

OCCLUSION

Occlusal theory
Temporomandibular disorders
Occlusal disease
Osteoarthritis of TMJ
Disease of lateral pterygoid muscle (provisional name)
Disease of retrodiscal tissue (provisional name)
Centric relation
Determining of centric relation
Malocclusion
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Occlusal plane

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(OCCLUSION)

Occlusal plane

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(OCCLUSAL PLANE)

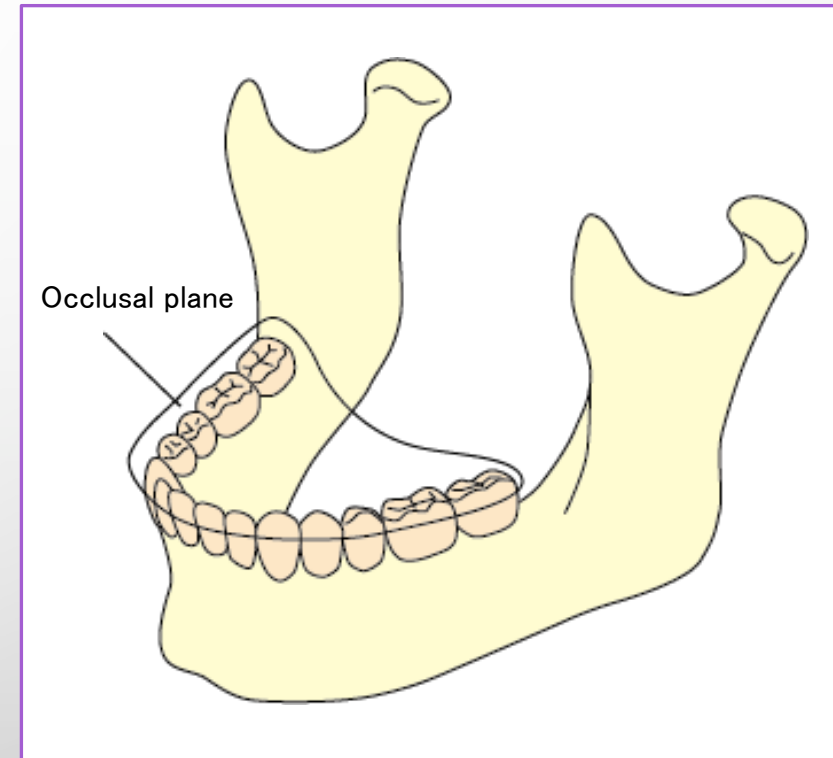


1. What is occlusal plane?

The “occlusal plane” is the plane obtained by contiguity of the incisal incisors and the occlusal apex of the posterior molars. As shown in the right illustration, the occlusal plane is not a flat surface, but a curved surface that averages the occlusal surfaces of the teeth. The occlusal plane consists of three curves: the curve of the anterior teeth, the anterior–posterior curve of the molars (Spee’s curve), and the lateral curve (Wilson’s curve).

The curve of the anterior teeth is determined by the esthetics of the maxillary dentition and the requirements for anthesis guidance and phonation. These will be discussed at another time.

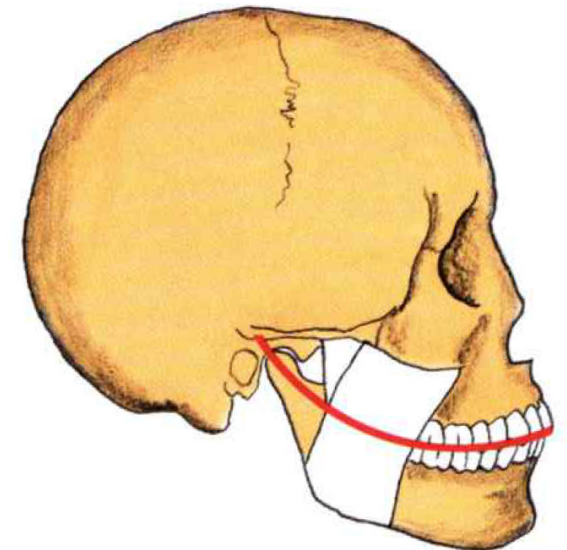
In this article, Spee’s and Wilson’s curves will be discussed.



