ABUTMENT EVALUATION IN FPD

INTRODUCTION

An abutment is that portion of tooth or dental implant that serves to support or retain a prosthesis.(GPT-6)

Fixed partial dentures transmit forces through the abutments to the periodontium. The forces applied to the missing teeth are transmitted through the Connectors and Retainers to the abutment teeth and abutment helps to withstand the forces normally directed to the missing teeth.The parts of fixed partial denture is shown in figure-1

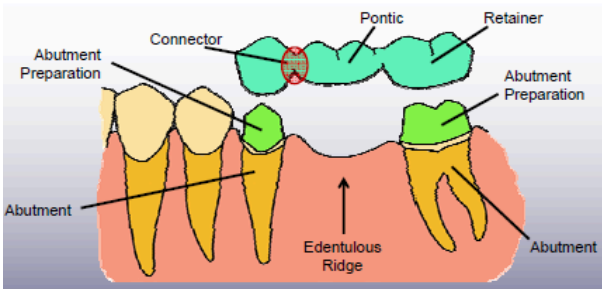


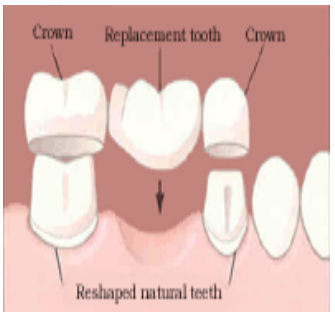
fig-1

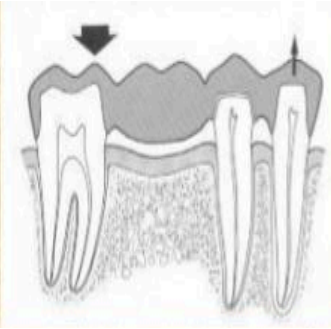
TYPES OF ABUTMENT

PRIMARY ABUTMENT:

Abutment adjacent to edentulous space(fig-2)

Figure -2 figure-3 figure-4





SECONDARY ABUTMENT:

Abutment remote from edentulous space(fig-3)

PIER ABUTMENT:

A natural tooth located between the abutment that serves to support a fixed or removable dental prosthesis(fig-4)

DIAGNOSTIC CAST

Evaluation of occlusal relationship of

dental arches and the abutment teeth.

Rotated malposed teeth can be easily observed.

The form and contour of abutment teeth can be visualized as well as the alignment and contacts of opposing teeth can be visualized.

Analysis of occlusion

ROENTGENOGRAPHIC EXAMINATION

Remaining bone support

Root number and morphology and root proximity

Width of periodontal ligament spaces

Axial inclination of teeth

Pulpal morphology and previous endodontic treatment

Presence of apical disease, root resorption or root fractures.

Retained root fragments, radiolucent areas, impacted teeth.

Presence of carious lesions

Proximity of carious lesions and restorations to alveolar crest.

FACTORS INFLUENCING ABUTMENT SELECTION

Crown-root ratio

PDL area and surface area

Root configuration

Root proximities

Periodontal disease

Long axis relationship

Mesially tilted molars

Arch form

Span length

Rigjdity

Margin location

Occlusal anatomy

Mobility

Available tooth structure

CROWN ROOT RATIO (fig-5 &6)

Physical relationship between portion of tooth within alveolar bone compared with the portion not within the alveolar bone ,as determined radiographically.Ratio of the length of tooth occlusal to the alveolar crest of bone compared with the length of root embedded in bone

Fig-5 fig-6

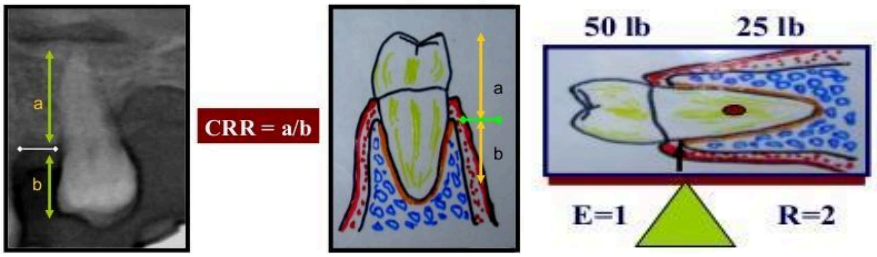
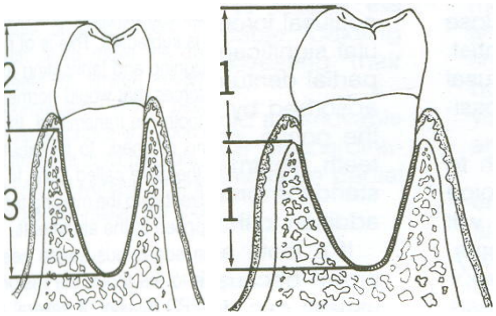


Fig7 &8



BIOMECHANICAL CONCEPT

Represents class I lever:(fig-6)

Crown-effort arm(E)

Root –resistance arm®

Centre of rotation of tooth-middle of root that is embedded in alveolar bone that leads to loss of alveolar bone

Crown portion(effort arm):increases

Root portion(resistance arm):decreases

Centre of rotation moves apically & more prone to lateral forces

VALUE OF CRR (fig 7&8)

Ideal -1:2

Optimum -2:3

Minimum -1:1

Teeth with loss of more than 1/3 periodontal support-questionable value

The occlusal forces against prosthetic appliances have been shown to be considerably less than that against natural teeth: *26 lb for removable partial dentures and 56 lb for fixed partial dentures versus 150 lb for natural teeth.*

FACTORS INCREASING CR RATIO:

Reducing the crown to 1 to 2 mm above the free gingival margin which can improve the CRR from 1:1 to 1:2 or 1:3.

