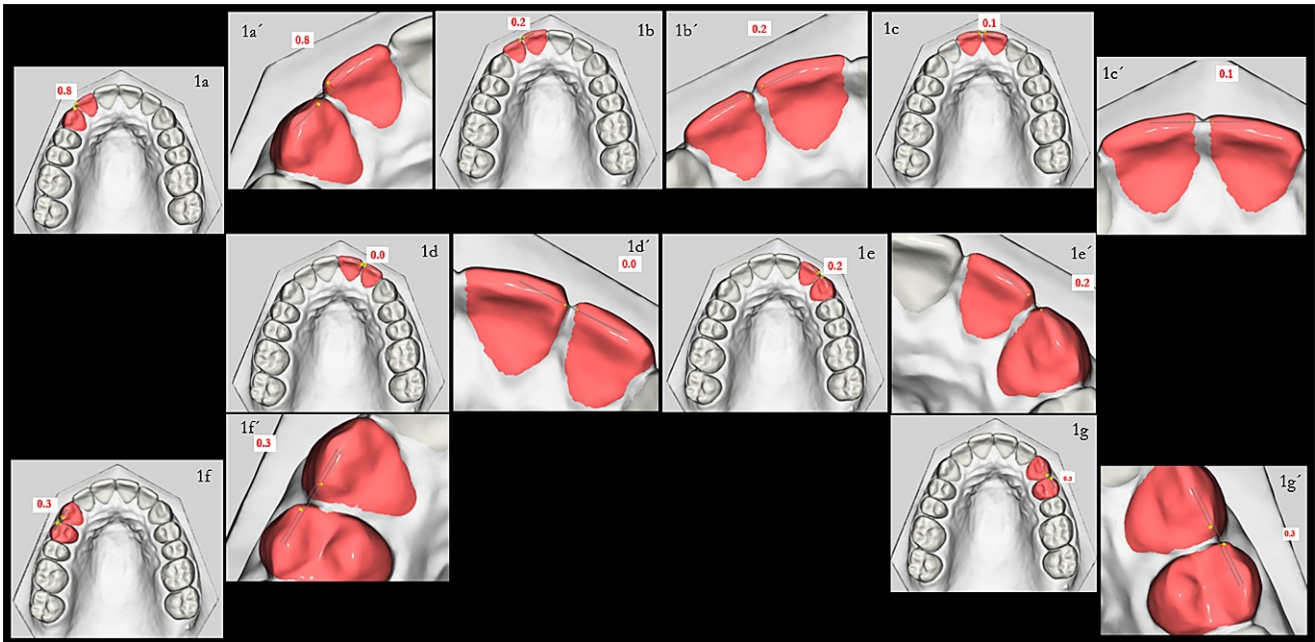


## MODEL ANALYSIS

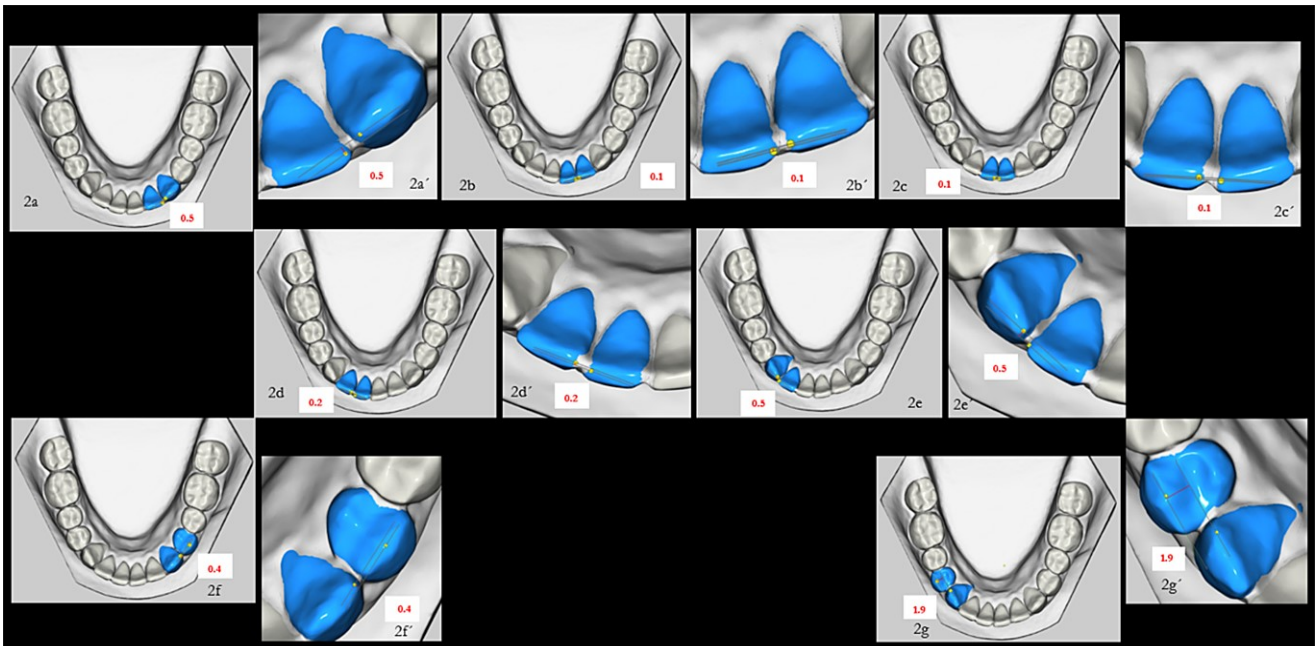
### ALIGNMENT

In the maxillary and mandibular anterior regions, proper alignment is characterized by coordination of alignment of the incisal edges and lingual incisal surfaces of maxillary incisors and canines (figs.1a-g). and