(OCCLUSAL PLANE)

2. Curve of Spee

As shown in the upper right illustration, Spee's curve is an anteroposterior/posterior folding of the occlusal plane and is a curve that begins at the apex of the mandibular canine, continues through the buccal cusps of the premolars and molars, and ends at the anterior margin of the mandibular ascending branch. As shown in the lower right illustration, this curve is further traced backward, ideally to the mandibular condyle. The radius of this curve is estimated to average 4 inches.



(from Functional Occlusion)



(OCCLUSAL PLANE)



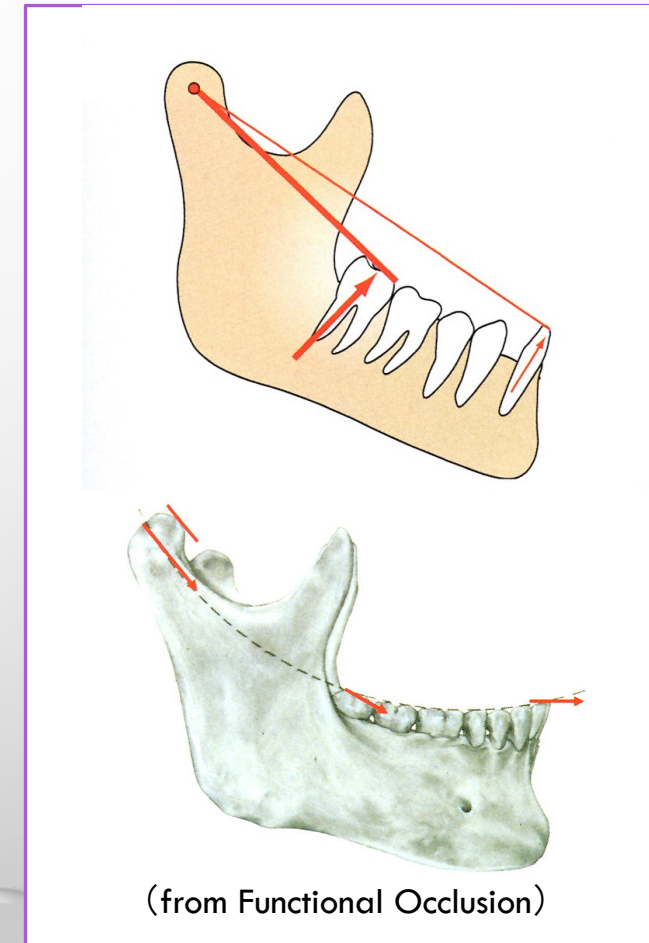
3. Relation between curve of Spee and masticatory function

Curve of Spee is closely related to masticatory function.

As shown in the upper right illustration, the long axis of each mandibular tooth roughly corresponds to the arc of the trajectory of each tooth as it closes its mouth around the mandibular condyle. As a result, the mandibular teeth are able to withstand the functional load to the greatest extent possible. The tooth axis of the most posterior tooth will be more strongly inclined than that of the anterior tooth.

This curve is also related to the condylar path during mandibular forward movement. As shown in the lower right illustration, if the occlusal plane is on an arc passing through the mandibular condyle, then even if the mandibular anterior guidance channel is flat, the molar occlusion can be detached because of the slope of the condylar angle.

Based on the above, Curve of Spee is closely related to masticatory function, especially mandibular forward movement.



