

# ORTHODONTICS 1

DOR1 32 PRELIMS| SECOND SEMESTER


DR. MELODY ANN DECOLONGON

## CHAPTER 1: ORTHODONTICS

Branch of dentistry concerned with the study of the growth of the craniofacial complex, the development of occlusion, and the treatment of dentofacial abnormalities.

## HISTORY OF ORTHODONTICS

- Hippocrates (460-370 B.C.)**
    - **Father of modern medicine**; was among the first to comment about craniofacial deformity.
  - Aristotle, Celsus, and Pliny (25 B.C.)**
    - Famous philosophers who were contemporaries of the Lord.
    - They described that simple finger pressure can move a tooth.
  - Adamanios "Adamantus of Alexandria" (5th century A.D.)**
    - First philosopher to describe the behaviors of men in relation to their external physical appearance.
    - Noted that "those persons whose lips were pushed out because of cuspid displacement are ill-tempered, abusive shouter and defamers.
    - Crude appliances that seemingly designed to regulate teeth have been found as archeologic artifacts in tombs of ancient Egypt, Greece, and the Mayans of Mexico.
- The first evidence of appliances being used for orthodontics dates back to 1000 BC. Mummies have been found with crude metal bands around their teeth and in ancient Greece, appliances were used to maintain space and prevent collapse of the teeth.


- Leonardo da Vinci (16th century)**
    - sketched series of human face with a straight line joining homologous anatomic structures.
    - Highlighted structural differences among the faces.
    - First to mention about teeth straightening and extraction.
  - Pierre Fauchard (1678-1761)**
    - Most famous of all dentists.
    - French dentist who contributed the 2 digit system / FDI tooth numbering.
    - **Father of modern dentistry**
    - Publications of first dental book "**Treatise in Dentistry**" which includes the bandellete that later evolved as expansion screws in modern days.
  - Bourdet (1757)**
    - French dentist who wrote a book "**The Dentist Art**"

- John Hunter (1728-1793)**
  - American anthropologist, author of the book "**The Natural History of the Human Teeth**"
- Le Foulon (1841)**
  - First to use the term "**orthodontia**"
- Norman Kingsley (1850 A.D.)**
  - American dentist who was the first to write an article about orthodontics.
  - He was the first to use an extraoral force to correct protruding teeth.
  - "**Treatise on Oral Deformities**"
  - First to be called as the "**Father of Orthodontics**"
- J.N. Farrar (1880)**
  - Published 2 vol. of books entitled "**Treatise on the Irregularities of the teeth and their corrections**"
  - "**FATHER OF ORTHODONTICS**"
- J.H. Guilford (1889)**
  - Published the first textbook of orthodontics for students.
- Eugene Solomon Talbot (1847)**
  - Suggested the use of x-ray for diagnosis
- Calvin Case (1878)**
  - First to recommend extractions of teeth to create facial proportions and normal occlusions
  - Pioneered the use of rubber elastics for tooth movement
  - "**Great Debate**"
- Edward Hartley Angle (1855-1910)**
  - Father of "**MODERN ORTHODONTICS**"
  - Published the book "**A System of Appliances for Correcting Irregularities of Teeth**"
  - Contributed the appliance bracket "**Edgewise**"
  - Introduced the Angle System of Classification of Malocclusion.
- Dewey and Anderson**
  - Contemporaries and students of Angle, collaborated with Angle and came **Dewey** up with a more detailed classification of malocclusion making use of types and subdivisions.

## SCOPE OF ORTHODONTICS

Orthodontic therapy is directed to malocclusion, abnormal growth of the complex of craniofacial bones, and malfunction of the orofacial neuromusculature, which alone or in combination may cause any of the following:

- Impaired mastication
- Unfortunate facial esthetics
- Dysfunction of the temporomandibular articulation

- d) Susceptibility to periodontal disease
- e) Susceptibility to dental caries
- f) Impaired speech due to malposition of the teeth

### GOALS OF ORTHODONTICS

1. Create an acceptable facial esthetics.
2. Create the best occlusal relationship.
3. Create stable occlusal results.

Orthodontic therapy involves the three primary tissue systems concerned in dentofacial development.

1. The dentition
2. The craniofacial skeleton
3. The facial and jaw musculature

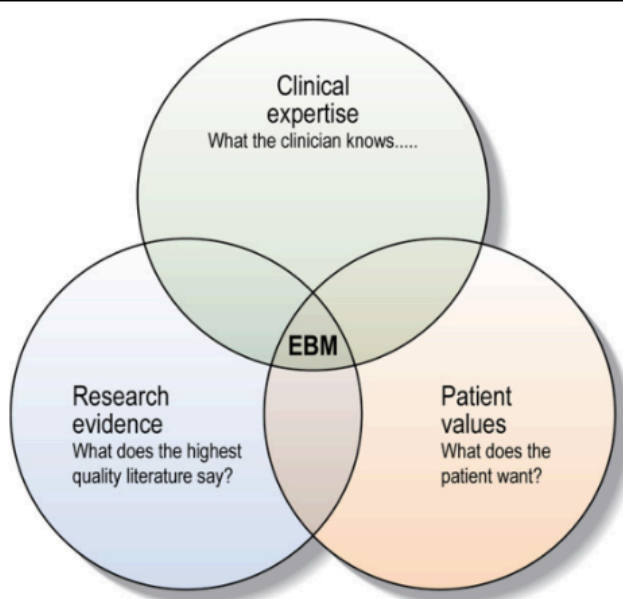
### A Century of Orthodontic Progress.



