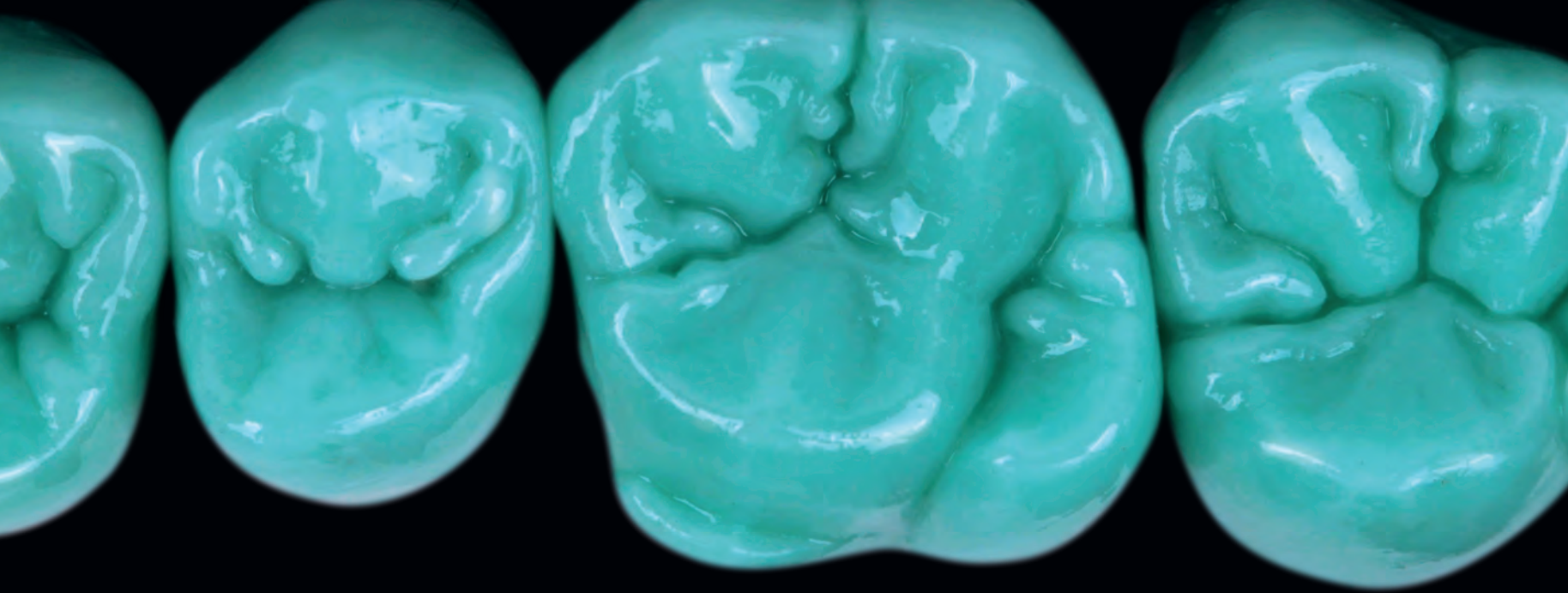




Dental Anatomy and Morphology

Hilton Riquieri



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Dental Anatomy and Morphology

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Forewords

Writing the foreword for a book is a huge responsibility because you endorse the work to the scientific community. For this book, the responsibility increases the pleasure, and the honor of doing it is immeasurable. Let me explain: This work is a gift to the field of dentistry because it was crafted by an outstanding professional, Dr Hilton Riquieri, who excels at waxing dental morphology.

As both an experienced dental technician and a prosthodontist, Dr Hilton is able to synthesize both disciplines as few others. I was very pleased to have Dr Hilton as a doctoral student in the restorative dentistry postgraduate program at the Science and Technology Institute of São Paulo State University. He was an ideal student because the university's function is to train dentists who have the mission of researching and spreading knowledge in Brazil and abroad.

This important work also showcases photography by Dr Rodrigo Riquieri, who is Dr Hilton's son; he has already shown his own dedication to the profession in his laboratory and clinical work and has a very promising future. Drs Francci, Saavedra, and Viegas have all proven themselves in teaching, research, and clinical

and laboratory experience, and their contributions are excellent.

However, this work attests, above all, to the leadership and synthesizing skills of Dr Riquieri in the art of teaching dental morphology. In 17 chapters, he explains step by step how to draw and sculpt dental anatomy with maximum accuracy. In these chapters, the exquisite morphology of all the teeth are developed and presented carefully, with examples from everyday life that greatly facilitate learning. What strikes me in this book is the richness of detail and the brilliant and direct way of teaching how to study, plan, and execute waxing and sculpting. This book will be very useful to students and professionals who want to improve waxing and sculpting techniques.

This book is a gift, and the field of dentistry will be grateful that—after all of the professional dental training—the authors and contributors have chosen to devote part of their lives to the creation of this scientific and technical book. Enjoy your reading!

Marco Antonio Bottino

This book is a guide that will inspire excellence in dentistry. Because of the fundamentals presented here, anyone who has dedicated themselves to the fabrication of dental prosthodontics should use it to learn the foundations of creating ideal morphology, which demands technical acumen. However, this book conveys not only the practical knowledge of morphology but also the art of its sculpture.

Dr Hilton Riquieri also demonstrates that, for every morphologic feature, there is a scientific explanation. It is immensely rewarding to see professional ability dedicated to teaching. Thus, it is with great honor that I write the foreword of a book whose pages convey much more than just words and images; they share a deep knowledge that comes only from professional

experience. Dr Riquieri is an exceptional professional whose sharp insight and illustrative teaching style is evidenced throughout this book. The presentation makes the learning pleasant and easy.

This beautiful atlas describes the anatomy of each dental structure and presents step by step and in detail the execution of sculpture in wax. In addition, the author uses analogies from everyday life to elaborate ideas and concepts of considerable complexity.

Congratulations to those who have shared from their experience and wisdom to prepare this book for worldwide dentistry.

Paulo Kano

Dedication

To Joseph and Divina, father and mother, who are my role models.
To my siblings—Carlos, Regina, Eurípedes, and Aparecida—for support and always being present.
And the reason for everything: my wife Deborah and my children Rodrigo, Breno, Arthur, and Enrico.

Preface

Learning is an endless path. Drawing and carving are basic skills, like walking and reading, that once learned are known for a lifetime. However, the most we can do is what our perception allows us to see. As Paulo Kano has said, “The hand can only reproduce what the brain can see.” How do we INCREASE our perception, our ability to see more?

Constructivism is a psychogenetic theory introduced by the Swiss biologist, Jean Piaget (1896–1980). This theory states that we develop skills through association of what we want to learn with memorized objects/figures. Thus, knowledge is built up from our interaction with the environment where, with constant training, long-term memory and innate skills are formed.

Sculpture is an innate ability, though we were not born with it. For the final results, 70% depends on perception, 20% depends on psychomotor training, and 10% depends on manual ability.

In Betty Edwards’ discussion of the development of skill training, the student moves from being:

Incompetent AND unaware



Incompetent BUT aware



Competent AND aware



Competent BUT unaware

Accumulated knowledge allows us to overcome obstacles, and overcoming difficulties opens new horizons and elevates our personal boundaries. May this book be part of your journey to new horizons.

Acknowledgments

I would like to thank:

Rodrigo Riquieri, who was fundamental to the development of this book thanks to his splendid images.

My collaborating teachers, Drs Carlos Francci, Guilherme Saavedra, and Diogo Viegas, who added their experience to this work with enthusiasm and genius. Being surrounded by people like them is a privilege.

Helcio Marques, owner of the first laboratory in which I worked. In 1981, he accepted me as his assistant. Thank you for the years in which you exercised the virtue of patience with me!

Expedito Bernardes and Perclísio de Oliveira Gomes, professionals who helped me to grow and offered me the opportunity to train and still be paid. Time and distance have not detracted from our friendship or my gratitude.

Sebastião César Manosso and his wife Édila Moreira Manosso, and Benvinda Maria de Souza, Antônio Gasparini, Paulo Rubens Ruiz Possebom, Mário Marques Cunha, Celso Garcia Rodrigues, and Milton José Aricó. In difficult times and without their help, the dream of graduating would not have come true.

My invaluable Professors: Vani Teixeira, Aziz Constantino, Sérgio Reinaldo De Fiore, Antônio Marcolino Pellicano, José Ceratti Turano, Milton Edson Miranda, Luís Ramos, Marcelo Lucchesi Teixeira, Vagner Ortega, and Marco Antônio Bottino.

To Prof Paulo Kano. Taking your course was a watershed in my life and truly represented an awakening that enabled me to connect the many small links of knowledge that, until then, were dispersed in my mind. The coalescence into a common larger universe about method and form allowed me understand that for every dental feature there was an explanation. This perception changed my view on the subject entirely.

My friend Carlos Oliveira, who bridged the gap between me and the one who would become my

student, awaken again my dream of completing my academic career, and finally, become my doctorate advisor.

My friend Herbert Mendes, for the friendship and well-wishing that he always expressed to me. My luck in meeting him was a real stepping stone in my life.

The entire APDESP Team, for the dedication and opportunities they have always given me to develop into a real professor.

My friends Luís Alves Ferreira and Marcos Celestrino, who invited me to teach my first course and for the frequent invitations to participate as a speaker.

The entire staff of Editora Napoleão, who helped me to finish this project. Professionalism is the word that best defines them.

The entire staff of the Hilton Riquieri Dental Laboratory, partners for so many years.

The entire staff of the Hilton Riquieri Training Center, who provided me with the tranquility to be a professor.

Julia Maria de Lima Oda and Mitsuo Oda, for their support, caring, and dedication to the family environment.

To all my students, because they made me learn more in trying to teach them.

To all those who stimulated me with their criticism. In a decisive and unforgettable way, they contributed to my development, helping me to transform the meaning of the great challenges that stood before me along my way. You made the difference.

Having learned from an early age that no one goes far alone, I apologize for taking the risk of forgetting someone among the many high-minded people with whom I met in my journey. Thank you all, thank you, thank you, thank you...

Thanks also to the stones on the way; without them there is no way to become a better person. Passing through them strengthens us.

