

BOOK REVIEWS

HOW ANTHROPOLOGY INFORMS THE ORTHODONTIC DIAGNOSIS OF MALOCCLUSION'S CAUSES. By Robert S. Corruccini. Mellen Studies in Anthropology Vol. 1. Lewiston, New York. The Edwin Mellen Press. 1999. 206pp. ISBN 0-7734-7980-5, \$89.95 (hardback).

Robert Corruccini has been at the forefront of anthropological studies of dental occlusion for most of the last 20 years. His research, ranging from cross-cultural studies on occlusal variation, through twin studies investigating the heritability of occlusal traits, to the effects of dietary consistency on occlusion in non-human mammals, has appeared in diverse journals targeting both anthropology and orthodontia. This book is a compilation of this diverse research and therein lies its value for individuals in both fields, although, as can be seen by the title, the primary audience is intended to be students and practitioners of orthodontics.

There have long been differences between anthropology and orthodontia in how the etiology of malocclusion is viewed. Currently, anthropologists tend to favor environmental factors, such as diminished dietary toughness, while orthodontists generally espouse genetic ones, such as admixture leading to disharmonious mixing of various tooth and jaw sizes and shapes. Within the framework of this debate lies the thread that connects all of Corruccini's research: that environment, not genetics, is the primary etiologic factor behind the extremely high rates of occlusal problems found in the modern, developed, nations.

Beginning with a review of the history of occlusion research, including a good treatment of genetics vs. environment, in Chapter 1, and through the succeeding seven chapters, Corruccini clearly lays out his argument in favor of environmental causation. Following a discussion of methods in Chapter 2, Chapter 3 surveys the many occlusal variation studies Corruccini has carried out involving peoples from around the world. Ranging from rural Kentuckians in whom marked differences in occlusion are seen between subsequent generations to like differences found between rural and urban Bengali youths, each study points to changes in dietary toughness as the force behind the revealed occlusal variation. Chapters 4 and 5 review, respectively, occlusal variation within the context of the epidemiological transition in minor diseases and Begg's theory on the effects of interproximal attrition on space available for erupting teeth, and therefore, its impact on crowding. One point discussed in Chapter 4, that is important for understanding the origins of the genetics perspective in orthodontia, relates to the types of samples encountered by orthodontists and anthropologists. Orthodontists, on the one hand, deal with small, frequently familial, groups of westernized people, a research base that tends to emphasize the genetic relatedness of individuals with poor occlusion. Conversely, anthropologists traditionally study larger groups of ethnically related peoples, frequently in their native area. This latter perspective, in which a view focusing on variation between populations is taken, tends to result in environmental forces becoming paramount in discussions of etiology.

Chapter 6 consists of a review of several nonhuman animal studies undertaken by Corruccini and various colleagues. These experiments entailed splitting groups of baboons, rats, or squirrel monkeys into two samples and feeding each either hard or soft diets and then recording the effects of the dichotomous diets on the development of the gnathic complex. In every case the sample fed the softer diet exhibited higher rates of occlusal irregularities as well as reduced development of the bones and muscles involved in mastication. Corruccini uses Chapter 7 to discuss genetic studies focusing on mono- and dizygotic twins. Each study shows that, for the vast majority of traits, the environmental component is the most important factor in variation in occlusion. In explanation Corruccini states (p. 164) that "Although it is generally agreed that a polygenic mode of inheritance is most likely to explain occlusal variation, our findings indicate that complicated environmental effects contribute more to the variability observed than suggested by early twin studies (and the general tone of the

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literature). Significant genetic variance was noted for certain traits in certain populations, with limited consistency or repeatability over populations. Heritability estimates were generally low to moderate in magnitude, within-pair estimates for these traits centering around 20 percent."

In the eighth, and concluding, chapter Corruccini sums up his argument succinctly noting, "Malocclusion syndromes follow certain non-random patterns of occurrence that support the idea of an underlying chewing stress principal factor as opposed to the myriad other etiologies" (p.173- 174). He also revisits a theme that is consistent throughout the book. This is that the idea of environment as the predominant etiological factor in malocclusion is not a new idea. Nearly all of the early researchers, mostly dentists, (for example Sim Wallace 1904; Hooton, 1918; Campbell, 1925, 1938; Waugh, 1937; Hrdlička, 1940a,b) who encountered changing occlusal patterns in rapidly acculturating societies attributed these changes to either diminished diet or reduced masticatory use. This fact seems to have become forgotten after the mid 1950's and the heightened interest in genetics that resulted from the discoveries of Crick and Watson.

In summary, this book is, excepting the somewhat awkward title, a good examination and compilation of Robert Corruccini's work on occlusion. It brings together in one place the arguments supporting an environmental etiology for malocclusion and emphasizes that function, rather than genetics, is at the root of most of the orthodontic problems encountered by our modern populace. I especially recommend this book to our colleagues in dentistry and orthodontia as I think it will, if nothing else, enlighten them to a different view of the forces involved in the development of occlusal irregularities.

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