

Bovine incisor enamel plays an important role in dental research, however little is known about the structural and ultrastructural characteristics of this enamel. Light microscopy studies of enamel thin sections and scanning electron microscopy studies of whole and fractured incisors, and sectioned teeth that were polished and etched were conducted. Twenty freshly extracted permanent central incisors were studied as well as twenty central incisors from skeletal material. Bovine incisor enamel, when viewed in a longitudinal section, has three distinct layers, an inner enamel layer consisting of two zones, (1) zone 1 - the initial layer of first formed prismless enamel, (2) zone 2 - a layer of decussating prisms called modified radial enamel, and (3) zone 3 - a wider layer of multiseriate Hunter-Schreger bands; and an outer enamel layer consisting also of two zones, (1) zone 4 - a wide layer of parallel prisms referred to as radial enamel, (2) zone 5 - the final layer of enamel at the surface described as prismless enamel, and a surface layer of coronal cementum that covers the surface of the tooth described as zone 6. Orientation of crystallites within zone 1 are perpendicular to the dentinoenamel junction while those of the decussating prisms in zones 2 and 3 are inclined  $45^{\circ}$  toward the surface and at  $90^{\circ}$  to the crystallites of the interprismatic enamel. The prisms and crystallites of zone 4 are also inclined toward the surface at  $45^{\circ}$ , however in zone 5, the prismless surface layer, crystallite orientation is perpendicular to the surface. Zone 6, the coronal cementum layer, was found in all freshly extracted incisors and most of the skeletal specimens. The structural and ultrastructural differences found in bovine enamel clearly demonstrate the differences between this type of enamel and human enamel. Therefore, caution must be used when extrapolating results from studies of bovine enamel to that of human enamel.