloy named Nitinol*

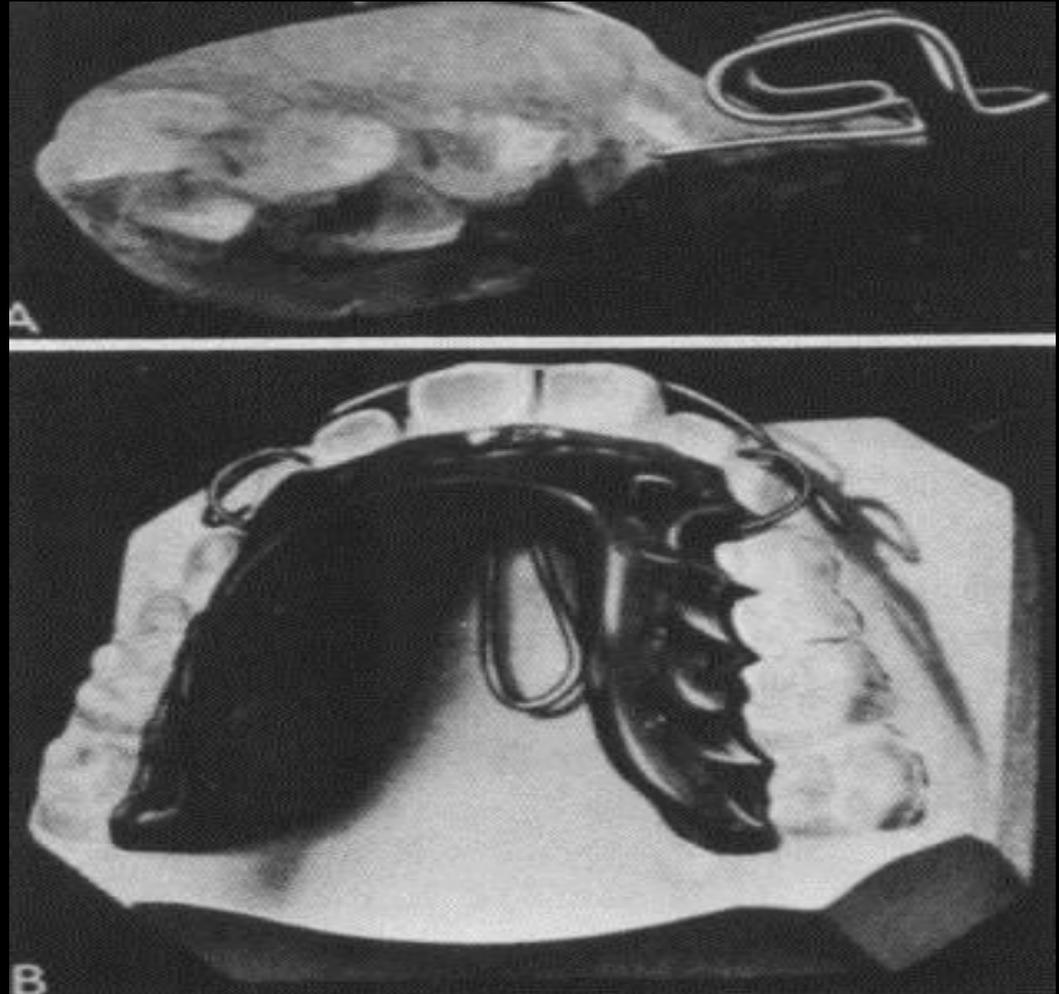
- **Burstone** (1980) developed a stabilized beta-phase titanium alloy, marketed as TMA

- While the American orthodontists were showing keen interest in improving fixed appliances, their European counterparts continued to develop removable and functional appliances for guidance of growth.
- **The principle of functional appliances was first articulated in a paper in Germany by ROUX in 1883 .**

➤ Pierre Robin (1902)

