

Sleep Surgery in a Nutshell

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Editors

 Springer

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Foreword

Obstructive sleep apnea (OSA) is a heterogeneous disorder that affects millions of people across all ages, genders, and racial groups. It is a significant public health concern exerting a substantial burden not only on patients but also on healthcare systems and society at large. The impact of OSA extends beyond disrupted sleep and snoring; it is associated with increased risk of cardiovascular disease, neurocognitive impairment, metabolic disorders, reduced quality of life, and motor vehicle accidents.

As our understanding of the disorder continues to grow, so does the recognition that effective treatment requires a multidisciplinary and personalized approach. While nonsurgical therapies such as positive airway pressure, oral appliances, and weight loss have been shown to be effective in the management of OSA, the role of surgery has steadily expanded over the years, offering targeted solutions for patients who do not benefit from or cannot tolerate non-invasive treatments.

Sleep Surgery in a Nutshell is a timely contribution to the evolving field of sleep surgery. It provides a concise yet comprehensive overview of OSA treatment principles, addressing concepts of disease pathophysiology and most current surgical interventions. The book is carefully structured, guiding the reader from the history and etiology of OSA to the full spectrum of operative strategies and technological advances. The book not only highlights surgical anatomy and techniques; it also summarizes evidence-based concepts of decision-making to address unique causes of OSA and individual needs. The authors highlight the rationale for intervention, patient selection criteria, expected outcomes, potential complications, and perioperative considerations.

This book serves both as a surgical manual and as a practical reference for understanding when, why, and how surgery should be applied in the management of OSA. It encourages a comprehensive patient-centered approach to treatment that prioritizes long-term outcomes and individualized care. It will undoubtedly be a valuable reference for otolaryngologists, sleep surgeons, and all clinicians engaged in the care of patients with OSA.

I would like to congratulate the editors and contributors for creating a practical resource that will enhance surgical education, advance clinical practice, and ultimately improve the well-being of patients with sleep apnea.

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Maria V. Suurna, MD

Preface 1

We are proud to present *Sleep Surgery in a Nutshell*, a concise yet practical guide for those seeking to understand, perform, and teach sleep surgery with greater clarity and structure. Surgical management of obstructive sleep apnea continues to evolve and is often underrepresented in mainstream literature. When performed without the appropriate training or understanding, sleep surgery can be detrimental to patients—especially when operating in the delicate anatomy of the upper airway.

The technical skills and knowledge required for sleep surgery are often scattered across a multitude of sources. Though various techniques are described in the published literature, they are seldom standardized. This lack of streamlining makes structured training in sleep surgery inconsistent and sometimes frustrating for both aspiring sleep surgeons to understand and perform these procedures, and for seasoned consultants seeking to refine their craft and teach their students. OSA surgery is currently one of the most rapidly progressing subspecialties within otolaryngology. The discipline has moved beyond traditional soft tissue procedures to include skeletal reconstruction, robotic-assisted techniques, and neurostimulation therapies such as hypoglossal nerve stimulation. This rapid evolution is not just a testament to innovation, but also a call to arms—inviting us to rethink how we empower patients with treatment options beyond conventional PAP therapy.

This book aims to bridge the training gap by offering a focused overview that supports both trainees and practicing specialists interested in advanced sleep surgery. It does not intend to replace comprehensive reference texts or proper formal fellowship, but rather to serve as a practical, approachable update on techniques and philosophies shaping modern surgical management of OSA.

The opening chapters lay a foundation by reviewing the basics of sleep apnea, treatment decision-making, and the anatomical rationale behind various surgical strategies. Subsequent chapters are organized by anatomical region, culminating in focused discussions on cutting-edge techniques such as hypoglossal nerve

stimulation and skeletal framework surgery. We are deeply grateful to our contributors—both local and international—for sharing their insights and enriching this book with their experience and expertise. We hope *Sleep Surgery in a Nutshell* serves not only as a resource but as an invitation for dialogue, growth, and collaboration as we continue to explore and expand this important field.

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Preface 2

All praise is due to The Almighty, who has granted me the gift of drawing, especially in the field of medical illustration. It is my sincere intention that these illustrations serve as a source of benefit—helping surgeons to better understand surgical techniques and, ultimately, contributing to the improvement of patient care and healthcare delivery.