the incisal edges and labial incisal surfaces of the mandibular incisors and canines (figs.2a-g).

In the anterior region, landmarks shall be placed on the mesial and distal incisal edges

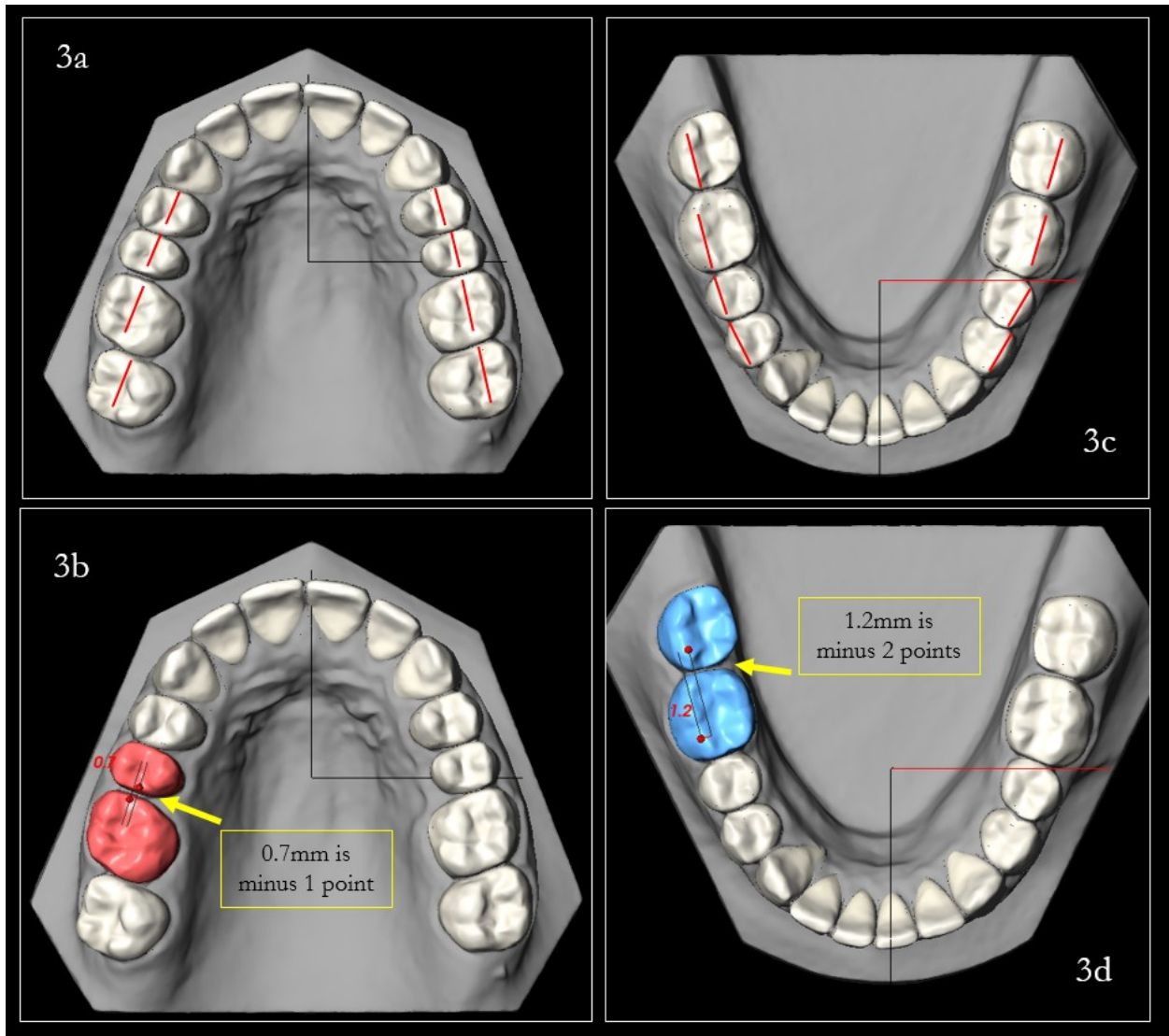


of adjacent teeth to be measured and in close alignment with the contact points.