(OCCLUSAL PLANE)

4. Curve of Wilson



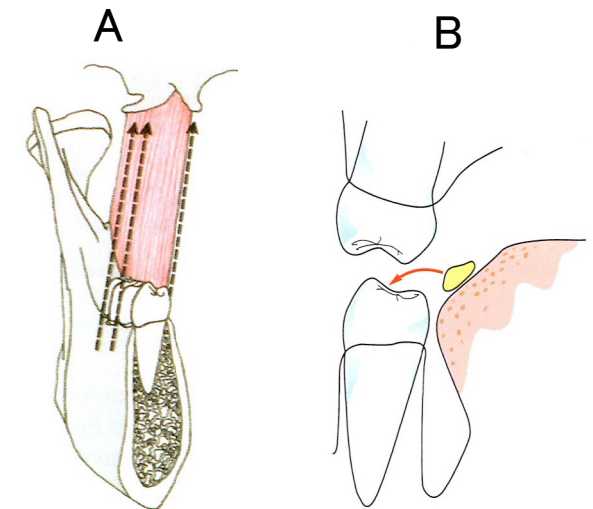
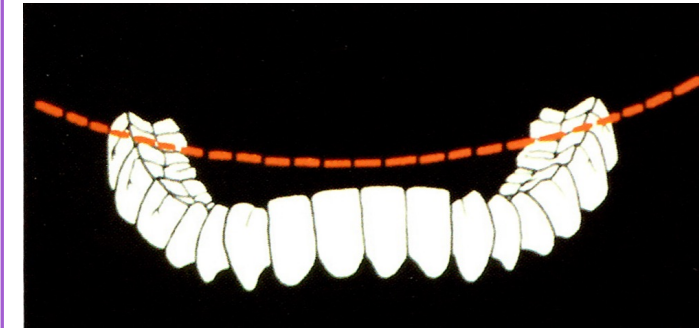
The Wilson's curve is a frontal plane continuous curve of the buccal and lingual cusps of the left and right molars, as shown in the upper right illustration. This curve is caused by the lingual cusp of the mandibular molars being lower than the buccal cusp. Consequently, the mandibular molars are inclined medially and the maxillary molars are inclined laterally.

This inclination has two meanings.

The first is that the direction of the long axis of the molars coincides with the direction of contraction of the medial pterygoid muscle, as shown in the lower right illustration A. The alignment of the upper and lower jaw molars in line with the major direction of contraction of the closing muscles creates resistance of the molars to external forces when masticatory forces are generated.

Second, as shown in the lower right illustration B, the occlusal plane of the mandibular molars is inclined lingually, which allows the food mass to be transferred to the occlusal table without interference from the lingual cusps of the mandible. In addition, the outward inclination of the maxillary molars allows the transfer of the buccal food mass onto the occlusal table by strong contraction of the buccal muscles.

Based on the above, Curve of Wilson is closely related to molar resistance and masticatory function.



