The gingival recession with NCCL in molars and the treatment modalities

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Introduction

Gingival recession is defined as the apical shift of the gingival margin with respect to the cementoenamel junction.

Gingival recession is esthetically more visible in anterior and premolar teeth than posterior molar teeth. Therefore, were the clinical case reports less found about molars. It's difficult to approach and operate on for surgical procedure due to anatomical differences like wide mesiodistal cervical gingival recession area, shallow vestibule, aberrant frenum/muscle position, prominent external oblique ridge, etc.

The aim of this presentation is to discuss the clinical treatment cases of gingival recession in molar teeth suggesting surgical modalities and compare the treatment outcomes during short- or long-term post treatment period.

Background

• Etiology

These following parameters are reported to be frequently associated with the gingival recession; thin gingival biotypes, keratinized tissue width, gingival thickness, buccal bone thickness, bucco-lingual tooth position, etc.[1]

Other etiologic factors had been suggested like tooth brushing, cervical restorative margins, and orthodontic treatment.

Fig 1. Classification of gingival biotype and gingival recession
Recession classification based on the interdental CAL measurement.[2]

Gingival site				Tooth site	
	REC Depth	GT	KTW	CEJ (A / B)	Step (+/-)
No recession					
RT1					
RT2					
RT3					

RT = recession type, REC Depth = depth of the gingival recession, GT= gingival thickness, KTW= keratinized tissue width, CEJ = cement enamel junction (Class A = detectable CEJ. Class B = undetectable CEJ), Step = root surface concavity (Class + = presence of a cervical step>0.5 mm. Class – = absence of cervical step).
Recession type 1(RT1): no loss of interproximal attachment. Mille Class Ⅰ and Ⅱ.
Recession type 2(RT2): interproximal attachment loss is less than equal to the buccal attachment loss. Miller Class Ⅲ.
Recession type 3(RT3): interproximal attachment loss is greater than buccal attachment loss. Miller Class Ⅳ.[3]

Fig 2. Classification system of four different classes of root surface concavities[4]

Pini-Prato et al. classified the presence/absence of CEJ as class A (detectable CEJ) or Class B (undetectable CEJ), and the presence/absence of cervical concavities (step) on the root surface as Class +(presence of a cervical step>0.5㎜) or Class –(absence of cervical step).

CEJ	Step	Descriptors
Class A	–	CEJ detectable without step
Class A	+	CEJ detectable with step
Class B	–	CEJ undetectable without step
Class B	+	CEJ undetectable with step

Treatment modalities

1. Coronally advanced flap and subepithelial connective tissue graft (bi-laminar method).
2. 2-step surgery: coronally advanced laterally displaced flap and/or epithelial connective tissue graft and free gingival graft.
3. Restorative treatment and/or odontoplasty in NCCL(non caries cervical lesion). The CE junction should be established in advance if undetectable with cervical concavities.

Clinical case reviews

▪ GWON DH, 46 yrs, M.

RT2 or Miller Cl Ⅱ, Complaint of sensitivity.

• Orthognathic surgery(BSSRO) for skeletal Cl Ⅲ, presurgical orthodontic treatment with molar up-righting.
• No attached gingiva on mesial root of lower left 1st molar.
• Dehiscence of alveolar bone and bifurcation involvement.
• Labial frenum was repositioned low to vestibule in advance.
• Coronally advanced flap with subepithelial connective tissue graft was performed with microsurgery (Prefgel™ root conditioning with Emdogain™ application).
• Gingival recessed roots were maximally covered, and recurrence not occurred later.

Before orthodontic tx.
high frenum pulling

Before gingival graft

7yrs after orthodontic tx. gingival recession of 1st, 2nd premolar, 1st molar

Before gingival graft on 1st molar

Bilayers subepithelial connective tissue graft on 1st molar

1yr 4ms after gingival graft on 1st molar

2yrs after free gingival graft on premolars

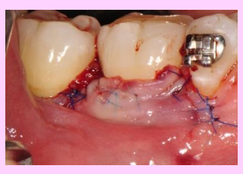
▪ KIM GH, 44 yrs, F.