In the maxillary posterior quadrants, the central grooves (mesio-distal) should all be in the same plane or alignment (figs. 3a). The maxillary occlusal landmarks shall be located

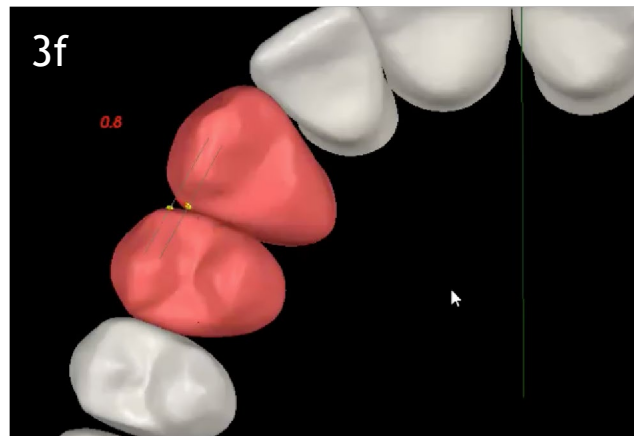
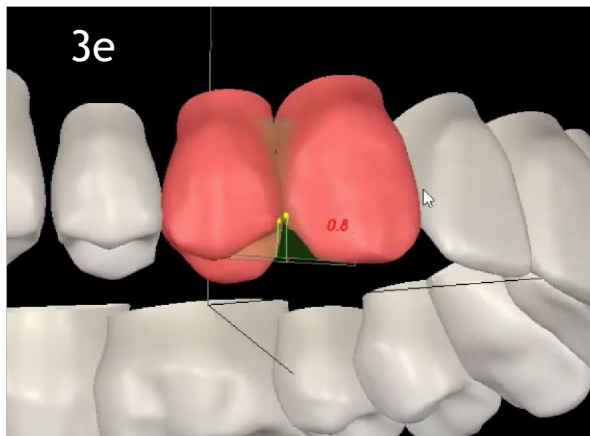
on the mesial and distal marginal ridges in alignment with the central grooves (fig. 3b)  
If all teeth are within 0.50 mm of proper alignment, no points are scored.



In the mandibular posterior quadrants, the mesio-buccal and disto-buccal cusps of the molars and buccal cusps of the premolars should be in the same mesio-distal alignment. (figs. 3c). The landmarks shall be placed on the height of contour of the buccal ridges and in alignment with the buccal cusps tips of the premolars and with the mesio-buccal cusps of the molars and closer to the occluso-buccal line angle (fig.3 d). As in the maxillary arch, if all teeth are within 0.50 mm of proper alignment, no points are scored.

In the premolar-cuspid region of both maxillary and mandibular arches, the contact points of these teeth should be used to score alignment (figs.3 e-f). These landmarks should be verified from the buccal view of their image (fig 3e). This is done by rotating the images to obtain proper view of the buccal surface to proper assess landmark location (not too far palatal/lingual). These landmarks shall be located on the mesial and distal contact points of adjacent teeth, closer to the labial line angle (fig

3.f). If all teeth are in alignment, or within 0.50 mm of proper alignment, no points are scored.



If all teeth are in alignment in the maxilla and the mandible, or within 0.50 mm of proper alignment, no points are scored. If the mesial or distal alignment at any of the contact points is  $>0.50$  mm to 1 mm deviated from proper alignment (figs. 3c-d), 1 point shall be scored for the tooth that is out of alignment. If adjacent teeth are out of alignment, then 1 point should be scored for each tooth. If the mesial or distal alignment at any of the contact points is  $>1$ mm, then 2 points should be scored (fig 3d). No more than 2 points shall be scored for any tooth.