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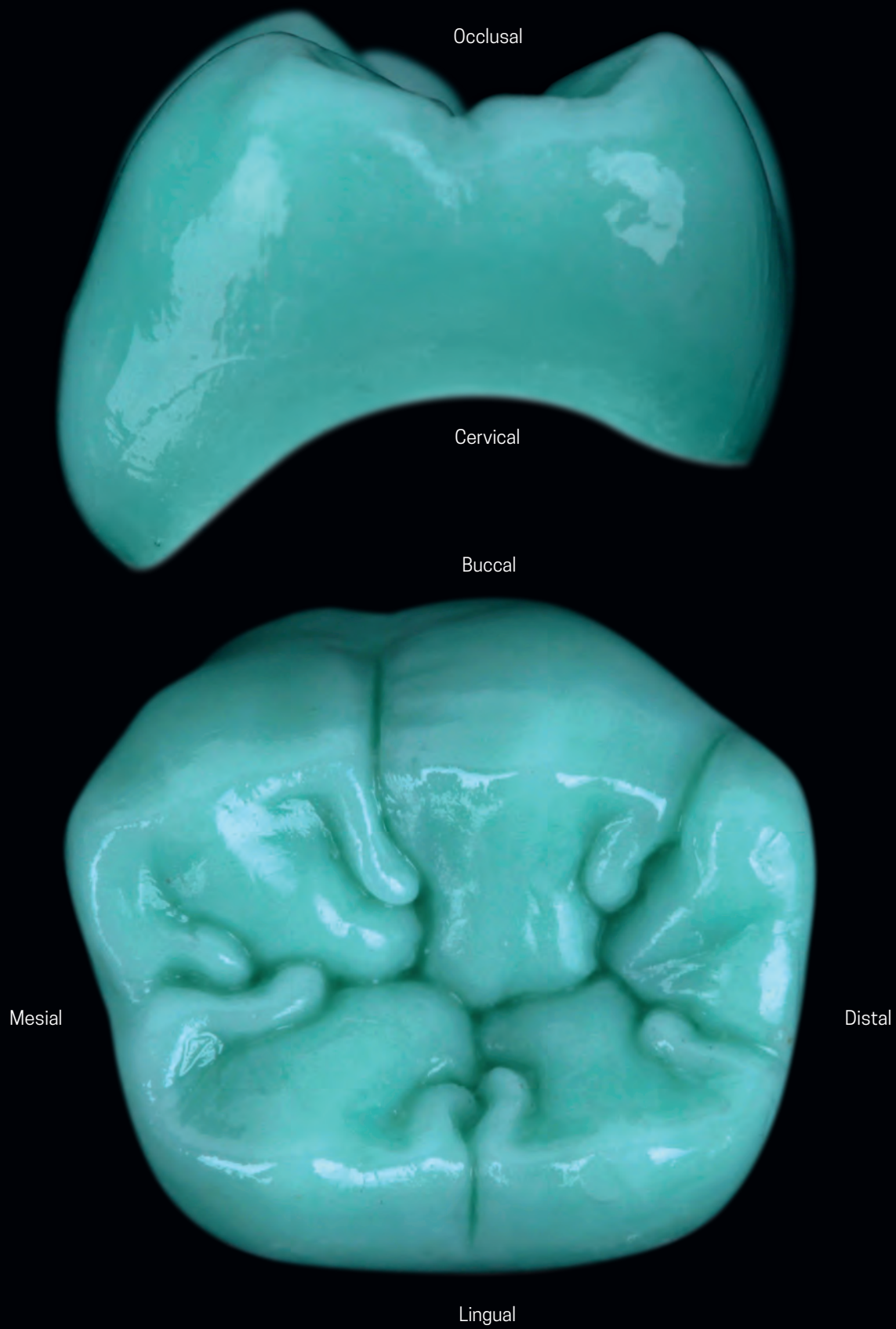
SECTION I

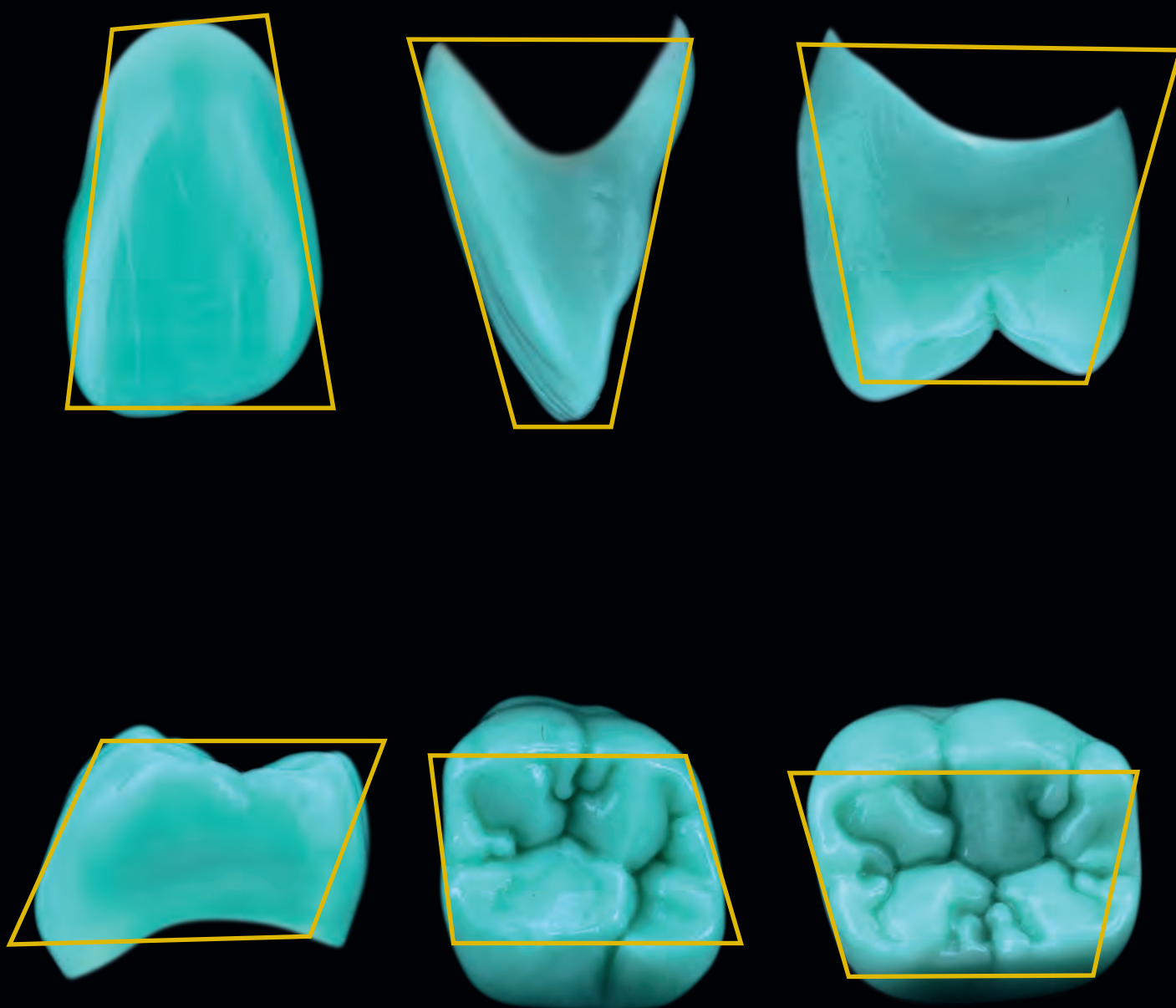
Posterior Teeth

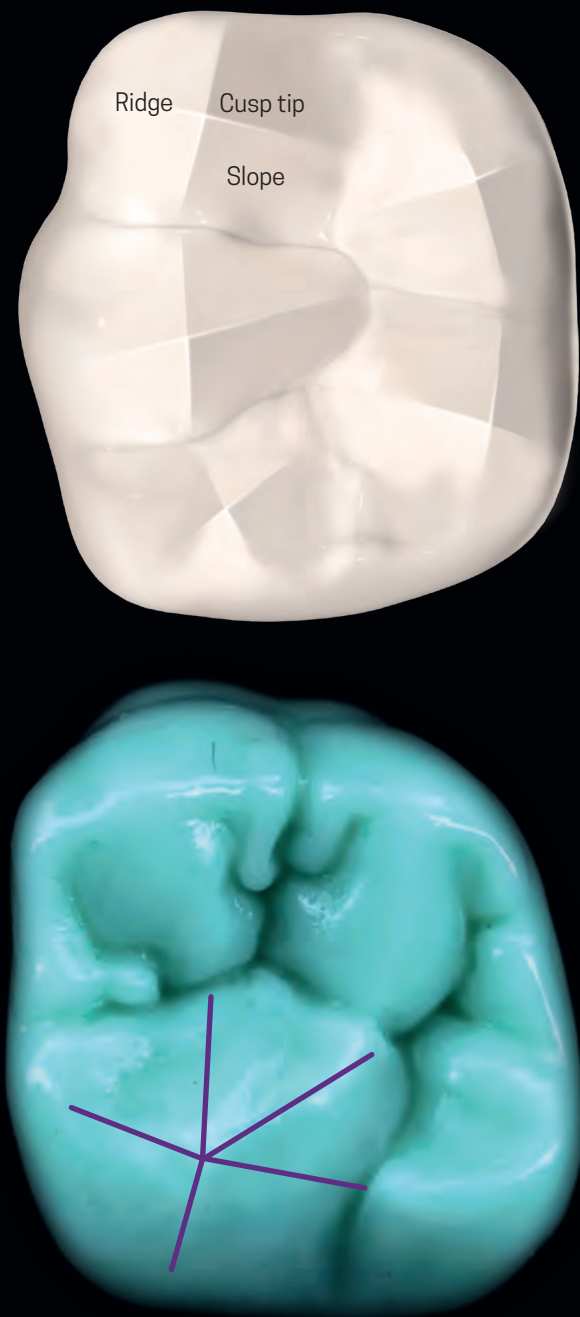


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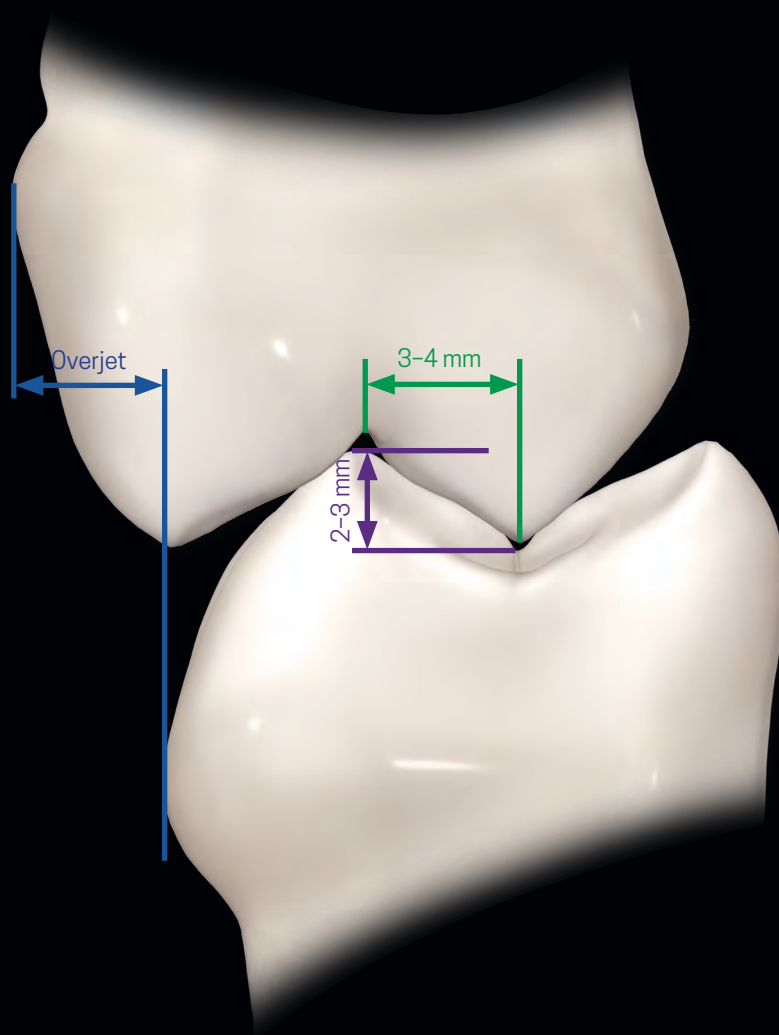
The Esthetic and Functional Parameters of Posterior Teeth