A good medical illustration is more than just a picture; it strikes a balance between realism and clarity, highlighting the details that are most essential to know. With this principle in mind, I have endeavored to ensure that every diagram in this textbook supports the understanding of critical surgical steps in sleep surgery. I am deeply grateful to my lecturers at the Faculty of Medicine, Universiti Malaya, for giving me the wonderful opportunity to contribute as an illustrator to this important book. Their trust and guidance have been invaluable throughout this journey.

At the same time, I humbly acknowledge that these illustrations may have imperfections. I warmly welcome any constructive feedback or suggestions for improvement, as refinement is the heart of both academic and artistic growth. It is my hope that the illustrations in this textbook will not only enhance your understanding of the essential steps in sleep surgery but also assist you in providing the best possible care for patients—helping them regain their quality of sleep and, with it, a better quality of life.

Kuala Lumpur, Malaysia

Muhammad Ariff bin Sobani, MBBS

Contents

1	Overview of Obstructive Sleep Apnea	1
	Liang Chye Goh, Muhammad Adam Mohd Shariff, Abdul Rahim bin Md Din, Lee Keng Wong, Ahmad Syahir Md Ismail, Rajendran Laavanya, Emelda Rose Sebastin, Nor Anis Elini Ismail, Chee Kuan Wong, Ahmad Izuanuddin Ismail, Wei Jin Wong, Ng Boon Han Kevin, Nurul Asma Che Ab Rahim, and Jeyasakthi Saniasiaya	
2	Drug-Induced Sleep Endoscopy (DISE)	111
	Chun Hong Yeap, Siti Nadzrah Yunus, Jeremy Sin Hun Tan, Mohd Ayzam Ahmad, and Maythad Uataya	
3	Nasal Surgery for Obstructive Sleep Apnea	135
	Chu Qin Phua, Kugan Raman, Hui Yan Ong, Gagandeep Singh Mann, Chee Chean Lim, Prepageran Narayanan, Andrew Junior Charles Gomez, Song Tar Toh, and Liang Chye Goh	
4	Palatal and Oropharyngeal Surgery for Obstructive Sleep Apnea . . .	175
	John Ming Ren Loh, Chu Qin Phua, Hui Yan Ong, Song Tar Toh, Liang Chye Goh, Claudio Vicini, Stephen Shih-Teng Kao, and Mackay Stuart Grayson	
5	Tongue Base and Hypopharyngeal Surgery for Obstructive Sleep Apnea	231
	Liang Chye Goh, Song Tar Toh, Srinivas Kishore, Moideen Sanu, Ahmad Kusyairi Khalid, Mohd Zulkiflee Abu Bakar, and Claudio Vicini	
6	Hypoglossal Nerve Stimulation (HGNS) Implant	265
	Liang Chye Goh, Song Tar Toh, and Clemens Heiser	
7	Bony Surgery for Obstructive Sleep Apnea	281
	May Nak Lau, Muhammad Kamil Hassan, and Firdaus Hariri	
	Index	309

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Technology will also play an increasing role in perioperative care. *Artificial intelligence (AI) and machine learning* are being applied to automate DISE video analysis, predict surgical outcomes, and stratify perioperative risk. Remote monitoring through wearable devices and telemedicine platforms is expected to become routine, enabling continuous assessment of treatment adherence and recurrence of symptoms [137].

Finally, there is growing recognition of the need for *integrated, multidisciplinary care models*. Obesity-related OSA is not solely a surgical or respiratory problem; it is a systemic disease requiring long-term engagement from sleep physicians, bariatric surgeons, endocrinologists, anesthesiologists, and dietitians. Future practice will likely center around multidisciplinary “sleep-obesity clinics” that combine surgical expertise with structured weight management, lifestyle coaching, and cardiometabolic monitoring.

1.10.7 Conclusion

Obesity exerts a profound impact on both the development of OSA and the outcomes of its surgical management. While sleep surgery remains a critical option for patients intolerant of CPAP or with significant anatomical obstruction, its success in obese populations is often limited by multilevel collapse, higher perioperative risks, and systemic metabolic drivers of disease. Weight loss, achieved through lifestyle, pharmacotherapy, or bariatric surgery, is therefore central to long-term disease control.

The future of managing OSA in obese patients lies in *combining airway surgery with weight management strategies*, supported by technological advances and multidisciplinary care. Surgeons must counsel patients that success should be measured not only by reductions in AHI but also by improvements in symptoms, quality of life, and comorbidity burden. By integrating surgical expertise with evolving metabolic and pharmacological therapies, clinicians can provide more durable and comprehensive outcomes.

