



# GROWTH AND DEVELOPMENT OF THE DENTOFACIAL SYSTEM

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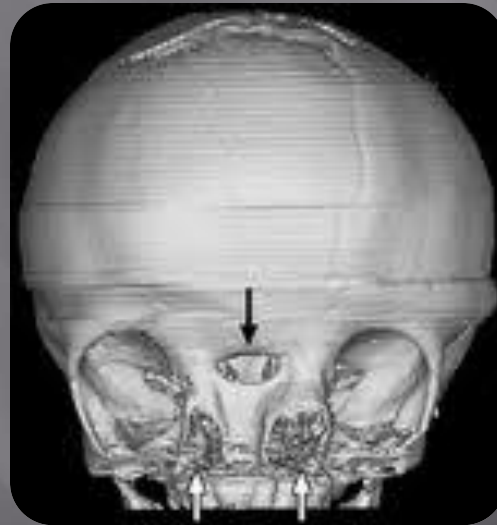
ORTHODONTIC: is a branch of dentistry concerned with the study of the growth of the craniofacial complex, the development of occlusion and the treatment of dentofacial abnormalities.



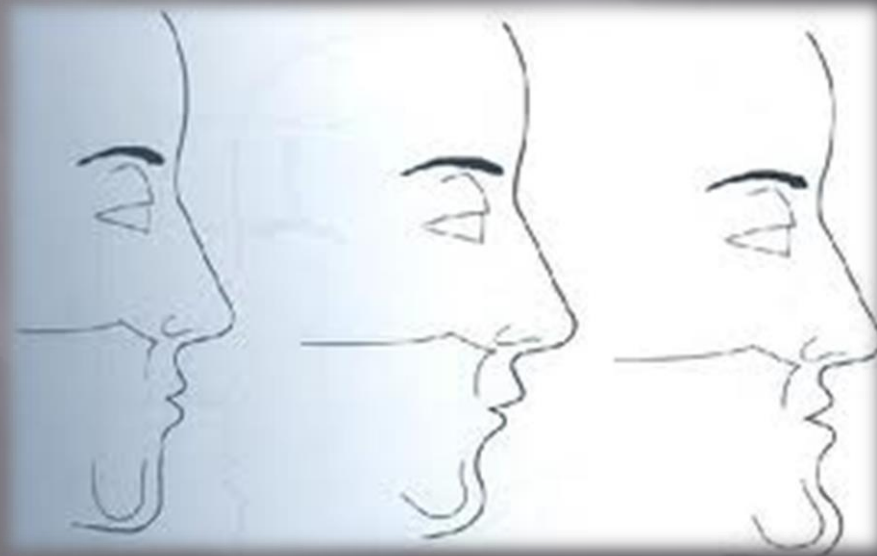


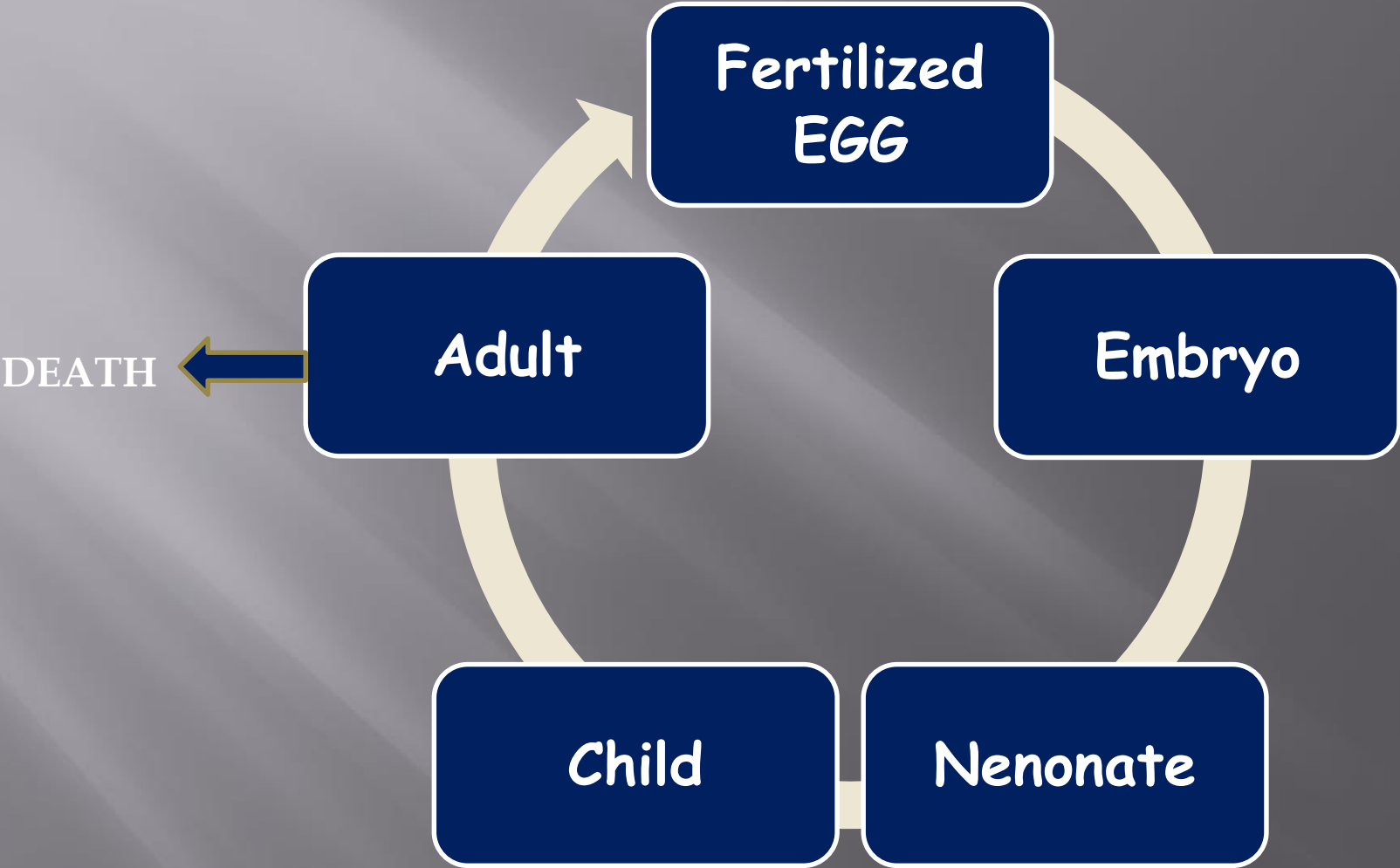
- ▣ Orthodontic therapy involves the three primary tissue systems concerned in dentofacial development, the dentition, the craniofacial skeleton and the facial and jaw musculature.
