PHYSICAL EVALUATION I
(Dent 5121)

Extra-oral Examination
TMJ & Muscles of Mastication
Lecture Objectives

After today’s lecture, the student will be able to:

Describe the anatomy and function of the temporomandibular joints and muscles of mastication.

Describe how to examine the function of the temporomandibular joints and muscles of mastication and how to record the findings in the dental record.

Describe some common abnormal findings and disorders associated with the temporomandibular joints and muscles of mastication.
Temporomandibular Joint Anatomy

- Mandibular condyle
- Glenoid fossa and articular eminence of temporal bone
Temporomandibular Joint Anatomy

- Articular disc
- Posterior attachment
- Superior head of lateral pterygoid muscle
- TMJ capsule
Normal TMJ
• Temporomandibular Disorders – functional disturbances of the masticatory system

Muscles of mastication
Temporomandibular joints
Both
• Diagnoses involving the muscles of mastication
  – Myalgia
  – Myofascial pain
Temporomandibular Disorders

- Diagnoses involving the temporomandibular joints
  - Disc displacement (with and without reduction)
  - Deviation in form
  - Capsulitis/arthritis
  - Subluxation/dislocation
Screening Questions

- Pain in jaw/temples/ears
- Fatigue/stiffness in jaw
- Difficulty opening
- Locking open/closed
- TMJ noise
- Trauma to jaw/face
- Change in occlusion
- Oral habits
Screening Examination

- Range of mandibular motion
  - Vertical
    - Limitation
    - Deviation/deflection
  - Lateral
    - Limitation
  - Protrusion
    - Limitation
    - Deviation/deflection

- TMJ noise

- Pain to palpation
  - TMJ
  - Masticatory muscles

- Occlusion
<table>
<thead>
<tr>
<th>General Inspection</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>1. blood pressure</td>
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<td>2. pulse</td>
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<td>3. habitus</td>
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<td>4. head and neck</td>
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<td>5. muscles of mastication</td>
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<td>6. TMJ</td>
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<td>7. eyes</td>
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<table>
<thead>
<tr>
<th>Soft Tissue</th>
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<tbody>
<tr>
<td>8. lips</td>
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<td></td>
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<tr>
<td>9. buccal mucosa</td>
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<td></td>
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<td>10. hard palate</td>
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<tr>
<td>11. soft palate</td>
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<tr>
<td>12. Pharynx</td>
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<tr>
<td>13. floor of mouth</td>
<td></td>
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<tr>
<td>14. tongue</td>
<td></td>
<td></td>
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<tr>
<td>15. alveolar ridge</td>
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<tr>
<td>16. gingiva</td>
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</tbody>
</table>
**OCCLUSAL ANALYSIS**

1. Mandibular Movement
   - Pain during mandibular movement?
     - Yes
     - No

2. Palpation of Masticatory Muscles
   - Temporalis:
     - RT
     - LT
   - Masseter:
     - RT
     - LT
   - M. Pterygoid:
     - RT
     - LT
   - None

3. Palpation of TMJ
   - RT
     - Pain
     - None
   - LT
     - None

4. Joint Noise (stethoscope)
   - RT
     - None
     - Eminence Pop
     - Single click
     - Crepitation
   - LT
     - None

5. Occlusal characteristics of intercuspal position:
   - Angle Classification (circle classification)
     - RT: 1 II1 II2 III
     - LT: 1 II1 II2 III
   - Anterior tooth relationships:
     - Vertical Overlap: __ mm
     - Horizontal Overlap: __ mm

6. Eccentric tooth guidance (circle contacting teeth)
   - RT: Working I C PM M
   - RT: Non-working
   - LT: Working I C PM M
   - LT: Non-working PM M
   - Protrusion I C PM M

7. Initial tooth contact in guided mandibular position:
   - RT: 1 C PM M
   - LT: 1 C PM M

8. Mandibular shift to I.P.
   - Anterior: ___ m.m.
   - Lateral: ___ m.m.
   - Vertical: ___ m.m.

9. If C.R. is located, guiding mandible into C.R. was:
   - Difficult
   - Easy

8. Tooth wear
   - Consistent with age
   - Accelerated wear

9. Interocclusal rest space: ___ m.m.

The maxillomandibular relationship which will be used as the reference position for restorative treatment is:
   - I.P.
   - C.R.
   - Other (describe)
Active Range of Motion
Normal Active ROM
40-60 mm
Adjusted for vertical overlap of incisors
Males > Females
Pattern of Opening
Deviation in Opening
Deviation in Opening