Crown height- shortens the corresponding lever arm length

Less lateral force is applied to the attachment apparatus

Apparent reduction of the abutment horizontal mobility.

Surgical crown lengthening

Forced eruption

Approx 2mm/mnth

Allows the periodontal ligament to repair and the alveolar bone to remodel

Radiographic assessment of clinical root-crown ratios of permanent teeth,
J Adv Prosthodont 2014;6:171-6

A study approved by Institutional Review Board (IRB) of the Yonsei University Dental Hospital used panaromic radiograph to determine the absolute crown to root ratio with 99 patient radiographs being examined

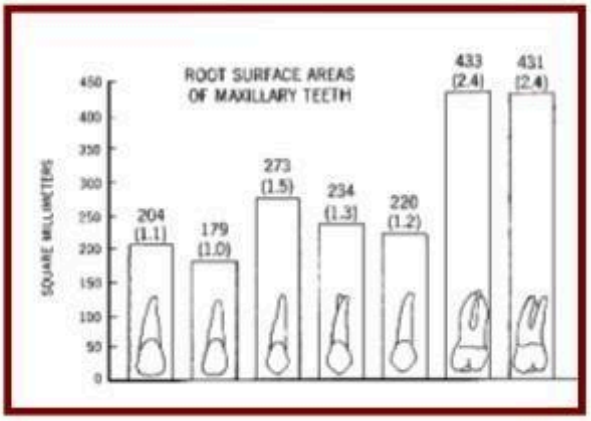
The highest R/C ratios were recorded for the mandibular canines (1.89), followed by the maxillary canines (1.79).

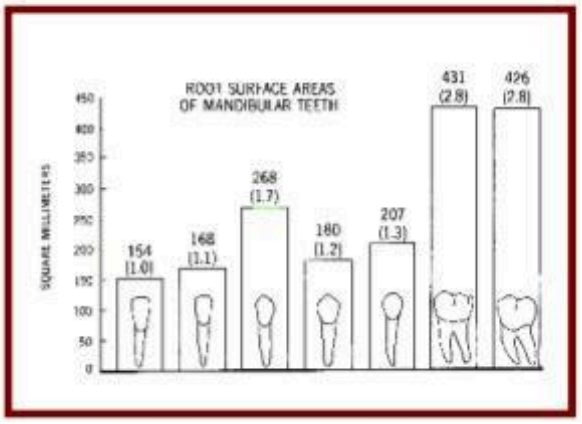
The lowest R/C ratios were recorded for the maxillary second molars (1.31).

In comparison with the maxillary teeth (1.29-1.78), the mandibular teeth yielded the higher R/C ratio (1.47-1.89)

AVERAGE ROOT SURFACE AREA

ANTE suggested in 1926 that it was unwise to provide a FPD when the root surface area of the abutment was less than the root surface area of the teeth being replaced(fig-9)





ROOT SURFACE AREA

This has been adopted and reinforced by other authors (Johnston, Dykema, Shillinburg, Tylman) as ANTE's LAW

ANTE's LAW(1926) – *Irwin H. Ante*

States that "the combined pericemental area of all abutment teeth supporting a FPD should be equal to or greater in pericemental area than the tooth or teeth being replaced."

CONTRAINDICATION TO ANTE'S LAW:

Newman and Ericsson statement:

Reduced bone support can be successfully used as FPD abutments. The majority of treatments presented by most of the authors had an abutment root surface area less than half that of replaced teeth

Results :No loss of attachment after 8-10 years.

They attributed this success to meticulous root planing during the active phase of treatment, proper plaque control during the observed period and the occlusal design of the prosthesis.

“FDP survival rate of 97.6 percent after five years and 92.9 percent after 10 years. These results were comparable with published survival rates of FDPs with abutments that satisfied Ante’s law”.

A study on stress distribution patterns in teeth and supporting structures of fixed prosthesis with either normal or reduced bone support of an additional abutment(FEA study) concluded that “When periodontal compromised abutment teeth was splinted with an additional abutment an increase of stress was observed in periodontally compromised abutments so an additional abutment is not required”.