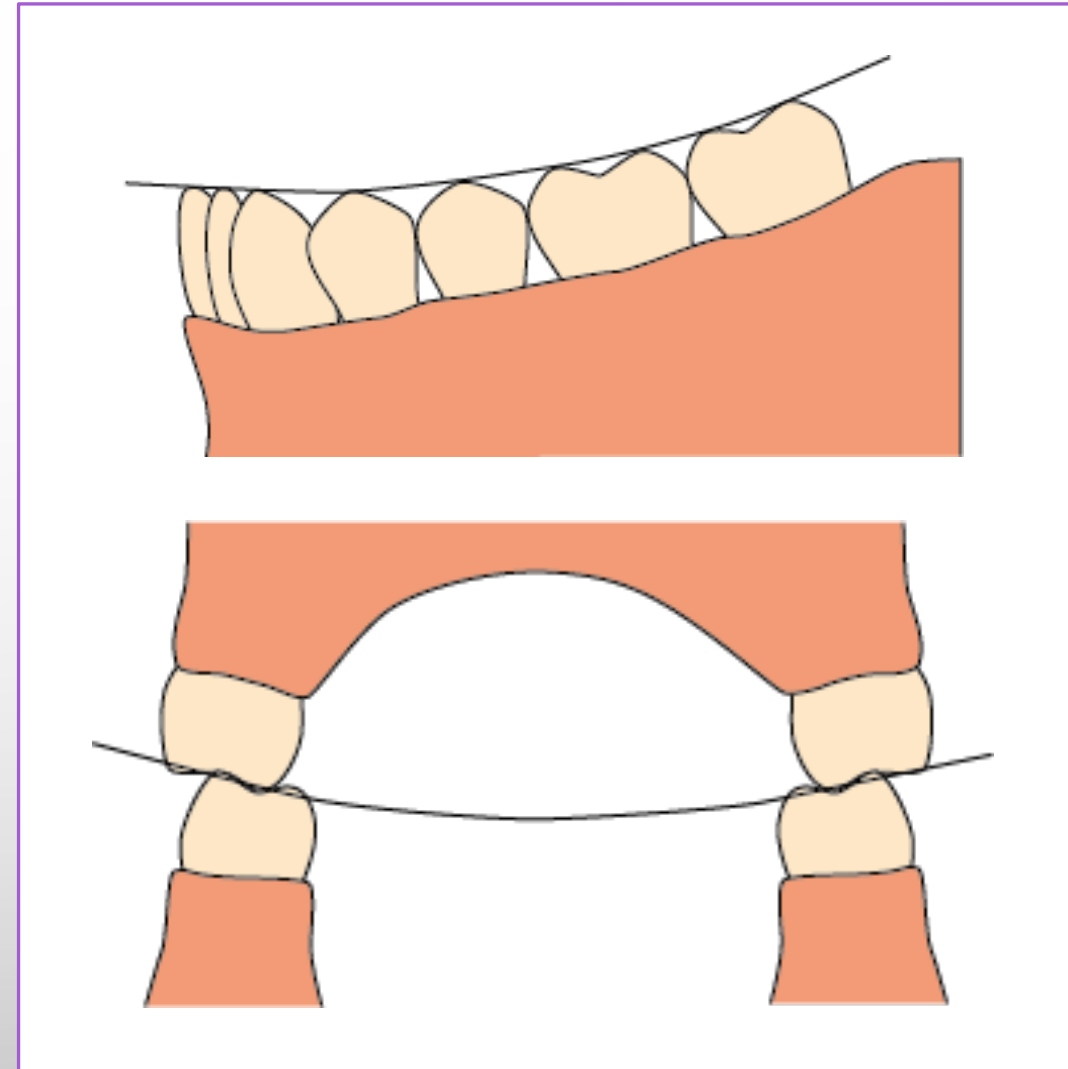
(from Functional Occlusion)

(OCCLUSAL PLANE)

5. Normal occlusal plane

The normal occlusal plane, viewed from the side, has a concave curve, as shown in the upper right illustration. This curve is necessary for smooth movement of the mandible in the anteroposterior direction.

Next, the occlusal plane of a normal molar, when viewed from the front, shows a concave, gentle curve, as shown in the lower right illustration. This curve is necessary for smooth lateral movement of the mandible.



(OCCLUSAL PLANE)

6. Abnormal occlusal plane

As shown in the right study cast, abnormal occlusal planes can result from inadvertent occlusal equilibrations, improper prosthetic placement, inadequate prosthetic occlusal surfaces on implants, or interrupted orthodontic treatment. There are several types of abnormal occlusal planes, including

- (a) Part of the molar occlusal plane protrudes from the occlusal plane
- (b) Mandibular #8 protrudes
- (c) Abnormal height of left and right molar occlusal planes
- (d) Inverse curve of occlusal plane

Each of these is explained below.