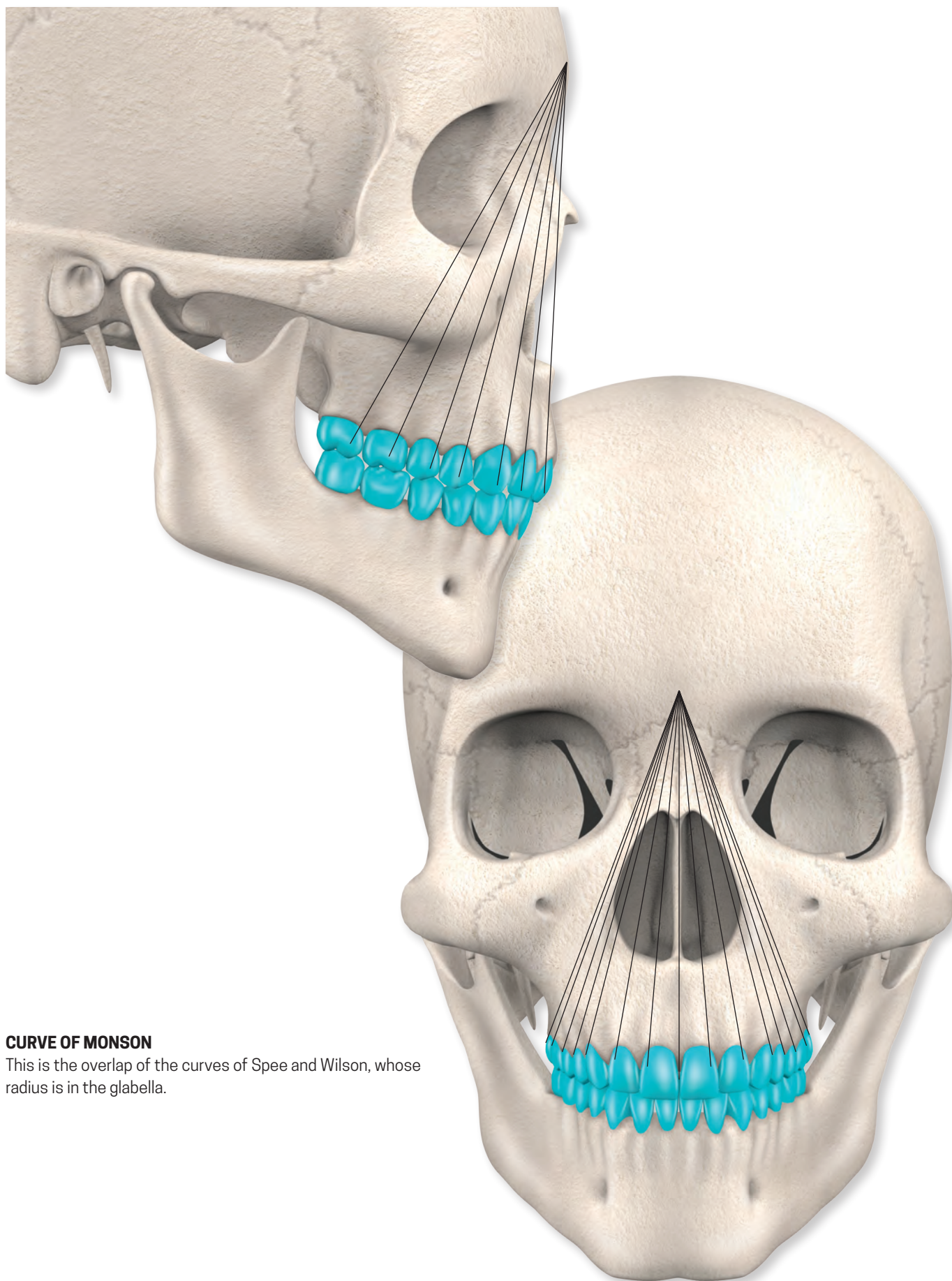


Every cusp is pyramidal with a quadrangular base, except the mesio-lingual cusp of the maxillary first molar, which is pentagonal.



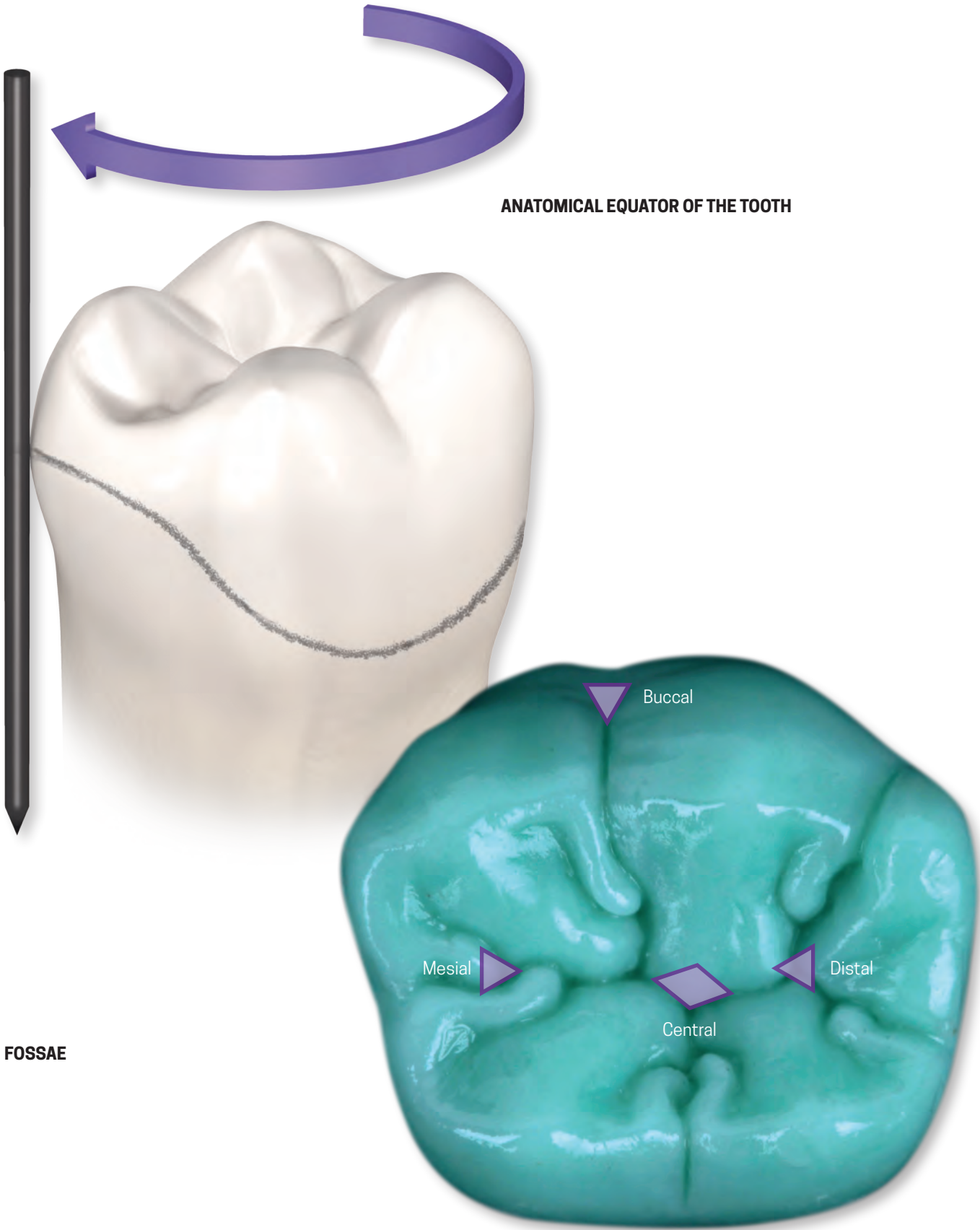
The OVERJET is the extent of the buccal overlap in the horizontal plane of the maxillary teeth over the mandibular teeth. The overjet protects the mouth, lips, and tongue from involuntary bites. The distance between the lowest point of the bottom of the fossa and the cusp tip is, on average, between 3 and 4 mm in the HORIZONTAL PLANE and between 2 and 3 mm in the VERTICAL PLANE.





CURVE OF MONSON

This is the overlap of the curves of Spee and Wilson, whose radius is in the glabella.



AREA OF CONTACT

In posterior teeth, the contact areas are horizontal ellipses.

