

CHAPTER

I

Introduction to Dental Anthropology

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The Foreword by Clark Larsen nicely addresses the content and purpose of this volume. Beyond that, the reader can look at the table of contents to ponder the topic of each chapter without us having to (re)state the obvious. So we will keep this chapter short and to the point. Think of it primarily as “reading instructions,” or at least suggested guidelines, to get the most out of this book.

What you hold before you, whether tactilely or virtually, is a text/reader/reference book or, if all else fails, paperweight, on the subject of all things teeth and tooth related. That is, we are talking teeth from the perspective of dental anthropologists. So what is the definition of “dental anthropology”? There is no need to reinvent the wheel when we have the internet. According to the *Medical Dictionary for the Dental Professions* (2012), it is “[a] branch of physical anthropology concerned with the origin, evolution, and development of dentition of primates, especially humans, and to the relationship between primates’ dentition and their physical and social relationships.” That definition works.

The reasons why teeth are studied are numerous. For one thing, they are made up of the two hardest tissues in the body, so are the most likely to be preserved in the fossil and archaeological records. Think about it. Many fossil primate species are defined based on teeth. Given that teeth are the only components of the skeleton to come into direct contact with the environment, we can learn about diet, health, and even certain cultural factors of individuals and groups. Throw in the facts that tooth size and shape have high genetic components in expression and that, unlike bone, this expression does not remodel itself during life (other than via crown wear and pathology), and we have an excellent

source to estimate biological origins and relationships across time and space. There is much more, but you can read about that in the remaining 30 chapters of this book.

WHO YOU ARE, AND OUR SUGGESTIONS

At this point, we would like to know something about you so we can offer suggestions on getting the most out of this volume. Are you a dental anthropology beginner, such as an upper-division or graduate student taking an initial course in this “branch of physical anthropology,” or an interested layperson? If so, then you may be using this volume as a textbook or secondary class source. In that case, we suggest you read the rest of this chapter and then, importantly, skip directly to Chapter 7. The latter contains the fundamental terms and terminology needed to fully grasp the content of each remaining chapter. Pay special attention to the differences in tooth class designations; they vary among studies of primate, fossil hominin, and modern human dentitions (e.g., a lower first premolar may be labeled as P₃, LP3, or LP1). After learning the basics, flip back to Chapter 2 and read the rest of the volume in order.

Are you an advanced graduate student, post doc, or a newly minted professional who wants to “bone up” on dental anthropology or focus on specific topics of interest to your own research or teaching? Then think of this book as a reader/reference, where you can reacquaint yourself with the basics, and get up to speed on new methods, areas of research, and references, and/or gain some personal insight from experts in the field. We suggest that you skim the rest of this chapter and start right in on Chapter 2. You should know enough to get by regarding dental terms, and besides, it will all come back to you as you peruse the material.

Or are you a dental professional, with strong academic or perhaps clinical experience, who is inclined to use this volume for reference purposes? If so, then you can probably skip the rest of this chapter, as well as Chapters 7–8, and perhaps any other chapter(s) covering material on which you are an expert. Then go ahead and “cherry pick” the sections and chapters that you find to be of interest.

VOLUME ORGANIZATION AND CONTENT

This section heading may seem to imply that we are going to restate the obvious, but as I have already said, we are not. Rather, we are chiefly providing some rationale for the order and structure of chapters. This book is organized exactly in the way the first editor has taught dental anthropology as an upper-division/graduate-level university course for the past couple of decades. That is, it proceeds in a more or less sequential manner, both procedurally and temporally:

- **Part I: Context** (see Chapter 2) provides a diachronic review of where this sub-discipline of physical (or biological) anthropology came from, and a list of some of the major players involved.
- **Part II: Dental Evolution** (Chapters 3–6) covers the origins and variation of teeth in an evolutionary perspective—from their first appearance in non-primates (which, according to the above definition is actually outside the realm of dental anthropology), to variation among non-human primates and fossil hominins, including pre-modern *Homo sapiens*.