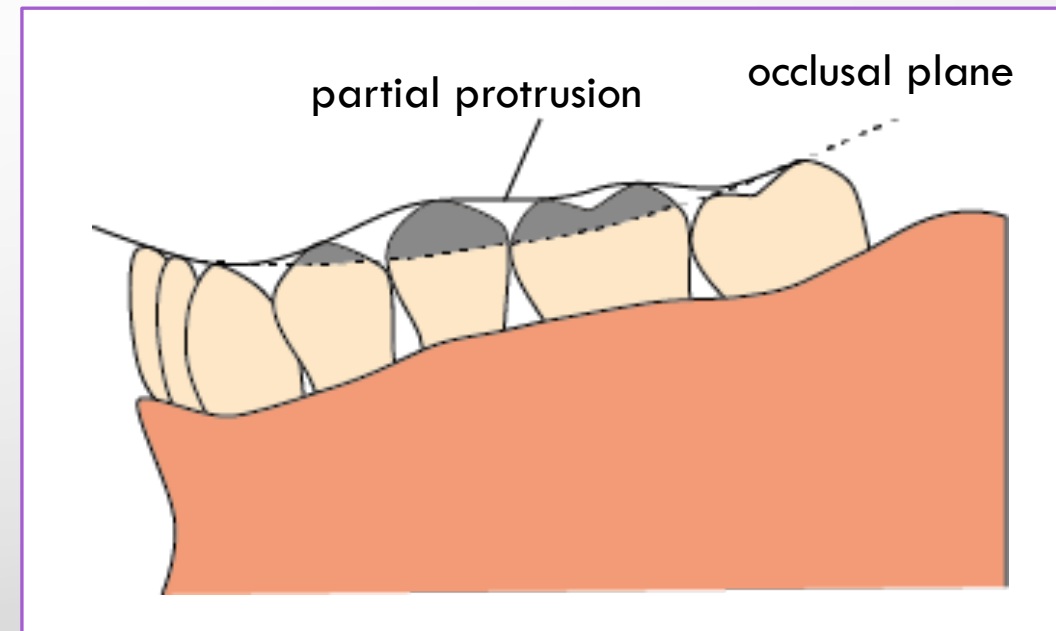
(OCCLUSAL PLANE)



6. Abnormal occlusal plane

a) Part of the occlusal plane of the molars protrudes from the occlusal plane

As shown in the right illustration, the occlusal plane can be disturbed by a partial protrusion of the molar occlusal surface. This protrusion interferes with the smooth movement of the mandible from side to side and back to front, contributing to functional malocclusion. This functional malocclusion induces strong clenching of the teeth, which places chronic stress on the muscles and temporomandibular joints, resulting in a variety of disorders.



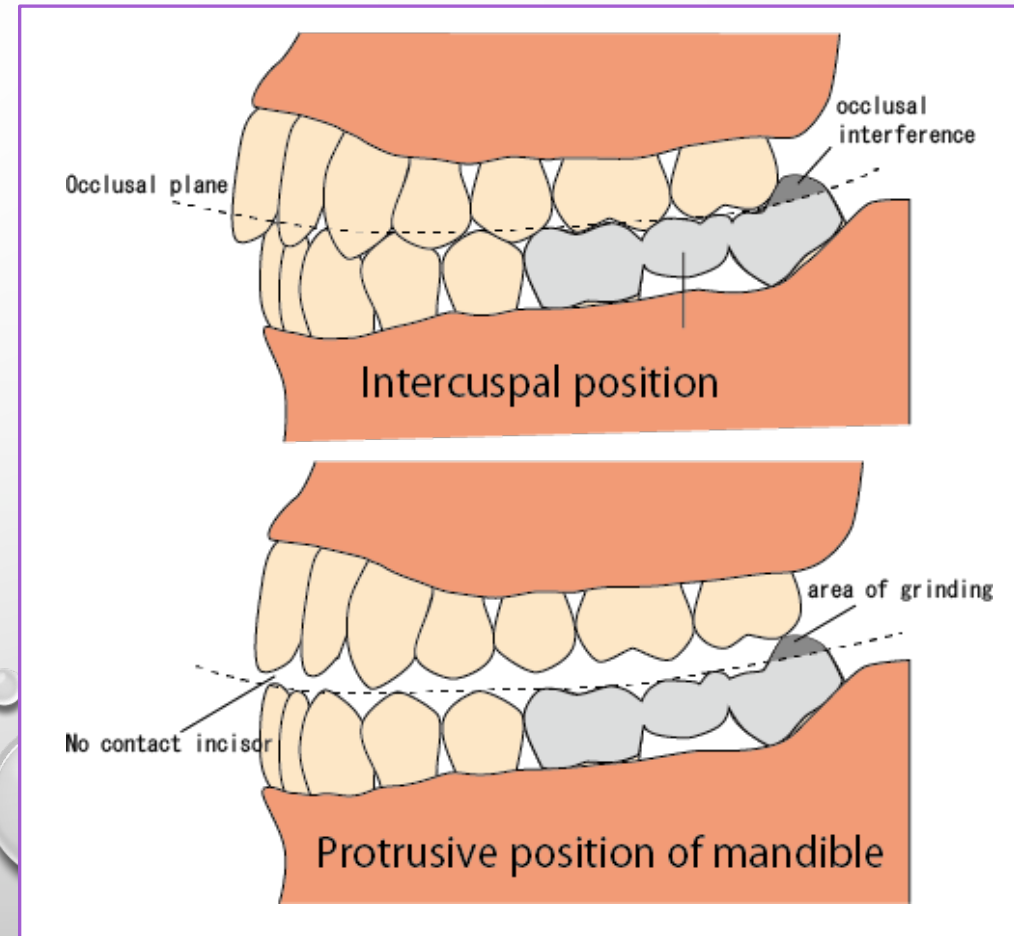
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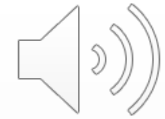
6. Abnormal occlusal plane

