Gingival Height of Lower Central Incisors, Orthodontically Treated and Untreated

LLOYD E. PEARSON, D.D.S.

INTRODUCTION

Gingival recession in young people must be viewed with concern because of the accompanying bone loss and lessened support for the teeth. When this recession exists in the lower incisal area it is commonly found on the tooth having the most anterior position. Parfitt and Mjor[1] studied the relationship of localized gingival recession and six etiologic factors in 9-11-year old children. They reported that the tooth arch relationship appeared to be the most important factor considered. The other five factors studied were gingivitis, vertical overbite, "traumatic occlusion," calculus, and soft deposits. The same study reported that 54 of the 688 children examined had localized gingival recession when comparing adjacent lower incisors.

At recent orthodontic meetings growing interest concerning the gingival tissues has evoked questions about the premature aging of the dentition through orthodontic treatment. This study was undertaken to compare the clinical height of lower central incisors of individuals who received no orthodontic treatment with individuals who have had orthodontic treatment accompanied by gingival recession. The treated cases were selected specifically because they exhibited gingival recession following treatment. The lower incisal positions were examined on models and cephalometrically to determine whether or not different inclinations or anteroposterior positions tend to be related with gingival recession.

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METHOD AND MATERIAL

This study was conducted on twenty-seven untreated controls and forty-five orthodontically treated cases. The controls were drawn from a longitudinal study of individuals selected as normals at the beginning of the study; the only cases excluded were those lacking complete records. The treated cases were selected from several practices and clinics and represented the most severe gingival recession found after surveying over six hundred cases.

Measurements of the clinical heights of the lower central incisors were made on plaster casts using a Boley gauge with sharpened points. The measurement was made at the middle of the crown's incisal edge to the deepest point on the labial gingival crest. The initial records used for the controls were taken just after the lower second molars had erupted and the final control measurements were made on records taken approximately two years later. The measurements of the treated cases were made on before-treatment records and after-treatment records.

The height of the most labial central incisor was measured and compared with the height of the most lingual central incisor. The average height of the two centrals was used in the comparisons between experimentals and controls. The treated cases were selected because they exhibited more than 0.5 mm average recession of the two central incisors. The study used lower centrals because of the rarity of lower lateral involvement.[1] The overbite was also recorded from measurements on the plaster casts.

Various measurements were made on

initial and final lateral cephalometric films to determine whether or not different inclinations or anteroposterior positions of the lower incisors tended to be related with recession of the gingiva. Measurements were made of the following:

1. The incisal edge of the lower central incisor as related to the A-pogonion line.
2. The labial surface of the lower incisor as related to the line nasion-B point.
3. The incisor mandibular plane angle.
4. The long axis of the mandibular incisor, nasion-B point angle.
5. The lower incisor apex as related to the nasion-pogonion line in millimeters.

Björk[2] has suggested, in lieu of metallic implants, superposing the tip of the chin and the following three internal structures: 1) the inner cortical structure of the inferior border of the symphysis, 2) detailed structures from the mandibular canal, and 3) the lower contour of the molar germ from the time that mineralization of the crown is visible until the roots begin to form. In attempting to use these structures difficulty was encountered in superimposing structures of the mandibular canal; the measurements were similar when compared with the use of the five previously-mentioned measurements.

By the use of the five measurements on cephalometric tracings described above, it was determined which type of movement the lower incisor had undergone: 1) translation or bodily movement, 2) tipping with the crown moving in one direction and the root apex in the opposite direction, and 3) torquing movement with the root apex moving either labially or lingually with the incisal edge stationary. Calculations were then made to determine whether or not different types of incisal movements were related with greater gingival recession in the control group and the experimental group.

Results and Discussion

Examination of the subgroups within the controls revealed no significant correlations between the types of movements undergone by the incisor and the amount of recession. This control group exhibited very small change in gingival height (0.04) with a range of −0.65 recession to +0.80 improvement or apparent shortening of the clinical crown.

The experimental group resembled the control group in that no significant correlations appeared when comparing the different types of incisal movements with the amount of gingival recession. The most lingual and the most labial lower central incisors receded the same amount (1.1 mm) during the treatment period.

Thirty-two of the forty-five experimentals had labial movement of the lower incisor apex (71%) while fourteen of the twenty-seven controls had labial movement of the incisor apex (52%).

The overbite was measured on the plaster casts and compared with the amount of gingival recession by means of a scatter diagram. No correlation appeared to exist.

Since the experimental group represents a biased sample of the most extreme gingival recession noted in over six hundred treated cases, no conclusion regarding a cause and effect relationship between orthodontic treatment and gingival recession can be drawn. It should be noted, however, that significantly greater recession was demonstrated in the treated cases and the etiology of this recession should definitely be investigated further. Differences in treatment as well as constitutional differences between individuals must be identified and studied in order to completely resolve this question.

Summary and Conclusions

1. The control group demonstrated that the untreated individuals exhibited very little change in gingival height over a two-year period at an age when most orthodontic cases are treated.
2. The experimental group of forty-five cases exhibiting gingival recession was selected from a survey of over six hundred cases and demonstrated that significant gingival recession occurred in only a small percentage of the treated cases.
3. No correlation could be found between the amount of overbite and the degree of gingival recession in the control or experimental group.
4. The most labial lower central incisors in the experimental group receded approximately the same amount as the most lingual lower central incisors during the treatment period.
5. A larger percentage of the experimental cases had the lower incisor apex move labially (71%) than did the control group (52%).
6. No correlation could be found between the amount of root apex advancement or retraction and the degree of recession in the experimental or control groups. No correlation could be found between the different types of incisal movements and the degree of gingival recession.

644 Southdale Medical Bldg.
Minneapolis, Minn. 55410

References

1. Parfitt, G. J. and Mjor, J. A.: A Clinical Evaluation of Local Gingival Recession in Children. *J. Dent. for Child.*, 31:257-262, 1964.
2. Björk, A.: Variations in the Growth Pattern of the Human Mandible; Longitudinal Radiographic Studies by the Implant Method. *J. Dent. Res.*, 42:400-411, 1963.