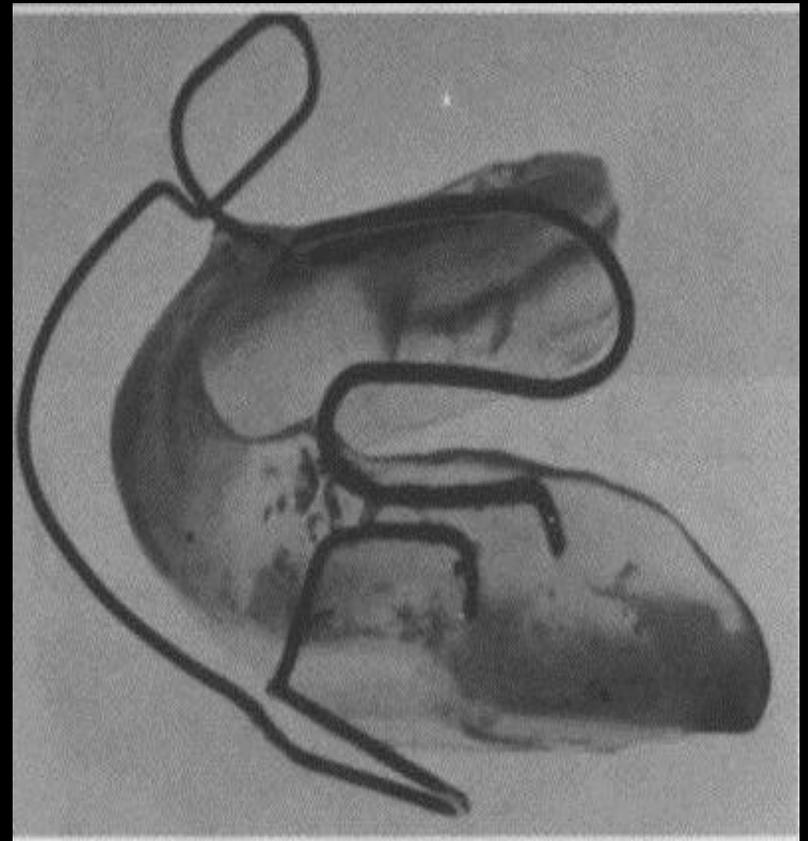
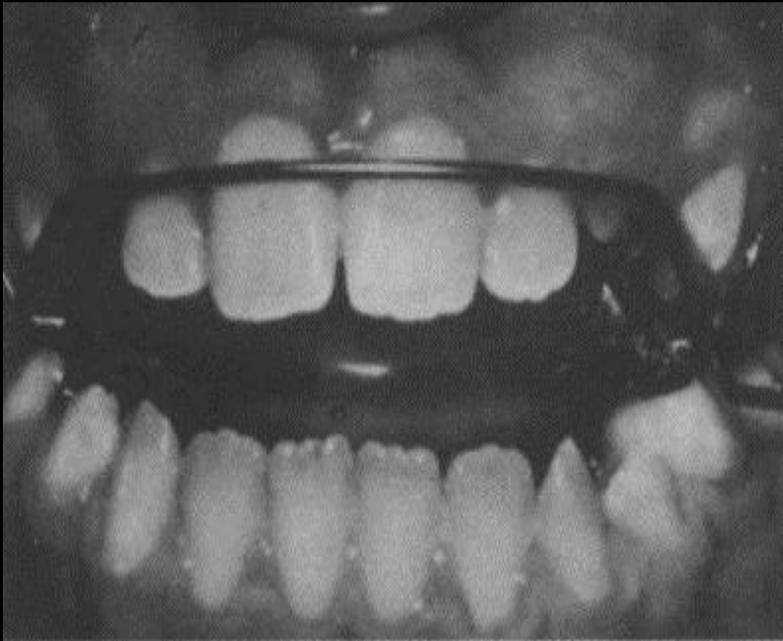
– introduced *Monobloc*, which protruded the mandible forward in patients with Pierre Robin Syndrome.

