



Root Angulation

(rev. 3.10.2025)



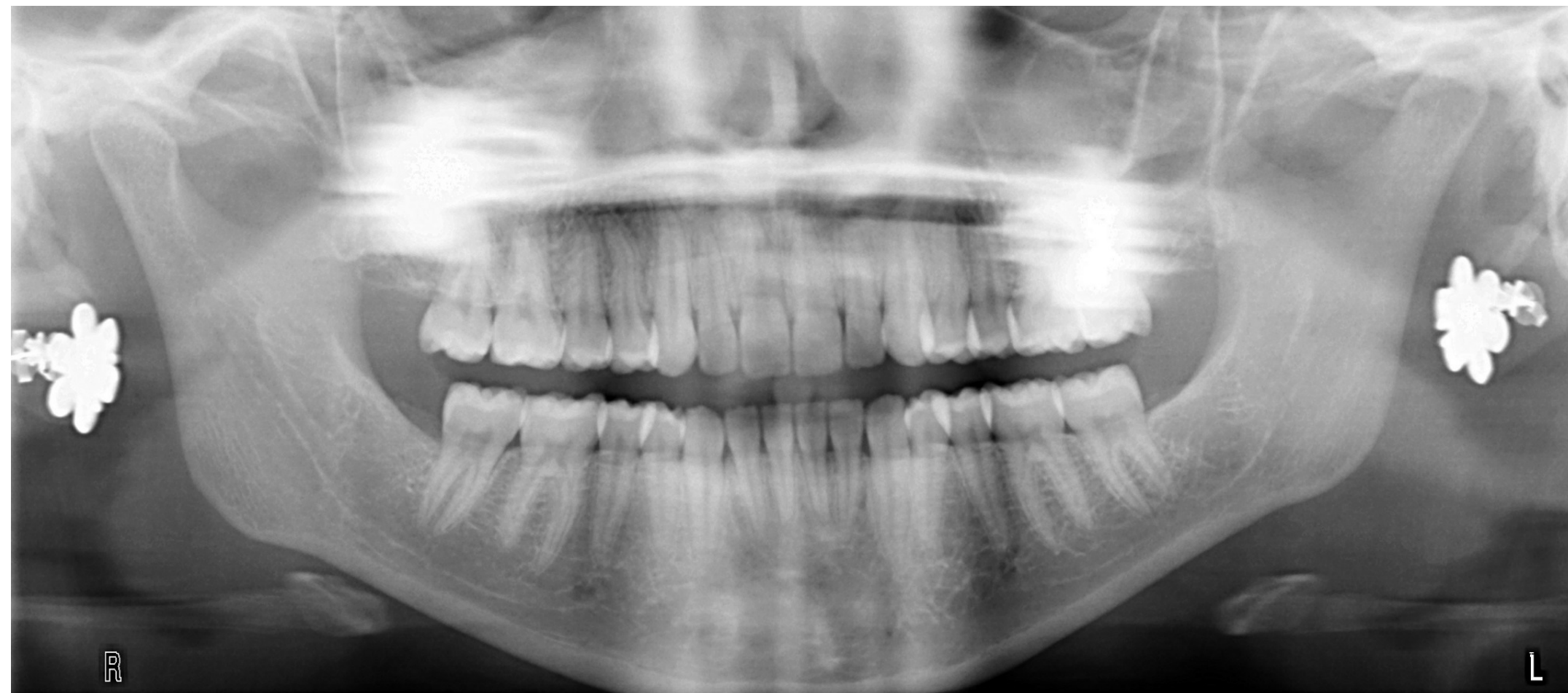
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Example of Good Quality Radiograph





Ahaa...not quite!



The relative angulation of the roots of the maxillary and mandibular teeth is assessed on the panoramic radiograph. Although this is not ideal, it gives a reasonably good assessment of root position. Generally, the roots of the maxillary and mandibular teeth should be parallel to one another and oriented perpendicular to the occlusal plane (fig.19). If this situation exists, then no points are scored.



R fig. 19

Roots parallel to each other/long axis
perpendicular to occlusal plane





The ABO acknowledges the distortion that frequently occurs within panoramic radiographs. The Board has recommended the following:

Omit scoring the canine relationship with adjacent tooth root when using a final panoramic radiograph unless the radiograph was taken by a CBCT.

- If a root is angled to the mesial or distal (not parallel) and is close to, but not touching, the adjacent tooth root, then 1 point is scored for each discrepancy (anterior, premolar, and/or molar areas, (fig.20). In the anterior, premolar and/or molar areas, if a root is angled (not parallel, and not touching) more than 1mm from an ideal location equidistant from the adjacent teeth in the arch (mesial or distal), then 1 point is scored.