- Which TMJ is involved?
- What may be happening?
Deflection in Opening
Deflection in Opening

- Which TMJ is involved?
- What may be happening?
Lateral Range of Motion
Lateral Range of Motion
Lateral Range of Motion

Normal Lateral ROM
> 7 mm
Adjusted for deviation in midlines
Males > Females
**OCCLUSAL ANALYSIS**

1. **Mandibular Movement**
   - R: 7 mm
   - L: 7 mm
   - 40 mm
   - 43

   Pain during mandibular movement?
   - Yes
   - No

2. **Palpation of Masticatory Muscles**
   - RT: temporalis, masseter, m. pterygoid
   - LT: none

3. **Palpation of TMJ**
   - RT: pain
   - LT: none

4. **Joint Noise (stethoscope)**
   - RT: none
   - LT: eminence pop, single click, crepitus

5. **Occlusal characteristics of intercuspal position:**
   - A. Angle Classification (circle classification)
     - RT: 1, 3, 2, 3
     - LT: 1, 3, 2, 3
   - B. Anterior tooth relationships:
     - Vertical Overlap: __mm
     - Horizontal Overlap: __mm
   - C. Occlusal Contacts (shimstock) (circle contacting teeth)
     - RT: 1, C, PM, M
     - LT: 1, C, PM, M
   - D. Cusp Fossa Relationships
     - Normal: RT, LT
     - Abnormal: RT, LT

6. **Eccentric tooth guidance (circle contacting teeth)**
   - RT: working, C, PM, M
   - RT: non-working, PM, M
   - LT: working, C, PM, M
   - LT: non-working, PM, M
   - Protrusion: 1, C, PM, M

7. **Initial tooth contact in guided mandibular position:**
   - A. RT - I C PM M
     - LT - I C PM M
   - B. Mandibular shift to I.P.
     - Anterior: ______ m.m.
     - Lateral: ______ m.m.
     - Vertical: ______ m.m.
   - C. If C.R. is located, guiding mandible into C.R. was:
     - [ ] difficult
     - [ ] easy

8. **Tooth wear**
   - [ ] consistent with age
   - [ ] accelerated wear
   - LT: anterior, posterior
   - RT: anterior, posterior

9. **Interocclusal rest space ______ m.m.**

The maxillomandibular relationship which will be used as the reference position for restorative treatment is:

- [ ] I.P.
- [ ] C.R.
- [ ] Other (describe)

[ ]

[ ]
Temporomandibular Joint

- Locate the TMJ by palpating while patient opens and closes mouth
Temporomandibular Joint

- Palpate TMJ for joint noises
• Auscultate TMJ noises (not routinely done)
Temporomandibular Joint Sounds

- Reciprocal click
- Reproducible opening click
- Reproducible closing click
- Fine crepitus
- Coarse crepitus
- Popping
Anterior Disc Displacement

• Anterior disc displacement with reduction

• TMJ sound:
  – Reciprocal click
  or
  – Reproducible opening click
Anterior Disc Displacement

- Anterior disc displacement \textbf{without} reduction

- TMJ sound:
  - No click
  - Possibly crepitus
Deviation in Form of TMJ

- Alteration in surface of:
  - Articular surface of mandibular condyle
  - Articular surface of articular eminence of temporal bone
  - Superior or inferior surface of articular disc

- TMJ sound:
  - Reproducible opening click
  - Reproducible closing click
  - Reproducible opening and closing click
Normal TMJ
Severe TMJ Arthritis
• Arthritis of TMJ
  – Mild articular changes
  – Severe articular changes

