Orthodontic Diagnosis and Treatment Planning
Tsung-Ju Hsieh, DDS, MSD

Questionnaire/ Interview
- Chief complaint: find out what is important to the patient
- Medical and dental history
- Physical growth evaluation
  - Growth charts
  - Signs of sexual maturation
  - Clothes size changes
  - Hand and wrist radiographs

Interview
- Why is this patient seeking treatment, and why now?
  – Chief complaint, motivation
- What does he or she expect to happen as a result of treatment?
  – Internal/ external motivation, expectation

Interview
- How did things get to be the way they are
  – Medical and/or dental history, etiology
- What if anything is likely to change in the near future?
  – Medical condition, growth status

Clinical evaluation
- Evaluation of oral health
- Evaluation of jaw and occlusal function
  – Mastication
  – Speech
  – TMJ
Clinical evaluation

• Evaluation of facial proportion
  – Assessment of developmental age
    • Chronologic vs. maturational age: 12-year-old looks 15 or 15-year-old looks 12
  – Facial esthetics vs. Facial proportions
  – Frontal examinations

<table>
<thead>
<tr>
<th>BOX 6-1</th>
<th>SCREENING EXAM FOR JAW FUNCTION (TMJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaw function/TMJ joint complaint now:</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>History of pain:</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>History of sounds:</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>TM joint tenderness to palpation:</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>□ Left</td>
<td></td>
</tr>
<tr>
<td>Muscle tenderness to palpation:</td>
<td>□ No □ Yes</td>
</tr>
<tr>
<td>Range of Motion:</td>
<td>Maximum opening _mm</td>
</tr>
<tr>
<td>Right excursion _mm</td>
<td></td>
</tr>
<tr>
<td>Left excursion _mm</td>
<td></td>
</tr>
<tr>
<td>Protrusion _mm</td>
<td></td>
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</tbody>
</table>

Clinical evaluation

• Profile analysis
  – Jaw proportionately positioned in the A-P plane of space
  – Lip posture and incisor prominence
  – Vertical facial proportions and mandibular plane angle
Clinical Evaluation

• Profile Analysis
  – Evaluation of lip posture and incisor prominence
  • Bimaxillary dentoalveolar protrusion
  • Lip incompetence

Vertical Facial Proportion

Diagnostic records

• Purpose:
  – Document a starting point for treatment
  – Add information gathered clinical examination
Diagnostic Records

- Three major categories:
  - Records for evaluation of the teeth and oral structures
  - Records for occlusal evaluation
  - Records for evaluation of facial and jaw proportions

Diagnostic Records

- Records for evaluation of the teeth and oral structures
  - Intraoral photographs
  - Panoramic radiographs
    - Periapical and bitewing radiographs

Diagnostic Records

- Records for occlusal evaluation
  - Symmetry
  - Space analysis
  - Tooth size discrepancy

Space analysis

Figure 6-21: Space available can be measured most accurately by dividing the dental arch into 8 weight line segments as shown. Each segment is measured independently with a pre-inked measuring instrument (solders, as used in orthodontic stabilizing arches, or a sharpened baby tooth is acceptable).

Figure 6-22: Space required is the sum of the maximum widths of all individual teeth, measured from contact point to contact point.

Curve of Spee

- Depth of Curve of Spee - Unilateral measurement of the deepest curve of Spee on the mandibular cast. This is defined as a vertical measurement (millimeters) from a horizontal plane resting on the most distal-buccal molar cusp tip and the ipsilateral central incisor edge to the most gingivally positioned premolar or deciduous molar buccal cusp tip.
Mixed dentition space analysis

- Measurement of the teeth on radiographs
- Estimation from proportionality tables
  - Moyers; Tanaka and Johnston
- Combination of radiographic and prediction table methods

**Moyer’s prediction table**

<table>
<thead>
<tr>
<th>True Mandibular Incisor Width</th>
<th>Width of Mesiodistal Width of Canine</th>
<th>Width of Mesiodistal Width of Premolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moyer’s Prediction Table</td>
<td>21.5</td>
<td>21.0</td>
</tr>
</tbody>
</table>

- The M-D width of the lower incisors is measured and this number is used to predict the size of both the lower and upper unerupted canines and premolars.

