Clinical Anatomy of the Face for Filler and Botulinum Toxin Injection
Clinical Anatomy of the Face for Filler and Botulinum Toxin Injection
Preface

First, I would like to thank my friend, Dr. Kyle Seo, for organizing all the extremely important clinical information and tips. I also wish to thank Dr. Hong-Ki Lee for his insightful inquisitions and questions that made coming up of creative contents possible. Also, I give my thanks to Dr. Jisoo Kim, who played a strong role in the planning of cadaver dissection workshops and in other works related to organizing necessary contents. Without the efforts and sacrifice of the above individuals in providing clinical manuscripts and in revising all of the visuals despite their busy clinical schedules, this book’s text and artwork would not have been able to shine. As such, I send infinite thanks to Dr. Kwan-Hyun Youn for providing all of the visuals for this book. I believe that Dr. Youn, an art major graduate with a PhD in Anatomy, has raised our country’s medical illustrations to that of world class. Many thanks to the effort of the Medart team led by Dr. Youn to make this book to have many clear, simple, and creative visual contents to be possible.

In the Fall of 2011, my research on clinical anatomy research in relation to aesthetics—and through this, teachings on clinical anatomy—started after receiving advice from John Rogers, a US neurology specialist and medical director of the Pacific Asian region for Allergan Inc., who visited my anatomy lab. Rogers, who had no particular interest in aesthetic treatments, enabled me to devote myself more to this field. Through regional and international educations, I had presented basic information on new methods regarding aesthetic treatment guidelines based on anatomy in order to avoid complications. Then, after hearing that many regional doctors were following anatomic guidelines based on Western research, the coauthors and I designed this book to introduce new methods to fit for Asians, who have slightly different anatomic features. For instance, Asians possess different locations of the modiolus, different directions and changes of facial arteries, and different attachment regions for muscles unlike to Caucasians. All of these and more are explained in detail in this book using research papers presented during my lectures as foundational information. Through this, new injection techniques are described in the book.

Current medical techniques are rapidly changing due to the development of science. As a result, this trend is giving way to a new slogan for medicine such as “borderless” and “above and beyond the border” for a movement working to dismantle academic borders. Biocompatible fillers and botulinum toxin injection development have started to create a new medical field of non-invasive aesthetic plastic surgery, referred to as ‘Beauty Plastic Surgery’, and
the desire for new medical techniques is bringing about developments in clinical anatomy. Likewise, I feel that it is right for clinical doctors from all fields to come together as a virtuous group to jump over the wall of traditional medicine for the development of medical practices. And, as a health personnel studying basic medicine, I feel immense responsibility and a sense of worth in being a part of this movement.

This book includes various images and pictures for simpler understanding of anatomy from ‘Plastic and Reconstructive Surgery’ and other 80 research papers from acknowledged journals in relation to clinical anatomy. In addition, we worked to include various documents about Koreans so that it may be utilized as a useful document in other areas. It is my wish that, through this book, readers are able to learn clinical techniques related to aesthetic treatments and to grow in knowledge regarding the prevention of complications.

I also thank Professor Kyungseok Hu and my graduate student Sang-Hee Lee, You-Jin Choi, Hyung-Jin Lee, Jung-Hee Bae, Liyao Cong, and Kyuho Lee from Yonsei University College of Dentistry who actively helped search for visual information and aided in other revision works for this book. Lastly, I would like to thank Dr. Yoonjung Hwang, Mr. Sanghoon Kwon, Juyong Lee, Yongwoong Lee and Ms. Hwieun Hur, and Young-Gyung Kim in translating the Korean manuscript of this textbook.