b) Mandible no. 8 protrudes from the occlusal plane

The most common type of occlusal plane with partially protruding molars is a bridge with a mandibular wisdom tooth as the abutment, as shown in the upper right illustration, in which tooth #8 protrudes from the occlusal plane. In this case, there is no abnormality in the intercuspital position and centric relation, but as shown in the lower right illustration, when the mandible is moved forward, the protruding part makes strong contact and prevents the front teeth from making contact. As a result, the patient is unable to chew through noodles with the front teeth, and strong teeth grinding during sleep is induced in an attempt to resolve this malposition.



(OCCLUSAL PLANE)

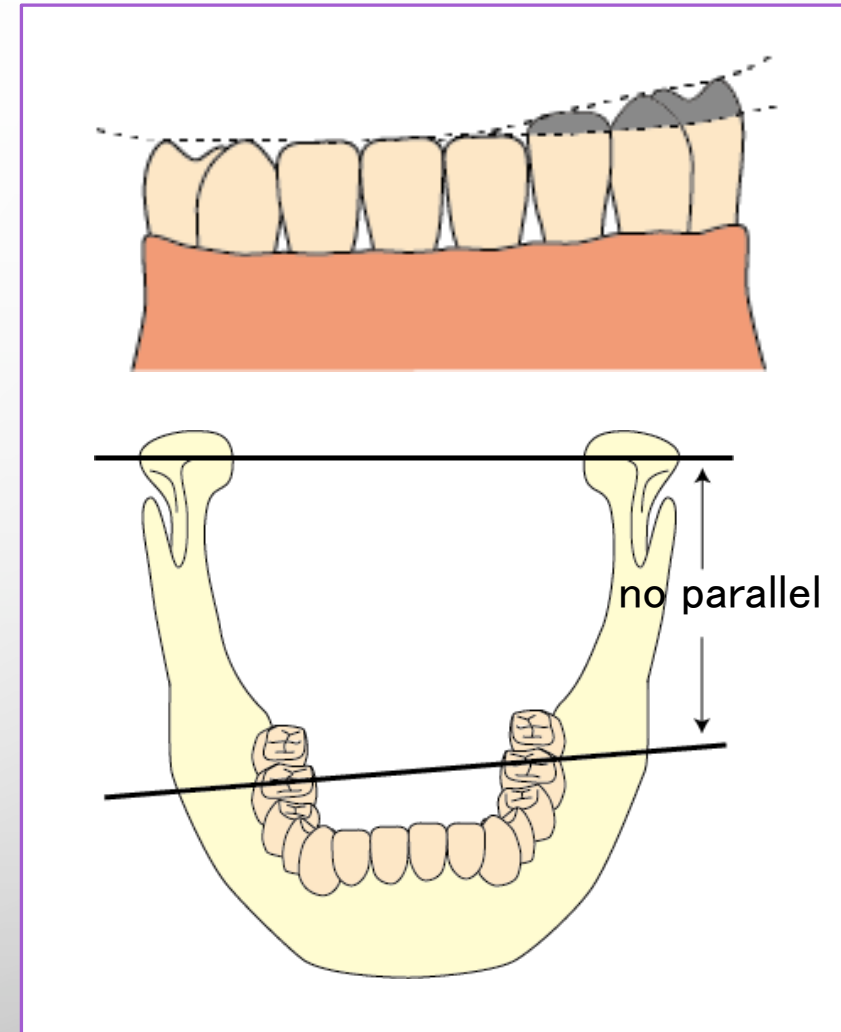


6. Abnormal occlusal plane

c) Abnormal height of molar occlusal plane

As shown in the upper right illustration, the height of the left and right molar occlusal surfaces may differ. Possible causes include submission of a contralateral tooth after extraction of a molar, placement of a prosthesis with improper occlusion, failure of occlusal equilibration, or improper height of a crown on an implant. If this abnormal occlusion is left untreated for a long period of time, a variety of disorders can occur.

Determination of the height of the left and right molar occlusal surfaces is based on an imaginary line connecting the left and right temporomandibular joints. Examination of the teeth alone or analysis of the study cast alone cannot detect this abnormality. Determination of the height of the left and right molar occlusal surfaces is based on an imaginary line connecting the left and right temporomandibular joints. Examination of the teeth alone or analysis of the study cast alone cannot detect this abnormality. This can be confirmed by using a study cast mounted with a facebow on a semi-adjustable articulator .



(OCCLUSAL PLANE)

