TOOTH MOBILITY

Mobility is the loosening of a tooth in its socket. Mobility of the teeth is closely dependent on some factors, which are:

1- Height of the supporting bone.

2- The width of the periodontal ligament.

3- The shape of the root present: whether thick or cylindrical

4- The No. of the roots present.

There are two type of mobility : physiologic & pathologic mobility.

physiological mobility refers to a large force exerted on the crown of a tooth surrounded by a healthy, intact periodontium and the tooth will show tipping movement or it will tip within its alveolus until a closer contact has been established between root & marginal or apical bony tissue.

All teeth have a slight degree of physiologic mobility, which varies at different times of the day. It is greatest in the morning and progressively decreases. The increased mobility in the morning is attributed to slight extrusion of the tooth because of limited occlusal contact during sleep. During the day, mobility is reduced by chewing and swallowing forces which intrude the teeth in the sockets. Also, this mobility is less marked in persons with healthy periodontium than in those with occlusal habits as bruxism and clenching.

Pathologic mobility is the progressive 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.

Tooth mobility also 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 (Fig .1)

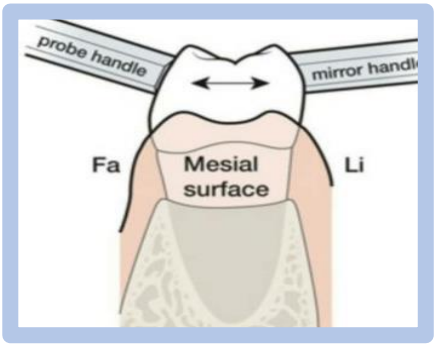


Fig .1 Assessing Horizontal Tooth Mobility. Using the ends of two handles, apply alternating pressure, first from the facial and then from the lingual aspects of the tooth.

Vertical tooth mobility, is the ability to depress the tooth in its socket, is assessed using the end of an instrument handle to exert pressure against the occlusal or incisal surface of the tooth .(Fig .2)

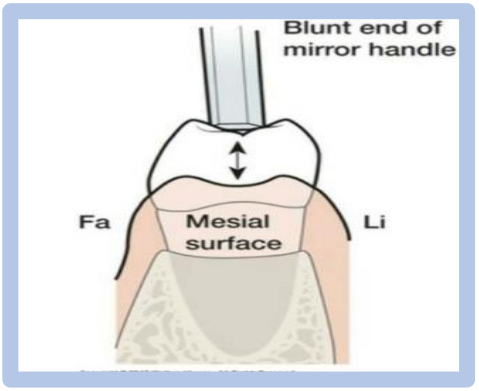


Fig.2 Assessing Vertical Tooth Mobility. Use the end of an instrument handle to exert pressure against the occlusal surface or incisal edge of the tooth.

Tooth mobility has many causes:

1. Advanced periodontal diseases & loss of supporting bone.
2. Gingival & periodontal inflammation.
3. Trauma from occlusion.
4. Immediately following periodontal therapy.
5. Pulpal inflammation.

Classification of tooth mobility(T.M.):

T.M. is graded according to the following criteria:

Grade I: is the mobility of the crown 0.2-1 mm in horizontal direction.

Grade II: mobility of the crown of the tooth exceeding 1mm in horizontal direction.

Grade III: mobility of the crown of the tooth in vertical direction as well & the tooth becomes even depressed in its socket.

Initial & secondary tooth mobility:

The mechanism of T.M. was studied in detail by Muhlemann (1954, 1960) who described a standardized method for measuring even minor tooth displacement. By means of periodontometer (fig. 3), a small force (100 pounds) is applied to the crown of a tooth, the crown start to tip in the direction of the force & the crown is moved only 0.05-0.1 mm. This movement of the tooth is called initial tooth mobility (I.T.M.) which is the result of intra alveolar displacement of the root. In this movement there is pressure & tension zone. In the pressure zone there is 10% reduction in the width of periodontal ligament & in the tension zone there is a corresponding increase. In the I.T.M., there is reorientation of the P.D. ligament fibers into a position of functional readiness towards tensile strength & it is differ from individual to another & from tooth to tooth (Fig.4)

When large force (500 pounds) is applied to the crown, the fiber bundles on the tension side cannot offer sufficient resistance to further root displacement. The additional displacement of the crown is called secondary tooth mobility (S.T.M.) which is allowed by distortion & compression of the periodontium in the pressure side. The displacement of the crown when a force of 500 pounds is applied varies between teeth :