1.11 Powered Instruments in Sleep Surgery

Ng Boon Han Kevin and Liang Chye Goh

1.11.1 Introduction

Modern sleep surgery has evolved in lockstep with advances in powered instruments—devices that transform energy (radiofrequency, plasma/coblation, laser light, ultrasonic vibration, or high-speed rotary power) into controlled tissue effects. Compared with cold steel alone, powered tools enable precise, hemostatic dissection in a highly vascular, compact airway; they can reduce thermal spread, shorten

Index

A

Ablate, 185
Ablation, 149, 168, 183–190, 231–237, 239, 241, 245, 247
Adaptive servo-ventilation, 58
Adenoidectomy, 165–171
Adenotonsillectomy, 24, 29, 30, 122, 166, 238, 239
Adherence, 14, 19, 28, 29, 42, 45, 48, 53, 55, 112, 114–116, 120, 121, 141, 148, 198
Adrenaline, 150, 159, 185, 247
Age, 54
Airway, 47, 113, 117, 126, 205, 243, 250, 286–288, 302
Alar cinch suture, 295
Allergic, 14, 24, 29, 122, 141
Analgesia, 47, 187, 206, 235, 250, 251, 302
Anatomic, 9, 10, 14–16, 23–24, 30–31, 44, 45, 54, 121, 191, 198, 208
Anesthesia, 123, 164, 167, 185, 232, 251, 295
Anterior nasal spine, 283
Antibiotics, 232, 235, 250, 302
Apnea, 9–22, 30–42, 47–48, 111–116, 142, 176–183, 209, 290–306
Apnea–Hypopnea Index (AHI), 11–14, 20, 24, 29, 30, 36, 37, 42, 44–46, 52, 53, 112, 115, 116, 118, 120, 125, 142, 184, 191, 198, 207–209, 232, 238, 286, 291
Architecture, 216, 238
Arousal threshold, 11, 13–16
Aspiration, 117, 126
Atrophic rhinitis, 156
Auto-titrating PAP, 57, 61

B

Barbed reposition pharyngoplasty, 36, 53
Barbed sutures, 45, 211
Bariatric surgery, 59, 68, 69, 71, 73–79
Bilateral sagittal split osteotomy, 291
Bilevel PAP (BiPAP), 47, 57, 61, 205
Bispectral index (BIS) monitoring, 123, 125
Bleeding, 47, 48, 55, 142, 148–150, 156, 169–171, 185, 189, 196, 197, 205, 208, 215, 235, 238, 239, 243, 244, 295, 302, 304, 305
Blood pressure, 113, 123
Body mass index (BMI), 11, 21, 35, 43–45, 48, 53, 54, 68, 70, 71, 113–116, 118, 120, 122, 123, 184, 205, 243, 250

C

Cardiovascular, 111–115
Celon ProSleep, 185, 234
Central sleep apnea, 60
Cephalometry, 113, 281, 282, 288
Cerebrovascular, 113
Cervical vertebrae, 283
Childhood Adenotonsillectomy Trial (CHAT), 24
Chronic obstructive pulmonary disease, 113
Chronic rhinosinusitis, 14, 24
Claustrophobia, 60
Coagulation, 167–169, 232, 234, 235, 239, 245, 250
Coagulative necrosis, 236
Coblate, 234

Coblation, 167, 231–244
 Coblation channeling of the tongue
 (CCT), 232
 Complete concentric collapse, 19, 44, 127
 Condylar, 305
 Cone-beam computed tomography (CBCT),
 282, 289, 290, 305
 Continuous positive airway pressure (CPAP),
 13, 14, 19, 20, 22, 23, 25, 26, 30, 32,
 40, 42–45, 47, 52, 53, 57, 61, 68, 71,
 73, 75, 77–79, 112, 114–116, 118,
 120–122, 141, 142, 148, 157, 184, 190,
 198, 199, 205, 207–209, 244, 291
 Craniofacial, 10, 20, 46, 48, 54, 55, 281, 282,
 288, 291