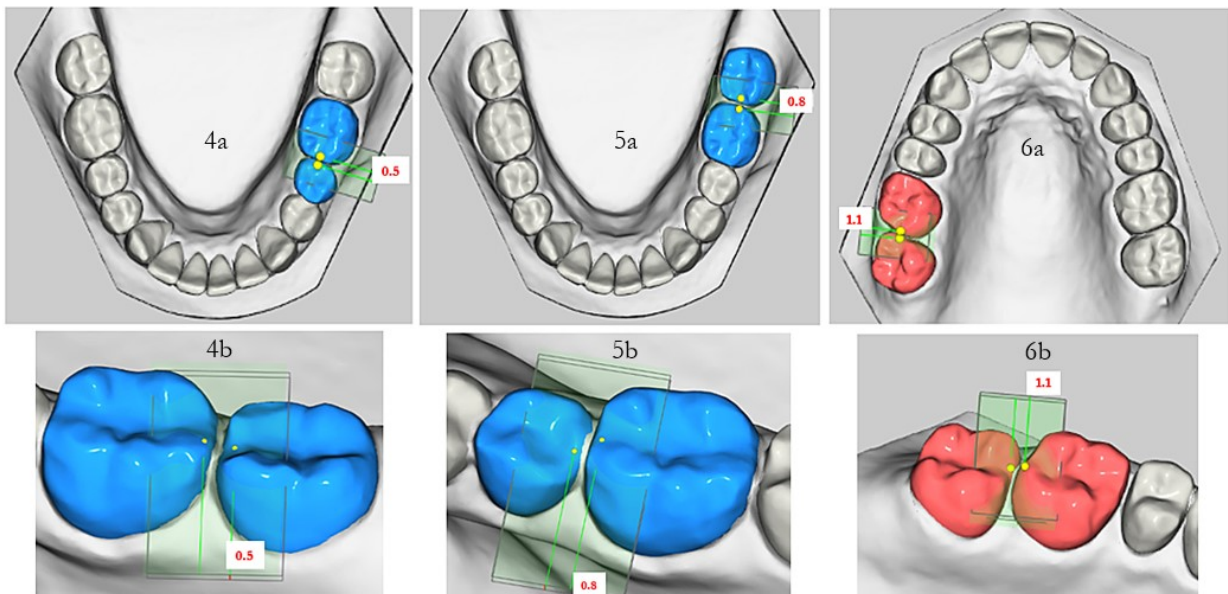
## MARGINAL RIDGES

In both maxillary and mandibular arches, marginal ridges of adjacent posterior teeth shall be at the same level, or within 0.50 mm of the same level (fig.4a,4b)

In scoring, do **not** include the canine-premolar contact; and do not include the distal of the mandibular first premolar.

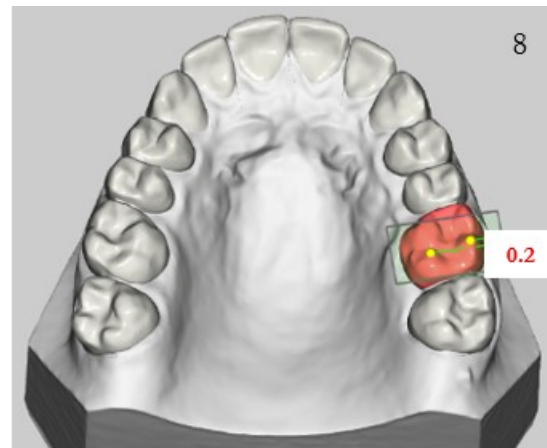
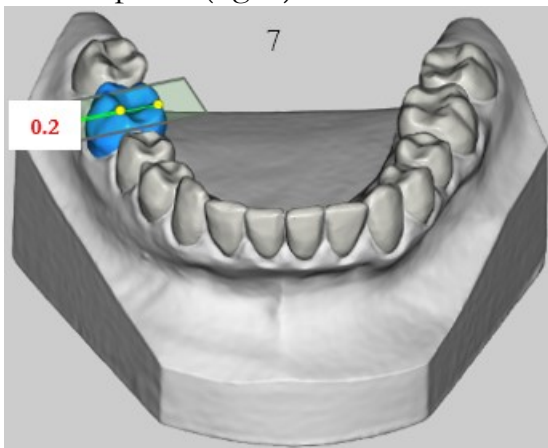
If adjacent marginal ridges deviate from 0.50 to 1 mm (fig. 5a,5b) then 1 point is scored for that interproximal contact. If the marginal ridge discrepancy is greater than 1 mm (fig. 6a,6b), then 2 points shall be scored for that interproximal contact. No more than 2 points will be scored for any contact point. The landmarks for scoring of marginal ridges are placed at the center of the mesial and distal marginal ridges of adjacent teeth and in alignment with the mesial and distal ends of the central grooves of adjacent teeth. Viewing the landmarks from the buccal and lingual by rotating the images, helps identifying the proper placement of the landmarks. (Fig.4b- 6b)