R fig. 20

If the root is angled to the mesial or distal and is contacting the adjacent tooth root (fig. 21), then 2 points are scored for that tooth.



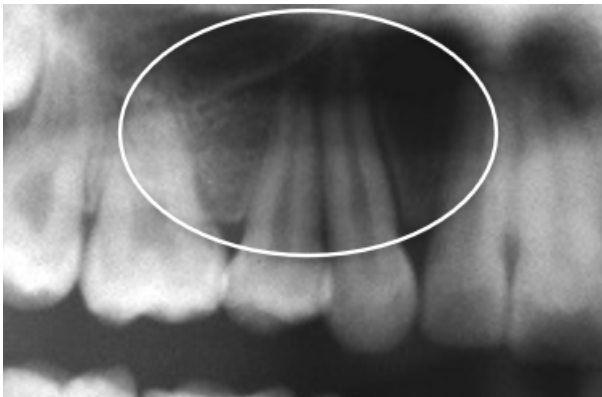


The ABO recognizes that the advent of 3-D radiographic technology (CBCT) has allowed the creation of images that are a true representation of root angulation. The planar cuts that are generated with this technology are far more accurate and present with less distortion than the traditional panoramic image. For this reason, the ABO has established that all roots identified on these images should be scored.

- In the anterior, premolar and/or molar areas, if a root is angled (not parallel, and not touching) more than 1mm from an ideal location equidistant from the adjacent teeth in the arch (mesial or distal), then 1 point is scored.
- If the root is angled to the mesial or distal and is contacting the adjacent tooth root then 2 points are scored for that tooth.
- The root relationship of the canines, however, should also be scored relative to the adjacent teeth. 1 point for roots angled mesial or distal but not touching the adjacent root, and 2 points for roots that contact the root of the adjacent tooth.

Points Scored

Roots not parallel = 1 pt scored



Roots touching = 1 pt scored
Note: exclude canines





Most Frequently Observed Errors:

- **Maxilla**
 - Laterals, canines, and premolars
- **Mandible**
 - First premolars
- ✓ Acknowledge that distortion frequently occurs with the panoramic radiograph.
- ✓ Therefore, omit scoring the canine relationship with adjacent tooth root when using the panoramic radiograph.