RT1, Miller Cl Ⅰ, Complaint of severe cold sensitivity.

• White gingival cleft(exposed the cementum) by improper use of dental floss and submarginal gingival NCCL.
• Ask to stop using a floss anymore with chlorohexidine rinse while waiting simultaneous cleft healing.

Before tx. distal gingival cleft and root exposure with NCCL due to both of mechanical abrasion and chemical erosion

Full and split thickness flap opening



Coronally advanced flap with subepithelial connective tissue graft

After light curing flowable resin filling and odontoplasty, gingival recession was recovered with laterally displaced flap(full and split thickness) and subepithelial connective tissue graft to utilize enough attached gingiva distal to 1st molar. Exposed root surface was treated with Prefgel™ and Emdogain™ was applied.
5 wks(weeks) after gingival graft

▪ YUN UJ, 60 yrs, F.

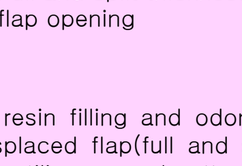
RT2 or Miller Cl Ⅲ

• Palatal gingival recession can not be found without help of a dentist. It often appears as NCCL like a smooth concavity by erosion.
• With aging, thick epithelium and connective tissue tend to recede despite thick marginal gingiva unlike buccal gingival recession of thin biotype. Buccal flap is likely to easily move with detachment of muscle and flexible elastic fiber, whereas the displacement of palatal flap is difficult due to thick, rigid collagen fiber-connective tissue. So, the different flap movement was suggested as a surgical connective tissue separation and sliding each side like sagittal osteotomy to adjust mandible position in orthognathic surgery.
• The modified Widman's marginal gingival incision[7] is performed to reduce the pocket and full thickness pedicle flap is opened up to 4-5mm beneath the gingival margin. The horizontal split incision is obliquely done so that each side of separated connective tissue may establish enough surfaces to contact after surgery. Separated flap is advanced coronally to cover the gingival recession.

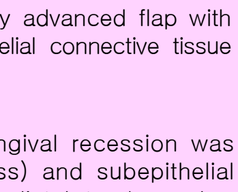
Before gingival graft

During gingival graft

Deep cervical cavity was filled with flowable resin or copomer, pedicle flap was coronally advanced to cover gingival recession in the limited extent from increase of interproximal CAL(clinical attachment loss).



2wks after gingival graft



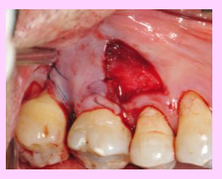
4yrs after gingival graft

▪ LEE MH, 62 yrs, M.

RT1 or Miller Cl Ⅱ of maxillary right 1st molar's distal root
Laterally moved and coronally advanced flap with free gingival graft

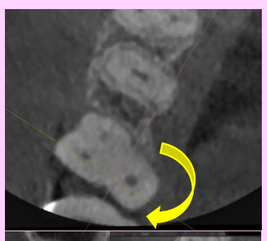
• Considering abundant attached gingiva of 2nd premolar mesial to 1st molar, recipient bed was prepared with de-epithelialization on the interproximal and mesial area of 2nd molar. Laterally displaced full and split thickness flap was designed, and free gingival graft was necessary for an exposed flap area. Horizontal flap incision was apart 2㎜ from the marginal gingiva of 2nd premolar and should be wide enough to cover CE junction of 1st molar.
• Prefgel™ root conditioning was necessary for increase fiber attachment to an exposed cementum.

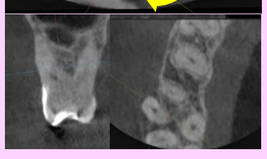
Before gingival graft



During gingival graft

6wks after gingival graft





Bucco-distal root was completely exposed due to dehiscence.

The distobuccal rotation of upper 1st molar was a cause of dehiscence of distobuccal root, in which case the complete root coverage was reported to be impossible if not corrected a tooth rotation.

▪ LEE SH, 36 yrs, F.