- ▣ By means suitable appliances, the individual teeth can be positioned more favorably to provide better aesthetics, occlusal function, oral health and speech.

- ▣ Correction of the craniofacial skeleton, however, is a different matter, since it is much more difficult to alter the craniofacial skeleton than it is to position teeth. It is possible, to direct the growth of the craniofacial skeleton in young children.



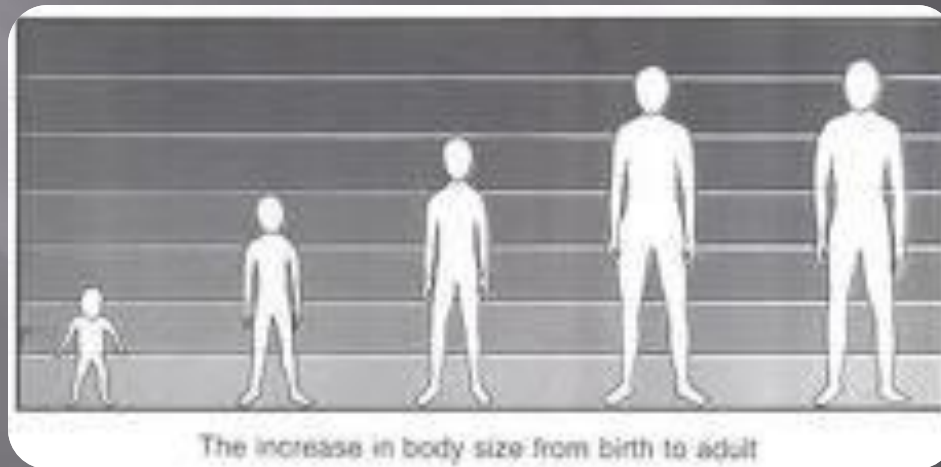
- ▣ In older patients, whose facial growth is mostly completed, the teeth are positioned to function better and to camouflage any disharmonies of the facial skeletal pattern.