• TMJ sound:
  – Fine crepitus
  – Coarse crepitus
TMJ Subluxation

• Condylar head moves too far beyond the articular eminence

• TMJ sound:
  – Eminence pop
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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>R 7 mm</td>
<td>temporalis</td>
<td>RT</td>
<td>RT</td>
<td>Angle Classification (circle classification)</td>
<td>RT - I C PM M M</td>
<td>RT working I C PM M</td>
</tr>
<tr>
<td>5</td>
<td>masseter</td>
<td>LT</td>
<td>LT</td>
<td>PT - I C PM M</td>
<td>RT non-working PM M</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>m. pterygoid</td>
<td>none</td>
<td>None</td>
<td>LT - I C PM M</td>
<td>LT working I C PM M</td>
<td></td>
</tr>
<tr>
<td>40 mm</td>
<td>none</td>
<td>none</td>
<td>Reciprocal</td>
<td>LT non-working PM M</td>
<td>Protrusion I C PM M</td>
<td></td>
</tr>
</tbody>
</table>

Pain during mandibular movement? [ ] Yes [X] No

B. Anterior tooth relationships:
Vertical Overlap _____ mm
Horizontal Overlap _____ mm

C. Occlusal Contacts (shimstock) (circle contacting teeth)
RT - I C PM M
LT - I C PM M

D. Cusp Fossa Relationships
Normal [ ] RT [ ] LT
Abnormal [ ] RT [ ] LT

The maxillomandibular relationship which will be used as the reference position for restorative treatment is:
[ ] I.P. [ ] C.R. [ ] Other (describe)

<table>
<thead>
<tr>
<th>8. Tooth wear</th>
<th>9. Interocclusal rest space _____ mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] consistent with age</td>
<td>[ ] anterior [ ] posterior</td>
</tr>
<tr>
<td>[ ] accelerated wear</td>
<td>[ ] anterior [ ] posterior</td>
</tr>
</tbody>
</table>

C. If C.R. is located, guiding mandible into C.R. was:
[ ] difficult [ ] easy

D. Mandibular shift to I.P.
Anterior _____ mm.
Lateral _____ mm.
Vertical _____ mm.
Palpation of TMJ

- After mandibular range of motion assessment
- Locate TMJ
- Teeth slightly apart
- Not clenching
- Not opening and closing
# Occlusal Analysis

## 1. Mandibular Movement
- **Pain during mandibular movement?**
  - Yes
  - No

## 2. Palpation of Masticatory Muscles
- **RT**
  - Temporals
  - Masseter
  - M. pterygoid
  - None
- **LT**
  - None

## 3. Palpation of TMJ
- **RT**
  - Pain
  - None
- **LT**
  - None

## 4. Joint Noise (stethoscope)
- **RT**
  - None
  - Eminence pop
  - Single click
  - Crepitus
  - Reciprocal
- **LT**
  - None

## 5. Occlusal characteristics of intercuspal position:
### A. Angle Classification (circle classification)
- **RT**
  - I
  - II
  - III
- **LT**
  - I
  - II
  - III

### B. Anterior tooth relationships:
- **Vertical Overlap** ___ mm
- **Horizontal Overlap** ___ mm

### C. Occlusal Contacts (shimstock) (circle contacting teeth)
- **RT**
  - I
  - C
  - PM
  - M
- **LT**
  - I
  - C
  - PM
  - M

### D. Cusp Fossa Relationships
- **Normal**
  - RT
  - LT
- **Abnormal**
  - RT
  - LT

## 6. Eccentric tooth guidance (circle contacting teeth)
- **RT**
  - Working
  - Non-working
- **LT**
  - Working
  - Non-working

## 7. Initial tooth contact in guided mandibular position:
### A. RT
- I
- C
- PM
- M
### LT
- I
- C
- PM
- M

### B. Mandibular shift to I.P.
- Anterior ___ m.m.
- Lateral ___ m.m.
- Vertical ___ m.m.

### C. If C.R. is located, guiding mandible into C.R. was:
- Difficult
- Easy

## 8. Tooth wear
- Consistent with age
- Accelerated wear
- **RT**
  - Anterior
  - Posterior
- **LT**
  - Anterior
  - Posterior

## 9. Interocclusal rest space ___ m.m.

The maxillomandibular relationship which will be used as the reference position for restorative treatment is:
- **I.P.**
- **C.R.**
- **Other** (describe)

---

**Instructions for further action:**

[Insert any specific instructions or actions required based on the analysis]
Muscles of Mastication
Temporalis Muscle