➤ *Viggo Andresen of Norway (1910)* developed the **ACTIVATOR** (Norwegian system), which made use of the *facial musculature to guide the growth of the jaws.*

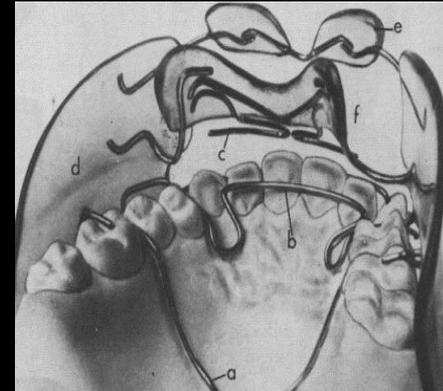
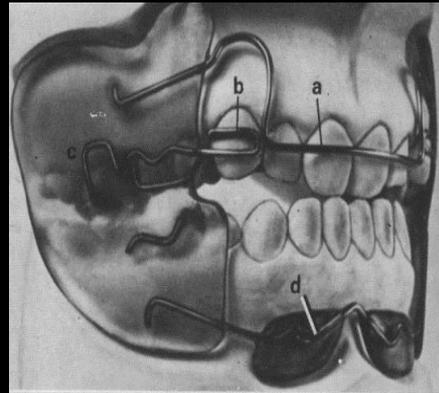


➤ **Bimler** developed *the* Bimler appliance
(Elastischer Gebissformer).

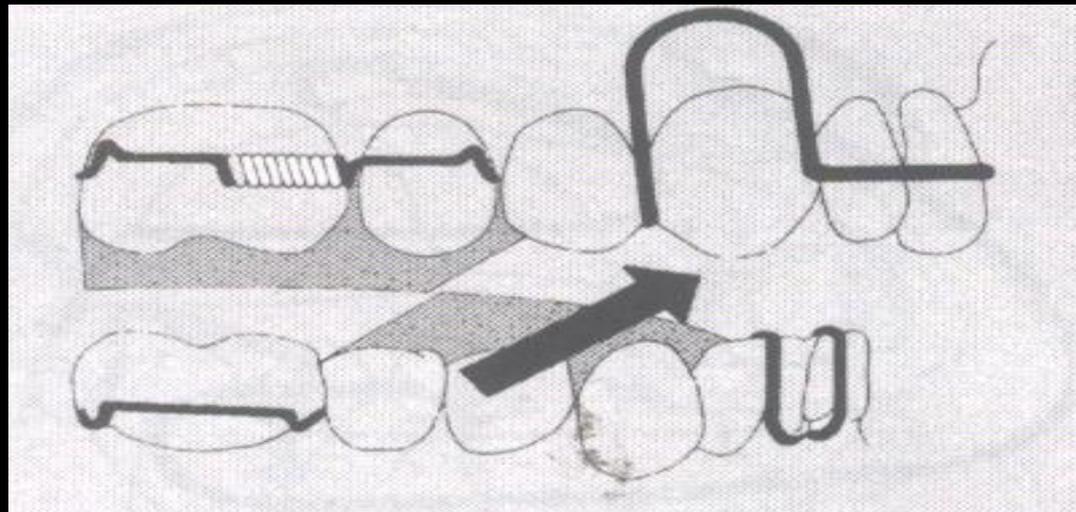
- **Bionator** by **Balters** in early 1950s



- **Rolf Frankel** in 1969-1973 proposed the Function Regulator to treat a variety of skeletal malocclusions.



- **William Clark** developed the Twin Block technique in 1977



➤ Phillip Adams(1948)

- Introduced **Adams Clasp**. It is the most widely used clasp in orthodontics today.

➤ Emil Herbst (1909)

- Introduced the first fixed functional appliance, **Scharnier or Joint**, which is a ***fixed bite jumping device***, and it was popularized by **Hans Panchers** in 1977.
- Also developed ***Quad-helix appliance***, which was popularized by **Ricketts**.

