

Tooth mobility

INTRODUCTION:

Mobility is defined as the degree of looseness of the tooth in its socket. All teeth have a slight degree of physiologic mobility which varies for different teeth & at different times of the day. It is greatest on arising in the morning & progressively decreases.

Types Of Tooth Mobility:

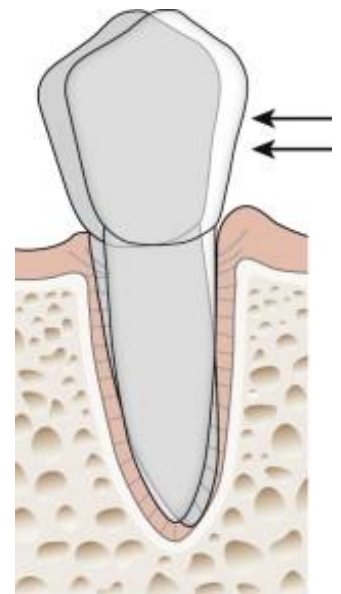
1. Physiologic tooth mobility
2. Pathologic tooth mobility

1. PHYSIOLOGIC TOOTH MOBILITY: It refers to a moderate force exerted on the crown of the tooth surrounded by a healthy & intact periodontium & the tooth will show tipping movement until closer contact has been established between root & marginal or apical bony tissue.

It is greatest on arising in the morning & progressively decreases. The increased mobility in the morning is attributed to slight extrusion of the tooth because of limited occlusal contact during sleep. During waking hours, mobility is reduced by chewing & swallowing forces which intrude on the teeth in the sockets. Also, this mobility is less marked in persons with healthy periodontium than in those with occlusal habits such as bruxism & clenching.

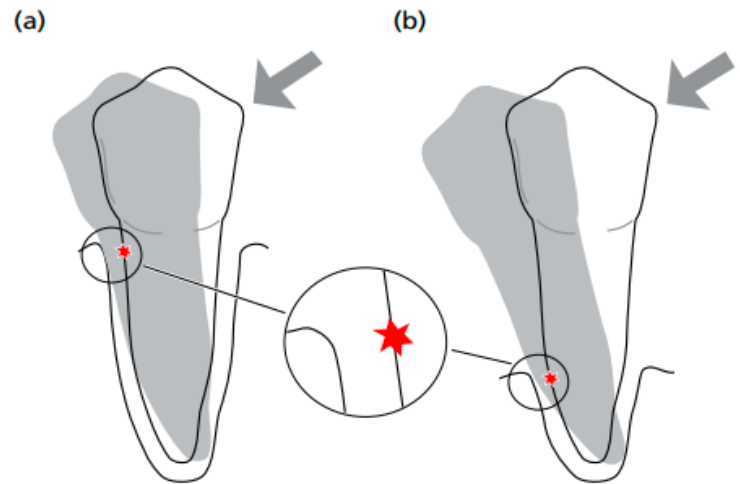
2. PATHOLOGIC TOOTH MOBILITY: progressively increasing tooth mobility, which may occur in conjunction with trauma from occlusion, is characterized by active bone resorption and which indicates the presence of inflammatory alterations within the periodontal ligament tissue, may be considered pathologic.. It is pathologic in that it exceeds the limits of normal mobility values.

however, the periodontium is not necessarily diseased at the time of examination



(a) Normal “physiologic” mobility of a tooth with normal height of the alveolar bone and normal width of the periodontal ligament.

(b) Mobility of a tooth with reduced height of the alveolar bone. The distance of the horizontal displacement of the reference point (*) on the roots is the same in the two situations (a, b)



The factors that may contribute to hypermobility:

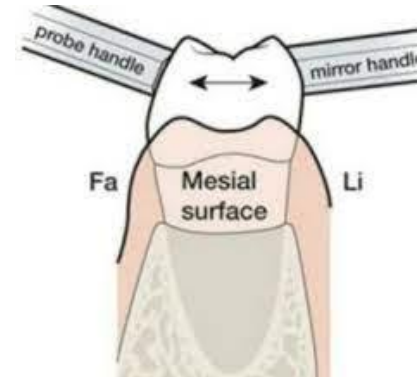
(1) a widening of the periodontal ligament as a result of unidirectional or multidirectional forces to the crown, high and frequent enough to induce resorption of the alveolar bone walls

(2) the height of the periodontal supporting tissues.

