Etiology of Malocclusion

Thomas J. Cangialosi, D.D.S.
Associate Dean Postdoctoral Education
Director Division of Orthodontics

Systems of Classification

• Inherited (predetermined) (genetic)
• Acquired (environmental)
Systems of Classification

• 1) McCoy and Shepard (1956)
  – a) Direct (determining)
  – b) Indirect (predisposing)

2) Moyers (1972)
  a) Heredity
  b) Developmental Defects
  c) Trauma
  d) Physical agents
  e) Habits
  f) Diseases
  g) Malnutrition

Classification

• 3. Salzman
  – a) Prenatal
  – b) Postnatal.

4. Graber
  – a) General (extrinsic) factors
  – b) Local (intrinsic) factors
Salzman’s Classification

Graber
General Factors

- Heredity
- Congenital defects
- Environment
- Predisposing metabolic climate & disease
- Diet
- Abnormal pressure habits
- Posture
- Trauma
Heredity

• Two Facts
• 1. For each individual there is a basic pattern or blueprint for dentofacial development which may be masked but not really changed. (unless by surgery).
• 2. Racial and familial characteristics repeat

Facial Typing

• Brachycephalic – short, broad
• Dolicocephalic – narrow, tapering, long
• Mesocephalic – round, oval
Facial Typing-Profile

- Convex – Class Two (protrusive maxilla or retrusive mandible) or Class 1 bimaxillary
- Concave – Class Three (protrusive mandible or retrusive maxilla)
- Flat – Class One (denture bases in harmony)

Affected by Heredity

- Tooth size
- Arch length and width
- Height of the palatal vault
- Crowding or spacing
- Overbite and overjet
- Position and configuration of muscles
- Tongue size and shape
- Character of the oral mucosa
Heredity also plays a role in:

- Congenital deformities
- Facial asymmetry
- Size and position of the jaws
- Oligodontia and anodontia
- Supernumerary teeth
- Variations in tooth shape

Examples of Congenital Defects

- Clefts of the lip and palate
- Cerebral Palsy
- Crouzons syndrome
- Cleido-Cranial Dysostosis
- Cranial Synostosis
Crouzon’s Syndrome

Surgery to reopen cranial sutures
Results of Surgery & orthodontics

Results of Surgery & Orthodontics
Results of Surgery & Orthodontics

Environmental Factors

- **Prenatal**
  - trauma
  - maternal diet
  - maternal metabolism & diseases
  - fetal posture
  - maternal consumption of alcohol & drugs
**Environmental Factors**

- Postnatal
  - Birth injuries
  - TMJ injuries
  - Accidents, fractures
  - Avulsion or displacement of teeth

**Metabolic Factors & Diseases**

- Acute febrile disease – e.g. measles, mumps, chicken pox, etc.
- Diseases of muscle dysfunction – e.g. muscular dystrophy, cerebral palsy, polio.
- Endocrine disorders – e.g. pituitary, thyroid, parathyroid.
**Diet**

- Poor diet may cause deficiency diseases such as rickets, beri beri, scurvy etc.

- These may cause severe malocclusion due to interference with craniofacial growth and development in addition to Periodontal problems associated with significant bone loss

**Posture**

- Not an important factor

- May be a contributing factor

- Seldom considered a primary cause
Habits

- Thumb or finger sucking
- Foreign objects
- Tongue thrusting
- Lip or cheek biting
- Mentalis muscle strain

Thumb Sucking
Treatment Phase 1

Progress
Tongue Thrusting

Treatment
Progress

Hyperactive mentalis muscle
Local Factors

- Congenital absence of teeth
- Anomalies of tooth size
- Anomalies of tooth shape
- Abnormal labial frenum
- Premature loss of deciduous teeth
- Supernumerary teeth

Local Factors

- Abnormal resorption of deciduous teeth
- Delayed eruption of permanent teeth
- Abnormal eruptive path
- Ankylosis of deciduous teeth
- Proximal caries
- Improperly contoured restorations
Congenital absence of teeth

Missing and peg-shaped lateral
Space adjusted

Retention
Temporary Restorations

Congenitally Missing Laterals
Spaces Opened

Temporary Restorations
Mandibular Retrusion

Mandibular Prognathism and facial asymmetry
Mandibular Prognathism & facial asymmetry

Bilateral Clefts
Expansion

Pre-grafting
Ideopathic Root Resorption

Dilantin Hyperplasia
Tooth Size

Over Retained Primary Canine
Ectopic Eruption

Ankylosed Primary Molar
Ectopic Eruption

Premature loss of Primary Molar and impacted premolar
Congenital Absence of Maxillary Premolars

Congenital Absence of Lateral Incisors
Congenital Absence of Lateral Incisors

Composite Odontoma causing Impaction of Central Incisor
Composite Odontoma

Supernumerary Teeth
Supernumerary Tooth