- **Origin:**
  - Temporal fossa
- **Insertion:**
  - Coronoid process, anterior border of ramus
- **Function:**
  - Elevates and retracts mandible, clenches teeth
Temporalis Muscle

Anterior, middle and posterior part of temporalis muscle
Temporalsis Muscle
Temporalsis Muscle

• Anterior part of temporalsis muscle
Temporalis Muscle

• Middle part of temporalis muscle
Temporalsis Muscle

- Posterior part of temporalsis muscle
Masseter Muscle

- **Origin:**
  - Superficial portion – anterior 2/3 of lower border of zygomatic arch
  - Deep portion – medial surface of zygomatic arch

- **Insertion:**
  - Lateral surface of ramus, coronoid process, and angle of mandible

- **Function:**
  - Elevates mandible, clenches teeth
Masseter Muscle

Multiple areas of masster muscle
Masseter Muscle

- Anterior superior part of masseter muscle
Masseter Muscle

- Posterior inferior part of masseter muscle
Medial Pterygoid Muscle

- **Origin:**
  - Medial surface of lateral pterygoid plate

- **Insertion:**
  - Posterior and lower part of medial surface of ramus, angle of mandible

- **Function:**
  - Elevates, protrudes and laterotrudes the mandible, clenches teeth
Medial Pterygoid Muscle
Lateral Pterygoid Muscle

• Origin:
  – Superior head – infratemporal surface of greater wing of sphenoid bone
  – Inferior head – lateral surface of lateral pterygoid plate

• Insertion:
  – Anterior portion of condylar neck and articular disc

• Function:
  – Protrudes and laterotrudes the mandible, pulls articular disc forward
### OCCLUSAL ANALYSIS

1. **Mandibular Movement**
   
<table>
<thead>
<tr>
<th>R</th>
<th>L</th>
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<tbody>
<tr>
<td>8</td>
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<td>5</td>
<td>6</td>
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<tr>
<td>43</td>
<td>8</td>
</tr>
</tbody>
</table>

   Pain during mandibular movement? 
   - [ ] Yes
   - [x] No

2. **Palpation of Masticatory Muscles**
   
<table>
<thead>
<tr>
<th>RT</th>
<th>LT</th>
</tr>
</thead>
<tbody>
<tr>
<td>temporalis</td>
<td>m. pterygoid</td>
</tr>
<tr>
<td>masseter</td>
<td>none</td>
</tr>
</tbody>
</table>

3. **Palpation of TMJ**
   
<table>
<thead>
<tr>
<th>RT</th>
<th>LT</th>
</tr>
</thead>
<tbody>
<tr>
<td>pain</td>
<td>none</td>
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</tbody>
</table>

4. **Joint Noise (stethoscope)**
   
<table>
<thead>
<tr>
<th>RT</th>
<th>LT</th>
</tr>
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<tbody>
<tr>
<td>none</td>
<td>eminence pop</td>
</tr>
<tr>
<td>single click</td>
<td>crepitus</td>
</tr>
<tr>
<td>reciprocal</td>
<td></td>
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</table>

5. **Occlusal characteristics of intercuspal position**
   
   A. **Angle Classification** (circle classification)
      
      | RT | LT |
      | I  | I  |
      | I1 | I1 |
      | II | II |
      | III| III|

   B. **Anterior tooth relationships**
      
      - Vertical Overlap: ___ mm
      - Horizontal Overlap: ___ mm

6. **Eccentric tooth guidance** (circle contacting teeth)
   
<table>
<thead>
<tr>
<th>RT</th>
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<tbody>
<tr>
<td>working</td>
<td>I</td>
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<tr>
<td>non-working</td>
<td>PM</td>
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<tr>
<td>LT</td>
<td>working</td>
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<tr>
<td>non-working</td>
<td>PM</td>
</tr>
<tr>
<td>Protrusion</td>
<td>I</td>
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<td>PM</td>
<td>M</td>
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7. **Initial tooth contact in guided mandibular position**
   
<table>
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<th>RT</th>
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<tr>
<td>I</td>
<td>C</td>
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<tr>
<td>PM</td>
<td>M</td>
</tr>
<tr>
<td>PM</td>
<td>M</td>
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</table>

   B. **Mandibular shift to I.P.**
      
      - Anterior: ___ m.m.
      - Lateral: ___ m.m.
      - Vertical: ___ m.m.

