How does *respiratory motion* impact radiation therapy treatments?

- Radiation therapy treatment goals:
  1. Deliver prescribed dose to the *tumor volume*
  2. Minimize dose to surrounding *healthy tissues*

<table>
<thead>
<tr>
<th>Tumor</th>
<th>Healthy tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static assumption:</td>
<td>✗   ✗</td>
</tr>
<tr>
<td>Encompassing method:</td>
<td>✓    ✗</td>
</tr>
<tr>
<td>Tracking method:</td>
<td>✓    ✓</td>
</tr>
</tbody>
</table>

How does Radixact motion tracking compensate for 3D respiratory motion?

- Build a predictive model of motion using:
  - Infrared camera → monitor phase of breathing (continuous)
  - X-ray images → monitor tumor position periodically (3-5 s)
- Adjust the collimation of the radiation in real-time
Validating tracking and dose delivery

**Setup:**
- Realistic patient motion
- Deliver the treatment to the measurement phantom

**Results:**

**Conclusion:**
- Works with tumor motion up to 25 mm
- Locates tumor within 1.5 mm
- Radixact motion tracking reduces the impact of motion on dose delivery