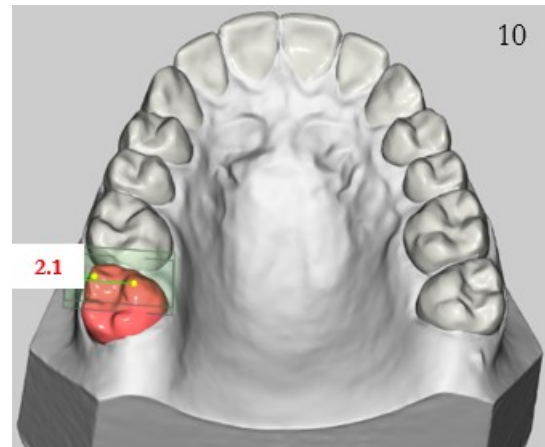
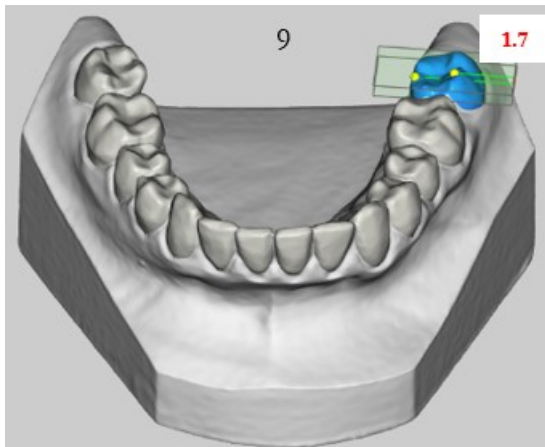
## BUCCOLINGUAL INCLINATION

The buccolingual inclination of the maxillary and mandibular posterior teeth shall be assessed by using a computer generated reference plane that is extended between the occlusal surfaces of the right and left posterior teeth. When positioned in this manner, the reference plane should contact the buccal cusps of the contralateral mandibular molars and premolars. The buccal cusps of the maxillary premolars and molars and lingual cusps of the mandibular premolars and molars should be within 1 mm of the surface of the reference plane (fig. 7-8) The landmark locations for this parameter are at the height of contour of the buccal and lingual cusps of the premolars and mesio-buccal and mesio-palatal/lingual cups of the molars. In the mandibular arch, the lingual cusps should be within 1 mm of the surface of the reference plane (fig. 7). In the maxillary arch, the reference plane should contact the lingual cusps of the maxillary molars and premolars. The buccal cusps should be within 1 mm of the surface of the reference plane (fig. 8).



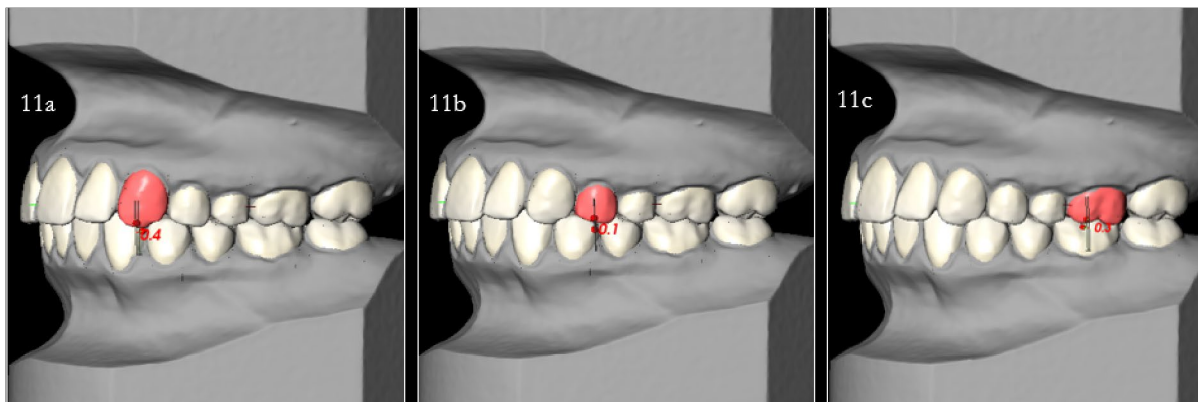
Do **not** score the mandibular first premolars nor the distal cusps of the second molars.

If the mandibular lingual cusps or maxillary buccal cusps are more than 1 mm, but less than 2 mm from the reference plane (fig.9) 1 point shall be scored for that tooth. If the discrepancy is greater than 2 mm (fig.10), then 2 points are scored for that tooth. No more than 2 points shall be scored for any tooth.