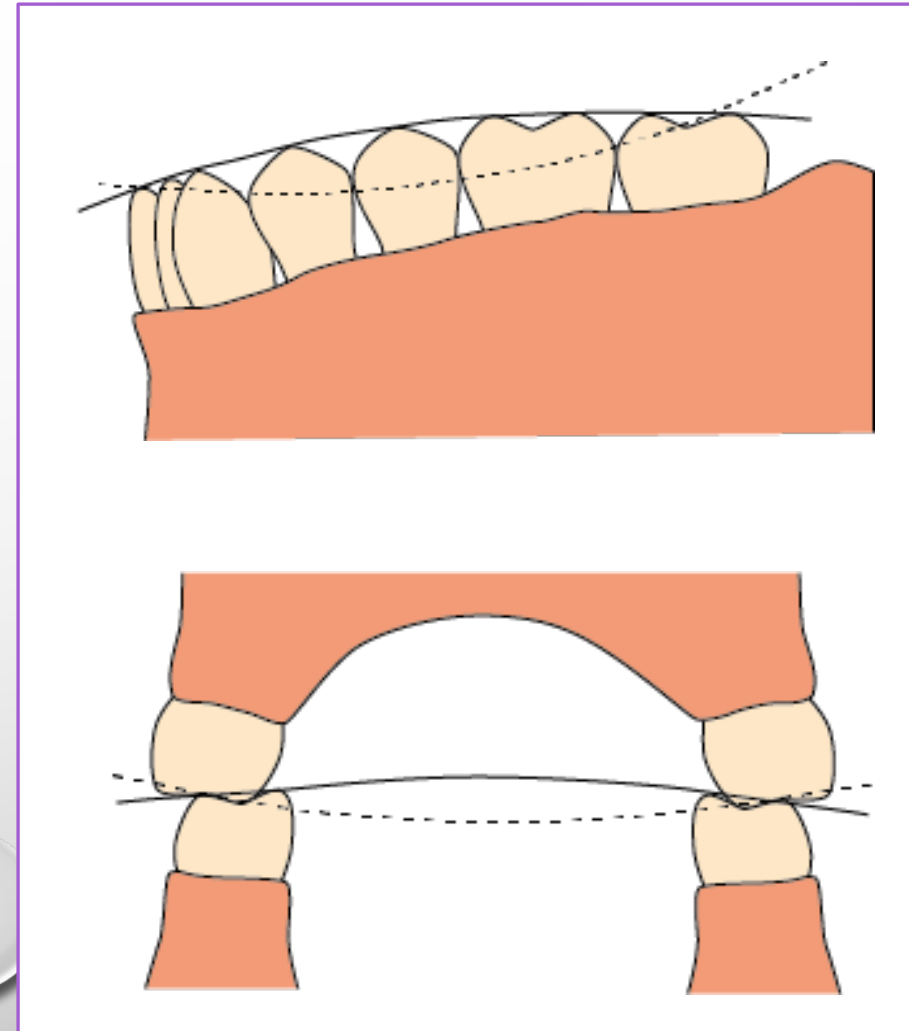


6. Abnormal occlusal plane

d) Inverted curve of occlusal plane

The normal occlusal plane has a concave gentle curve. On the other hand, the reverse-curved occlusal plane, when viewed from the side, has a convex curve, as shown in the upper right illustration. In this condition, normal mandibular motion is disturbed when the mandible is moved back and forth.

The inverted curved occlusal plane, when viewed from the front, has a convex curve, as shown in the lower right illustration. If the mandibular molar lingual cusps are too high, when the mandible is moved sideways, the mandibular lingual cusps make strong contact, and the front teeth, especially the canines, are unable to engage. This induces strong clenching of the teeth, and the muscles and temporomandibular joints that make up the masticatory system suffer from various disorders.



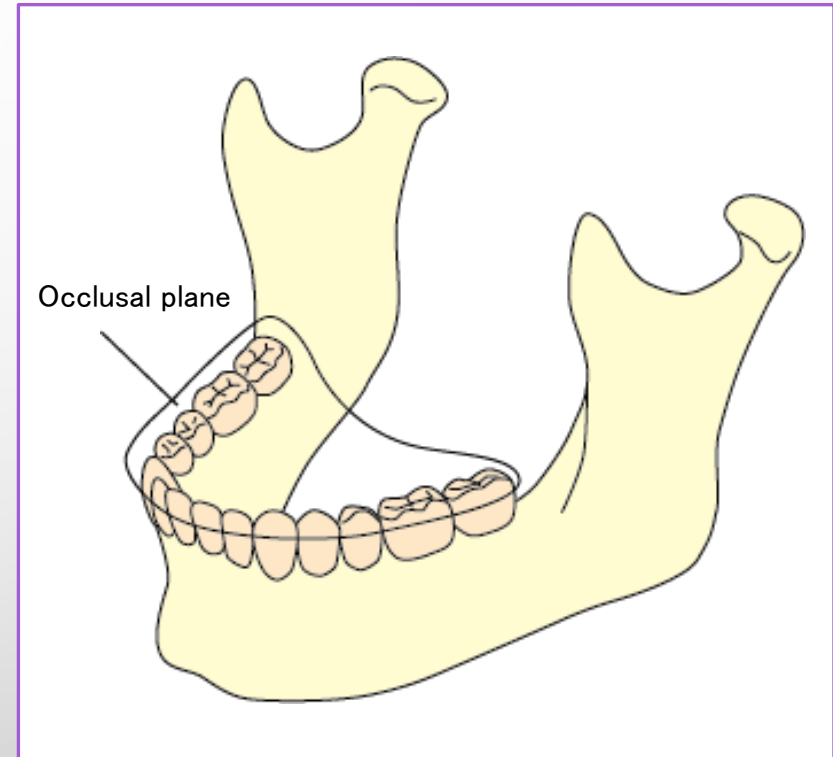
(OCCLUSAL PLANE)



Summary

Morphological malocclusions in the occlusal plane are related to functional movement of the mandible. In other words, the presence and type of functional malocclusion can be predicted if abnormalities are found in the patient's occlusal plane. The final determination of the adequacy of the occlusal plane should not be based on the ideal morphology of the occlusal plane, but on the functional malocclusion state based on occlusal analysis.

It is also very important to identify the morphological characteristics of the occlusal plane during the initial examination. By understanding the morphological characteristics of the patient's occlusal plane, it is possible to predict the presence or absence and type of malocclusion and to obtain important information for selecting the examination and tests necessary for occlusal analysis.



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Occlusal plane



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If you have any questions or doubts, please leave them in the public comment section below.

The next topic will be ” Vertical dimension ”.