On the behalf of the authors,

Seoul, South Korea

November, 2015

Hee-Jin Kim
# Contents

1 General Anatomy of the Face and Neck .............................................. 1
   1.1 Aesthetic Terminology ................................................................. 2
       1.1.1 Basic Aesthetic Terminology .................................................. 2
   1.2 Layers of the Face ...................................................................... 5
       1.2.1 Layers of the Skin ................................................................. 5
       1.2.2 Thickness of the Skin ............................................................ 6
   1.3 Muscles of Facial Expressions and Their Actions .......................... 7
       1.3.1 Forehead Region ................................................................. 8
       1.3.2 Temporal Region (or Temple) ................................................ 10
       1.3.3 Orbital Region ................................................................. 11
       1.3.4 Nose Region ................................................................. 13
       1.3.5 Perioral Muscles ............................................................... 14
       1.3.6 Platysma Muscle ............................................................... 20
   1.4 SMAS Layer and Ligaments of the Face ....................................... 21
   1.5 Nerves of the Face and Their Distributions .................................. 23
       1.5.1 Distribution of the Sensory Nerve ........................................ 24
       1.5.2 Distribution of the Motor Nerve .......................................... 24
       1.5.3 Upper Face ................................................................. 24
       1.5.4 Midface ................................................................. 25
       1.5.5 Lower Face ................................................................. 26
   1.6 Nerve Block ................................................................................. 28
       1.6.1 Supraorbital Nerve Block (SON Block) .................................. 28
       1.6.2 Supratrochlear Nerve Block (STN Block) ................................ 28
       1.6.3 Infraorbital Nerve Block (ION Block) .................................... 28
       1.6.4 Zygomaticotemporal Nerve Block (ZTN Block) ...................... 29
       1.6.5 Mental Nerve Block (MN Block) ............................................ 29
       1.6.6 Buccal Nerve Block (BN Block) ............................................ 29
       1.6.7 Inferior Alveolar Nerve Block (IAN Block) ............................ 31
       1.6.8 Auriculotemporal Nerve Block (ATN Block) ............................ 31
       1.6.9 Great Auricular Nerve Block (GAN Block) ............................ 31
   1.7 Facial Vessels and Their Distribution Patterns ............................ 32
       1.7.1 Facial Branches of the Ophthalmic Artery ............................... 34
       1.7.2 Facial Branches of the Maxillary Artery ................................ 35
       1.7.3 Facial Artery ......................................................................... 35
       1.7.4 Frontal Branch of the Superficial Temporal Artery ................. 37
       1.7.5 Facial Veins ........................................................................... 38
       1.7.6 Connections of the Vein ......................................................... 42
1.8 Facial and Skull Surface Landmarks .......................... 42
1.9 Characteristics of Asian (Korean) Skull and Face .......... 45
1.10 Anatomy of the Aging Process ............................... 48
   1.10.1 Aging Process of the Facial Tissue ..................... 49
   1.10.2 The Complex Changes of the Facial Appearance with Aging .......... 50
Suggested Reading ............................................. 51
   Physical Anthropological Traits in Asians .................. 51
   Muscles of the Face and Neck ............................. 52
   Vessels of the Face and Neck .............................. 52
   Peripheral Nerves of the Face and Neck ................... 53

2 Clinical Anatomy for Botulinum Toxin Injection ............. 55
   2.1 Introduction ............................................. 56
      2.1.1 Effective Versus Ineffective Indications of Botulinum Toxin for Wrinkle Treatment .......... 56
      2.1.2 Botulinum Rebalancing .............................. 56
   2.2 Botulinum Wrinkle Treatment ............................ 58
      2.2.1 Crow’s Feet (Lateral Canthal Rhytides) .......... 58
      2.2.2 Infraorbital Wrinkles .............................. 62
      2.2.3 Horizontal Forehead Lines ......................... 63
      2.2.4 Glabellar Frown Lines ............................. 63
      2.2.5 Bunny Lines ....................................... 69
      2.2.6 Plunged Tip of the Nose ......................... 70
      2.2.7 Gummy Smile, Excessive Gingival Display .......... 71
      2.2.8 Nasolabial Fold ................................ 71
      2.2.9 Asymmetric Smile, Facial Palsy .................... 72
      2.2.10 Alar Band ....................................... 75
      2.2.11 Purse String Lip ................................ 75
      2.2.12 Drooping of the Mouth Corner .................... 75
      2.2.13 Cobblestone Chin ................................ 80
      2.2.14 Platysmal Band .................................. 81
      2.2.15 Temporalis Hypertrophy ........................... 88
      2.2.16 Hypertrophy of the Salivary Gland ............... 89
   2.3 Botulinum Facial Contouring .............................. 91
      2.3.1 Masseter Hypertrophy ............................. 94
      2.3.2 Temporalis Hypertrophy ........................... 94
      2.3.3 Hypertrophy of the Salivary Gland ............... 94
Suggested Reading ............................................. 91
   Muscles of the Face and Neck ............................. 91
   Peripheral Nerves of the Face and Neck ................... 92
   Others .................................................. 92

