Radiation Induced Trismus
Head & Neck Cancer

Trismus is a serious side-effect of head and neck cancer surgery and radiation therapy, with long-lasting medical implications for the patient. Trismus is often not diagnosed until it is so severe that patients cannot use a fork or spoon, which can be too late to fully treat and can severely restrict the patients treatment and quality of life.

**Incidence:**

35-55% of Patients Develop Trismus

- Higher Risk: Oro- and Para-pharyngeal cancers, masseter and pterygoid muscles irradiated (up to 73%).
- Lower Risk: Laryngeal and Nasopharyngeal cancers

**Increased radiation increases chance of Trismus**

- Steep increased risk with increased dosage.
- Steep increase on second round of radiation.

**Radiation effects on oral tissues:**

- Fibrin deposition and collagen formation.
- Radiation Fibrosis and Stiffening.

**Radiation in salivary tissues:**

- Severely reduced saliva after small doses.

**Complications of Radiation Induced Fibrosis and Trismus:**

- Reduced Oral Hygiene and Saliva promote dental decay and integrity of mandible.
- Disruption of Cancer Treatments
- Compromised Airway, Aspiration
- Reduced Quality of Life:
  - Voice, Speech problems (68%)
  - Difficulty Sneezing, Laughing
  - Reduced social interaction
  - Dysphagia, Eating, drinking (65-73%)
- Malnutrition and Dehydration
- Reduced Oral Access, for:
  - Dentures/Prosthetics
  - Dental Procedures
  - Medical Procedures, Intubation
- Joint Immobilization (oral cancer 73%):
  - Muscle contracture and atrophy
  - Muscle and joint degradation
  - Inflammation, pain, fatigability.

**Prevention and Treatment:**

**Prevention:** Trismus can be very difficult to treat, especially when caused by radiation. Preventing its development is imperative for the long-term functionality and quality of the patients recovery.

- Therapy and stretching are less effective in treating radiation induced trismus after it has occurred.
- Trismus (<35mm MIO) at discharge of radiation therapy is strong predictor of trismus at 6 months.
- Preventative early rehabilitation can reduce incidence (by 40%) and severity (by 60%) of trismus.

**Treatment:** Therapies generally include self-exercise, massage, tongue depressors, and jaw motion rehab devices.

- Jaw motion rehab devices (OraStretch® press, TheraBite) are 40-60% more effective in treating trismus.

**Joint Function & Trismus:**

**Definition:** Any restriction in mouth opening, often caused by infection, trauma, surgery, or radiation

**Synonyms:** Jaw hypomobility, restricted opening, limited range-of-motion (ROM), lockjaw

**MIO/D:** Maximum Intercisal Opening/Distance

**ROM:** Range-of-Motion

**Normal MIO:** Men 50-60mm Women 45-55mm

**Trismus:** Decreased function of less than 30-35mm MIO.

**Basic Diagnostic - The 3-Finger Test:**

- Insert Tips of index, middle and ring fingers non-dominant hand between front teeth.

<table>
<thead>
<tr>
<th>Normal MIO</th>
<th>&gt;40 mm</th>
<th>3+ Fingers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild Trismus</td>
<td>30-40 mm</td>
<td>2-3 Fingers</td>
</tr>
<tr>
<td>Moderate Trismus</td>
<td>15-30 mm</td>
<td>1-2 Fingers</td>
</tr>
<tr>
<td>Severe Trismus</td>
<td>&lt;15 mm</td>
<td>&lt;1 Finger</td>
</tr>
</tbody>
</table>

**Progression:**

<table>
<thead>
<tr>
<th>Time During Therapy</th>
<th>1-3 Months</th>
<th>3-12 months</th>
<th>12-24 Months</th>
<th>24-48 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss</td>
<td>Emergent</td>
<td>Dramatic</td>
<td>Slowing</td>
<td>Continued</td>
</tr>
<tr>
<td>Average MIO Loss</td>
<td>3-4%</td>
<td>20+%</td>
<td>2-3%</td>
<td>1-2%</td>
</tr>
</tbody>
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