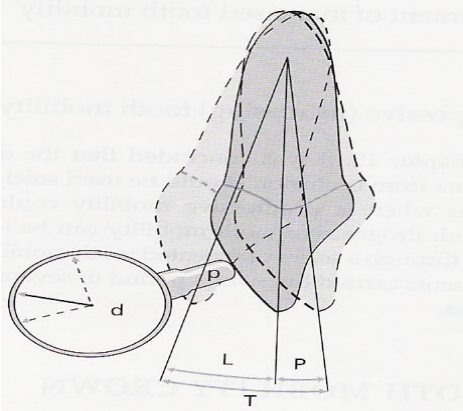
Incisors 0.1-0.12 mm

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



(Fig 3)Tooth mobility measurements by means of the Periodontometer. d = dial indicator; p = pointer; L = labial excursion of the crown; P = palatal excursion of the crown; T = L + P = total excursion of the crown

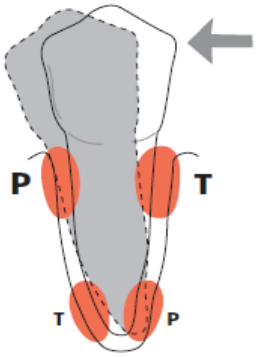


Fig (4) If the crown of a tooth is exposed to excessive, horizontally directed forces (arrow), pressure (P) and tension (T) zones will develop within the marginal and apical parts of the periodontium. The supra-alveolar connective tissue remains unaffected by force application. Within the pressure and tension zones tissue alterations take place which eventually allow the tooth to tilt in the direction of the force.

Sign & symtoms of T.M

1-Patient awareness of mobility:

Mobility is detected quite incidentally when patient's attention is brought to tooth by tenderness experienced on chewing.

2-Functional discomfort:

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

3- Aesthetic :

Anterior labial or lateral tooth displacement results in fanning & elongation of clinical crown with poor appearance

Treatment of increased tooth mobility:

A number of situations will be described for the aim of reducing increased tooth mobility.

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

This case is seen in teeth with improper filling or crown restoration (high spot) (fig 5) so this cause occlusal interferences and the surrounding periodontal tissues become inflamed (trauma from occlusion) and resulting increase in the width of periodontal ligament . In case of normal periodontium such traumatizing forces in teeth with cannot result in pocket formation or loss of connective tissue attachment, the resulting mobility of the tooth is regarded as a physiological adaptation of the periodontal tissues to the altered functional demands. In such a case bone resorption is a reversible process can be treated by elimination of occlusal interferences or occlusal adjustment.

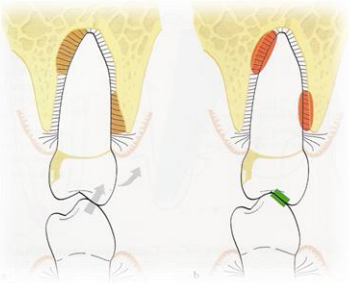
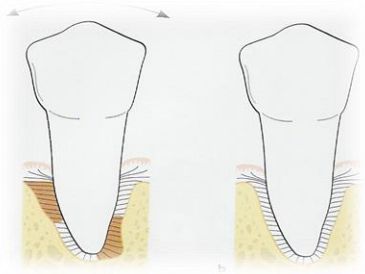


Fig.5

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

When a dentition properly treated for plaque-associated periodontal disease, gingival health is established but the teeth will be surrounded by periodontal structures of reduced height. If a tooth with reduced periodontal tissue support is exposed to excessive horizontal forces (trauma from occlusion), inflammatory reaction develops in the pressure zone of the periodontal ligament with bone resorption and result in increased width of PD ligament and the tooth become hypermobile. Treatment of such a case is by occlusal adjustment & elimination of the excessive force or reduce it, so bone apposition will occur and the PD ligament will regain its normal width and the tooth stabilized (Fig.6).



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

In teeth with normal width of PD.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 chewing function or comfort, no treatment is required. If the mobility disturb the patient so it can be treated by splinting by joining the mobile tooth or teeth together with other teeth in the jaw either by using composite fillings, fixed bridges or removable partial prosthesis.

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

This case seen in advanced periodontal disease, the tissue destruction may have reached a level where extraction of one or several teeth cannot be avoided. Teeth that remaining in such dentition are still available for periodontal treatment may after therapy exhibit a progressively increasing mobility when force applied during function which may mechanically disrupt the remaining PD ligament. components& cause extraction of the teeth. Treatment is only by fixed splint to stabilize the hyper mobile teeth & to replace missing teeth.

Situation V: (increased bridge mobility despite splinting)

In patient with advanced P.D. disease, the destruction of the periodontium has progressed to varying levels around different teeth & tooth surfaces in the dentition. Following proper treatment of the plaque-associated lesions, often including multiple extraction, the remaining teeth may display extreme reduction of the supporting tissues with increased tooth mobility & they may be distributed in the jaw in such a way that it make it difficult or impossible to obtain proper splinting effect even by means of cross-arch bridge & the entire bridge/splint may exhibit mobility.

An increased mobility of a cross-arch bridge/splint can be accepted providing that the mobility does not disturb chewing ability or comfort & the mobility of the splint is not progressively increasing.