   C. If C.R. is located, guiding mandible into C.R. was:
      
      - [ ] difficult
      - [ ] easy

8. **Tooth wear**
   
   - [ ] consistent with age
   - [ ] accelerated wear
   - LT anterior: [ ], posterior: [ ]
   - RT anterior: [ ], posterior: [ ]

9. **Interocclusal rest space** ___ m.m.

The maxillomandibular relationship which will be used as the reference position for restorative treatment is:

- [ ] I.P.
- [ ] C.R.
- [ ] Other (describe)

__________________________________________
__________________________________________
__________________________________________
Temporomandibular Disorders

• Muscles of Mastication
  – Myalgia
    • Symptoms
      – Pain in localized area of one masticatory muscle
        (usually masseter or temporalis)
      – Fatigue with chewing

• Signs
  – Tender muscles upon palpation
  – Sometimes limited active vertical range of mandibular motion
Temporomandibular Disorders

• Muscles of Mastication
  – Myofascial pain
    • Symptoms
      – Regional pain in area of masseter or temporalis muscles
      – Tinnitus, vertigo, toothache, tension-type headache
      – Fatigue with chewing
      – May have limited mandibular function secondary to pain

• Signs
  – Multiple tender areas in several masticatory muscles upon palpation
  – Tender areas may refer pain to other locations in face
  – Sometimes limited active vertical range of mandibular motion
• Temporomandibular joints
  – Disc displacement with reduction
    • Symptoms
      – Clicking or popping noise in TMJ
      – May feel “catching” in TMJ
    • Signs
      – Reciprocal click
      – May have deviation in active vertical mandibular range of motion and/or in protrusion
      – No restriction in active vertical mandibular range motion
Temporomandibular Disorders

• Temporomandibular joints
  – Disc displacement without reduction (Closed lock)
    • Symptoms
      – History of clicking or popping noise in TMJ
      – Limited mandibular range of motion
    • Signs
      – No TMJ sounds
      – Restriction in active vertical mandibular range motion and laterotrusion
      – May have deflection in active vertical mandibular range of motion and/or in protrusion
Temporomandibular Disorders

- Temporomandibular joints
  - Capsulitis/arthrits
    - Symptoms
      - Pain in TMJ or in front of ear
      - Pain exacerbated by jaw function
      - May have limited mandibular function secondary to pain
    - Signs
      - TMJ tender to palpation
      - TMJ pain worsened upon clenching
      - Limited active mandibular range of motion, laterotrusion, protrusion
Temporomandibular Disorders

- Temporomandibular joints
  - Subluxation/dislocation (Open lock)
    - Symptoms
      - Jaw “catches” open when yawning or opening mouth wide (if gets stuck open then dislocation)
      - Pain in TMJ when jaw gets stuck
      - Loud pop when opening wide
    - Signs
      - Excessive active mandibular vertical range of motion
      - Eminence pop
      - Residual tenderness in TMJ upon palpation if recent episode
Diagnosis of Temporomandibular Disorders

- Temporomandibular Disorders -
  - Muscles of Mastication
  - Temporomandibular joints
  - Both

- TMJ arthritis and myofascial pain
- TMJ disc displacement with reduction, TMJ capsulitis, and myalgia
Lecture Objectives

After today’s lecture, the student will be able to:

Describe the anatomy and function of the temporomandibular joints and muscles of mastication.

Describe how to examine the function of the temporomandibular joints and muscles of mastication and how to record the findings in the dental record.

Describe some common abnormal findings and disorders associated with the temporomandibular joints and muscles of mastication.
Clinical Seminar Sessions

Groups 1&2  Groups 3&4  Groups 5&6  Groups 7&8
3/7/08      3/10/08   3/12/08   3/14/08
10:10-12:05 3:35-5:30 3:35-5:30 10:10-12:05

8th Floor South Clinic
Cubicles 33-46

Wear short sleeved shirt or scrub top and bring your name tag!
Bring a black/blue ink pen.