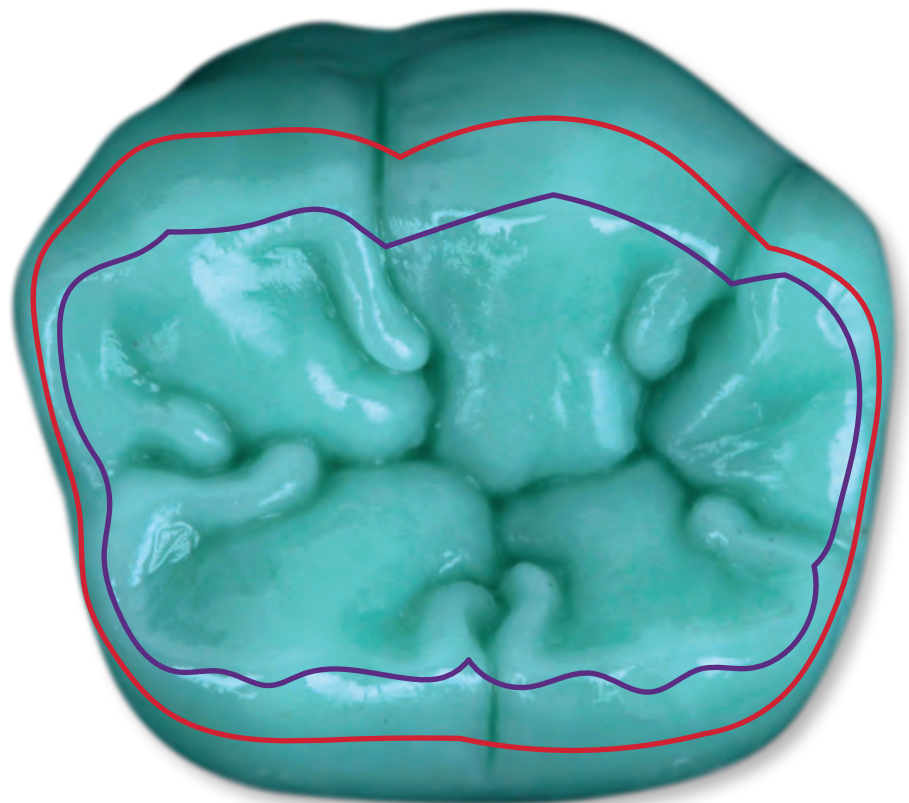


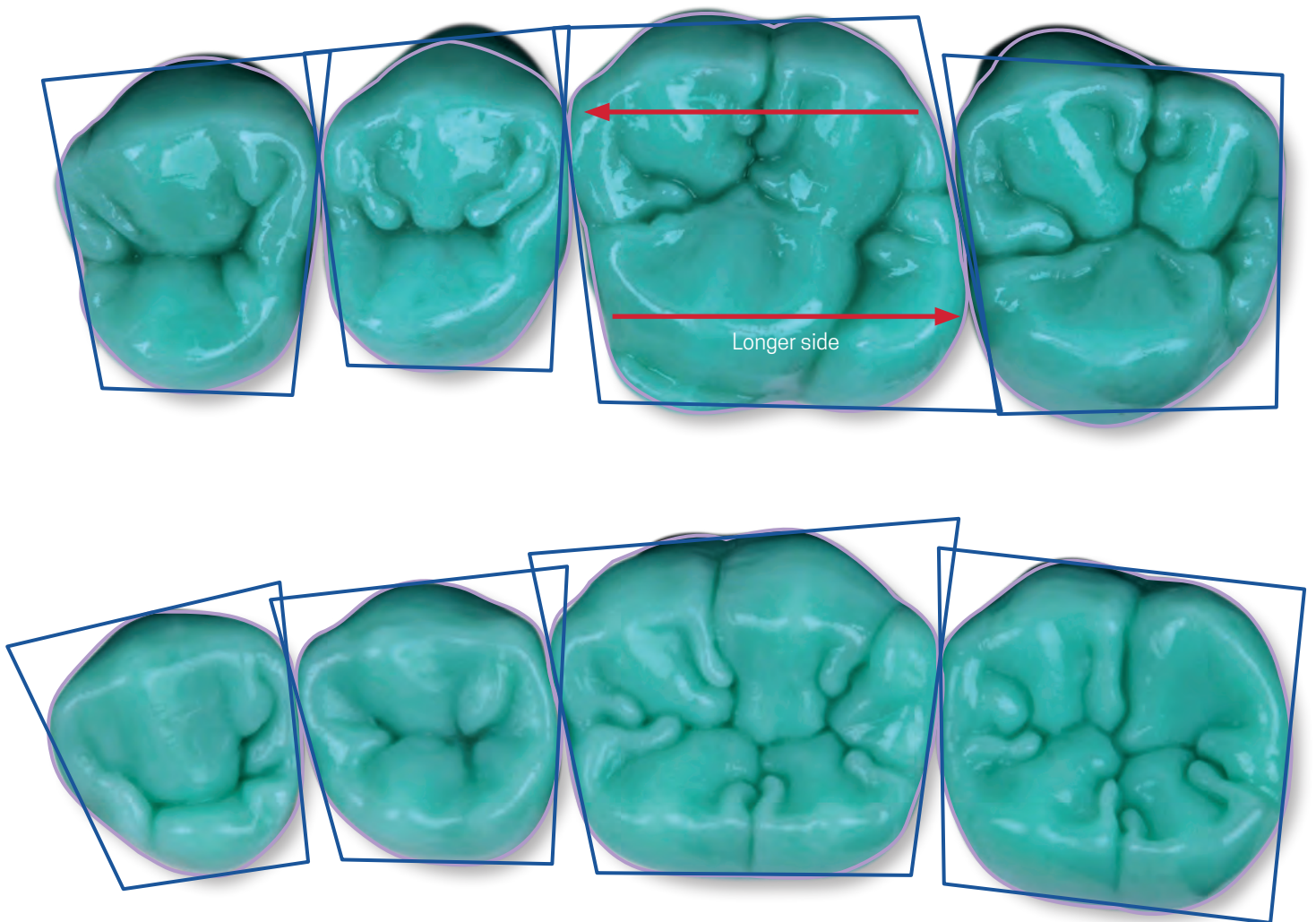
OCCLUSAL SURFACE

- This includes the occlusal table as well as the occlusal third of the buccal and lingual surfaces.

OCCLUSAL TABLE

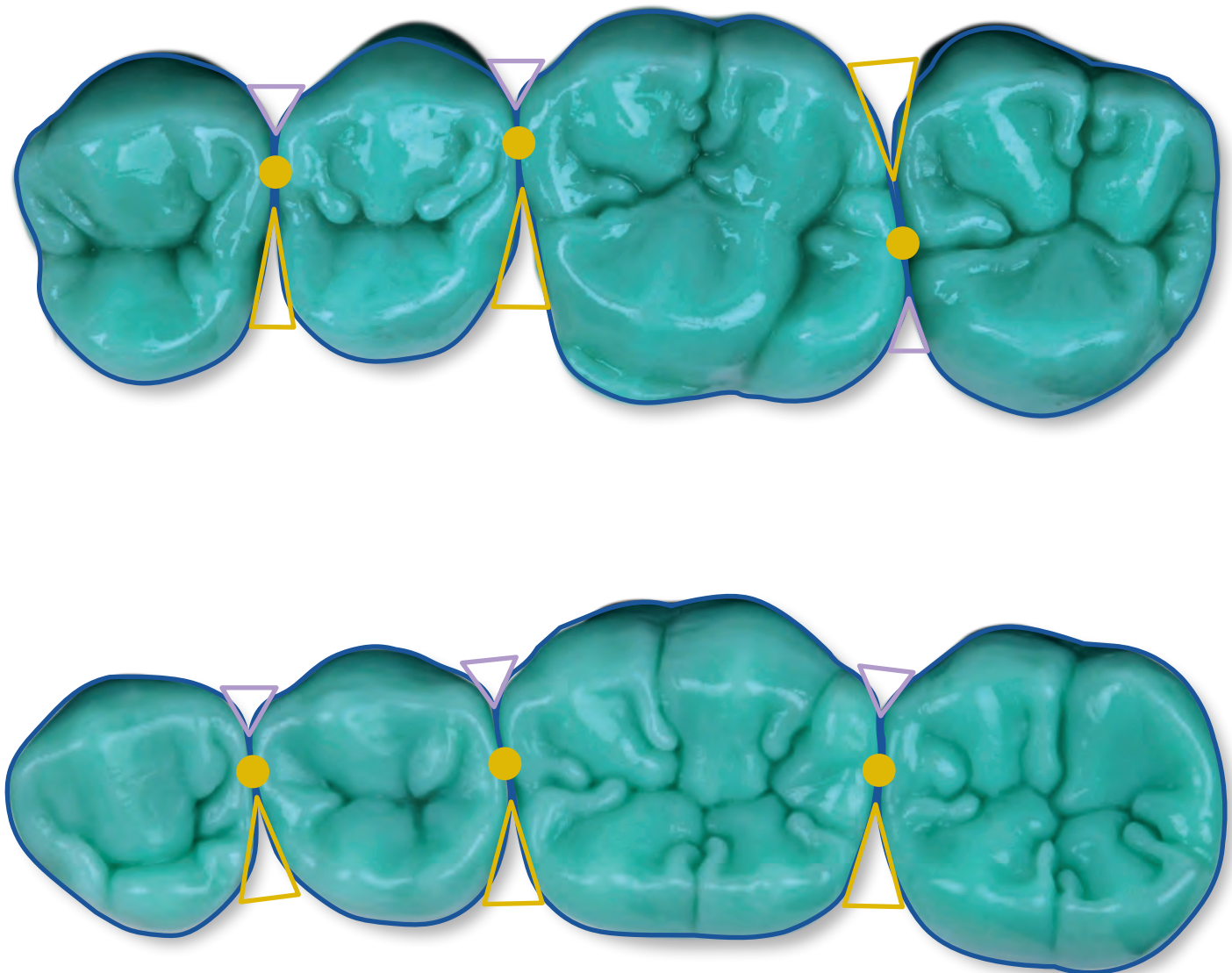
- Anatomical area delineated by marginal ridges and transverse ridges.





EXTERNAL CONTOUR, OCCLUSAL VIEW

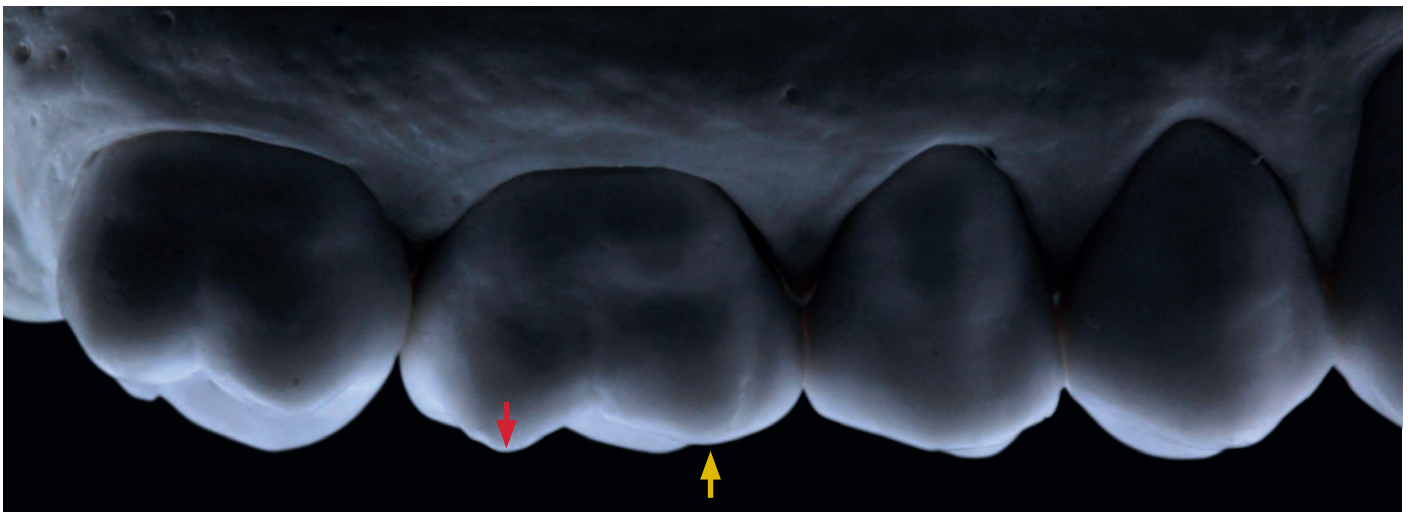
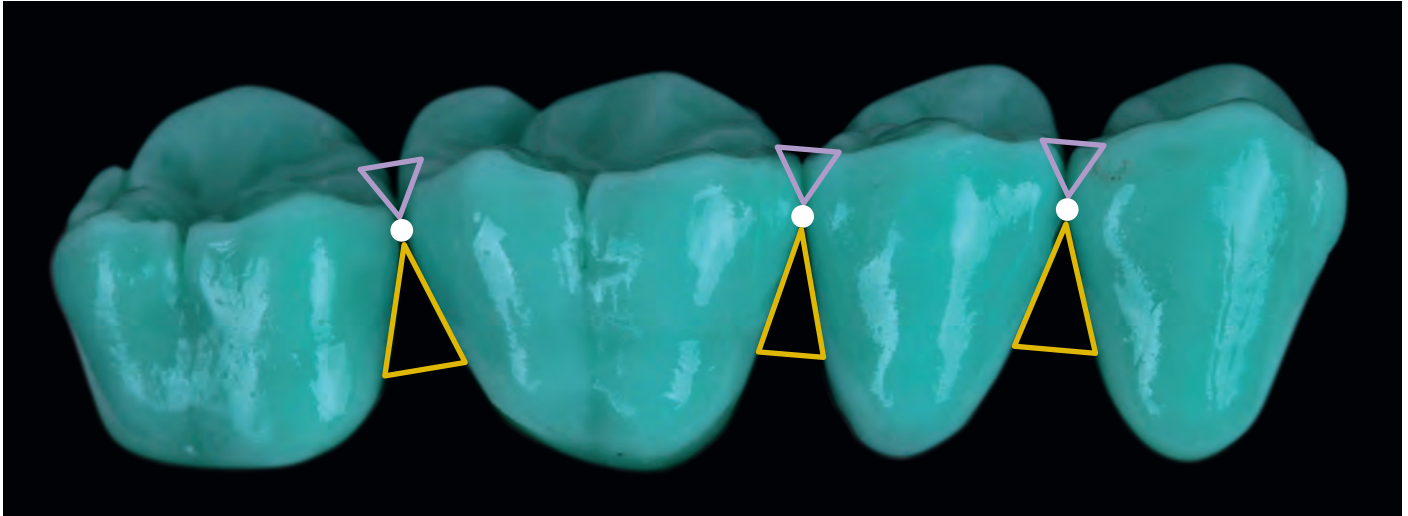
All the teeth are visualized in a trapezoid. Buccolingually, the longer side of the trapezoid is on the buccal aspect, except for the mandibular first molar, where the trapezoid is inverted. In that case, the lingual aspect is longer.