Summary

Pierre Fauchard	1728	Bandlette
Etienne Bourdet	1722-1789	Ivory splint
Catalan	--	Inclined plane
Charles Goodyear	1839	Vulcanite
Schange	1841	Adjustable clamp band
Tucker	1846	Rubber elastics
Dwinelle	1849	Jacks screw
Emerson Angell	1860	Expansion of palate
Coffin	1860	Flexible piano wire
Kingsley	1861	Headgear
Magill	1870	Dental cement
E.H. Angle	1880	Jack & traction screw
E.H. Angle	1887	Angle system

E.H. Angle	1889	Classification of malocclusion
Pierre Robin	1902	Monobloc
E.H. Angle	1907	E-Arch
Charles Hawley	1908	Retainer
Andresen	1908	Activator
Balter	--	Bionator
H.P. Bimler	--	Myodynamic appliance
John Mershon	--	Removable lingual arch
E.H. Angle	1912	Pin & tube appliance
Newell	1912	Vestibular screen
E.H. Angle	1915	Ribbon arch appliance

James McCoy	1922	Open tube appliance
Paul Simon	1924	Gnathostatics
E.H. Angle	1928	Edgewise appliance
Spencer Atkinson	--	Universal appliance
George Crozat	1928	Crozat appliance
Broadbent	1930	Cephalometrics
Herbst	1934	Herbst appliance
Joseph Johnson	1938	Twin-arch appliance
Oren A. Oliver	1940	Labio-lingual appliance
Tweed	1941	Edgewise-Tweed philosophy
H.D.Kesling	1945	Positioner
C.P. Adams	1948	Adam's crib

Martin Schwarz	--	Schwarz double plate
Hotz	--	Guide plane plate
William Downs	1948	Down's analysis
Kraus	--	Double oral screen
Hotz	--	Propulsor
P.R. Begg	1956	Begg technique
Jarabak	--	Light-wire technique
Rolf Frankel	1967	Frankel appliance
Andrews	1972	Straight wire appliance
Ricketts	--	Bioprogressive therapy
T.L. Root	--	Level anchorage system
Pancherz	1977	Herbst appliance
Clark	1977	Twin block
Alexander	1978	Vari-Simplex Discipline

HISTORY OF ORTHODONTICS IN INDIA

- The beginning of orthodontics in India was made in **1935**, as **Dr. H.D.Merchant** gave the first series of lectures in orthodontics at the Nair Hospital Dental College, Bombay.
- He is considered to be the “*the father of Indian orthodontics*”.
- The first department of orthodontics was properly established in **1939** in **Nair Hospital Dental College** under him.

- At that time, the appliances used were
 - Mershon's Lingual Arch and High Labial Arch, Hawley's Plate, Catalan's Appliance
 - later on Badcock's Expansion Plates and Norwegian Appliances were introduced.

➤ Dr. N.H. Parikh (1957)

- Introduced Jarabak's Technique.

➤ Dr. A.B. Modi

- Introduced Frankel's Appliance and functional appliances.

- **Dr. Prem Prakash (1954)**
 - Introduced edgewise appliance

- **Dr. Henriques (1955).**
 - Introduced labio-lingual appliance

- **Dr. Prem Prakash (1963)**
 - Introduced Begg's technique.