D

Desaturation, 12, 16, 52, 112, 115, 120,
 123, 126
 Dexmedetomidine, 119, 120
 Dilator, 9, 10, 14, 121
 Dissection, 156, 159, 160, 168, 170, 205, 206,
 210, 300
 Doppler, 240, 244, 246, 247, 250, 251
 Drug-induced sleep endoscopy (DISE), 15, 19,
 20, 22, 25, 29, 32, 34, 35, 37, 41, 42,
 44–46, 48, 53–55, 70, 78, 112, 113,
 116–132, 184, 191, 192, 198, 207–209,
 232, 237, 238, 244, 281
 Dynamic, 19, 22, 28, 29, 34, 37, 41, 44, 121,
 122, 132, 141, 157, 158, 164, 165, 202,
 216, 232
 Dynamic Nasal Valve Collapse, 158
 Dysarthria, 251
 Dysgeusia, 206, 244, 251
 Dysphagia, 36, 37, 45, 47, 55, 196, 198, 206,
 243, 244, 250
 Dysphonia, 195

E

Electrocautery, 149, 167
 Empty nose syndrome, 156
 Endoscopic, 34, 140–147, 165–171,
 203, 237–244
 Endotypes, 10, 14–16
 Epiglottis, 11, 20, 22, 53, 125, 283, 287
 Epiglottoplasty, 209
 Epworth Sleepiness Scale, 24, 52, 115,
 184, 238
 Etoricoxib, 170
 Eustachian tube, 165–170

Expansion sphincter pharyngoplasty, 20,
 198, 208
 External nasal valve, 24, 157

F

Fibrous, 212
 Fistula, 190
 Flap, 11, 144, 145, 148, 152–154, 191–197,
 202, 293, 296, 300
 Floppy, 20
 Foramen cecum, 240, 244–246, 250
 Frenulum, 233
 Friedman tongue position, 34, 35, 232, 238
 Full face mask, 58
 Functional endoscopic sinus surgery
 (FESS), 149
 Functional Outcomes of Sleep Questionnaire
 (FOSQ), 52, 55, 238
 Functional residual capacity, 14

G

Gastric bypass, 73–75
 General anesthesia, 142, 159, 196, 199, 210
 Genial tubercle, 301
 Genioglossus, 10, 14, 20, 45, 301
 Globus, 206
 Glossopharyngeal nerve, 206
 Gnathion, 283
 Gonion, 283
 Granulation, 251

H

Hematoma, 146, 243, 251, 302
 Hemorrhage, 205, 250, 304
 Hemostasis, 148, 156, 170, 210, 244
 High-dependency unit (HDU), 47, 115–117,
 120, 205, 250
 Home sleep apnea testing (HSAT), 112, 113,
 184, 238
 Hyoid, 47, 283, 286
 bone, 283, 286, 287
 suspension, 42, 45, 286
 Hypoglossal–lingual neurovascular bundle,
 244, 245
 Hypoglossal nerve, 19, 32, 37, 41, 44, 45, 121,
 122, 209, 234, 245
 stimulation, 19, 32, 37, 41, 42, 44, 45, 53,
 121, 122, 209
 Hypoventilation syndromes, 60
 Hypoxemia, 9, 112, 114–117, 120, 121, 198

I

- Infection, 156, 189, 197, 251, 303
- Inflammatory, 12, 14, 23, 30, 250
- Inpatient, 114
- Intensive care unit (ICU), 115, 250, 302
- Intermaxillary fixation, 302
- Internal nasal valve, 157

J

- Jaw, 15, 20, 22, 29, 34, 41, 42, 54, 121, 125, 238, 303

L

- Laser-assisted uvulopalatoplasty (LAUP), 186
- Lateralization, 148
- Lateral pharyngoplasty, 20, 22
- Le Fort I maxillary advancement, 291
- LeFort I osteotomy, 291
- Llevator veli palatini, 10
- Lidocaine, 142, 148, 185, 247
- Lingual artery, 244–246, 250
- Lingual tonsil, 42, 48, 125, 129
- Lingual tonsillar hypertrophy, 46, 129, 238, 244
- Lingula, 296
- Liraglutide, 72
- Local anesthesia, 185
- Loop gain, 11, 13–16

