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CEMENTO-ENAMEL JUNCTION VARIABILITY WITHIN THE MOUTH

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Two recent papers[1,2] have drawn attention to the lack of fundamental data on root cementum and the cemento-enamel junction (CEJ). In the light of recent surveys[3,4] it is apparent that for our elderly community, there is a need for basic information on this area of the tooth where, in future, much conservative treatment will occur. This study was undertaken to examine the relationship between enamel, dentine and cementum in teeth obtained from the full mouth clearance, against dental advice, of a healthy 24 year old male with minimal periodontal involvement. All teeth examined had the CEJ exposed to the oral environment for some time and thus this region would be representative of the clinical situation where restorative work would be required.

Extraction of the teeth was completed with as little forceps damage as possible. After rinsing in running tap water, the teeth were stored in a 10% formol saline solution. Prior to SEM examination, the crown and root approximately 5mm above and below the cemento-enamel junction, was removed from each tooth using a diamond disc. The resultant cylindrical tooth specimens were immersed for 3 hours in 5% sodium hypochlorite to remove adherent organic debris, thoroughly rinsed with a jet of distilled water and air dried. All specimens were mounted on SEM stubs, with the long axis at right angles to the stub surface, so that the entire length of the CEJ could be examined by rotation of the specimen stub. After coating with gold palladium the teeth were viewed in a JEOL 840 scanning electron microscope at an accelerating voltage of between 15 and 20kV. In each specimen the entire circumference of the CEJ was examined and the relationship between the enamel, dentine and cementum noted and photographed. A total of 18 teeth out of a possible 26 were examined, 4 teeth were too severely damaged for use. Following this initial examination, 13 of the 18 specimens were etched for 60 sec using 50% phosphoric acid around the entire CEJ. After allowing the specimens to air dry once again, the tooth cylinders were recoated and viewed. Areas which proved to be of interest in the initial examination were relocated, re-examined and re-photographed.

This study concurs with a previous finding[1] that the predominant arrangement of tissues at the CEJ is cementum overlapping enamel. However in our study this overlap took two distinct forms. Either the cementum formed a definite "roof" over the enamel, with a gap present between the cementum and the underlying enamel; or the cementum was directly attached to the underlying enamel with or without the cementum

forming an obvious groove prior to the overlap (fig 1). In contrast to a prior report[2] scanty areas of dentine, exposed between the enamel and cementum, was observed in only 5 of the teeth examined. A striking feature of the 5 incisors and one premolar was the distinctive scalloping of the CEJ (fig 2). Notable of this arrangement was the formation of cementum islands within the enamel. Variation of the overall CEJ arrangement was apparent between the teeth. For instance, although the upper left 2 showed scalloping of the CEJ this was absent in the upper right 2. The enamel extended 2mm down into the bifurcation between the roots on the lingual side in the lower left 6, but the CEJ at the buccal margin followed a straight course around the neck of the tooth.

This is the first study which compares the relationships of the three hard tissues present at the CEJ in all four types of fully erupted teeth originating from one mouth. As the CEJ had been exposed to the oral environment for some time, cementum formation had definitely ended. Consequently it is felt that the CEJ arrangement as reported here is more representative as encountered in the clinical situation than those of a previous study[1] where the tooth specimens were at best partially erupted and only posterior teeth were examined.

References

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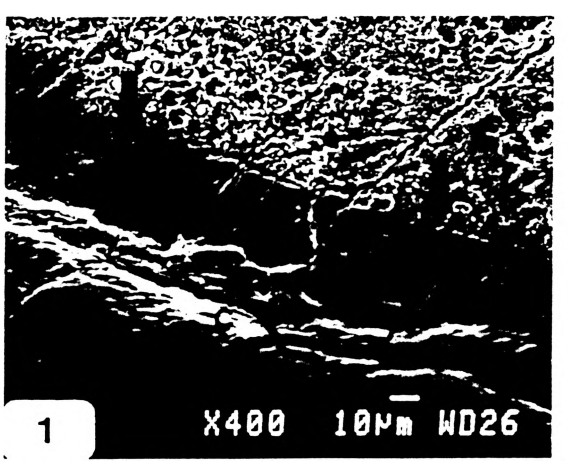




Fig 1: Note the distinct groove (g) prior to the cementum (c) overlapping the enamel (e) arrowed. Fig 2: The scalloping of the CEJ in the upper right central incisor.