RT2 or Miller Cl Ⅱ of lower left 1st molar's mesial root
Coronally advanced flap and sub-epithelial sub-connective tissue graft

Orthodontic related gingival recession. Closing space of extracted 2nd premolars on both arches included the retraction of mesial teeth to align crowded anterior teeth and protract molars to close the rest of extraction spaces.

Before orthodontic tx.

During orthodontic tx.
Closing space of extracted 2nd premolars on both arches included the retraction of mesial teeth to align crowded anterior teeth and protract molars to close the rest of extraction spaces.

2yrs after orthodontic tx. gingival recession began to appear at the 1st molar

The loss of attached gingiva, buccal frenum and alveolar bone dehiscence caused gingival recession to be worsened. To remove pulling of frenum and deepen shallow vestibule, frenotomy and vestibuloplasty were simultaneously performed before gingival graft.

Before gingival graft

7ms after coronally advanced flap and subepithelial gingival graft

5ms after coronally advanced flap and subepithelial gingival graft

8yrs 3ms after gingival graft
Attached gingiva increased to almost cover the exposed mesial root

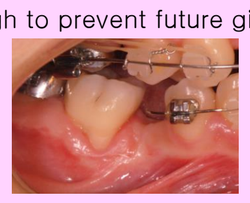
▪ JEONG MH, 44 yrs, F.

RT2 or Miller Cl Ⅱ of lower right 1st molar

• Thin gingiva and gingival recession at mesial root was seen. To upright and protract 1st molar in orthodontic treatment was likely to proceed the gingival recession.
• During orthodontic treatment gingival graft was operated to prevent worsening.
• The thick attached gingiva on the extraction ridge was incised for a laterally displace flap with connective tissue graft from palate.
• Thick and wide keratinized gingiva has grown enough to prevent future gingival recession

Before orthodontic tx.

Before gingival graft



3ms after gingival graft

4ms after gingival graft

Orthodontic root movement in thin keratinized gingiva aggravated root exposure by progressive gingival recession.

← 8yrs after gingival graft

15yrs after → gingival graft

▪ JEON WS, 59 yrs, F.

RT2 or Miller Cl Ⅱ

• Orthodontic treatment for protrusion and upper left 1st molar intrusion
• Gingival recession and periodontal pocket, NCCL.
• Composite resin filling in NCCL(until just above anticipated maximum gingival coverage)
• Odontoplasty and modified Widman's flap incision, horizontal incision 4-5㎜ beneath gingival margin as well as an oblique connective tissue incision extended distally to facilitate moving a pedicle flap coronally.
• Thick connective tissue allowed to slide each side of incised surface for coronally advanced flap.

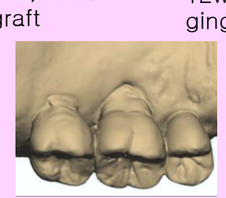
Coronally advanced pedicle flap with split flap incision in thick connective tissue

2wks(weeks) after gingival graft

12wks after gingival graft

4yrs 4ms after gingival graft

Before orthodontic treatment of extruded 2nd molar due to loss of an opposite tooth



After orthodontic tx.
1st molar intrusion reduced gingival recession on palatal cervical area

Result

Gingival graft for molars was successfully achieved by laterally displaced or coronally advanced flap with subepithelial connective tissue. Long term outcome showed that attached gingiva width and thickness increased in gingival creeping. Early intervention for gingival recession was desirable, if possible. Palatal gingival recession was introduced to improve by sliding an obliquely incised connective tissue.

Discussion

The report presented that the recession amount was reduced in 83% of treated cases, whereas increased 48% of non treated cases during the 23.6+3.9 years follow up period.[5]

The main purpose of gingival graft is to cover the exposed root surface to protect weak cementum. But in the impossible full gingival coverage of RT2, or Miller Cl Ⅱ/Ⅲ, and thin gingival biotype, the achievement of thick and wide keratinized gingiva is necessary to prevent the future progression of gingival recession.

• Limitations for good treatment outcomes[6]

Clinical and anatomical factors limiting treatment outcomes of gingival recession should be discussed to prevent mistakes in selection of reference measurement parameters and in the selection of clinical case.

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