Notice that the contact area between the teeth is more buccal, except between the first and second molars, where it is more lingual.

EMBRASURES

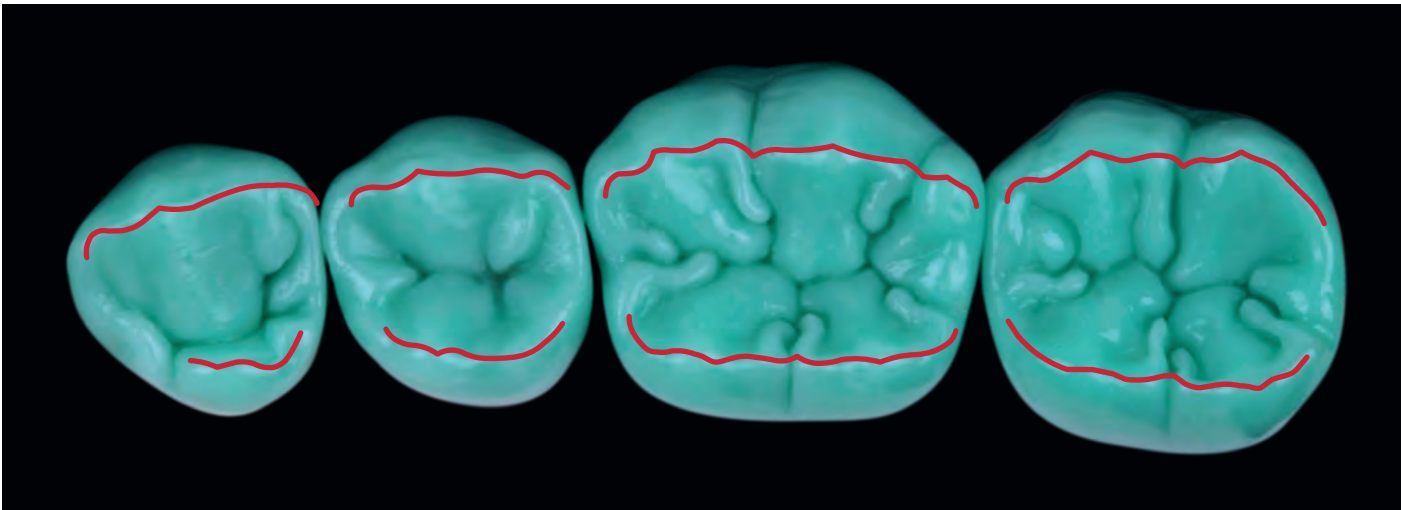
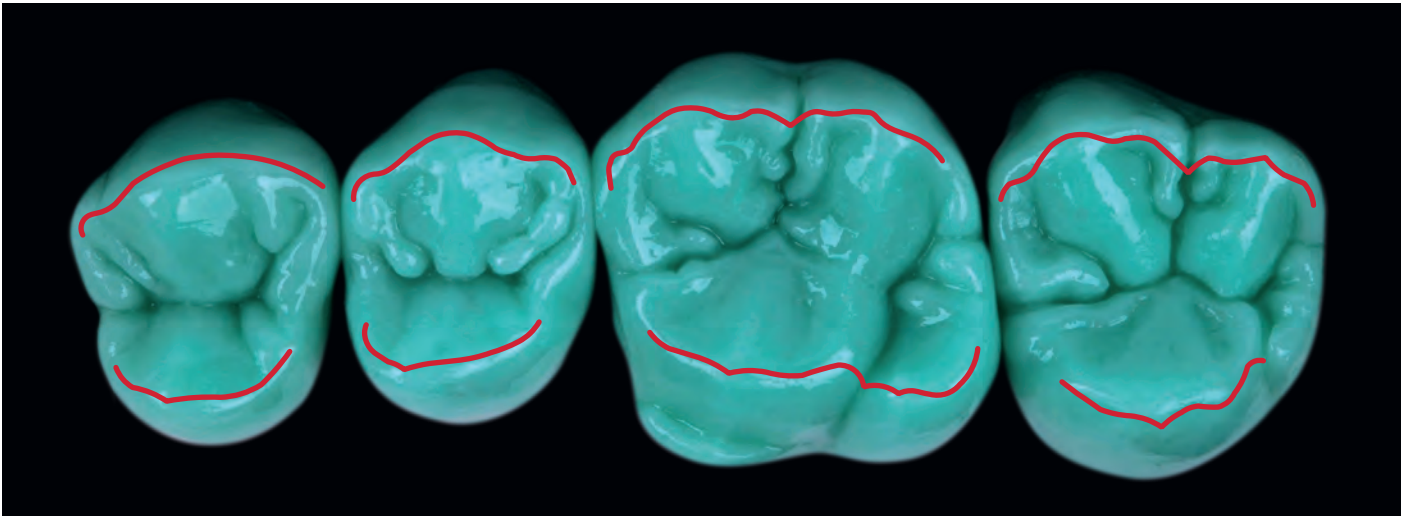
These are triangular spaces between the teeth. The lingual grooves are larger than the buccal grooves, except between the maxillary molars, where an inversion occurs.



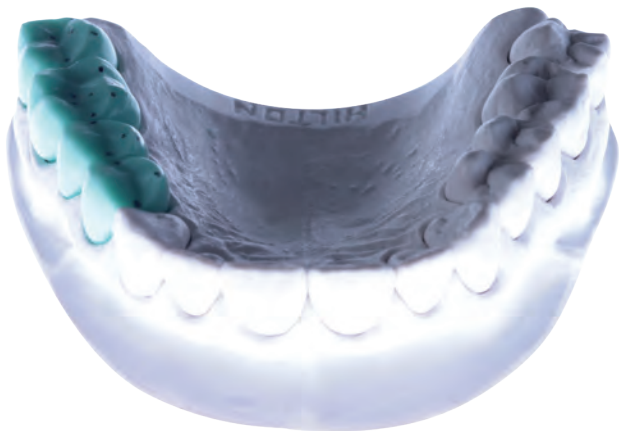
▽ SPACE ABOVE THE CONTACT AREA

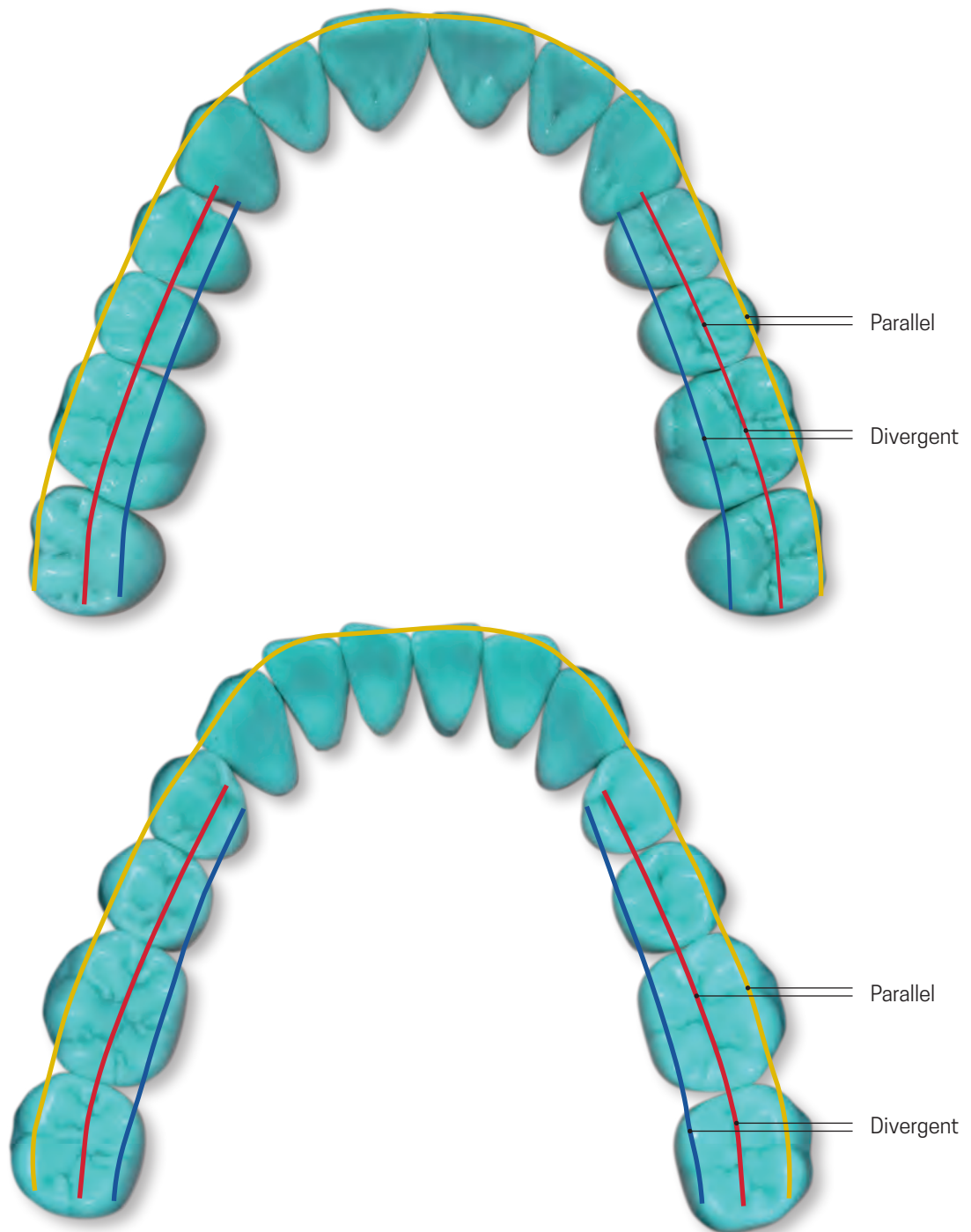
△ SPACE BELOW THE CONTACT AREA

The distobuccal cusp (*red arrow*) of the maxillary first molar is taller and sharper than the mesiobuccal cusp (*yellow arrow*), which is smaller and rounder.