M

- Macroglossia, 117
- Magnetic resonance imaging (MRI), 11, 18–20, 22, 35, 37, 41
- Malocclusion, 47, 54, 55, 302
- Mandible, 11, 15, 281–283, 285–287, 291, 296–298
- Mandibular advancement, 16, 20, 22, 41, 42, 54, 121, 125, 238, 285, 286, 291
- Maneuvers, 20, 54
- Mask interface, 56, 58, 60
- Mastication, 302
- Mattress, 201, 202
- Maxilla, 11, 281–283, 291, 295
- Maxillary, 144, 285, 291–294, 304, 305
- Maxillomandibular advancement, 46, 53, 291
- Mentalis, 299, 301
- Menton, 283
- Microdebrider, 147–157, 167–169
- Midazolam, 119
- Midline glossectomy, 42, 45

- Modified Mallampati, 34, 35
- Mouth, 117, 167, 239, 246
- Mucosa, 143, 144, 148, 153, 184, 186, 193, 206, 207, 210, 244, 251, 294, 295, 301
- Müller's maneuver, 34, 121, 123
- Multidisciplinary, 35, 43, 55, 64, 66, 68, 69, 71, 76, 77, 79, 115, 130, 131, 291
- Multilevel, 11, 20, 22, 29, 30, 32, 35–37, 41, 42, 45–48, 53–55, 121, 122, 141, 148, 184, 186, 191–193, 196–198, 205, 207–209, 232, 235, 238, 243, 244
- Muscle, 9–11, 14–16, 55, 121, 125, 191, 192, 194, 195, 197–200, 202, 205, 207, 209, 210, 214, 215, 234, 239, 295, 296, 299, 301

N

- Nadir, 52, 112, 115, 120
- Nasal airflow, 14, 29, 46, 140–142, 144, 148, 149, 159
- Nasal mask, 58
- Nasal pillow, 58
- Nasal resistance, 14
- Nasal valve stabilization, 28, 157, 158, 165
- Nasion, 283
- Nasopharyngeal, 24, 26–27, 29, 34, 125, 167, 192, 195, 197, 287
- Nasotracheal intubation, 239, 246
- Neuromuscular, 10, 47, 193
- Neurostimulation, 44
- Neurovascular, 199, 205, 244, 245
- New York Heart Association (NYHA), 113
- Non-allergic rhinitis, 14, 24, 141
- Non-REM (NREM), 14, 22
- NOSE score, 28

O

- Obesity, 16, 19, 39, 40, 43, 54, 59, 60, 62, 68–79, 114, 122, 184, 302
- Obstructive sleep apnea (OSA), 9–16, 19, 20, 22–24, 26–27, 29, 30, 32, 34, 35, 37, 42–56, 61, 70, 71, 73, 76, 77, 116, 117, 120–122, 125, 132, 141, 147, 148, 157, 165, 166, 183, 184, 190–193, 196–199, 205, 207–209, 216, 231, 235, 237, 238, 243, 250, 251, 285, 286, 291, 302, 303
- Occlusion, 54, 299
- Odynophagia, 203, 206, 243, 250
- Olfactory dysfunction, 156
- Oropharyngeal, 20, 32, 34, 53, 125, 191, 192, 199, 207, 287, 288

Oropharynx, 126, 128
 Orthodontic, 46, 282, 303, 305
 OSA, *see* Obstructive sleep apnea
 Osteotomy, 292–301
 Outpatient, 114, 120
 Oximetry, 47, 116, 205

P

PaCO₂, 114
 Pain, 13, 47, 48, 115, 120, 126, 142, 186, 187, 189, 192, 196, 244, 302, 304, 305
 Palatoglossus, 202
 Palatopharyngeus, 36, 45, 199–202, 207, 210, 214
 Palpation, 251
 Paracetamol, 170, 187
 Parotid duct, 293
 Partial epiglottectomy, 20, 22, 42
 Pediatric, 14–15, 122, 166
 Perioperative, 47–48, 56, 59, 63, 65, 67, 70, 73, 77–79, 112, 114–120, 196, 205, 232, 291, 302
 Periosteum, 295
 Pharmacological, 68, 78, 79
 Pharmacotherapy, 72, 73, 79
 Pharyngeal collapsibility (Pcrit), 10, 13, 14, 16, 22, 23
 Phenotypes, 13, 14, 20, 22, 23, 29, 37, 39–42, 44, 48, 52–55, 121, 141, 148, 166, 184, 198, 207–209, 238, 250
 Piriform aperture, 157, 158
 Plasma, 167, 232, 236, 237
 Plates, 299, 303
 Pneumatic splint, 15, 56, 57
 Pogonion, 283
 Polysomnography, 22, 48, 113, 166, 184, 238, 281, 303
 Porion, 283
 Positive airway pressure (PAP), 14, 23, 24, 112, 116, 121, 141, 148, 184, 198, 238
 Posterior nasal spine, 283
 Posterior pharyngeal wall, 11, 31, 185, 287, 288
 Premolar, 295
 Preoperative, 44–46, 114, 116–118, 123, 150, 159, 166, 167, 185, 207, 239, 245
 Primary epiglottic collapse, 130
 Prophylactic, 156
 Propofol, 119
 Pterygoid, 294
 Pterygomandibular raphe, 212, 214
 Pulmonary hypertension, 113, 114
 Pyloric aperture, 293