Even though the pericemental area of compromised abutments with an additional abutment (canine) was more than combined pericemental area of pontics to be replaced, stress generated was more on abutments. This disproves Ante's law

FACTORS MODIFYING ANTE’S LAW

Condition Existing	Probable modification in ANTE's LAW
1. Bone loss from periodontal disease	Increase the number of abutments.
2. Mesial or distal tipping or changes in axial inclination.	Increase the number of abutments.
3. migration (bodily movement)of abutment teeth decreasing M-D length of edentulous area.	Decrease the number of abutments used (less pericemental support required)
4. Less than favorable opposing arch relationship producing increased occlusal load.	Increase the number of abutments used for support.
5. Endodontically restored abutment teeth with root resections.	Increase the number of abutments
6. Arch form situations creating greater leverage factors.	Increase the number of abutments.
7. Tooth mobility created after osseous surgery.	Increase the number of abutments(splinting procedure)

ROOT CONFIGURATION (fig-10,11,12)

Roots that are broader labiolingually than they are mesiodistally are preferable to roots that are round in cross – section

Multirooted posterior teeth with widely separated roots will offer better periodontal support than roots that are short converge, fuse, blunted

Since most roots have conical shape and the root length is only a 1-dimensional linear measurement,other criteria should be used to evaluate the alveolar support of abutment

Mowry et al studied the root surface area of mandibular canines and premolars and found that at half of the root length of these teeth, only 38% of attachment remained. The authors also found that increasing attachment loss is related to, but not directly proportionalto, decreasing root surface area

ROOT PROXIMITIES

There must be adequate clearance between the roots of proposed abutments to permit the development of physiologic embrasures in completed prosthesis.

Malpositioned anterior teeth and the mesiobuccal roots of maxillary molars often present unfavorable root proximities where desired embrasure form is not possible.

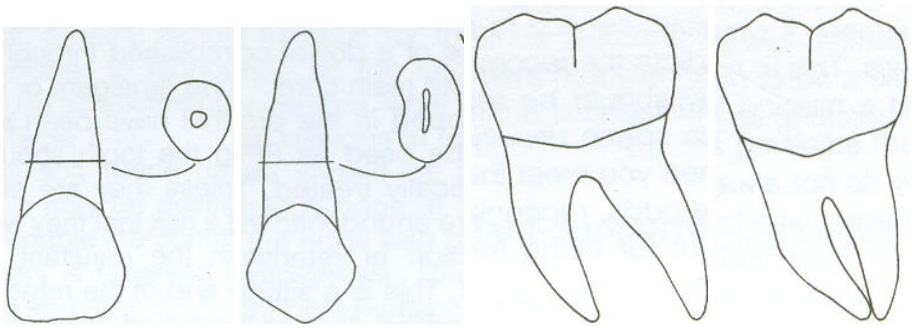
Selective extraction or root resection procedures may be the solution

PERIODONTAL DISEASE

Healthy periodontal tissues are a prerequisite for all fixed restorations

Occasional lapse in plaque removal by patient is unlikely to affect the long term prognosis

Conical shape of most roots, when 1/3of root length has been exposed, ½ the supporting area is lost. (fig-13)



COMMON PATH OF INSERTION

Abutment teeth to an FPD must be prepared with common path of insertion for all retainers .

If the long axis of tooth diverge or converge from parallelism by more than 25 degree,then tooth preparation becomes difficult

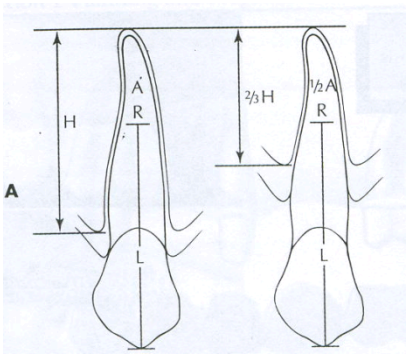
Eg:Mesially tilted molars

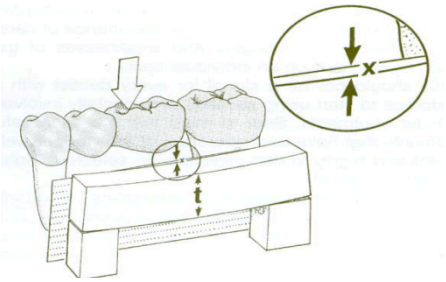
SPAN LENGTH

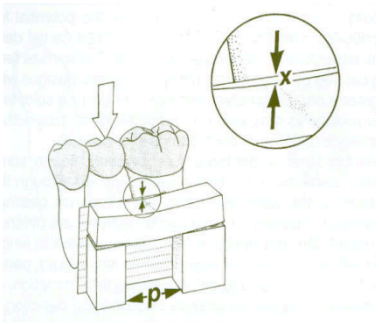
Excessive flexing under occlusal loads cause failure of long span FPD

Bending or deflection varies directly with the cube of the length and inversely with the cube of the occlusogingival thickness of the pontic.

Longer pontic spans also have the potential for producing more torquing forces on the fixed partial denture(fig-14 & 15)







Two pontic-8X deflection

Three pontic-27X deflection

SPAN LENGTH

When long span FPD is fabricated ,pontic and connector should be made bulky as possible to ensure rigidity without jeopardizing the gingival health.

Double abutments are sometimes used in long edentulous conditions. A secondary abutment must have at least as much root surface area and as favorable a crown-root ratio as the *primary* abutment

The retainers on secondary abutments must be at least as retentive as the retainers on the primary abutments. When the pontic flexes, tensile forces will be applied to the retainers on the secondary abutments.