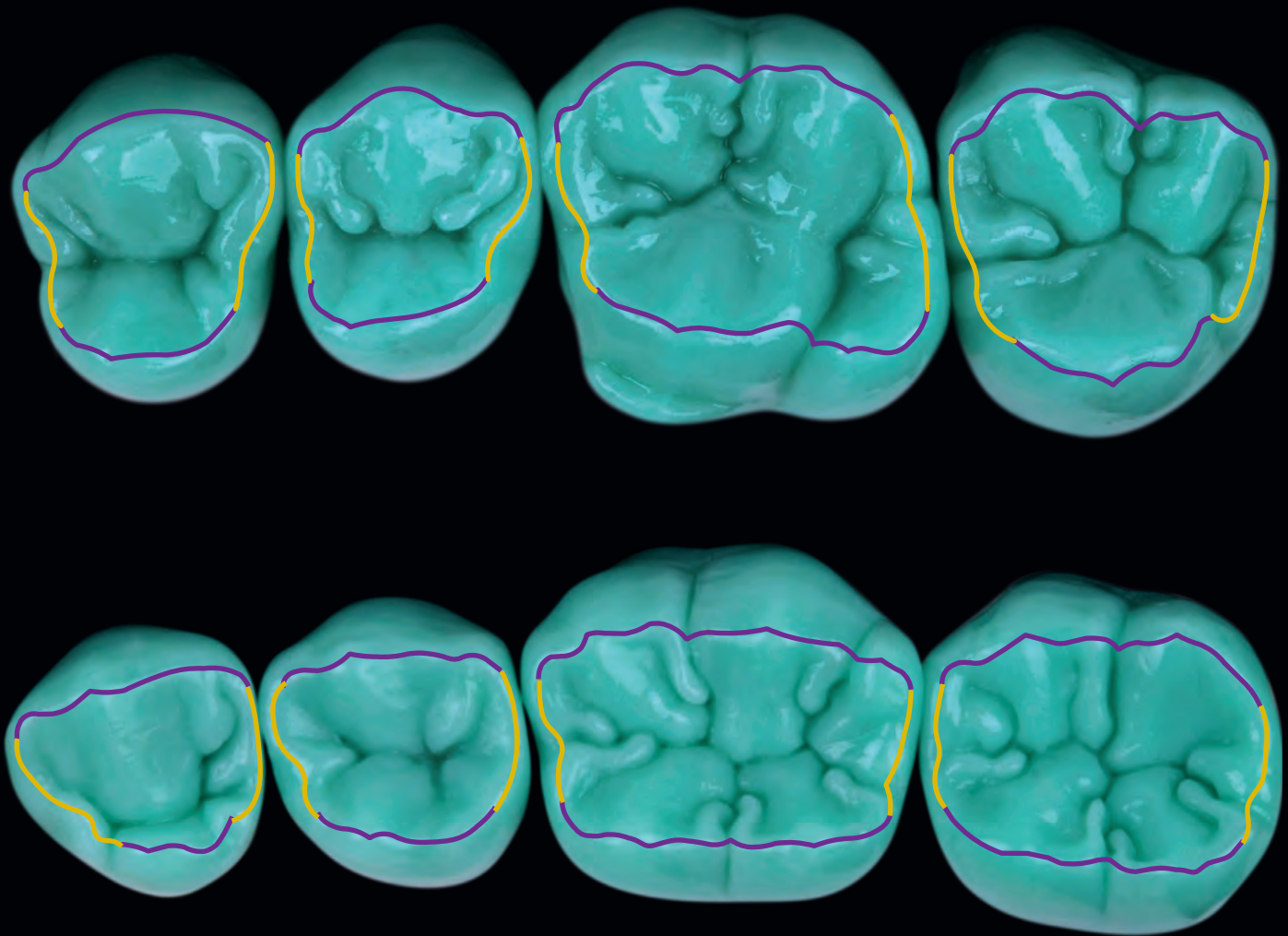


— BUCCAL AND LINGUAL RIDGES

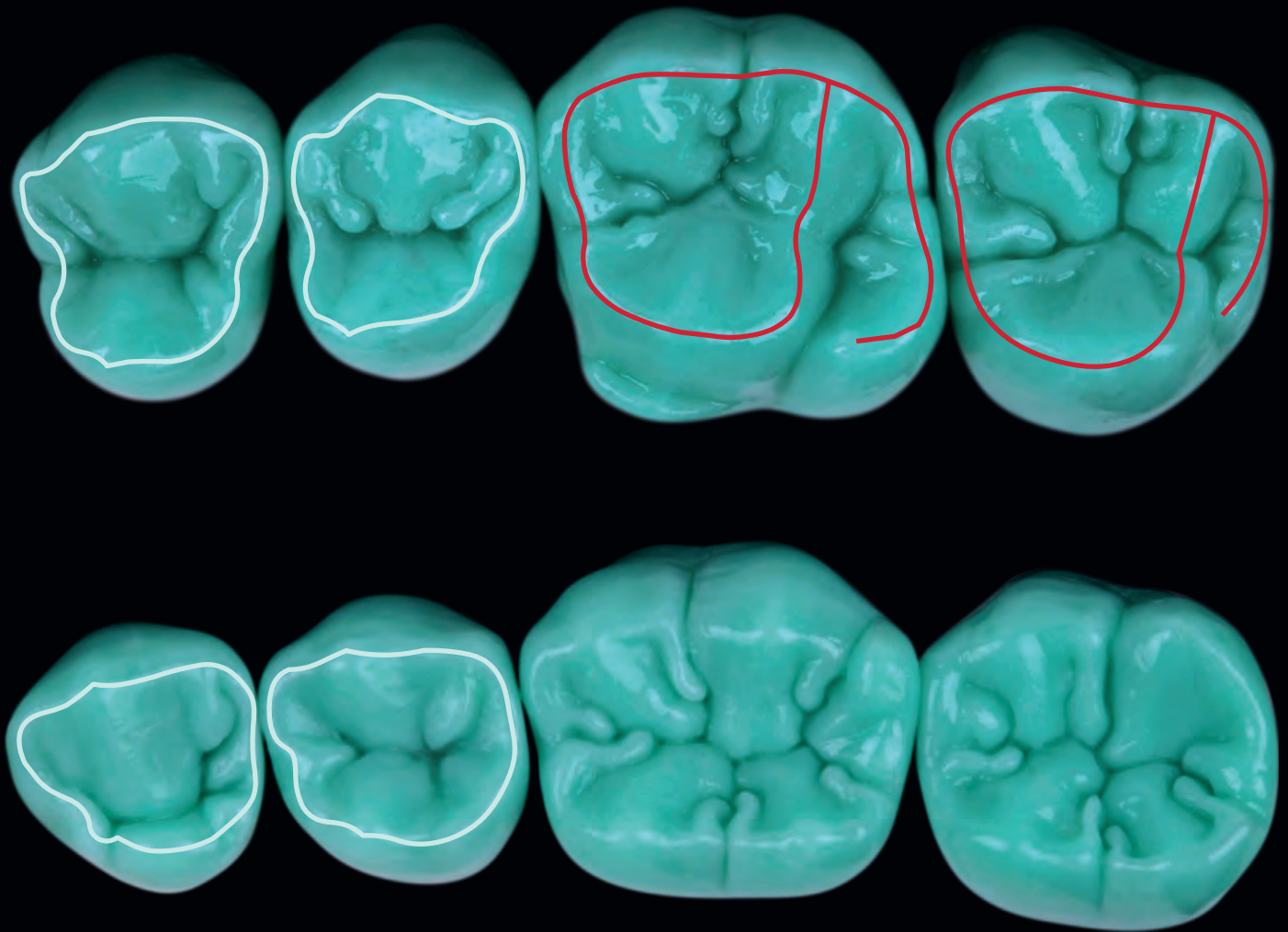




ANTEROPOSTERIOR ALIGNMENT OF BUCCAL AND LINGUAL RIDGES AND OF MESIODISTAL GROOVES

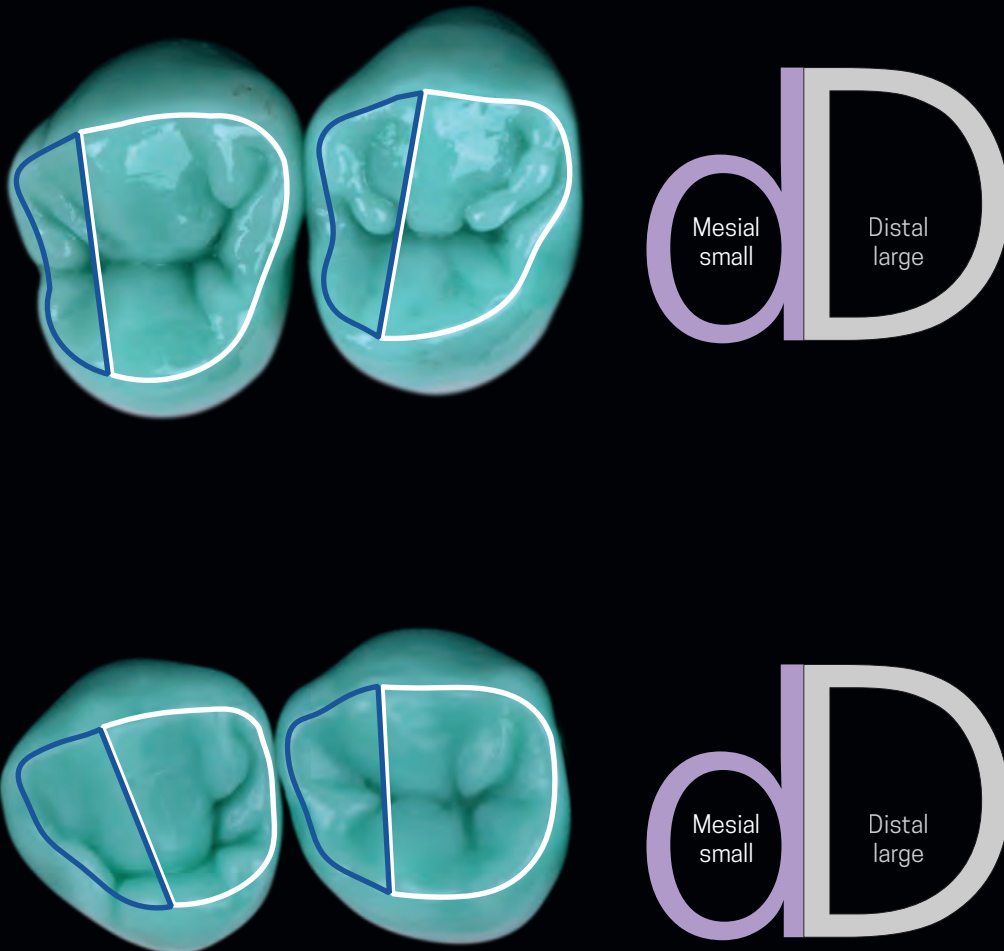


MESIAL AND DISTAL MARGINAL RIDGES



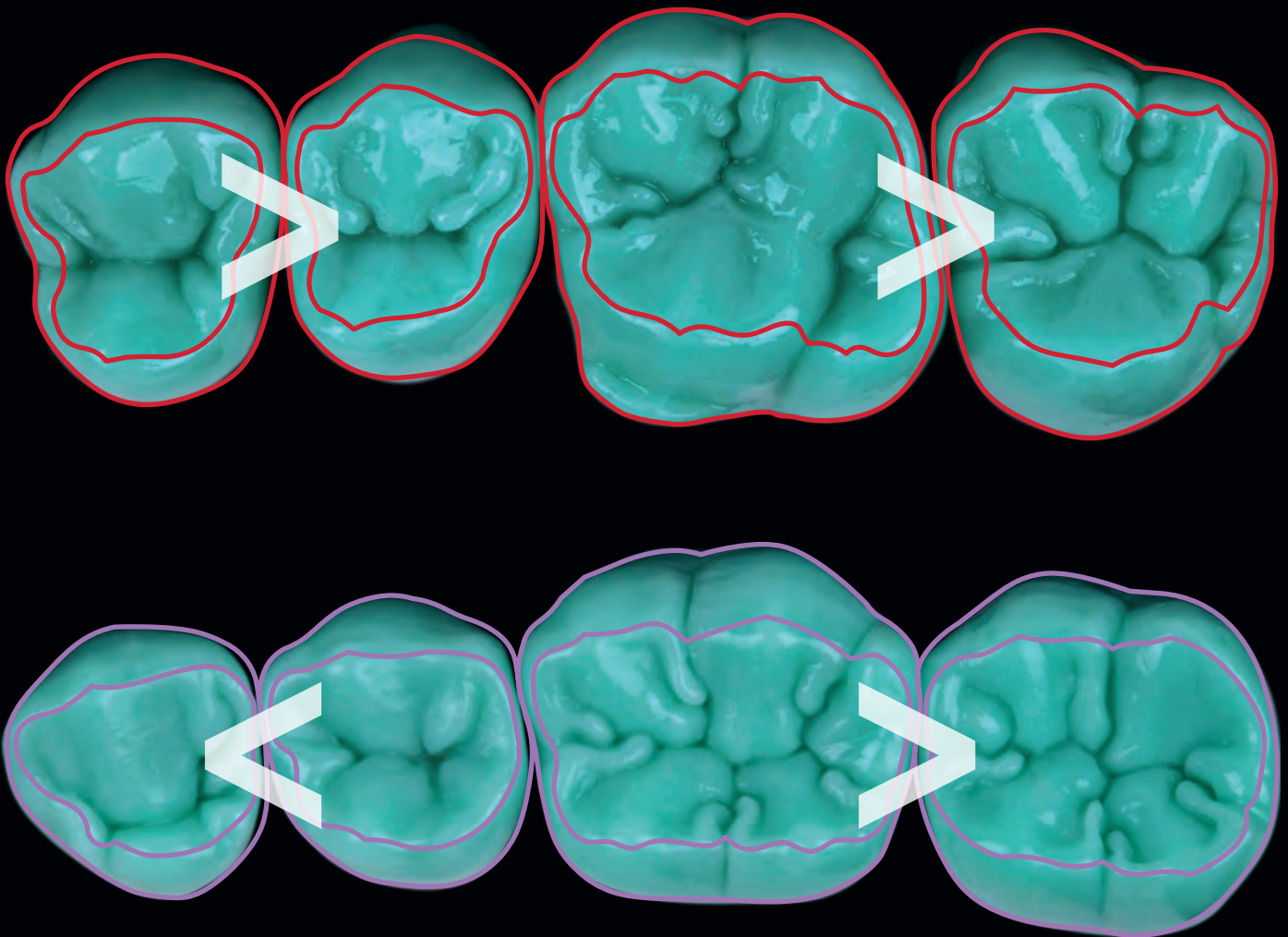
MEMORIZATION BY ANALOGY

The union of all transverse and marginal ridges of the maxillary first molar reveals the number 9 (from Paulo Kano).



MEMORIZATION BY ANALOGY