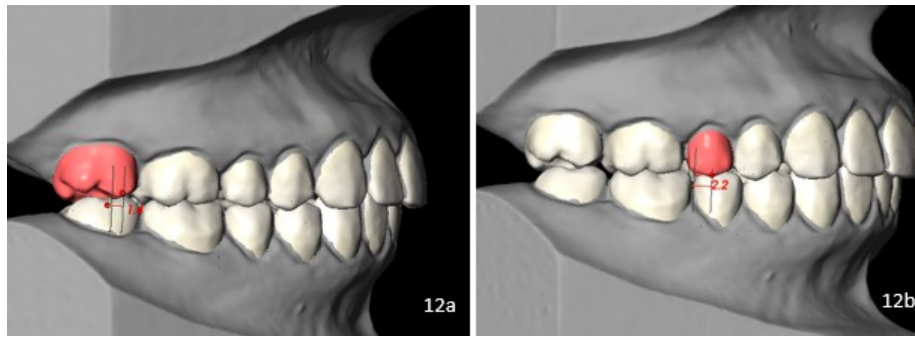


## OCCLUSAL RELATIONSHIP

This section of the evaluation determines whether the occlusion has been finished in an Angle Class I relationship. Ideally, the maxillary canine cusp tip should align with (or within 1 mm of) the embrasure or contact between the mandibular canine and adjacent premolar (fig.11a). The buccal cusps of the maxillary premolars should align with (or be within 1 mm of) the embrasures or contacts between the mandibular premolars and first molar (fig.11b) The mesio-buccal cusps of the maxillary molars should align with (or be within 1 mm of) the buccal grooves of the mandibular molars (fig11c).



If the maxillary buccal cusps deviate between 1 and 2 mm from the aforementioned positions (fig.12a), then 1 point shall be scored for that maxillary tooth. If the buccal cusps of the maxillary premolars or molars deviate by more than 2 mm from ideal position (fig.12b) points shall be scored for each maxillary tooth that deviates. No more than 2 points shall be scored for each maxillary tooth. In some situations, the posterior occlusion may be finished in either an Angle Class II or Class III relationship, depending upon the type of tooth extraction in the maxillary or mandibular arches.



In a Class II situation the buccal cusp of the maxillary first molar should align with the embrasure or interproximal contact between the mandibular second premolar and first molar. The buccal cusp of the maxillary second molar should align with the embrasure or interproximal contact between the mandibular first and second molars. If the final occlusion is finished in a Class III relationship (when mandibular premolars are extracted), the buccal cusp of the maxillary second premolar should align with the buccal groove of the mandibular first molar. The remaining occlusion distal to the maxillary second premolar and mandibular first molar are adjusted accordingly.

## OVERJET

(Scoring in the Posterior and Anterior Segments)

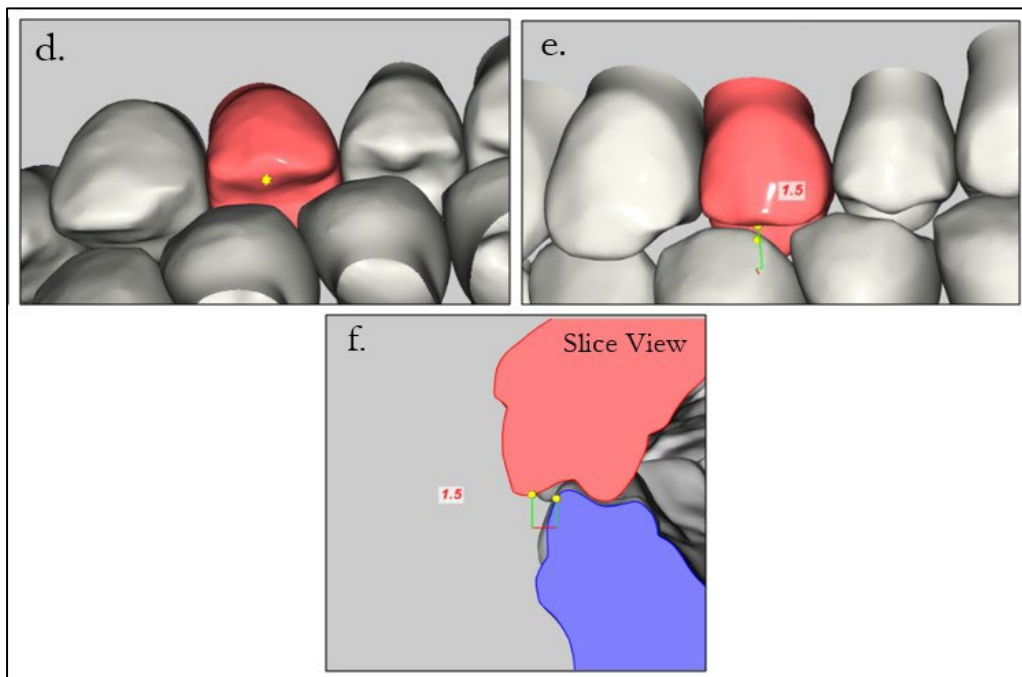
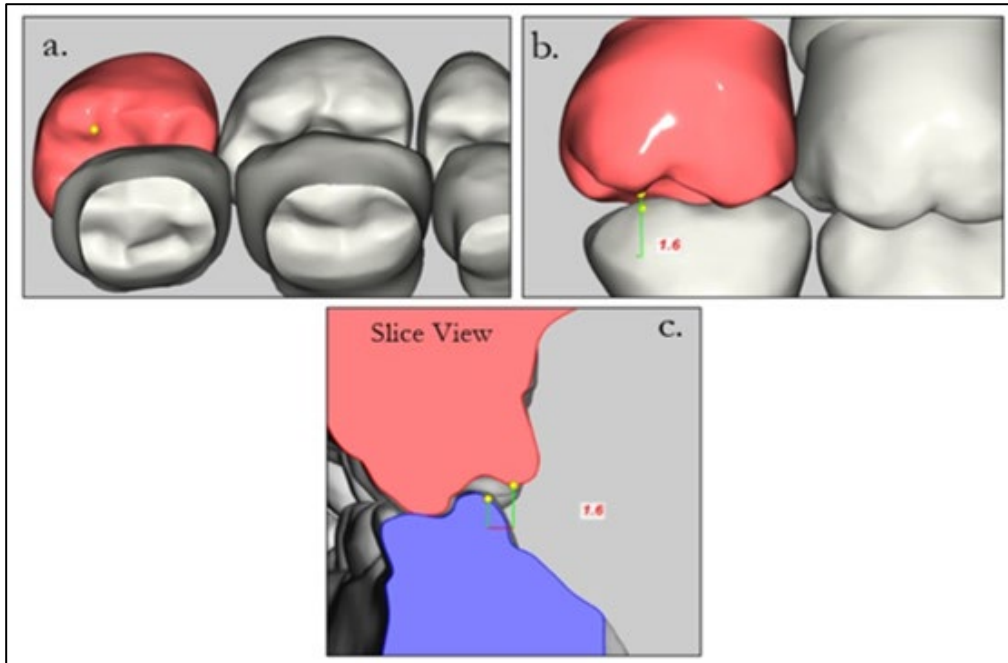
0.0 to 0.5mm- no points scored