SPAN LENGTH

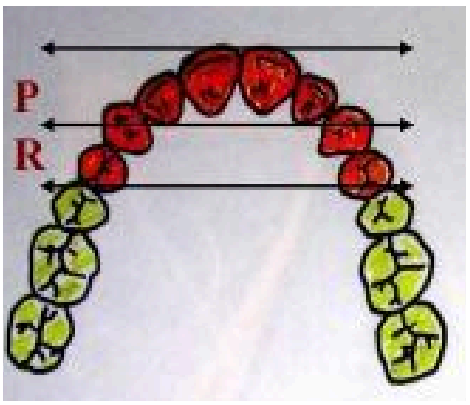
ARCH CURVATURE (fig-16)

When pontics lie outside the interabutment axis line, the pontics act as a lever arm, which can produce a torquing movement

Common problem in replacing all four maxillary incisors

By gaining additional retention in the opposite direction from the lever arm and at a distance from the interabutment axis equal to the length of the lever arm.

The first premolars sometimes are used as secondary abutments for a maxillary four-pontic canine-to-canine fixed partial denture.



OCCLUSAL ANATOMY

Occlusal anatomy has an indirect influence on the loads transmitted to the teeth

Ridges and grooves increase the sharpness and shearing action of teeth and reduce friction between opposing surfaces.

Permits the efficient mastication of food, thus reducing the load transmitted.

Stallard points out that worn-down teeth need more muscular power & more masticator strokes in order to chew food enough

OCCLUSAL ANATOMY

Factors affecting occlusal forces:

Degree of muscular activity

Habits such as bruxism

Number of teeth being replaced

Leverage on the bridge and adequacy of bone support..

Excessive occlusal forces

Loosening of prosthesis through flexure

Induce ceramic fracture.

Tooth mobility(presence of decreased bone support)

OCCLUSAL ANATOMY

The buccolingual width of pontics should harmonize with buccolingual dimension of natural unmutilated teeth, and recreate the normal buccal and lingual form to the height of contour.

Reducing the width of the pontics does not materially reduce the forces transmitted to the abutments, but merely places heavier per unit stress on the restoration

PERIODONTAL FACTOR

INFLAMMATION:

To resolve the inflammation

Convert periodontal pocket depths to clinically normal sulcular depths

Establish physiologic gingival architecture

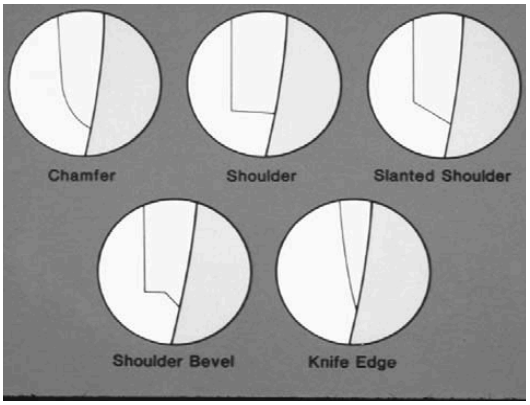
Provide an adequate zone of attached gingiva.

MARGIN PLACEMENT

A margin placed too deep in the sulcus risks the possibility of biologic width violation which leads to gingival inflammation.The selected margin must provide a predictable level of marginal integrity.To minimize plaque accumulation, the selected margin must present smooth materials to the gingival sulcus. Margin also must provide acceptable esthetics .The gingiva are the healthiest when the margins are placed 2mm coronal to alveolar crest

VARIOUS TYPES OF MARGINS

TYPES OF MARGINS (fig-17)



KNIFE EDGE MARGINS

Termination of knife-edge margins is often difficult to read on the gypsum die, so ‘‘fit’’ is often compromised

Thin metal margins - prone to distortion during the ceramic firing

Metal display

Indications:

Situations where a root has been amputated due to periodontal disease

CHAMFER MARGINS

Due to the relative inherent lack of specificity of depth

Compromised marginal integrity as a result of distortion of the metal framework during porcelain firing

SHOULDER & SHOULDER

BEVEL

Resist distortion due to the inherent bulk of metal at the margin

The shoulder can be used with a metal margin, which can be highly polished with glazed porcelain in the sulcus

Shoulder-bevel margin has a collar of metal 1 mm or more in width and thus places highly polished metal in the sulcus

SLANTING SHOULDER

Can be used with metal collar/disappearing margin

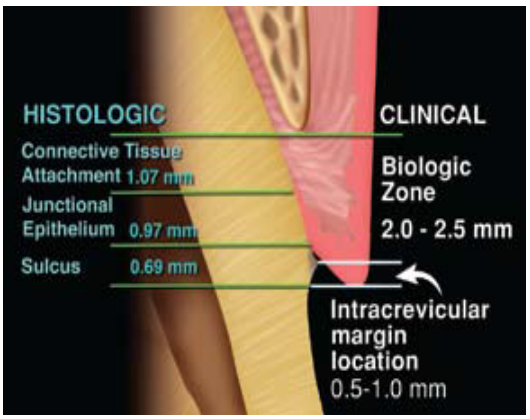
If a metal collar is used, it can be highly polished

Disappearing margin-Three different materials at the terminus of the margin .