# GROWTH

- ▣ Its defined as the normal changes in amount of living substance. Growth is the quantitative aspect of biologic development and is measured in units of increase per units of time, for instance, inches per year, grams per day and so forth.



The increase in body size from birth to adult

- ▣ Growth is the result of biologic processes by means of which living matter normally gets larger. It may be the direct result of cell division or the indirect product of biologic activity, e.g. bones and teeth.







# DEVELOPMENT

- ▣ All the normal sequential series of events between fertilization of the ovum and the adult state.
- ▣ There are three important aspects of development growth, that is,
  1. Increase in size
  2. Cellular differentiation
  3. Morphogenesis: the processes where by the adult form is achieved. Development brings about a more advanced, effective or complex state.

# MATURATION

- ▣ The stabilization of the adult state brought about by growth and development. the individual enters the process of degeneration, and increasing in various changes. new cells are made and destroyed and ultimately death will be occure by the end of some functions.



# METHOD OF STUDYING PHYSICAL GROWTH AND DEVELOPMENT

1. Opinion: when looking at the living creatures around us puts forward an idea about development. this opinion is not have a value in scientific. but If done by a person experienced and knowledgeable will lead for further studies.



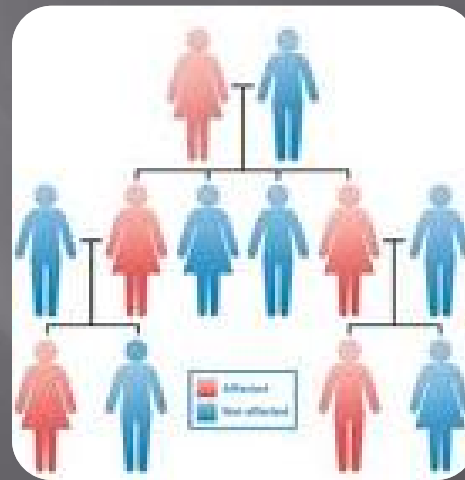


2. Observation: are useful for studying all or none phenomena, e.g. congenital absence of teeth.
3. Quantitative measurement: to find real scientific results these measurements must be gotta.

- ▣ There are three methods to make a measurement:
  1. Direct data: direct growth data are measurements taken on the living child or cadaver by means of calipers, scales, measuring tapes, etc.
  2. Indirect data: indirect growth measurements are those taken from images or reproductions of the actual person, e.g. measurements made from photographs, dental casts or cephalograms.
  3. Derived data: these data are obtained by comparing two other measurements.

# VARIABLES AFFECTING PHYSICAL GROWTH

1. Heredity: genetic studies of physical growth make use of twin and family data. Differences between monozygotic and dizygotic twins are assumed to be differences due to environment. There is genetic control of size of parts to great extent, of the rate of growth and of the onset of growth events, e.g. dental calcification or the eruption of teeth.





2. Nutrition: malnutrition during childhood delays growth, and the adolescent sprout in growth, "catch-up growth", appears when a favorable nutritional regimen is supplied early enough.
  - Malnutrition may effect size of parts, body proportions, body chemistry and the quality and texture of certain tissues, e.g. bone and teeth.



3. Illness: systemic disease has an effect on child growth, but the plasticity of the human organism during growth is so great that the clinician must differentiate between minor illnesses and major illnesses.
- The usual minor childhood illnesses ordinarily cannot be shown to have much effect on physical growth. On the other hand, serious prolonged and debilitating illnesses have a marked effect on growth.