**Tanaka and Johnston prediction values**

- True width of primary molar
- Apparent width of primary molar
- True width of unerupted premolar
- Apparent width of unerupted premolar

*Distorted image of canine on radiograph*
Hixon and Oldfather prediction graph

- Combination of radiographic and prediction table methods
- Only for mandibular arch
- Measure the width of #25, 26 from the cast
- Measure the width of unerupted #28, 29 from the radiograph
- Sum of the above 2 and look up the graph for the total width of unerupted canines and premolars (#27,28,29)

Comparison

- Hixon and Oldfather: most accurate
- Tanaka and Johnston: most practical
- Radiographic method: for population other than Caucasians.

Diagnostic Records

- Tooth size analysis
  - 5% of the population have some degree of disproportion among the sizes of individual teeth → tooth size discrepancy

Treatment planning for the primary dentition

- Alignment problems
  - Malposed, crowded and irregular incisors: uncommon
  - Absence of spaces between primary incisors: crowding in permanent dentition
  - Space maintenance for missing primary molars but not anterior teeth
Treatment planning for the primary dentition

- Posterior and anterior crossbites: treat early
- Skeletal A-P and vertical problems: treatment indicated only for the most severe discrepancies

Treatment planning for the early mixed dentition

- Space discrepancies
  - <4mm: non-extraction
  - 5-9 mm: non-extraction/ extraction
  - > 10 mm: extraction
- Serial extraction
Treatment Planning for the Early Mixed Dentition

• Skeletal problems
  – Growth modification
• Dentofacial problems related to incisor protrusion:
  – Late mixed dentition or early permanent dentition

Growth modification

• Facemask for Class III skeletal malocclusion

Treatment planning for the early mixed dentition

• Space problems: missing primary teeth with adequate space: space maintenance
  • > 6 month delay before permanent premolar erupts with adequate space: space maintenance
  • Early loss of single primary canine space maintenance or extraction of contralateral tooth

Treatment planning for the early mixed dentition

• Generalized moderate crowding
  – 2-4 mm of arch length discrepancy with no prematurely missing primary teeth
  → eventually has moderately crowded permanent incisors.
  → Expand the arches with either LLHA in lower arch or W-arch in upper arch
Treatment planning for the early Mixed dentition

• Irregular/ Malpositioned incisors
  – Spaced and flared maxillary incisors
  – Maxillary midline diastema: “ugly duckling stage”
    • Space > 2mm: spontaneous closure is unlikely (early frenectomy should be avoided)
      – Mesioden?
      – High frenum?

Treatment planning for the early mixed dentition

• Anterior crossbite
  – Skeletal class III jaw relationship
  – Maxillary laterals erupt lingually due to lack of space → extraction of adjacent primary canine prior to complete eruption of the lateral incisors → spontaneous correction

Treatment Planning for the Early Mixed Dentition

• Posterior Crossbite
  – Narrowing of the maxillary arch: children with prolonged sucking habits
  – Anterior open bite:
    • Prolonged thumb sucking
    • Tongue thrust
Treatment planning for the early mixed dentition

- Over-retained primary teeth and ectopic eruption
  - Delayed eruption of permanent teeth if primary predecessor retained too long
  - If a primary tooth still has considerable root remaining, when ¾ of the root of the permanent successor has formed, the primary tooth should be extracted.

Treatment planning for the early mixed dentition

- Premature removal of primary tooth: layer of dense bone and soft tissue
- Extraction of Mx primary canine when permanent canines are overlapping the permanent lateral incisor roots → positive influence on the permanent tooth’s eruption path.

Summary

- Questionnaire/Interview
- Clinic evaluation
- Diagnostic records
- Treatment plan