This side-by-side comparison of braces old and new illustrates the technological advances of the first 100 years of orthodontics. At left is a set of full-banded braces, ca. 1929, fashioned from metals including gold bands on the top teeth. Today's braces may feature translucent brackets and the heat-activated nickel-titanium wires developed through NASA, as shown on the right.

### EVIDENCE BASED ORTHODONTICS

Evidence-based medicine, which has been defined as: Integration of the best research evidence with clinical expertise, patient values, and patient circumstances (Straus et al, 2018)



**FIG. 1.1** The essential components of evidence-based medicine (EBM): what the clinician knows, what the literature says and what the patient wants.

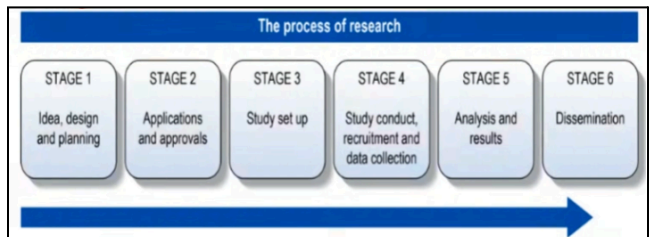
There are key steps involved in the routine practice of applying an evidence-based approach to medicine.

### BOX 1.1 The Five Steps to Practising Evidence-Based Medicine

1. Formulating the right clinical question
2. Finding the best evidence
3. Critically appraising the evidence
4. Integrating critical appraisal with clinical practice and the personal needs, values and belief of each individual patient
5. Evaluating effectiveness

Adapted from **Straus et al (2018)**.

The essential components are formulating the right question when considering the best treatment to provide for your patient, evaluating the highest-quality evidence when attempting to answer this question and applying this knowledge as a clinician in a patient-specific manner. The evidence is obtained primarily from research studies that populate the scientific literature.



**FIG. 1.2** The essential process of conducting a research study involves (1) formulating the research question and planning the study design; (2) obtaining the necessary ethical approval and permissions to undertake the research; (3) setting up the study; (4) recruiting the sample and collecting relevant data; (5) analysing the data and evaluating the results; and (6) disseminating the results and conclusions through scientific publication and wider public engagement.

It is important that the orthodontic practitioner has the necessary skills to appraise the available evidence because ultimately, this will equip them with a good platform to provide the best treatment for their patients.

### PICO: Formulating The Right Question

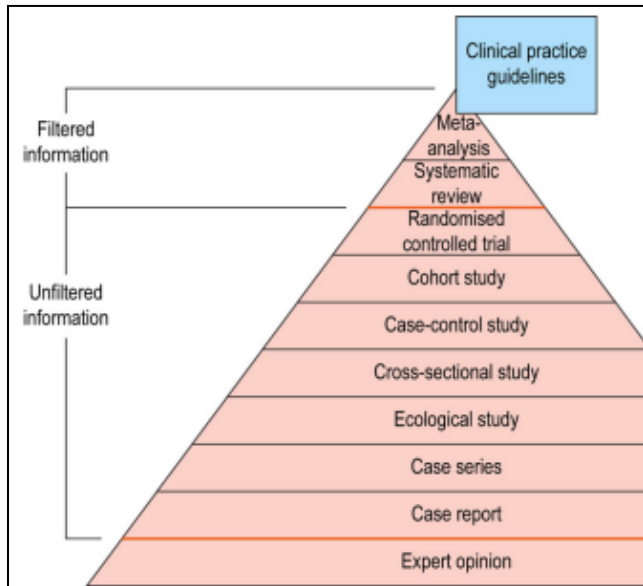
For any clinician a multitude of clinical questions arise every day when considering how best to manage different patients. It is important to carefully formulate and construct any clinical question so that it is focused and of direct relevance to each specific patient problem. Evidence-based medicine uses the Patient, Intervention, Comparison, Outcome (PICO) framework to help with this.

<b>P</b>	Patients	Who are the relevant patients or population/s associated with the clinical problem, including age, sex and other demographics?
<b>I</b>	Intervention	What is the intervention, treatment or exposure under consideration?
<b>C</b>	Comparison	What is the main alternative under consideration?
<b>O</b>	Outcomes	What are you trying to accomplish, measure, improve or effect?

### THE EVIDENCE OF HIERARCHY

The hierarchy of evidence represents a universally accepted framework within evidence-based medicine for ranking evidence based upon the rigour (strength and precision) of the research design. Amongst the different types of evidence that can be obtained are meta-analyses derived from systematic reviews (which represent filtered information); primary studies,

which include Randomised Controlled Trials (RCTs), cohort studies, case-control studies, cross-sectional studies, case series, case reports which represent unfiltered information) and expert opinion. The evidence base should ultimately allow the development of clinical practice guidelines based upon high-quality meta-analysis, and this represents the gold standard.



**FIG. 1.3** The hierarchy of evidence. The pyramid represents a decreasing level of bias associated with evidence obtained from ascending sources. The blocks situated between the horizontal red lines represent primary research and unfiltered information. Systematic review and meta-analysis represent filtered information based upon secondary research. Expert opinion represents the lowest-level evidence (and yet it continues to dominate clinical orthodontics). Clinical practice guidelines based upon high-quality meta-analysis represent the gold standard (*pale blue box*).