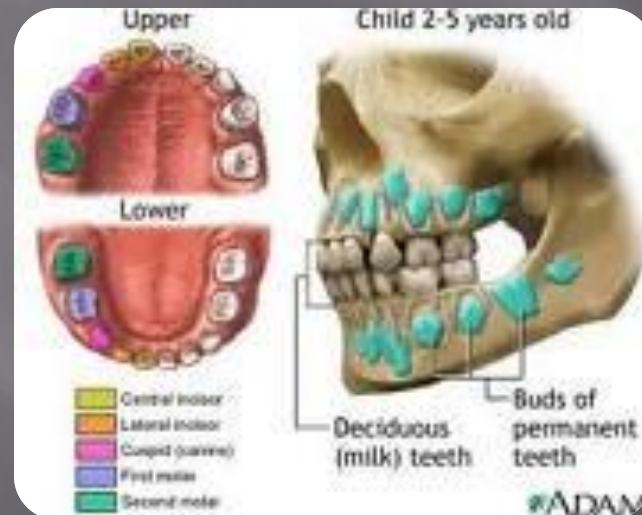


4. Race: the physical anthropologist studying the racial aspects of growth has a problem in the definition of race as well as in the separation of socioeconomic from racial factors.

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- With the precise control of all variables other than race, it can be shown that there are racial differences of some significance in birth weight, height and weight, growth rate and the onset of various maturational indicators, e.g. menarche, ossification of bones, dental calcification and tooth eruption.



## 5. Climate and seasonal effect on growth



- ▣ There is a general tendency for those living in cold climates to have a greater proportion of adipose tissue, and much has been made of the skeletal variations associated with variations in climate.
- ▣ There are seasonal variations in the amount of growth rate of children and in the weights of newborn babies.



6. Adult physique: there are correlations between the adult physique and earlier developmental events; e.g. tall women tend to mature later as well as having variations in the rate of growth with differing somatotypes.



7. Socioeconomic factors: this category obviously includes some overlapping with factors mentioned previously, e.g. nutrition; yet there are discrete differences. Children living in favorable socioeconomic conditions tend to be larger, display different types of growth (e.g., height-weight ratios) and to show variation in timing of growth, when compared to disadvantaged children.

8. Exercise: a strong case for beneficial effects of exercises on growth has not been made in a quantitative fashion. Although it may be useful for the development of motor skills, for fitness and general well-being, those children who exercise strenuously and have not been shown to grow more favourable.





## 9. Family size and birth order:

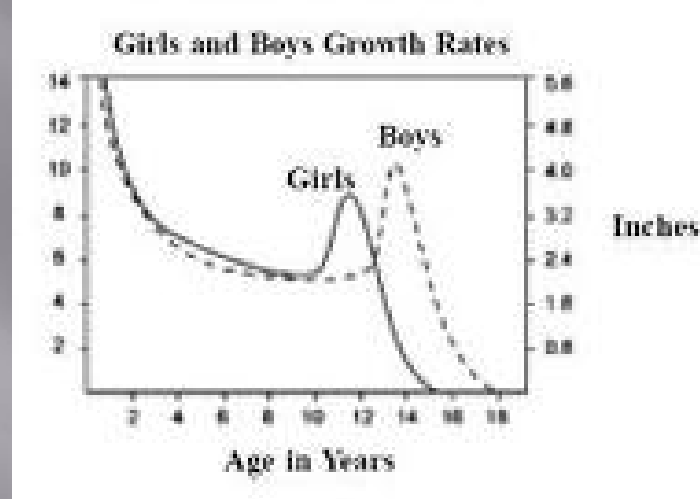
There are differences in the size of individuals, in their maturational level of achievement and in their intelligence that can be correlated with the size of the family from which they came.

first-born children tend to weight less at birth and ultimately achieve less stature and a higher I.Q.

10. Secular trends: size and maturational changes can be shown to be occurring with time that, as yet, have not been well explained.

Fifteen year old boys are approximately 5 inches taller than 15 year old boys were 50 years ago. The average age at onset of menarche has steadily become earlier throughout the entire world.