By joining all the premolar ridges as shown, we have a larger D on the distal and a smaller, inverted D on the mesial.

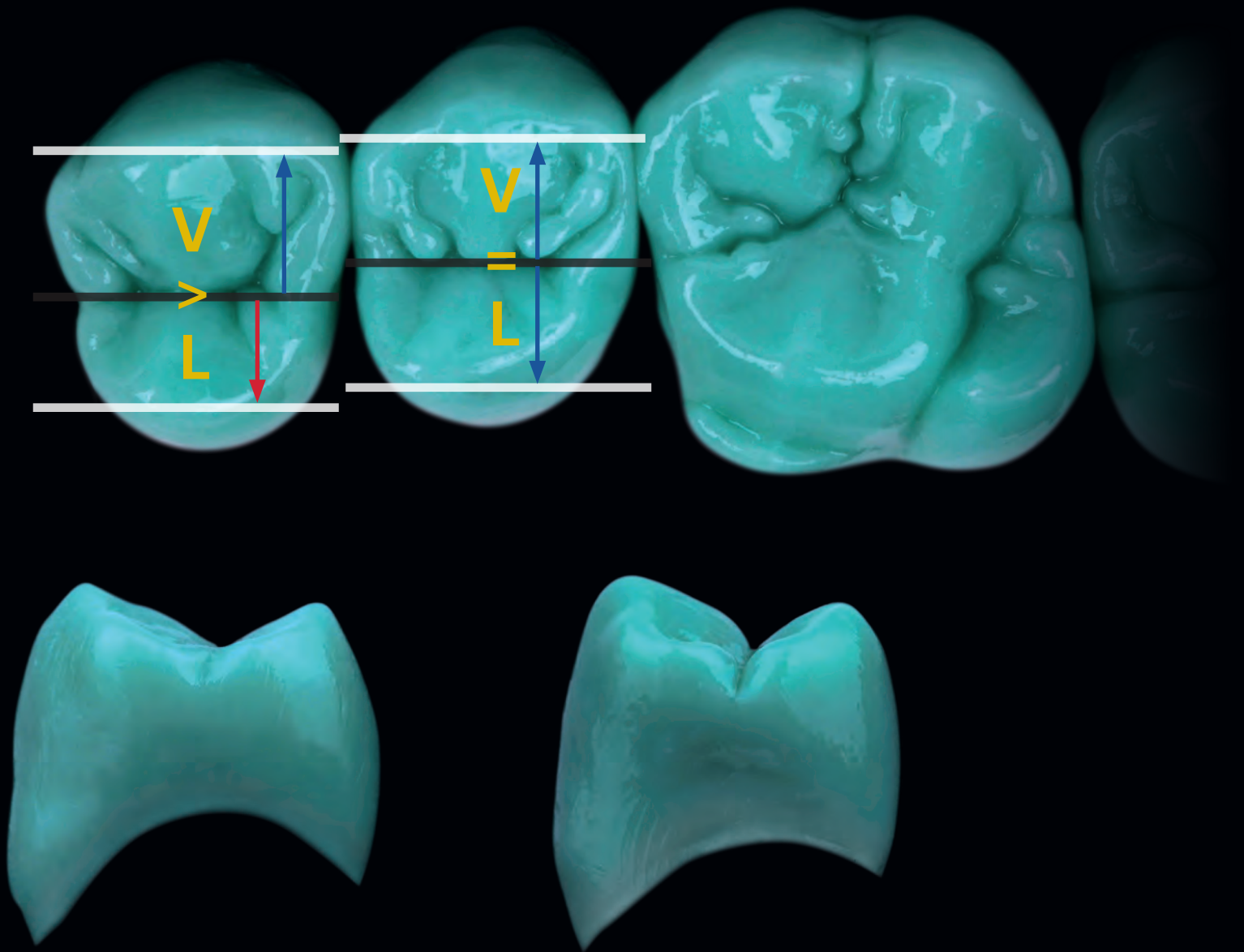


— **COMPARISON OF MAXILLARY POSTERIOR TEETH: EXTERNAL CONTOURS AND OCCLUSAL TABLES**

The first premolars are larger than the second premolars and the first molars are larger than the second molars.

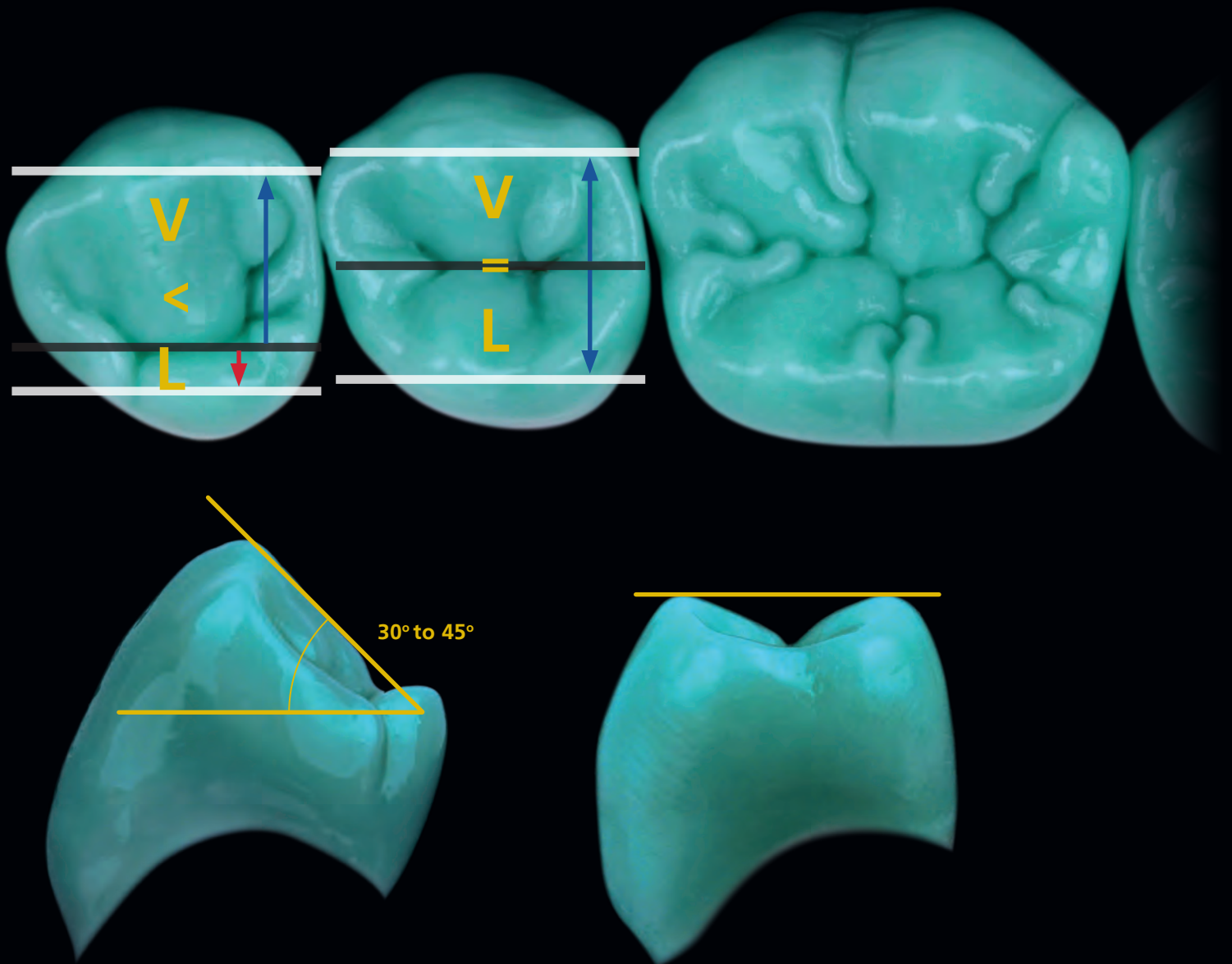
— **COMPARISON OF MANDIBULAR POSTERIOR TEETH: EXTERNAL CONTOURS AND OCCLUSAL TABLES**

The first premolars are smaller than the second premolars and the first molars are larger than the second molars.