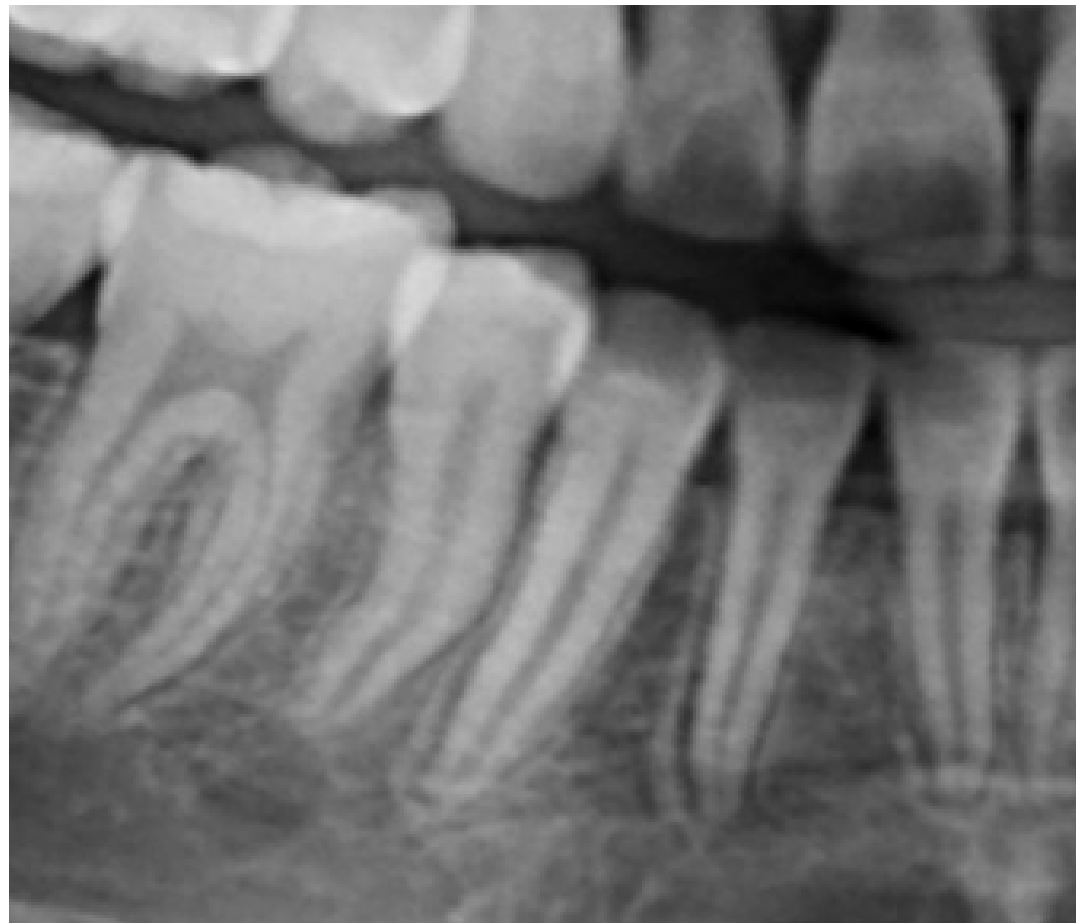


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Dilacerated Roots – Not Scored



Dilacerated Roots

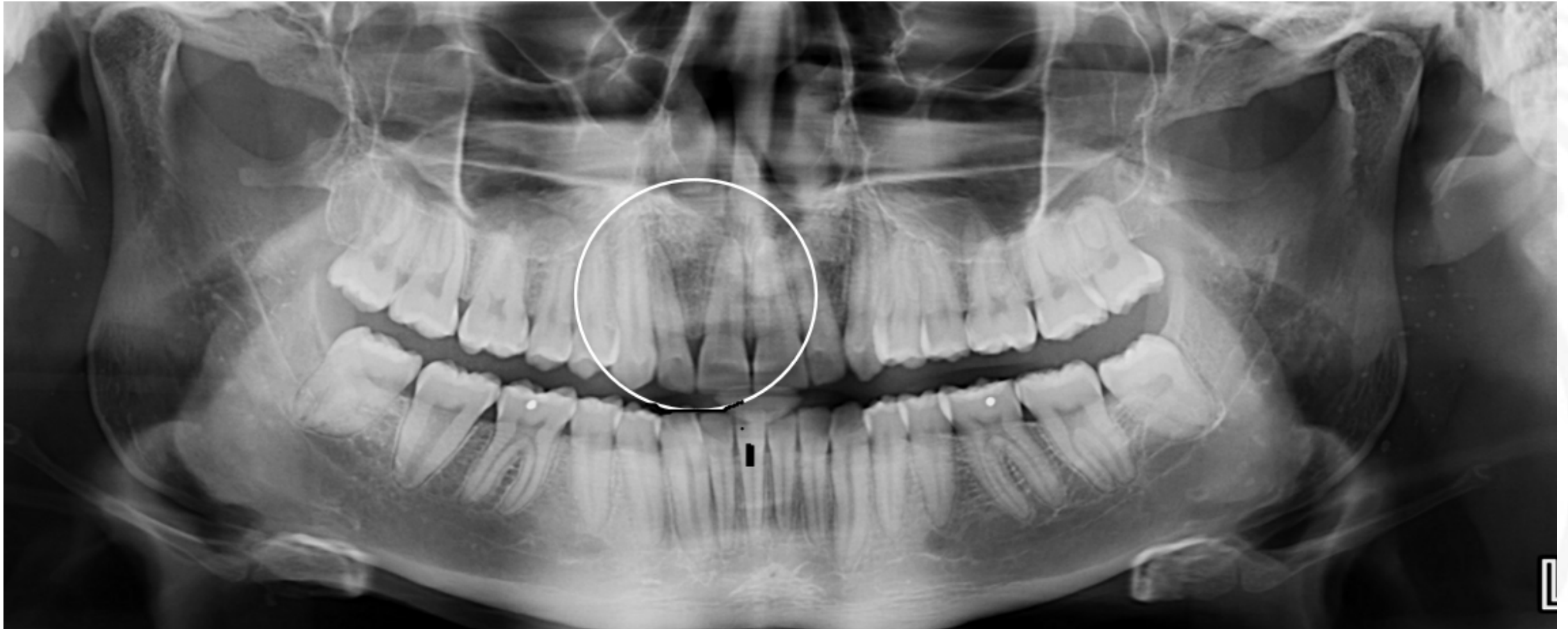


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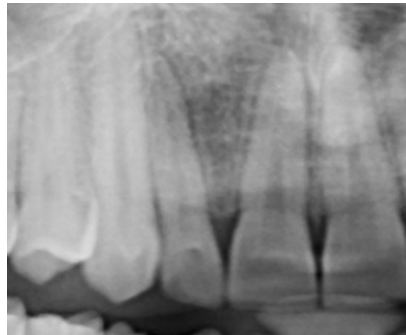
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Maxillary Right Lateral = 1 point scored



Max right lateral – 1 point



Mand left – between 5 & 6 – Mand left first molar scored?