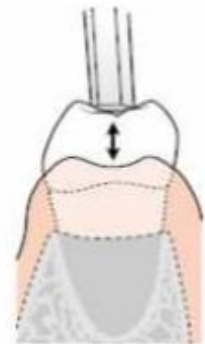
If this is reduced due to prior periodontal disease, but the width of the periodontal ligament is unchanged, the amplitude of root mobility within the remaining periodontium is the same as in a tooth with normal height, but the leverage on the tooth following application of forces to the crown is changed. Therefore, it has to be realized that all teeth that have lost periodontal support have increased tooth mobility as defined by crown displacement upon application of a given force. Nevertheless, this hypermobility should be regarded as physiologic

Tooth mobility could be in the horizontal or vertical direction

Horizontal tooth mobility is the ability to move the tooth in a facial-lingual direction in its socket. It is assessed by putting the handles of two dental instruments on either side of the tooth and applying alternating moderate pressure in the facial lingual direction against the tooth first with one, then with the other instrument handle .



Vertical tooth mobility is the ability to depress the tooth in its socket, which is assessed using the end of an instrument handle to exert pressure against the occlusal or incisal



Causes of tooth mobility

Increased mobility is caused by one or more of the following factors:

1. **Loss of tooth support (bone loss) can result in mobility**:-the factors that affect the mobility of teeth, including the **severity and distribution** of bone loss, the **length and shape** of roots, and **the size of the root compared to the crown**. Teeth with short, tapered roots are more likely to become loose than those with normal or bulbous roots. It is important to evaluate postorthodontic cases for possible root shortening, which can lead to excessive mobility. Additionally, **the severity of tooth mobility does not always correspond to the amount of bone loss** since bone loss is usually caused by a combination of factors.
2. **Gingival & periodontal inflammation**:-Mobility will occur by increasing the infiltration of connective tissues by fluid of inflammatory exudates.

3. **Trauma from occlusion** (i.e., injury produced by excessive occlusal forces or incurred as a result of abnormal occlusal habits such as bruxism and clenching) is a common cause of tooth mobility.
4. **Extension of inflammation from the gingiva or the periapex into the periodontal ligament** results in changes that increase mobility. The spread of inflammation from an acute periapical abscess may increase tooth mobility in the absence of periodontal disease
5. **Periodontal surgery** temporarily increases tooth mobility immediately after the intervention and for a short period
This results from oedema in the periodontal ligament space from the inflammation that occurs postsurgically. The mobility diminishes to the pretreatment level by the fourth week. The patient should be reassured before surgery that the mobility is temporary.
6. **Tooth mobility** is increased during pregnancy, and it is sometimes associated with the menstrual cycle or the use of hormonal contraceptives. This is unrelated to periodontal disease, and it occurs presumably because of physicochemical changes in the periodontal tissues
7. **Pathologic processes of the jaws** that destroy the alveolar bone or the roots of the teeth can also result in mobility. Osteomyelitis and tumors of the jaws belong in this category

***The three main etiologic factors of tooth mobility are periodontal inflammation, attachment loss, and occlusal trauma**

Classification of tooth mobility(T.M.) according to Miller (1950):

Increased TM may be classified

- **Degree 0:** “physiologic” mobility measured at the crown level. The tooth shows the mobility of 0.1–0.2mm in the horizontal direction within the alveolus
- **Degree 1:** increased mobility of the crown of the tooth of at the most 1mm in the horizontal direction
- **Degree 2:** visually increased mobility of the crown of the tooth exceeding 1mm in the horizontal direction
- **Degree 3:** severe mobility of the crown of the tooth in both horizontal and vertical directions, and impinging on the function of the tooth

Initial & secondary tooth mobility:

Tooth mobility occurs in the following two stages:

1-The initial or intrasocket stage:- This occurs when a tooth moves within the periodontal ligament due to viscoelastic distortion and the redistribution of periodontal fluids, inter bundle content, and fibres. ITM can be observed when a small force (100 pounds) is applied to the crown of a tooth, causing the crown to tip in the direction of the force and move only 0.05-0.1 mm. During ITM, there is a pressure and tension zone in the periodontal ligament, with a 10% reduction in width in the pressure zone and a corresponding increase in the tension zone. The P.D. ligament fibres also reorient into a position of functional readiness towards tensile strength. The degree of ITM varies among individuals and from tooth to tooth.