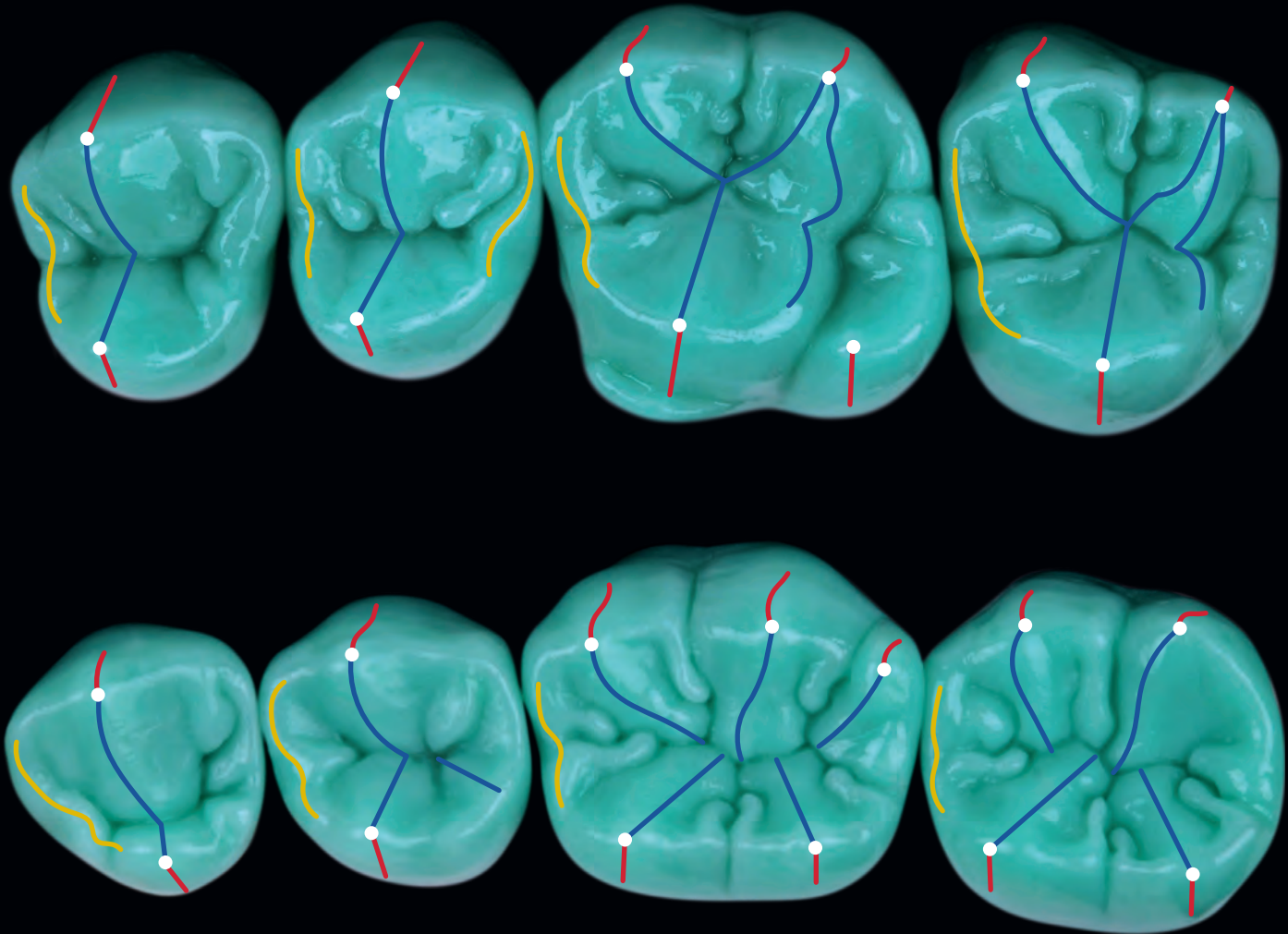


VOLUME OF PREMOLAR CUSPS

The mesiodistal groove of the maxillary first premolar is positioned more toward the lingual, so the buccal cusp is larger than the lingual cusp. In the second premolar, the mesiodistal groove is positioned more at the center of the occlusal surface so that the lingual and buccal cusps have similar volumes.



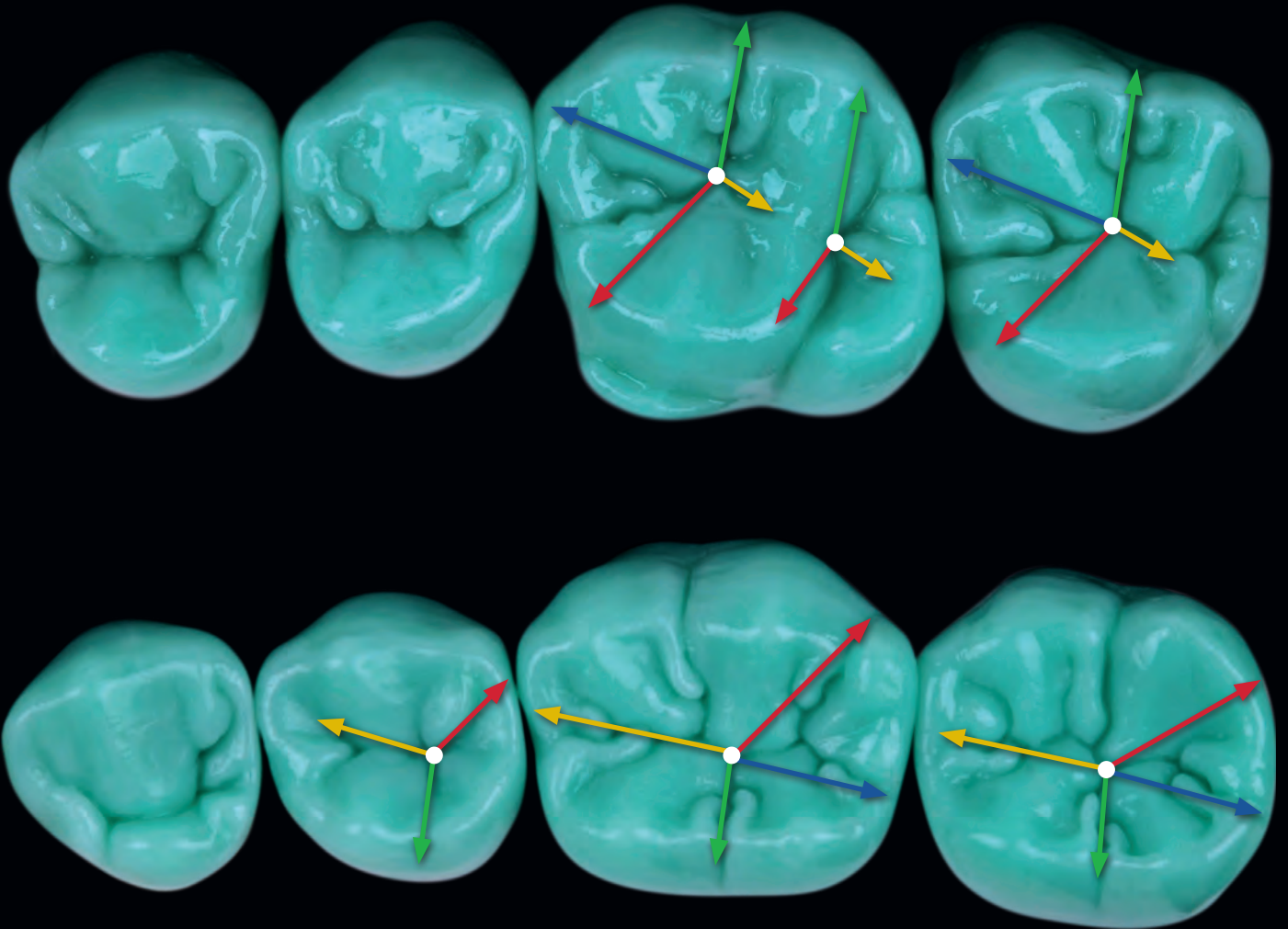
In the mandibular first premolar, the difference in height between the cusps is, on average, between 30 to 45 degrees.



— CUSP CRESTS are located inside the occlusal table.

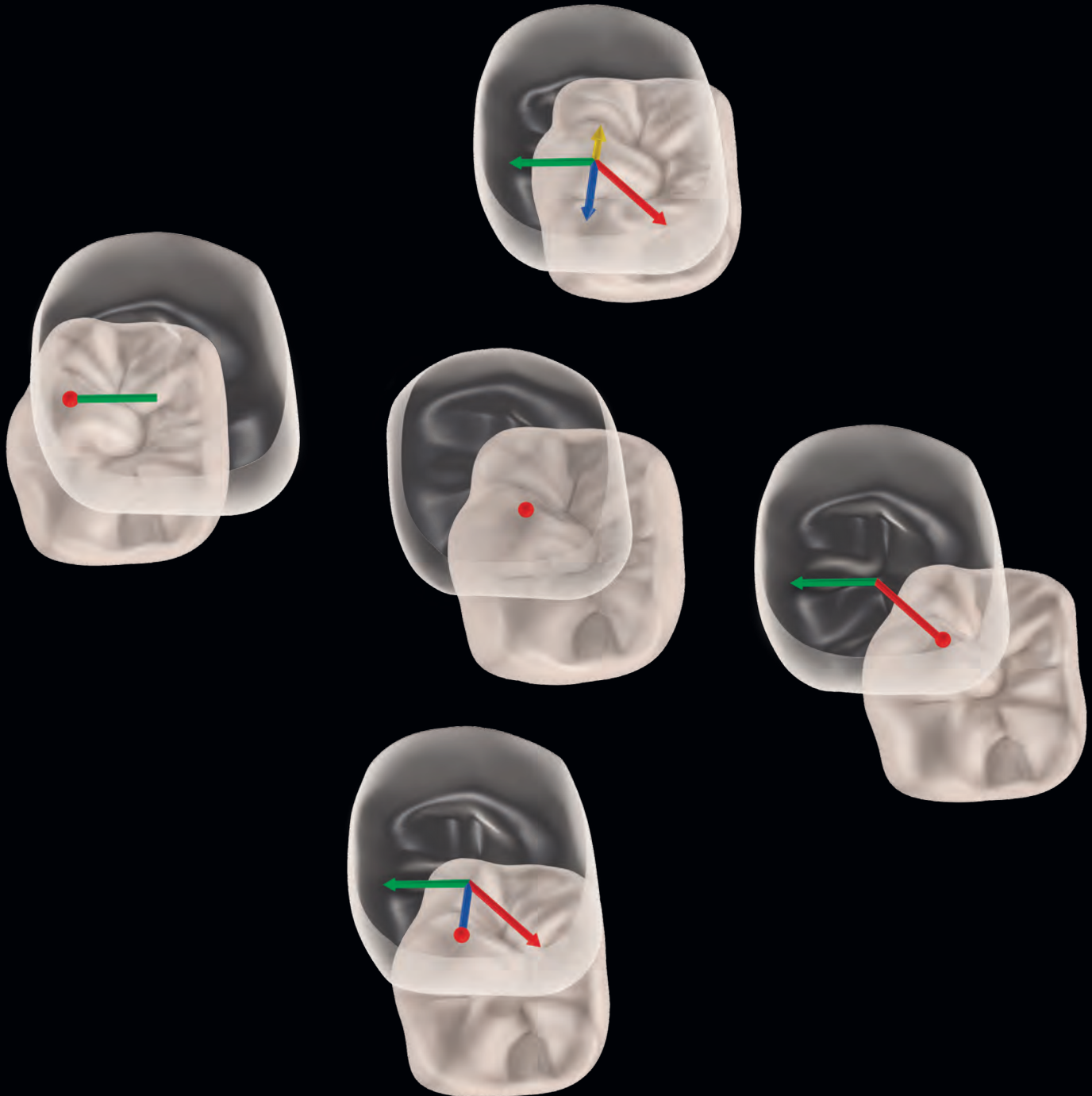
— CUSP SLOPES are located outside the occlusal table.

— A KIDNEY BEAN PROFILE is visible in mesial marginal ridges of all teeth and also on the distal marginal ridge of the maxillary second premolar.



FUNCTIONAL GROOVES

- WORKING
- BALANCING
- PROTRUSIVE
- RETRUSIVE



BUCCAL AND OCCLUSAL VIEW OF FUNCTIONAL MOVEMENTS

Grooves formed by the medial cusp of the mandibular first molar in the central fossa of the maxillary first molar from the functional movements of:

- WORKING
- BALANCING
- PROTRUSIVE
- RETRUSIVE