0.6 to 1.5mm- 1 point scored

1.6 and beyond- 2 points scored

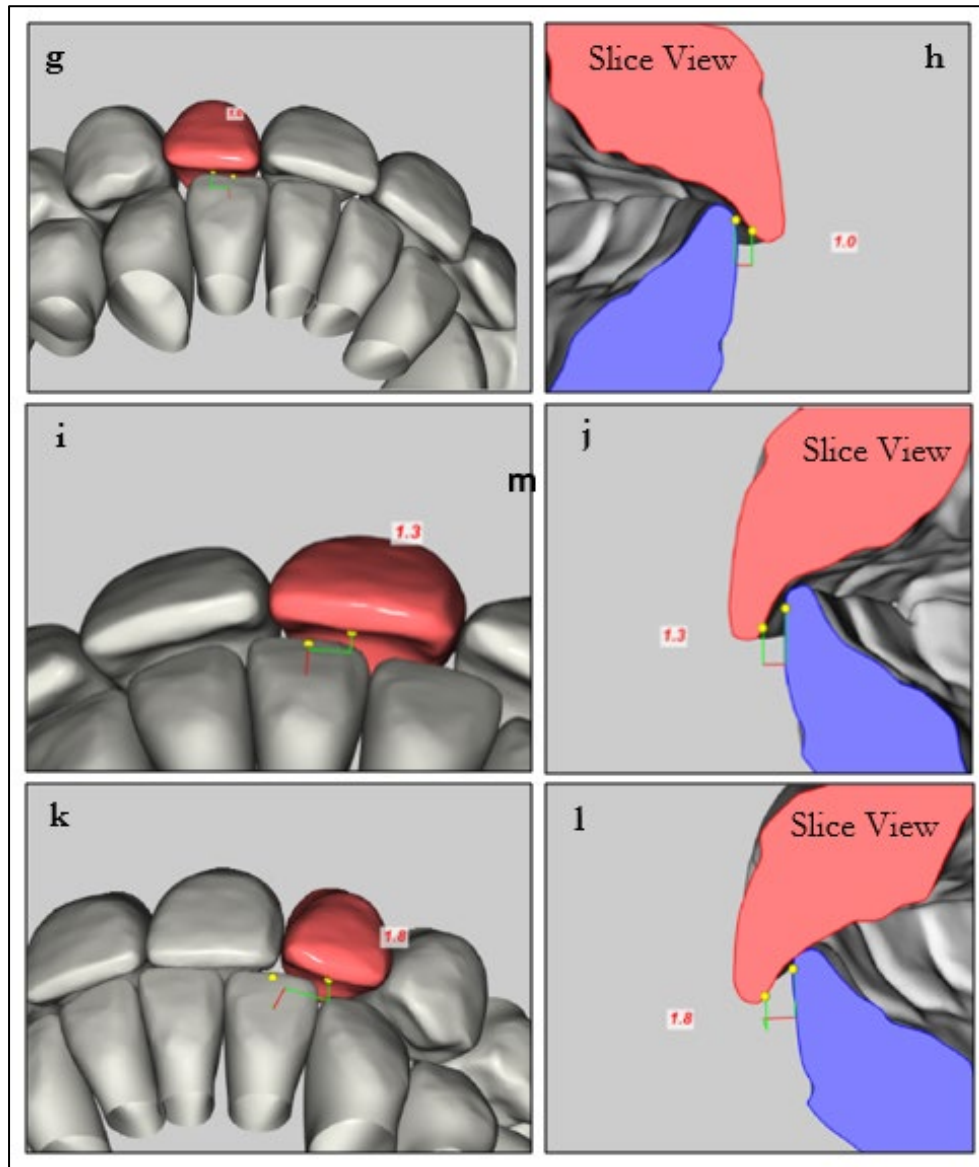
The **posterior overjet** is evaluated by using digitally articulated 3D casts and measuring the bucco/palatal relationships of the maxillary posterior teeth to the mandibular posterior teeth. The amount of discrepancy is measured in a perpendicular relationship to an ideal archform that is constructed in relationship to the patient of record. The landmarks for posterior overjet measurements shall be located for the maxillary molars and premolars on the height of contour of the palatal surface of the buccal cusp. The mandibular landmarks should be located on the height of contour of the buccal ridge and in alignment with the cusp tip of the buccal cusp of the corresponding opponent maxillary molar. For the maxillary molars, the cusp further away from the opponent molar must be measured. The vertical position of the landmarks is within the occlusal 1/3 of the buccal surface. Please note that to measure the posterior overjet, the maxillary landmark must be located first on the tooth being measured, as specified before. Then, the mandibular landmark shall be placed at the height of contour of the buccal ridge of the corresponding mandibular tooth. The value for overjet will now be displayed (fig. a-f).