2-the secondary stage of tooth mobility, which occurs when a large force (500 pounds) is applied to the crown of a tooth. At this stage, the fiber bundles on the tension side cannot offer enough resistance to prevent further root displacement, resulting in the additional displacement of the crown. This movement is called secondary tooth mobility (STM) and is allowed by distortion and compression of the periodontium on the pressure side. **The degree of crown displacement when a force of 500 pounds is applied can vary among different teeth.**

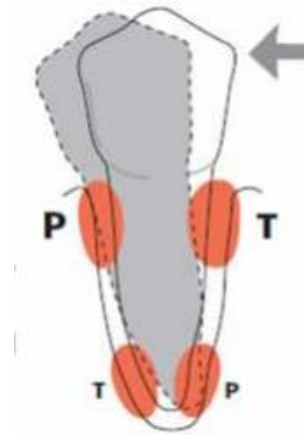
Incisors 0.1-0.12 mm

Canines 0.05-0.09 mm

Premolars 0.08-0.1 mm

Molars 0.04-0.08 mm

& it is larger in children than adults & is larger in females than males
& increase during pregnancy



Signs & symptoms of T.M

1) Patient awareness of mobility:

Mobility is discovered by chance when the patient's attention is drawn to the tooth by discomfort during chewing.

2) Functional discomfort:

Pain may be expected following sudden tooth displacement when biting on hard foods or with inadvertent trauma

3) **Aesthetic**: when there is anterior labial or lateral displacement of a tooth, it can result in fanning and elongation of the clinical crown. This can lead to a poor appearance of the affected tooth or teeth.

Treatment of increased tooth mobility:

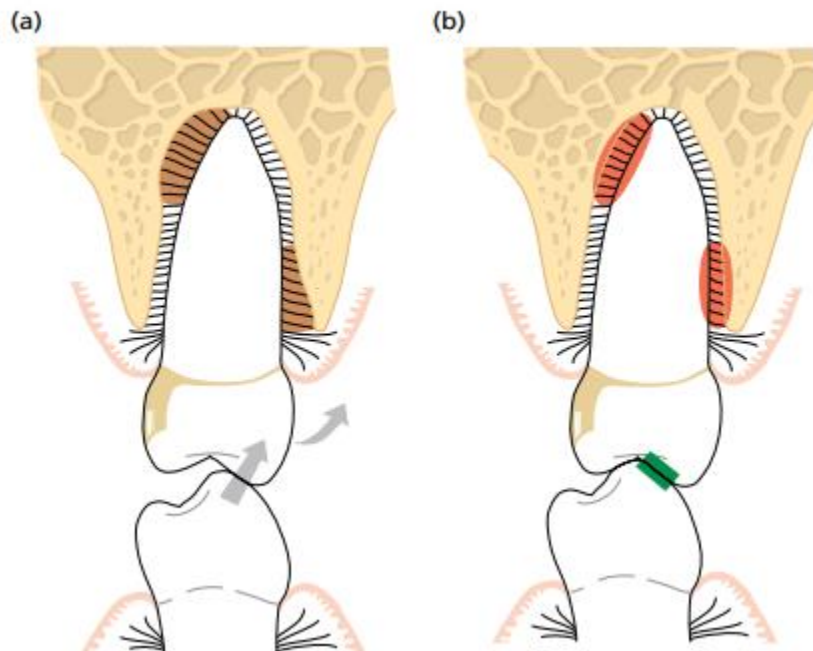
Several situations will be described to reduce increased tooth mobility.

The situation I:

(increased mobility of a tooth with increased width of the periodontal ligament but normal height of the alveolar bone).

When a tooth is fitted with an improper filling or crown restoration, it can develop occlusal interferences that cause inflammatory reactions in the surrounding periodontal tissues, leading to trauma from occlusion. Improperly directed forces can cause bone resorption in certain areas, leading to increased mobility of the tooth. However, in teeth with normal periodontium or overt gingivitis, these forces will not result in pocket formation or loss of connective tissue attachment. **Therefore, the resulting increased mobility should be regarded as a physiologic adaptation of the periodontal tissues to the altered functional demands.** Proper correction of the occlusal surface through occlusal adjustment can eliminate excessive forces, allowing for apposition of bone in previously resorbed areas and normalization of the width of the periodontal ligament, thus stabilizing the tooth and restoring its normal mobility. In summary, resorption of alveolar bone caused by trauma from occlusion is a reversible process that can be treated by eliminating occlusal interferences.

Treatment In such a case bone resorption is a reversible process that can be treated by the elimination of occlusal interferences or occlusal adjustment.



