

## BOOK REVIEW

*The Anthropology of Modern Human Teeth. Dental Morphology and Its Variation in Recent and Fossil Homo sapiens.* By G. Richard Scott, Christy G. Turner II, Grant C. Townsend, and Maria Martinon-Torres. Cambridge University Press. 2018. 396 pp., \$44.99 (paperback). ISBN:978-1-316-62648-1

*The Anthropology of Modern Human Teeth* second edition has been published 20 years after the original Scott and Turner (1997). The first edition made the Arizona State University Dental Anthropology System (ASUDAS) dental morphology data collection methodology accessible to scholars around the world. Since that time multiple generations of dental anthropologists have graduated and continued the exploration of information gleaned from modern human and fossil hominid teeth. The second edition closely follows the same outline as the first edition. Each chapter has been updated with the inclusion of almost every single published study up to the publication date. The developmental and genetic sections have been expanded. The most obvious difference between the two editions is the addition of an entire chapter focused on dental variation among fossil hominids.

G. Richard Scott was Turner's first graduate student and their close research relationship is the core of this book. Scott brings his expertise in covering the breadth of dental anthropology populations studies on European and Arctic populations, familial studies on patterns of inheritance, and the possible effects of gene flow on trait expression. This book greatly benefits from Christy G. Turner II's global dental morphology data and his unique slide collection of dental variation and rare traits. Both of these researchers have seen almost every dental morphological variation recorded in modern human populations. The addition of two new co-authors helps to round out the scope of this book. Grant C. Townsend's extensive research into odontology, dental development, and genetics provides the background to understand the necessity for morphological stud-

ies. María Martínón-Torres specializes in the dental anthropology of fossil hominins. She brings a unique perspective on dental variation among fossil hominids with a focus on sites in Spain and China.

The organization is straightforward with a prologue, eight chapters, and an epilogue. The prologue summarizes the present state of dental morphological research. They address potential problems encountered in the process of data collection. Finally, dental anthropology class teaching objectives are mentioned. Chapter 1 covers the history of dental morphological studies, what has been the research focus of dental anthropologists, who are the key historical figures, and research trajectories through time. Chapter 2 is a thorough description of crown and root dental traits in permanent teeth. Dental anatomical terminology, direction and positional terminology, and cusp numbers are reviewed. Data collection, interobserver error, and intraobserver error are discussed. Thirty-six traits are shown with photographs of real teeth and dental casts. Each trait is listed with a brief description, observable variants, and which key teeth to be scored. Chapter 3 switches directions and introduces ontogeny, dental trait development, asymmetry, intertrait associations, and dental genetics. Chapter 4 focuses on the genetic background of dental traits. How are dental traits influenced by intertrait associations and levels of heritability? How is trait expression affected by the combination of genes and environment? Chapter 5 looks at the distribution of dental traits along five macro-regional divisions using over 30,000 individuals from Turner's data set. More intra-regional subdivisions have been added since the first edition to provide a more detailed picture. The two regions which benefit the most from the added data sets are Sub-Saharan Africa and North America. The tables and figures help greatly to organize this immense amount of information. The specific dental traits used to define macro-regional dental complexes are explained. Chapter 6 introduces the theoretical and methodological issues encountered in population history studies. Many studies use either a historical or processual basis for their hypotheses. Studies are grouped according to whether they are addressing natural selection, gene flow, gene drift, mutation, or sexual selection. An attempt is made to determine possible adaptive mechanisms for dental traits based on structure, function, strength, or durability. An interesting section mentions the potential of using

rare dental traits to determine kinship or marital patterns. The authors mention the level of congruence (or not) dental trait studies have had with linguistic regions, historical records, archaeological evidence, blood group patterns, cranial nonmetric traits, odontometrics, and dermatoglyphics. Finally, extensive citations are mentioned for micro-regional studies, which have exploded since the publication of the first edition. Chapter 7 goes into detail about the macro-regional dental complexes and how they contribute to the understanding of population history in very deep time. These studies focus on the “Peopling of the World” hypothesis which was the driving factor in Christy G. Turner II’s lifetime of research. Some exploration into the evolution of dental traits is mentioned. In the end all of the data supports an origin of modern humans from Africa. Chapter 8 is a new addition to this edition focusing on fossil hominids. This is an excellent and much needed overview on fossil hominid dental variation. While the emphasis is on finding a dental complex, which will identify modern *Homo sapiens*, almost every fossil hominid species are represented. Twelve potential distinguishing dental traits are examined in detail. While no single dental trait is unique to modern humans, a particular combination and expression of traits may provide some discrimination. A large number of individual hominids is represented. The numerous photographs allowing a side-by-side comparison of individual teeth, more or less to scale, is impressive. The epilogue covers areas that are outside the authors’ research focus including deciduous teeth, dendrochronology, and forensics applications.

Many things about this edition are incredible achievements. The writing style and tone are comfortable and clear. Very complicated concepts are explained well and made accessible. The manipulation and visualization of the huge data set is an accomplishment. The tables, graphs, and figures are well designed and explained within the text. The sheer number of photographs is a huge asset to any researcher. The bibliography in itself is probably the most valuable part of this book. This is a refreshingly inclusive collection of national and international research.

The main weaknesses of this edition have to do with being too ambitious with lapses in structure and organization. The flow of the chapter topics can be abrupt. It may have flowed more smoothly with all of the background information first, then intro-

duce the traits, ending with the populational studies. The prologue, epilogue, and Chapter 8 feel as if they are tacked on, and not well integrated into the rest of the chapters. This may be a result of the all-inclusive nature of the book, that there is just too much information to fold everything in smoothly. With the exception of Chapter 8, the photo quality of the rest of the book is not as good as the first edition. This may be the result of quantity overshadowing quality in the photographs. Some of the dental traits are difficult to visualize due to the small size or not enough contrast.

Overall, this book is a much needed addition to the fields of dental anthropology, dental genetics and development, population history, and fossil hominid research. The numerous photographs and all-inclusive bibliography make this a unique contribution to the field. While the information is too dense to use as a textbook, researchers and advanced graduate students will find this a valuable addition to their libraries. This is a poignant last publication and a fit tribute to the career of Christy G. Turner II

#### REFERENCE

Scott, G.R., & Turner II, C.G. (1997). *The anthropology of modern human teeth. Dental morphology and its variation in recent human populations*. Cambridge: Cambridge University Press.

CHRISTINE LEE

California State University, Los Angeles