Oxidized metal, opaque porcelain, and body porcelain

Inherent lack of smoothness

BIOLOGIC WIDTH (fig-18)



The dentogingival complex is composed of three entities:

The supra-crestal connective tissue attachment – the connective tissue fibers originate from the osseous crest to the cemento-enamel junction (CEJ)

Epithelial (or junctional epithelium) attachment – the epithelial attachment from the CEJ onto the tooth ename.

The sulcus-coronal to the junctional epithelium is the

gingival sulcus

The biologic width is 2.04 mm (calculated by addition of connective tissue and epithelial attachment)

SIGNIFICANCE OF BIOLOGIC WIDTH

It is defined as the dimension of the soft tissue,which is attached to the portion of the tooth coronal to the crest of the alveolar bone

It acts as a natural seal that develops around both teeth and dental implant protecting the alveolar bone from infection & disease

The area of biologic width along with sulcus around the natural teeth is sometimes called Bermuda's triangle

BERMUDA TRIANGLE OR DEVIL'S TRIANGLE.

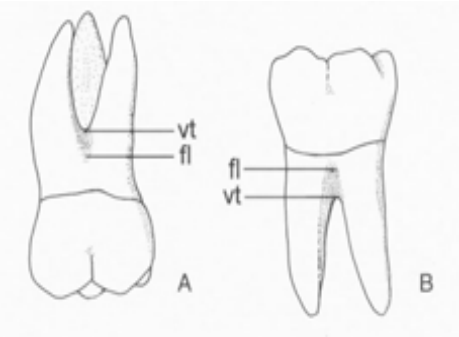
It extends from gingival crest, with tooth/implant on one side and biological width on the other side.It is called Bermuda triangle or intracrevicular space.This biological width area is most exploited and misused area in dentistry

Like the Bermuda triangle where a number of aircraft and sea vessels are said to have disappeared, the margins of the prosthetic crowns are extended so much that the dentist loses the access and vision where the margin is actually located in the sulcus region.

This leads to many periodontal complications and eventually prosthetic failure.

FURCATION INVASION(1953,Irvin Glickman)

DIAGNOSIS OF FURCATION INVASION (fig-19)



Nabers probe is one of the method

Bone sounding:Done evaluate the bone topography

The technique involves insertion of periodontal probe in an anaesthetized gingiva until the tip of probe contacts the bone.The probe is penetrated horizontally & vertically.

Greenberg et al referred this technique as transgingival probing and reported that the vertical probed bone level and surgically confirmed bone level were closely correlated

TREATMENT OF FURCATION INVASION :

The restorative preparation for teeth with exposed furcation involves fluting the preparation into the involved area.

Preparation finish line intersects with the vertical flutes in the root trunk.

GRADE I,EARLY GRADE II -Fluted complete crown preparation with fluted cast restoration

DEEP GRADE II,GRADE III,EARLY GRADE IV- Root amputation:removal of root from a multirooted tooth

Hemisection :surgical separation of multirooted tooth through the furcation area in such a way that a root,or roots may be surgically removed along with associated portion of crown

SKYFURCATION:

Separating the roots of molars without removing the root

The roots are cut apart and rejoined by crown(interradicular splint)

The crown placed over these areas reestablishes the furcation in metal

A study was done to determine the occurrence of furcation involvement in the molars of patients with chronic periodontitis and correlate clinical and radiographic findings.

A total of 64.5% individuals presented with furcation involvement, 43.1% of whom had degree II furcation. A significant association was found between tooth type and frequency of furcation involvement

Park et al have suggested molars that are having questionable prognosis can maintain the teeth without detectable bone loss for a long-term period by hemisection but patient should maintain a good oral hygiene

Shin-Young Park performed root resection therapy on 691 molars in 579 patients. The associated factors were examined from 342 of 402 molars that had been followed up for >1 year. They concluded root resection to treat periodontal problems had a better prognosis than for non-periodontal problems.

MOBILITY

It can be determined by holding the tooth between the handles of two metallic instruments or with one metallic instrument and one finger. An effort is made to move the tooth in all directions. Mobility is graded as:

Grade I – Barely distinguishable tooth movement.

Grade II – Any movement upto 1mm (Labiolingual or mesiodistal).

Grade III – Any movement more than 1mm or teeth that can be depressed or rotated in their sockets

Causes :

Periodontal disease

Overloading of tooth with restoration

Trauma from occlusion

The mobility is considered physiologic if it is increased but not increasing and does not impair function or cause patient discomfort.It is reversible once the source is removed .Lindhe described these conditions as,

Situation I-increased mobility of tooth with increased width of PDL but normal height of alveolar bone

Situation II-increased mobility with increasd width of PDL and reduced height of alveolar bone

Residual mobility of teeth or FPD may be present with advanced bone loss but not increasing,

Situation III-increased mobility of tooth with reduced height of alveolar bone and normal width of PDL.

If mobility is increasing and when it interferes with chewing,

Situation IV-progressive increase in mobility of tooth as a result of increase in width of PDL in teeth with reduced height of alveolar bone

Situation V-increase bridge mobility inspite of splinting

A study on stress distribution patterns in teeth and supporting structures of fixed prosthesis with either normal or reduced bone support of an additional abutment(FEA study) concluded that “When periodontal compromised abutment teeth was splinted with

an additional abutment an increase of stress was observed in periodontally compromised abutments so an additional abutment is not required".