The sagittal cut (slicer) of the software will aid in more accurate placement of the landmarks. (fig. c, f)





The **anterior overjet** is evaluated by using digital articulated 3D casts to measure the labio-lingual relationships of the maxillary anterior teeth anterior teeth to the mandibular teeth. The proper anterior overjet has been established when the labial-incisal edges of the mandibular anterior teeth are in light contact with the palatal surfaces of the maxillary anterior teeth at a vertical position that is directly within the incisal one third (1/3) of the labial surface of the mandibular anterior teeth. The landmarks location for the maxillary central and lateral incisors should be vertically within the 1/3 of their palatal incisal incline. (fig. h, j, l) Horizontally (mesio-distally), it should be in the center (mesio-distally) of the tooth. The mandibular landmarks shall

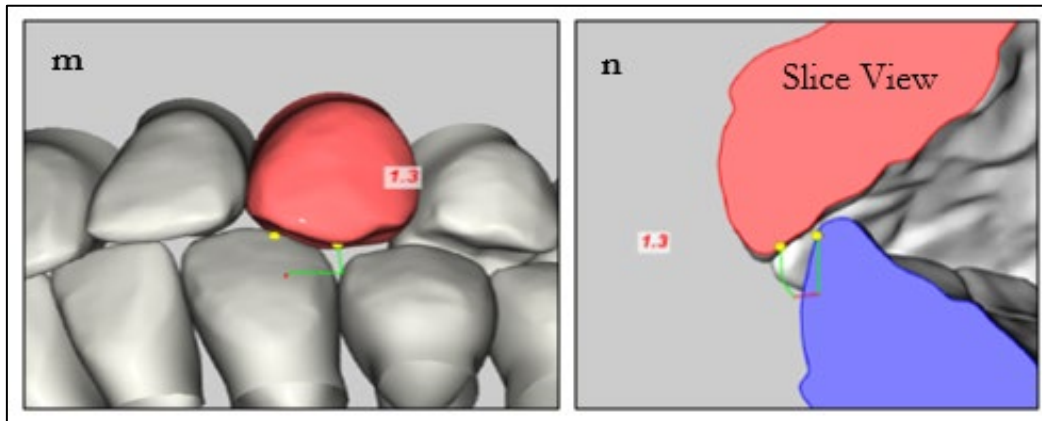


be located horizontally on the center (mesio-distally) of the labial surface of the incisors and vertically within the labial 1/3 of their labial surface. (fig. g, i, k) Landmark location



for the maxillary canines is at the height of contour of the palatal surface of the buccal cusp and vertically within the incisal 1/3 of their palatal incline

Disarticulate the models for better landmark placement. Use the slicer as a guide. Change the landmark location on the disarticulated occlusal view of the tooth using the slicer s the guide.



## ROOT ANGULATION

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 each other. (fig.19)



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).



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.