3 Clinical Anatomy of the Upper Face for Filler Injection ...... 93
   3.1 Forehead and Glabella .................................. 94
      3.1.1 Clinical Anatomy .................................. 94
      3.1.2 Injection Points and Methods ..................... 94
      3.1.3 Side Effects ..................................... 100
   3.2 Sunken Eye and Pretarsal Roll .......................... 103
      3.2.1 Clinical Anatomy .................................. 103
      3.2.2 Injection Points and Methods ..................... 105
      3.2.3 Side Effects ..................................... 109
3.3 Temple

3.3.1 Clinical Anatomy

3.3.2 Injection Points and Methods

3.3.3 Side Effects

Suggested Reading

Muscles of the Face and Neck

Vessels of the Face and Neck

Peripheral Nerves of the Face and Neck

4 Clinical Anatomy of the Midface for Filler Injection

4.1 Tear Trough

4.1.1 Clinical Anatomy

4.1.2 Injection Points and Methods

4.2 Nasojugal Groove

4.2.1 Clinical Anatomy

4.2.2 Injection Points and Methods

4.3 Palpebromalar Groove

4.3.1 Clinical Anatomy

4.3.2 Injection Points and Methods

4.4 Nasolabial Fold

4.4.1 Clinical Anatomy

4.4.2 Injection Points and Methods

4.5 Hollow Cheek

4.5.1 Clinical Anatomy

4.5.2 Insertion Points and Methods

4.6 Subzygoma Depression

4.6.1 Clinical Anatomy

4.6.2 Injection Points and Methods

4.7 Nose

4.7.1 Clinical Anatomy

4.7.2 Injection Points and Methods

Suggested Reading

Physical Anthropological Traits in Asians

Muscles of the Face and Neck

Vessels of the Face and Neck

Peripheral Nerves of the Face and Neck

5 Clinical Anatomy of the Lower Face for Filler Injection

5.1 Lip

5.1.1 Clinical Anatomy

5.1.2 Injection Points and Methods

5.1.3 Side Effects

5.2 Chin

5.2.1 Clinical Anatomy

5.2.2 Injection Points and Methods

5.2.3 Side Effects

5.3 Perioral Wrinkles

5.3.1 Clinical Anatomy

5.3.2 Injection Points and Methods

5.3.3 Side Effects
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4 Marionette Line and Jowl</td>
<td>166</td>
</tr>
<tr>
<td>5.4.1 Clinical Anatomy</td>
<td>166</td>
</tr>
<tr>
<td>5.4.2 Injection and Methods</td>
<td>168</td>
</tr>
<tr>
<td>5.4.3 Side Effects</td>
<td>168</td>
</tr>
<tr>
<td>5.5 Anatomical Considerations of the Symptoms</td>
<td>169</td>
</tr>
<tr>
<td>5.5.1 Vascular Compromise</td>
<td>169</td>
</tr>
<tr>
<td>5.5.2 Suggested Methods to Reduce Vascular Problems</td>
<td>172</td>
</tr>
<tr>
<td>Related with Filler Injection</td>
<td></td>
</tr>
<tr>
<td>Suggested Reading</td>
<td>173</td>
</tr>
<tr>
<td>Physical Anthropological Traits in Asians</td>
<td>173</td>
</tr>
<tr>
<td>Muscles of the Face and Neck</td>
<td>173</td>
</tr>
<tr>
<td>Vessels of the Face and Neck</td>
<td>173</td>
</tr>
<tr>
<td>Peripheral Nerves of the Face and Neck</td>
<td>174</td>
</tr>
</tbody>
</table>

Index ............................................................................. 175