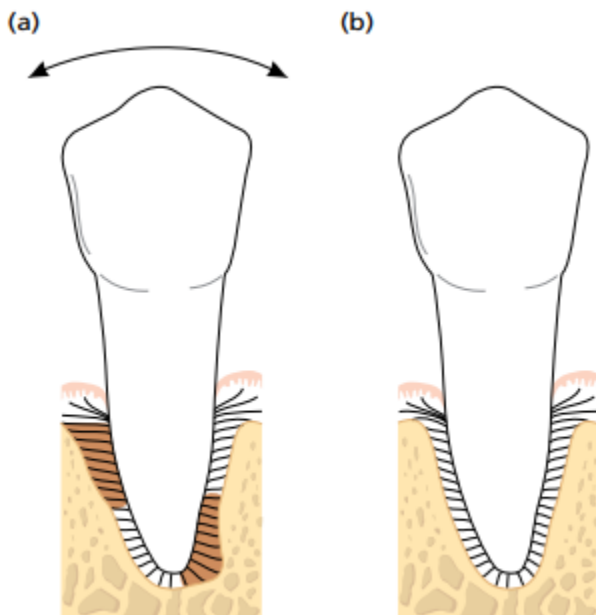
(a) Contact relationship between a mandibular and a maxillary premolar in occlusion. The maxillary premolar is fitted with an artificial restoration with an improperly designed occlusal surface. Occlusion results in horizontally directed forces (arrows) which may produce an undue stress concentration within the “brown” areas of the periodontium of the maxillary tooth. Resorption of the alveolar bone occurs in these areas. A widening of the periodontal ligament can be detected as well as increased mobility of the tooth. (b) Following adjustment of the occlusion, the horizontal forces are reduced. This results in bone apposition (“red areas”) and normalization of tooth mobility.

Situation II: (increased mobility of a tooth with increased width of P. D. ligament& reduced height of alveolar bone).

When a dentition has been properly treated for moderate-to-advanced periodontal disease, gingiva health is established in areas of the dentition where teeth are surrounded by periodontal structures of reduced height. If a tooth with a reduced periodontal tissue support is exposed to excessive horizontal forces (trauma from occlusion), inflammatory reactions develop in the pressure zones of the periodontal ligament with accompanying bone resorption. These alterations are similar to those which occur around a tooth with supporting structures of a normal height; the alveolar bone is resorbed, the width of the periodontal ligament is increased in the pressure/tension zones, and the tooth becomes hypermobile. If the excessive forces are reduced or eliminated by occlusal adjustment,

bone apposition to the “pretrauma” level will occur, the periodontal ligament will regain its normal width and the tooth will become stabilized .

Treatment of such a case is by occlusal adjustment & elimination of the excessive force or reduce it, so bone apposition will occur & the P.D.lig. will regain its normal width & the tooth stabilized.



(a) has been exposed to excessive horizontal forces, a widened periodontal ligament space (“brown” areas) and increased mobility (arrow) result. (b) Following the reduction or elimination of such forces, bone apposition will occur and the tooth will become stabilized.

Situation III: (increased mobility of a tooth with a reduced height of alveolar bone & normal width of P.D.ligament).

The increased tooth mobility which is the result of a reduction in height of the alveolar bone without a concomitant increase in width of the periodontal membrane cannot be reduced or eliminated by occlusal adjustment. In teeth with normal width of the periodontal ligament, no further bone apposition on the walls of the alveoli can occur. If such an increased tooth mobility does not interfere with the patient’s chewing function or comfort, no treatment is required. If the patient experiences the tooth mobility as disturbing, however, the mobility can only be reduced in this situation by splinting, that is by joining the mobile tooth/teeth together with other teeth in the jaw into a fixed unit – a splint.

A **splint** is “an appliance designed to stabilize mobile teeth” and may be fabricated in the form of joined composite fillings, fixed bridges, removable partial prostheses, etc

Situation IV: (progressive (increasing) mobility of a tooth (teeth) as a result of gradually increasing width of P.D.ligament in teeth with a reduced height of alveolar bone).

Often in cases of advanced periodontal disease the tissue destruction may have reached a level where extraction of one or several teeth cannot be avoided. In such a dentition, teeth which are still available for periodontal treatment may, after therapy, exhibit such a high degree of mobility, or even signs of progressively increasing mobility, that there is an obvious risk that the forces elicited during function may mechanically disrupt the remaining periodontal ligament components and result in the loss of the teeth. It will only be possible to maintain such teeth by means of a splint. In such cases, a fixed splint has two objectives: (1) to stabilize hypermobile teeth and (2) to replace missing teeth.