## H92 Wearing Down Old Perspectives: The Prevalence of Severe Dental Attrition in Modern Individuals

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After attending this presentation, attendees will have a better understanding of the frequency of severe dental attrition in modern individuals, as well of the possible causes of this condition.

This presentation will impact the forensic science community by highlighting the presence of severe tooth wear in forensic cases, which is typically observed only in archaeological contexts. Additionally, the researchers explore how this degree of wear can affect the development of the biological profile and the process of identification.

In the analysis of skeletal remains in the United States, the presence of severe dental attrition is usually an indicator of ancestry (i.e., Native American) and can serve as a deciding factor in determining medicolegal significance. However, attrition occurs in all populations for a variety of reasons. For example, 121 contemporary individuals from the William M. Bass Donated Skeletal Collection were examined for severity of tooth wear in the posterior (premolar and molar) and anterior (incisor and canine) teeth. Large areas of exposed dentin, as indicated by a wear score of five or higher according to Smith, were observed in the posterior dentition of 14% of the sample, and in the anterior dentition of 12% of the sample.[1] While a relatively small percentage of the sample exhibited a severe wear score, none of the individuals fit the typical demographic or contextual profile for this degree of wear (e.g., prehistoric).

Possible causes for severe attrition in contemporary individuals were explored through the examination of the skull of a male in his early 40s exhibiting a degree of dental attrition akin to prehistoric populations. Although this condition typically rules out medicolegal significance in the United States, three key lines of evidence indicated that he was a modern individual. First, the remains were in an advanced state of decomposition upon discovery. Second, the individual displayed evidence of antemortem modern cranial surgery. Third, several modern dental restorations were present. Without these indicators, time since death for this individual may have been determined to be outside the realm of medicolegal significance; as such, these remains may never have been identified.

A number of hypotheses for the presence of this extreme attrition were examined through a review of the literature and a cross-disciplinary discussion with dental professionals. Hypotheses considered included wear resulting from this individual's particular occlusal alignment, wear related to subsistence strategies or other nonmasticatory use, and pathological bruxism secondary to neurotrauma. The investigation suggested that fewer and fewer researchers consider occlusal alignment to be a prominent factor in bruxism.[2] Although the individual exhibits edge-to-edge occlusion, the researchers surmised that this morphological factor did not play a significant role in the progression of attrition. Further review found that the individual exhibits a wear pattern unlike any previously documented population-specific wear.[3] Thus, cultural influence is an unlikely factor. Finally, literature describing similar wear in patients with neuromuscular disorders suggested that severe wear can occur over a relatively short time period due to constant diurnal and nocturnal bruxism.[4] Research also showed that disturbances in the central neurotransmitter system of the brain, specifically the basal ganglia, are directly linked to severe bruxism.[2] Therefore, the researchers conclude that this individual's advanced state of attrition was likely associated with the antemortem cranial trauma and resulting neuromuscular complications.

The frequency of tooth wear observed in the Bass Collection, as well as the presence of severe attrition in a fairly young individual, illustrated the necessity to consider the impact of severe attrition on the forensic identification process. Specifically, consideration of the full range of possible factors associated with tooth wear is essential in determining medicolegal significance. Additionally, the fact that this degree of wear occurs secondary to neurotrauma over a relatively short period of time is important in instances where tooth wear may be used for aging, as it would result in a significant overestimation of age. Forensic anthropologists should be aware that encountering similar modern cases of severe attrition may be more common than previously thought. Special attention to causal factors is required in these cases to determine the possible effects on the development of the biological profile.

**References:**

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**Dental Attrition, Bruxism, Neurotrauma**

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