- **Part III: The Human Dentition** (Chapters 7–9) introduces the terminology, anatomical structures, and functions of the teeth and supporting structures that are necessary for dental anthropological research.
- **Part IV: Dental Growth and Development** (Chapters 10–13) provides key information on dental genetics, crown and root formation, eruption, final form, and variation therein.
- **Part V: Dental Histology from the Inside Out** (Chapters 14–16) continues on from the previous part by providing detail on the structure and material properties of tissues that comprise the teeth.
- **Part VI: Dental Morphometric Variation in Populations** (Chapters 17–20) shows how tooth shape and size can be quantified in samples to estimate intra- and inter-population variation and affinities, that is, involving the “big picture” in anthropology.
- **Part VII: Dental Morphometric Variation in Individuals** (Chapters 21–24) follows up on the preceding part by focusing on individual characterization and differences; forensic applications are essential, but the ability to reconstruct life histories, as in an archaeological context, is necessary as well.
- **Part VIII: Dental Health and Disease** (Chapters 25–28) covers the importance of dental pathology, like caries and enamel hypoplasia, for understanding life histories (including diet, indications of stress, etc.) at both the population and individual levels.
- **Part IX: The Future of Dental Anthropology** (Chapters 29–31) shows a glimpse of where the subdiscipline is headed, by describing state-of-the-science approaches to assess the link among morphological variants, the use of chemical analyses, and an overview of non-destructive techniques to image the inside of teeth. All in all, the future looks bright.

EXPERTISE AND A PERSONAL TOUCH

No matter whether you use this book as a text, reader, reference, or something else, it is important to know that each chapter was written by an expert (or experts) in that area of dental research. For example, do you want to know about the origins and early evolution of teeth? The author of Chapter 3, Peter Ungar (2010), literally wrote the book on the subject. The same goes for Peter Lucas (2004) concerning jaw function in Chapter 9, and the authors of Chapter 16 on enamel structure; in the latter case Daniel Antoine (2001) wrote his entire PhD thesis on enamel(!) and Simon Hillson (1996, 2000, 2014) has no fewer than three books in which this tissue is detailed. However, a quick perusal of the references in these chapters shows that the authors do much more than write books, as the many publications in peer-reviewed professional journals indicate. Along these lines, check out all the articles by the first author of Chapter 13 on tooth classes and the field concept, Grant Townsend (e.g., among others, 2005, 2009), and Chapter 27’s author, Debbie Guatelli-Steinberg (e.g., among others, 2004, 2012) on dental stress indicators (enamel hypoplasia). Each of the remaining authors could be singled out for kudos in this manner, but there are just too many. So please make sure to look through their short biographies at the beginning of this book to get an idea of who they are.

Now think about this. If you were tasked with creating a textbook (or reader/reference) on any topic of your choosing, would you not want it to be written by the best and the brightest? Ordinarily, textbooks are written by one or a few authors. Such

an approach is great for chapter consistency in writing style, format, and so forth. Nevertheless, those few authors are likely not experts on every topic in the book. For example we—your kindly book editors—are dental morphologists, and we also know a little about other aspects of dental anthropology. However, we are not experts in primatology, paleoanthropology, genetics, forensics, or histology. So we got the experts to write about what they know best, while doing a “light touch” editing job to strive for consistency across chapters in writing style, format, and so forth. But wait, there is more. Beyond presenting material specific to each chapter topic, many authors provided findings from their own research, maybe a case study or two, and/or voiced opinions about their or other areas of dental anthropology. As such, they personalized their chapters so you can see that there is more to research than just the same old “empirical” or “scientific” approach.

NOW ON TO CHAPTER 2 (OR CHAPTER 7)

So, if you have read this far you must not be a dental expert, unless you simply wanted to see how everything turned out in the end. In any event, sit back, tactilely or virtually grab this volume firmly, and start reading (and above all, learning). The 40+ authors put a lot of work into their chapters. We hope you enjoy reading them as much as we did when putting this edited volume together.

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