The effects of splinting the periodontally involved teeth to one or more additional sound teeth were studied.

It was shown that for a cantilever fixed partial denture with either normal periodontal support, or a distal abutment with a moderate degree of mobility and bone loss, the following can be concluded:

(1) occlusal forces on a cantilever fixed partial denture were significantly distributed to only the three teeth closest to the loaded cantilever

(2) optimum stress reduction occurred with the splinting of a periodontally compromised tooth to two periodontally sound teeth. Increasing the number of splinted abutments did not result in a proportional reduction of stress in the periodontium

SELECTION OF ABUTMENT TEETH
ENDODONTICALLY TREATED ABUTMENTS

Vital tooth is preferred

Pulp capped tooth should be endodontically treated before selecting as abutment

Endodontically treated teeth:

Asymptomatic with radiographic evidence of good seal and complete obturation of canal

Serve well as abutment with post and core foundation for retention and strength

ENDODONTICALLY TREATED ABUTMENTS

Dentin of endodontically treated teeth was different from vital dentin

Structural integrity is lost because of access preparation

Negative effect on fracture resistance of endodontically treated teeth

Neurosensory feedback mechanism is impaired

Decreased protection of endodontically treated tooth during mastication

Endodontically treated teeth are restored to their original function with the use of intraradicular devices such as post & core

Two-dimensional finite element analysis to study the effect of posts on dentin stress in pulpless teeth. When loaded vertically along the long axis, a post reduced rnaximal dentin stress by as much as 20%. However, only a small ***(3% to 8%)*** decrease in dentin stress was found when a post was present and when the teeth were subjected to masticatory and traumatic loadings at 45" to the incisal edge.

KO et al determined that the reinforcement effect of posts is doubtful for anterior teeth because they are subjected to angular forces.

Reuter and BroscIo found a difference between abutments with little or no caries at the time of tooth preparation and abutments with deep carious lesions.3% of the teeth with little or no caries required endodontic treatment after 5 years,whereas 10% of the teeth with deep carious lesions required treatment.

Using photoelastic stress analysis, Hunter el al*' determined that removal of internal tooth structure during endodontic therapy is accompanied by a proportional increase in stress.

They also determined that minimal root canal enlargement for a post does not substantially weaken a tooth. However, if root canal enlargement has occurred, a post substantially reinforces the tooth.

(Clinical evaluation of root filled teeth restored with or without post-and-core systems in a specialist practice setting
Salvi et al,International endodontic journal,40,209-215,2007)

A study on survival rates and complications of root-filled teeth restored with or without post-and-core systems over a mean observation period of 5years.

The results amounted to 92.5% for teeth restored with titanium posts, 9 7.1 % for teeth restored with cast post-and-cores , 94.3% for teeth without post restorations, respectively.

The most frequent complications included root fracture (6.2%),recurrent caries (1.9%). post-treatment disease (1.6%) and loss of retention (1.3%).

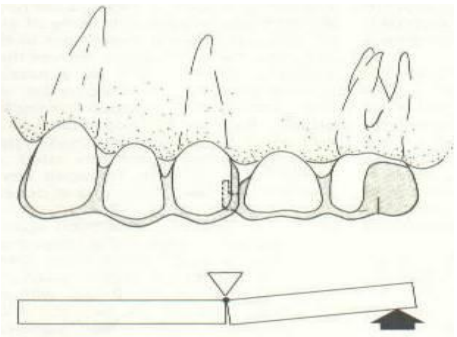
PIER ABUTMENTS

A natural tooth located between the terminal abutments that serves to support a fixed or removable partial denture.When an occlusal load is applied to the retainer on the abutment tooth at 1 end of FPD with a pier abutment, the pier abutment act as a fulcrum

Tensile forces -between the retainer and abutment at the other end of the restoration leading to loss of retention for these restorations.Anterior or posterior abutments produce extrusive forces during fulcrum action

Completely rigid restoration are contraindicated

Some of the non rigid connectors used include,(fig-20)



1.Dovetail(key-keyway) or Tenon-Mortise type connectors.