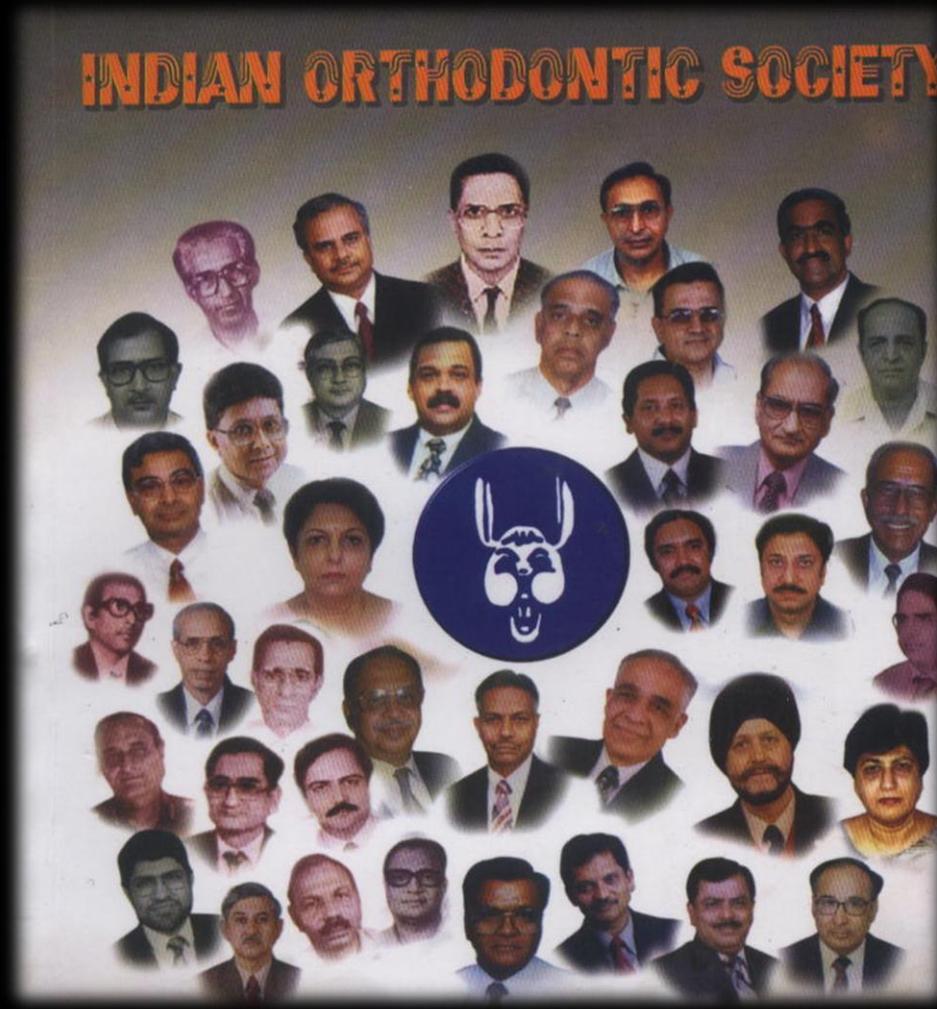
- The **Post-Graduate courses** were started at the **Bombay colleges** in **1959**

INDIAN ORTHODONTIC SOCIETY

- The *Indian Orthodontic Society* was established on *Friday the 5th October 1965 at Mumbai with (Late) Dr. H.D.Merchant* as the Founder President and Dr. Parikh as the Founder Secretary and Treasurer.
- The First Annual Conference of the Indian Orthodontic Society was held along with the Indian Dental Conference during January 1967 at *New Delhi* with a scientific session.

- **The quarterly publication of the Journal of Indian Orthodontic Society (JIOS) was started by Dr.H.D.Merchant as the first Editor.**
- **In 1996, first Post Graduate Student Convention was conducted in Mangalore, to expose the postgraduate students of the entire country to a cross section of teachers on different facets of orthodontics.**
- **In 1999, the Indian Board of Orthodontics, first dental specialty to establish a professional certifying board in India, was formed and the first specialty Board Examination was conducted on 29th September at Bangalore.**

Indian Orthodontic Society – Oct. 5th 1965.



★ 7 visionaries –
Dr. Prem Prakash,
Dr. H.D. Merchant,
Dr. H.S. Sheikh,
Dr. A.B. Modi,
Dr. K.N. Mistri,
Dr. Naishadh Parikh,
Dr. Mohandas Bhat.



CONCLUSION

- ◎ *Orthodontics has achieved the status of a recognized specialty of dentistry because of a long period of **craftsmanship and professional expertise**.*
- ◎ *Our objective has always been to provide for the **preservation of dental health through the conservation of oral structures and the maintenance of dental function**.*
- ◎ *Orthodontics, and indeed all of dentistry if it is to survive as a profession, must continually reexamine its history and find relevant and significant ideals to meet the crises of today.*

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THANKU