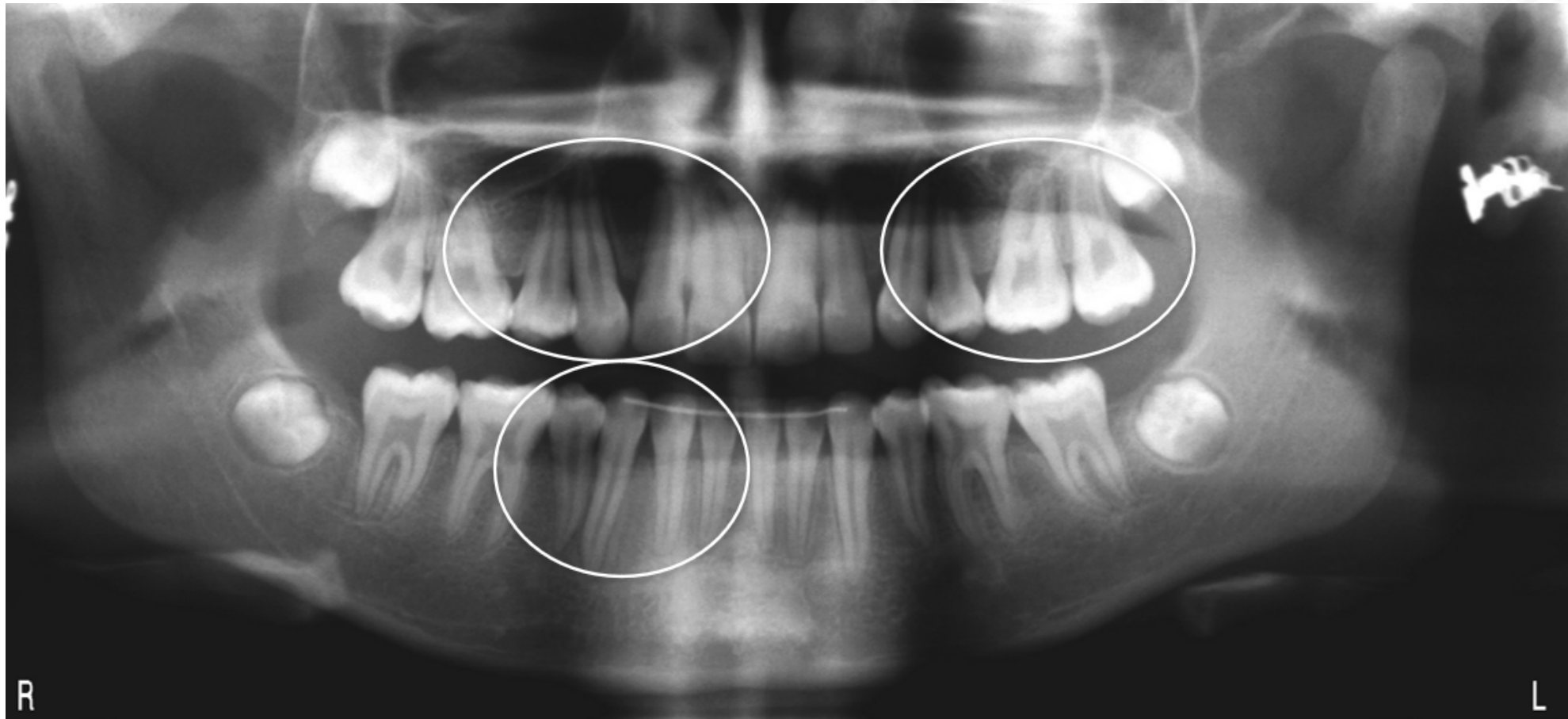


Non-Parallel Roots

Max arch – 2 x 1 = 2 pts scored

Mand. Right = 1 point scored

Total = 3 points



Roots touching(?) = 2 points (but against canines...distortion?)

Non-Parallel roots = 3 points

Total = 3 points