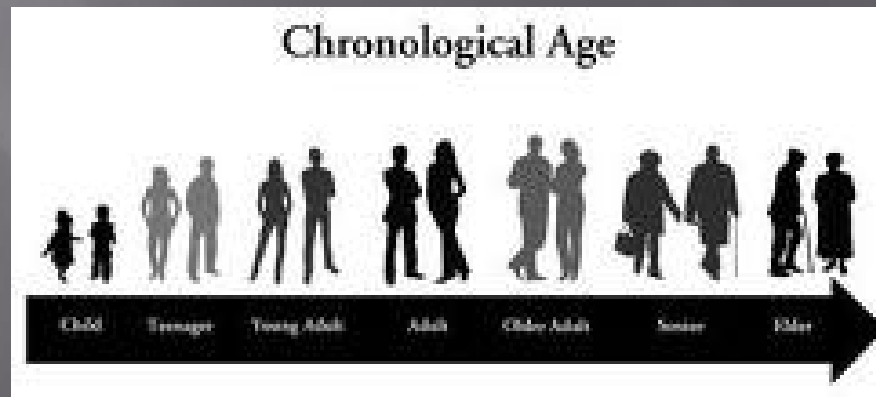
- Before puberty, this reduction is minimum and called minimum prepubertal. Starting from this period of growth through puberty sprout reaches its maximum and this time called maximum pubertal. Period of time starting this growth sprout shows the difference in boys and girls. Girls 11-14 years of age, boys 13-18 ages is equivalent to growth sprout. The growth rate then decreases and reset to reach adulthood. Growth sprout period called peak period.

# Maturation

- ▣ After the growth and development have been completed, the individual's enters the period of maturation. Is important to determine the degree of maturation. Also its important to know how much that in growth and development to completion. There are three criteria to detect maturation level.
  1. Chronological age
  2. Dental age
  3. Skeletal age

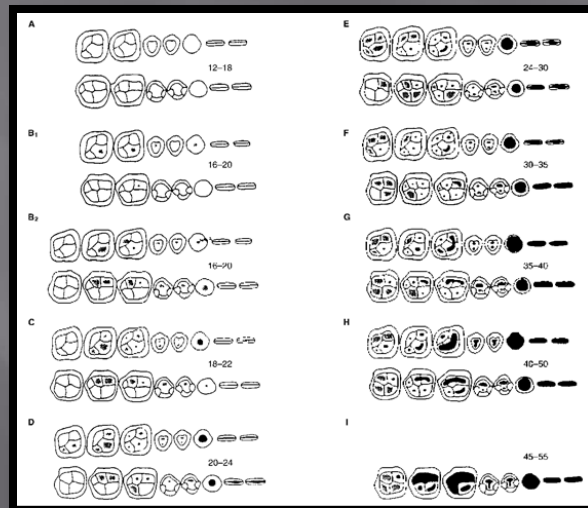
# CHRONOLOGICAL AGE

- ▣ Refers to the period that has elapsed beginning with an individual's birth and extending to any given point in time. is not a good criterion for measurement. because the chronological age of the individual to the measurement not have to have a level of maturation. its suggestive but at the same time the data may be false.



# DENTAL AGE

- Once, after a tooth germ form: calcifications, root formations, the completion of the roots and teeth will continue in eruption at certain times. can be found the age of the teeth by studying the table of the individual's development teeth. its not easy to establish a direct relationship between the physical maturity and dental age. e.g. girl and boy pubertal growth spurts for different times, that it is difficult to express as a dental age.



# SKELETAL AGE

- ▣ Calcification of different bones determined according to various degrees. An assessment of skeletal age must be based on the maturational status of markers within the skeletal system. Although a number of indicators could theoretically be used, the ossification of the bones of the hand and the wrist is normally the standard for skeletal development.



- ▣ A radiograph of the hand and wrist provides a view of some 30 small bones, all of which have a predictable sequence of ossification. Although a view of no single bone is diagnostic, an assessment of the level of development of the bones in the wrist, hand, and fingers can give an accurate picture of a child's skeletal development status.

- ▣ Growth and development are examined in prenatal and postnatal. Growth and development start from the beginning of prenatal period and will continue without interruption in the postnatal period. At birth is only the media difference.



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