Occlusal Radiology. Neill Serman Aug. 00.

Principles of Dental Imaging. Langland and Langlais
W&P Pgs. 158 - 164

There is no textbook that adequately discusses this complete topic and this lecture was compiled from several textbooks. The occlusal film is a very versatile film that can be used extra orally with the dental X-ray machine for many reasons as well.

An occlusal radiograph is a radiograph designed to be placed between the occlusal surfaces of the teeth with the central beam directed at 90^{o} or at 50 -60^{o} to the plane of the film depending on what is required to be viewed. The occlusal film comes as either D or E speed film [E 041 (or 42) or **Insight** 41 or 42 (DF 50)] and the package and contents are the same as intra-oral films; but about 2.25 x 3 inches in size. This is one of the few projections that a short cone is utilized resulting in a larger beam, as one requires to radiograph a **larger** area of the mouth. The Insight tab is colored beige.

The object of the **topographic** occlusal projection [50 -60^{o}] is to show a *similar* angle but larger areas of anatomy [and pathology] that can not viewed on a periapical radiograph. The object of the **cross sectional** [90^{o}] projection is to see the relationship of objects to the teeth in the arch. I.e. whether a root / supernumary tooth is lying lingually or buccally.

The film is placed on the occlusal surfaces of the teeth and held **gently** in position by the patient **gently** biting on the film. If the patient bites hard, the teeth marks will be seen on the film because energy has been created. In edentulous mouths cotton rolls can be placed on the other side of the film when the patient closes the mouth or a hemostat can be utilized to hold the film. Sometimes, as a last resort, in edentulous mouths, the patient is required to hold the film in position with the thumbs [for the maxilla] or fingers [for mandible] placed over the alveolar ridges.

One can either take anterior or posterior [W&P call it a Lateral] projections, depending on the area that requires to be investigated. The **mandibular occlusal projection** is taken when images of the floor of the mouth [sialoliths], mandibular tori, position of supernumary, roots or impacted teeth, fractures, foreign body, are required to be viewed. The **maxillary occlusal projection** can be taken to view images of the hard palate, the nose, the maxillary sinus and for most of the reasons one takes the mandibular view. It is a particularly suitable view when a panoramic view is not available in private practice. It is the projection of choice when several implants in the anterior part of the jaws want to be viewed.

Head Position.

The head can be placed in any position but for the maxillary view, it is easier to position the patient with the occlusal surface of the jaw to be exposed, horizontal. For the mandibular view, one is forced to ask the patient to elevate the head as the cone will otherwise be resting on the chest of the patient. See diagram.

Film Position.

If the area of interest extends antero posteriorly then the long axis of the film should be in the same direction. If the area of interest extends from side to side then the long axis of the film should

be in the same direction. Always ensure that the film is placed with the correct side toward the source of radiation.

Angulation.

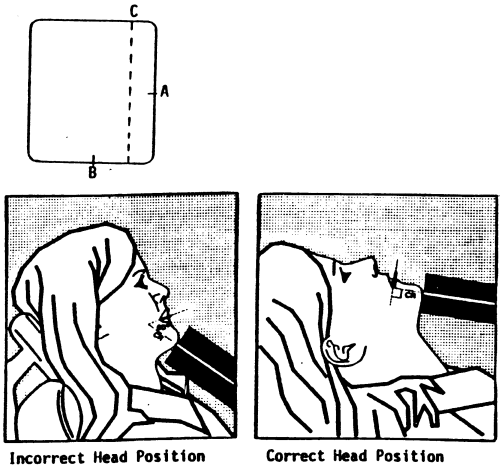
One requires to decide whether a topographical view (50 - 60^{o}) is required or whether a cross section view (90^{o}) is required. One usually never takes a cross sectional view of the maxilla because of the large amount of radiation given to the brain. The maxilla is a **positive** angulation and the mandible is a **negative** angulation. For the topographic view some people recommend 60 - 65^{o} for the maxilla and 50 - 55^{o} for the mandible.

Exposure factors.

Short Cone for all occlusal views
E - speed film. 10 mA; 85 - 90 kVp; 12 - 18 impulses
For children and edentulous patients reduce the exposure time.

Technique.

For **<u>posterior views</u>**, before placing the film in the mouth, mark it as is shown on the film with point "A" to be placed opposite the second premolar or where that tooth would have been. The film should be placed in the mouth with the long axis of the film in an antero-posterior position and with the posterior teeth biting within and parallel to line "C".



The indicating lines on the side of the short cone must be placed so that they are positioned vertically and horizontally. The horizontal line must initially be placed parallel to the film in the mouth. The angle must then be increased in a positive or a negative direction by the amount that is required to give a cross sectional [90^{o}] or topographic [55- 60^{o}] view. The vertical line on the cone must be placed opposite point "B" on the film and the horizontal line on the cone must be placed opposite point "A" on the film to ensure that the central ray will be in the middle of the film and that there will be no cone cutting. Thus, the central ray is being directed at the apex of the second premolar tooth.

For **anterior views** one requires to mark the film as shown only with positions "A" and "B" and the lines on the cone must be placed as explained for the posterior views. If the area / pathology to be viewed is situated antero-posteriorly then place the long axis of the film antero-posteriorly. One rarely takes a cross sectional view of the maxilla because of the large radiation dose to the brain.

One always prefers to use **cassettes,** if available, when taking **extra oral** projections as the **intensifying screens** markedly reduce the amount of radiation to the patient. Where possible screen film should always be used for extra-oral views to keep patient exposure to a minimum.

Reverse Topographic Anterior Mandibular Projection.

Where a patient has trismus or the teeth have been wired together, and the mouth cannot be opened, an occlusal film can be placed under the patient's chin. The central ray is directed **perpendicular to the bisector** of the angle formed by the teeth and the film. The apices of the mandibular anterior teeth will be seen. This is a very suitable projection for viewing fractures of this area before or after the jaws have been wired together. If the film is moved to the side of the face images of the mandibular premolar teeth can be seen.

Lateral Oblique Projection

Where a panoramic machine or a cassette is not available, an occlusal radiograph can be utilized to view impacted third molars. Place the film with the long axis horizontal; the inferior border of the film must be placed opposite the inferior border of the mandible and the posterior border of the film opposite the posterior border of the ascending ramus. Ask the patient to turn their head at 90^{o} and place the angle of the cone at **minus 15 - 20^{o}**. Aim the central beam at the first or second mandibular / maxillary molar tooth, depending on the area to be viewed. Part of the ascending ramus will also be seen.

Nasal Projection.

This film can be utilized to check for fractured fingers or nose. For the nasal view, place the film about an inch from the nose and parallel to it. Reduce the exposure factors as the nasal bones are very this. For very small children a size 2 periapical film can be substituted.