2. Cross-pin and wing type connector.

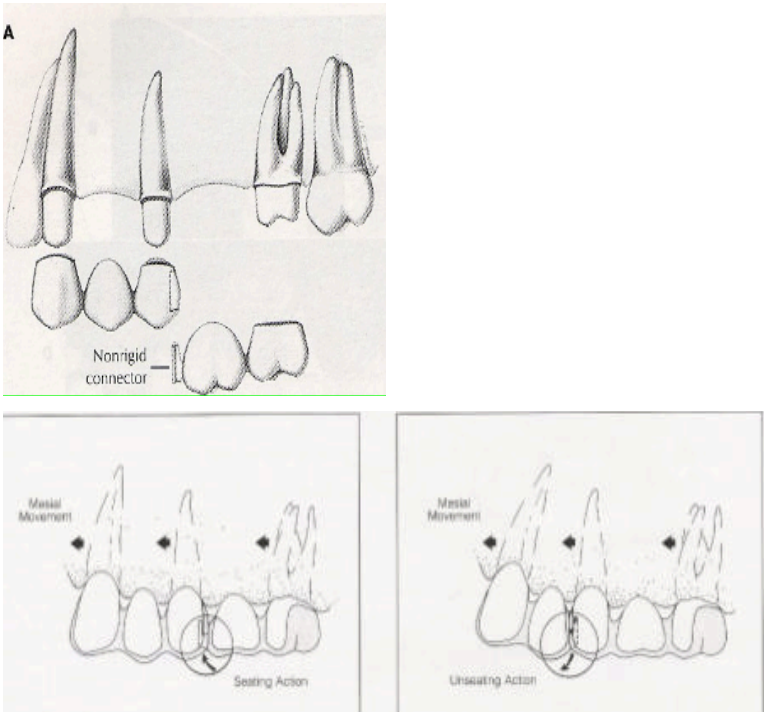
3. Split type connector.

4. Loop type connector

Consist of T-shaped key that is attached to the pontic and a dovetail keyway place within a retainer

If a non rigid connector is placed on the distal side of the retainer on the middle abutment,movement in a mesial direction will seat the key into the key way

If a non rigid connector is placed on the mesial side of the middle abutment, mesial directed movement will unseat the key (fig-21 &22)



Oruc *et al., in 2008, conducted a stress analysis study and* showed that when a non-rigid connector was incorporated

distal to the pier abutment, the area of stress concentration in the pier abutment is reduced

This position has been supported by a finite element study conducted by Seluck Oruc et al., and observed that the area of maximum stress concentration occurs in pier abutments and it was decreased by the use of non-rigid connectors at the distal region of the second premolar .

Markley suggested that non-rigid connector should be placed at one of the terminal retainer, and emphasized that it should not be placed at the pier abutment because this would subject the relatively weak premolar abutment to extreme loads .

MESIALLY TILTED MOLARS

Loss of permanent mandibular first molars due to caries may lead to mesial drifting of second molar with eruption of the third molar. It then becomes difficult or impossible to make a satisfactory FPD

MANAGEMENT :

Mesial one half crown preparation

Use of non rigid attachments

Telescopic prosthesis

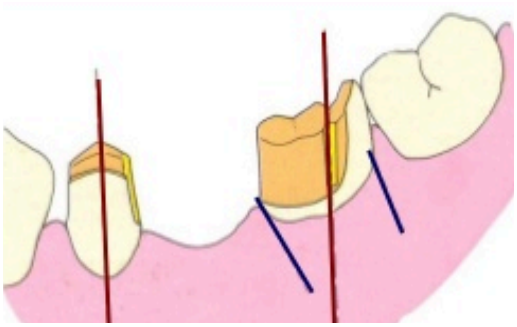
Orthodontic uprighting

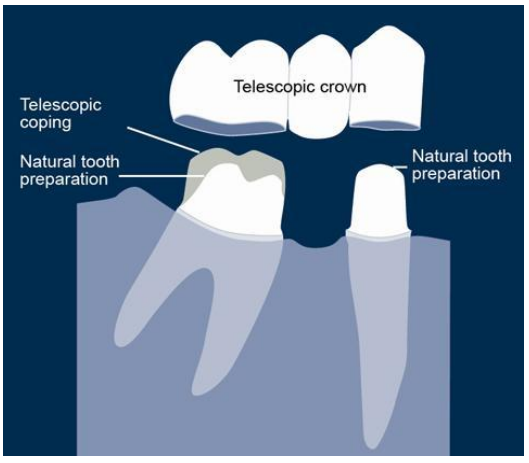
The proximal(mesial) half crown is used as retainer on the distal abutment.Because of mesial component of force, the female portion of attachment is usually placed on distal surface of mesial abutment

CONTRAINDICATION :

If there is severe marginal discrpency between distal of second molar and mesial of third molar as a result of tipping ,the proximal half crown is contraindicated

TELESCOPIC CROWNS(fig-23&24)





A full crown preparation with heavy reduction is made to follow the long axis of third molar

An inner coping is made to fit the tooth preparation and the proximal half crown that will serve as the retainer is fitted over the coping

NON RIGID CONNECTORS:

A full crown preparation is done on the molar

A box form is made on the distal surface of premolar to accommodate the keyway

Placing connectors on the mesial half of tipped molars can lead to greater tipping of the tooth

The non rigid connectors is mostly indicated when the molar exhibit both lingual and mesial inclination

A three dimensional FEA study on tilted molar as FPD abutment concluded that placement of FPD modified the stress distribution around the roots of tilted molar abutment and favoured the tilted molar(Jia et al)

The results showed decrease in stress on the mesial area of the root and adjacent area to the apex of tilted molar and increase in stress surrounding the second premolar

ABUTMENTS FOR CANTILEVER FPD

A cantilever FPD is the one that has an abutment or abutments at one end only, with the other end of the pontic remaining unattached

INDICATIONS:

Lengthy roots

Long clinical crowns

Good crown root ratio

Healthy periodontium

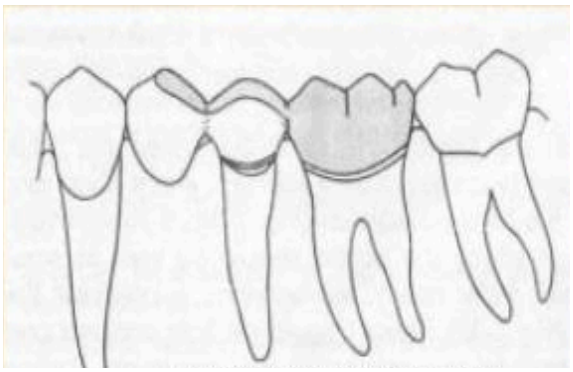
Missing lateral incisors:

Their should be no occlusal contact on the pontic in either centric or lateral excursion

Canine –serves as solo abutment only if it has long root & good bone support

There should be rest on the mesial of the pontic to prevent rotation of pontic & abutment

Missing first premolar:(fig-25)



Used when occlusal contact is limited to the distal fossa. Full veneer retainers are required on both the second premolar and first molar. These teeth must exhibit excellent bone support

Missing molar with no distal abutment:

When pontic is loaded occlusally, the adjacent abutment tends to act as a fulcrum, with a lifting tendency on the farthest retainer.

To minimize the leverage effect, the pontic should be kept as small as possible

Using a photoelastic model, Wylie and Caputo evaluated the stresses that cantilever FPDs developed in teeth and supporting bone where the most distal abutments had osseous defects

The authors found that for a cantilever FPD with either normal periodontal support or a distal abutment with a moderate degree of mobility and bone loss, the occlusal forces were significantly distributed to only the 3 teeth closest to the loaded cantilever.

Moreover, increasing the number of splinted abutments beyond 3 did not result in a proportional reduction of stress in the periodontium, and no significant cross-arch sharing of occlusal loads was seen

QUESTIONABLE ABUTMENTS

General disorders: Mineralization

1) Amelogenesis Imperfecta.

2) Dentinogenesis Imperfecta.

3) Hypocalcification.

4) Ectodermal Dysplasia.

5) Discolouration due to drugs like Tetracycline.

6) Fluorosis.

7) Internal resorption

Congenital & growth deformities:

1)Malformed dentition.

2) Malposed teeth.

3) Skeletal disparities of Maxillo-mandibular relationships.

4) Oligodontia

Local problems:

1)Carious tooth.

2) Periodontally involved teeth.

3) Occlusal plane correction.

4) Endodontically treated teeth

5) Tilted teeth.

6) Attrition, abrasion, erosion.

QUESTIONABLE ABUTMENTS IN FPD

Extensively damaged teeth

Periodontaly weakened teeth

Pier abutments

Tilted abutments

Cantilever fixed partial dentures

Short abutments

EXTENSIVELY DAMAGED TOOTH

Location of the destruction and the amount of the tooth surface involved should be considered

Location can be classified as

Peripheral

Occurring on the axial surfaces of the tooth

Center of the tooth

Destruction in both sites

Two rules should be observed to avoid excessive tooth destruction while creating retention in an already weakened tooth:

The central “core” (the pulp and the 1.0-mm-thick surrounding layer of dentin) must not be invaded in vital teeth.

No retentive features should extend farther into the tooth than 1.5 mm at the cervical line or down 1.5 mm from the central fossa. If caries removal results in a deeper cavity, any part lying within the vital core should be filled with restorative cement..

No wall of dentin should be reduced to a thickness less than its height for the sake of retention

Evaluate the strength of the remaining walls: If the thickness to height ratio of a wall lies between 1:1 and1:2 it should be supported. Any wall with a thickness to height ratio of less than 1:2 is subject to fracture and should be shortened

PERIODONTALLY WEAKENED TEETH

Rationale for therapy

Periodontal treatment is undertaken to ensure the establishment of stable gingival margins before tooth preparation.Periodontal therapy should follow restorative care because the resolution of inflammation may result in repositioning of teeth or in soft-tissue and mucosal changes.If traumatic forces applied to teeth with ongoing periodontitis, it may result in increased tooth mobility, discomfort and possibly the rate of attachment loss

Preparation of the periodontium for the restorative dentistry can be divided into two phases:

(1)Control of periodontal inflammation with non-surgical and surgical approaches

(2) Pre-prosthetic periodontal surgery.

In case of short clinical crowns,surgical crown lengthening is indicated

PROGNOSIS OF ABUTMENTS

The prognosis of an abutment is considered "good" when sufficient residual tooth substance with adequate retention and resistance (ideally, 4mm wall height with 15-20 degree convergence angle but with 1.5 to 2mm ferrule).

An abutment is considered "questionable" when there is reduced retention and resistance form (less than 3mm wall height and/or more than 25 degree convergence angle.)

Insufficient residual tooth substance (less than 1.5mm with circular ferrule)[43] and no crown lengthening or extrusion is feasible in an abutment is considered as "hopeless" abutment.

CONCLUSION

Abutments bear the stresses of mastication and the choice of abutment influences the prognosis of treatment. Selection of abutments in fixed partial denture plays an important role in treatment planning and also aids in long term durability of restoration .Thus preliminary treatment planning is necesssary to bring about success in fixed partial dentures

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