Form and Function of the Dentition

Dr. Pauline Hayes Garrett

Department of Endodontics, Prosthodontics, and Operative Dentistry
University of Maryland, Baltimore
This material is taken from:

Chapter 5

Wheeler’s Dental Anatomy, Physiology and Occlusion, Ash, Saunders, Text and CD-Rom.
Objectives

1. Identify, compare and contrast and describe the clinical significance of protective forms.
2. Identify, compare and contrast and describe the clinical significance of axial alignment.
3. Identify, compare and contrast and describe the clinical significance of basic static occlusal relationships.
Form and Function

• “Normal tooth form, plus proper alignment in the jaws, promotes efficiency during mastication, but in addition, the major portion of the form operates to insure the life of the tooth through stabilization. Proper root form for anchorage, and certain intricate crown contours combine to protect vulnerable soft tissues; all facilities combined serve to preserve the periodontium.” (Wheeler, 5th Edition, p. 80)
Functions of Teeth

- Incise and reduce food during mastication
- Help in the development of the tissues that support them
- Esthetics
- Phonetics
- Psychological
Intra-arch Relationships

- The relationships of the teeth to each other in the same arch.
Protective Functional Form of the Teeth

Includes:

- Proximal contact areas
- Interproximal areas
- Embrasures
- Height of contours
- Curvature of the Cemento-enamel junction (CEJ)
Proximal Contact Areas

- All teeth contact adjacent teeth at a proximal contact area except:
  - distal of the last tooth in the arch
  - diastemamas
  - pathology (caries)
  - faulty restorations
Proximal Contact Areas

- The contact is an area on the tooth not just a point.
- As teeth age and wear, these contact points broaden and decrease the size of the space below.
Proximal Contacts

Importance:
- Ensures food will not be packed between teeth causing inflammation to the supporting tissues
- It helps stabilize the dental arches by the combined anchorage of all the teeth in either arch in positive contact with each other (exception - third molars.)
- Each tooth is individually supported by these contact areas.
Contacts are viewed from a facial or lingual direction which demonstrates the cervicoincisal or cervico-occlusal position.

Contacts are viewed from an occlusal or incisal views which demonstrates the facio-lingual position.
Generalizations of Proximal Contacts Occlusal view

- Anterior teeth have contacts that are generally centered faciolingually when viewed from the incisal.
- Posterior teeth have contacts that are generally located buccal to the center of teeth when viewed from the occlusal.
Generalizations of Proximal Contact Areas

1. Contact area move cervically from anterior to posterior in each quadrant
2. On individual teeth the distal contact is more cervically located then the mesial contact
3. Contacts increase in size from anterior to posterior

**Note: Contacts on incisors in incisal 1/3, Where as contacts on molars in middle 1/3**
• **Mandibular Teeth:** Contact their class counterpart and the tooth mesial

• **Maxillary Teeth:** Contact their class counterpart and the tooth distal
# Proximal Contacts

<table>
<thead>
<tr>
<th>Maxillary</th>
<th>Mesial</th>
<th>Distal</th>
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<tbody>
<tr>
<td>Central incisor</td>
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</tr>
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</tr>
<tr>
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<tr>
<td>2nd pre</td>
<td>Middle 1/3</td>
<td>Middle 1/3</td>
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</tr>
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**This chart is a compilation from Appendix A, Tables 1-9 in Wheeler’s Dental Anatomy, Physiology and Occlusion, Ash, Eighth Edition, Saunders, 2003. with permission from Elsevier.**
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**Interproximal Areas/Spaces**

- Triangle is formed by alveolar bone at the base, proximal surfaces of teeth at its sides, and the apex is the proximal contact area.
- Triangularly shaped areas that are normally filled with gingival tissues.
Interdental Areas

- Triangular in shape
- Base = alveolar bone
- Sides = proximal surfaces of teeth
- Apex = proximal contact area
Embrasures

- The curvature formed by two adjacent teeth in an arch form a spillway space that is called an embrasure.

Note the symmetry of the embrasure of the central incisors.
Embrasures
Embrasures

Lingual larger than buccal!!
Embrasures

- Embrasures are named relative to the contact area
  - **Facial or lingual views** show the occlusal/ incisal embrasures and cervical/gingival embrasures
  - **Occlusal views** show the buccal/ labial and lingual embrasures
Significance of Embrasure Form

- Serves as a spillway for food material during mastication.

- Prevents food from being forced through the contact area and injuring the periodontal tissues.

- Also, Enhances the self-cleansing process of the tooth by exposing the surfaces to oral fluids, mechanical cleansing, and friction from the tongue, lips, and cheeks.
Generalizations About Embrasures

• Facial or lingual aspects:

  − The incisal / occlusal embrasures increase in width from anterior to posterior
  
  − The cervical embrasure decreases in height from anterior to posterior

  − The incisal embrasure of the maxillary lateral/canine = greatest or longest

  − The incisal embrasure of the maxillary canine/premolar = widest angle
Interproximal Shape

Determining Factors

- Form of the teeth
- Position and wear of contact areas
- Type of teeth
- Level of eruption
Contours and Alignment
Contours and Alignment
Importance of Heights of Contours

- The facial and lingual contours:
  - Protect the gingiva by the deflection of foods and help prevent trauma
Height of Contour Generalizations

- The height of contour on both the facial and lingual surfaces of anterior teeth is located in the cervical third.
• The height of contour of the buccal surfaces of posterior teeth is located in the gingival third.

• The height of contour of the lingual surface of posterior teeth is located in the middle or occlusal third.
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Curvature of the CEJ

- The CEJ is a stable line whose curvature is related to the widths and lengths of the crown and the location of the contact areas interproximally.
CEJ Generalizations

- The extent of curvature appears to depend on the height of the contact area.

- The depth of the curvature on a tooth is greater on the mesial than on the distal aspect.

- The curvatures of the CEJ on adjacent proximal surfaces have approximately the same depth of curvature.
CEJ Generalizations Contd..

- The CEJ is curved toward the apical on the facial and lingual surfaces of teeth.

- The CEJ is curved toward the incisal or occlusal surfaces on the proximal surfaces of teeth.
• The depth of curvature on the CEJ on all surfaces is greater on anterior teeth and decreases toward the posterior
Axial Alignment

• The alignment of teeth within the dental arches
1. All teeth are mesially inclined, with the possible exception of the most distal maxillary teeth.

2. Maxillary teeth are inclined facially.

3. Mandibular anterior teeth are inclined facially.

4. Mandibular posterior teeth are inclined lingually.
Harmony

Form follows function
- The arches fit a three dimensional plane
  - The maxillary teeth fit into the occlusal plane
- Not a flat surface
- Curved due to the varying degrees of inclinations of the teeth
Curvatures of the Occlusal Plane

- Curve of Spee
  - Alignment of the cusp tips of posterior teeth produces a relatively linear curve in an anteroposterior direction
  - This curve exists in the sagittal plane
  
  - From the level of the occlusion the Curve of the **maxillary arch is convex**
  - From the level of the occlusion the Curve of the **mandibular arch is concave**
Curvatures of the Occlusal Plane

- Curve of Wilson
  - This curve is created primarily by the lingual inclination of the posterior teeth
  - The occlusal surfaces of the teeth conform to the surface of a sphere
The End