R

Radiofrequency, 42, 53, 148, 150, 183–190, 232, 236, 244
 Radiofrequency ablation (RFA), 232
 Radiograph, 282
 Rapid eye movement (REM), 11, 13, 14, 16, 22, 23, 52, 125
 Rapor bipolar electrode, 185
 Reconstruction, 198, 203, 207, 305
 Recovery, 46, 116, 119, 120, 184, 196, 302, 303
 Reflex Ultra 55, 185, 234
 Relocation pharyngoplasty, 198–207
 Respiratory, 113
 Retroglossal, 11, 15, 16, 20, 23, 41, 42, 53, 141, 148, 244, 286, 287
 Retrognathia, 11, 54, 113, 282, 285
 Retrolingual, 17, 21, 46, 68, 70, 231, 232, 237, 238, 291
 Retropalatal, 11, 17–19, 21, 23, 26, 31–32, 34, 35, 41, 44, 46, 68, 70, 141, 148, 183, 184, 191, 192, 197–199, 207–209, 216, 286, 291
 Rhinomanometry, 29

S

Sagittal, 11, 285, 291, 296–298
 Saline irrigation, 146, 155
 Scarring, 169, 184, 190, 193, 197, 199, 206, 209, 235, 251
 Screws, 295, 298, 301, 303
 Sella, 283
 Semaglutide, 72
 Septal, 14, 23, 141–143, 145, 146, 295
 Septoplasty, 28, 29, 140–147, 149, 295
 Septum, 24, 29, 140–144, 146, 149, 157, 238, 293, 294
 Sher, 44–46, 52, 53
 Silk, 233
 Sinonasal, 305
 Sinus, 142, 149, 150, 239, 245, 246, 293, 294, 305
 Skeletal, 11, 20, 22, 54, 55, 198, 207, 281, 282, 285, 291, 305
 Sleep, 9–12, 14–16, 18–24, 34, 41, 44, 47, 52, 53, 55, 112–116, 119–125, 132, 141, 147–149, 157, 159, 165, 166, 183–185, 190, 191, 205, 207, 209, 231, 232, 238, 291
 fragmentation, 11, 12, 121
 questionnaire, 52, 238
 surgery, 52, 132, 199, 205, 209, 232
 Sleeve gastrectomy, 73–75

Sliding genioplasty, 291, 299, 300
SMILE, 244–251
Snoring, 14, 23, 24, 121, 122, 141, 148, 157, 159, 165, 166, 183, 184, 187, 189–192, 197, 203, 238
Soft palate, 10, 11, 14, 31, 125, 184–187, 189–193, 195, 197–200, 202, 205, 207–209, 212, 240, 281–283, 286–288
Speech, 166, 170, 187, 189, 191, 195, 196, 198, 206, 251, 302, 303
STAR trial, 20
Starling resistor, 11, 13–14
Steroids, 156, 232, 235, 250, 302
STOP-BANG, 117
Stratafix, 208, 210
Submucosal, 148, 153, 156, 183, 185, 192–194, 200, 202, 232, 244, 247, 248, 250, 295
Superior constrictor, 200, 202, 205, 210
Supine, 10, 14, 29, 31, 123, 125, 126, 193, 199, 210, 232, 239, 246
Supraglottic, 121
Surgeon, 167, 211, 239, 246
Surgical-site infection, 305
Suspension, 214
Sympathetic, 12

T

Target-controlled infusion, 119
Taste disturbance, 251
Teeth, 282, 293, 296, 298, 300
Telemonitoring, 66–67
Temperature, 183, 236
Temporomandibular joint, 305
3D airway modeling, 282
3D facial photography, 290
Tissue ablation, 232
Tongue, 10, 11, 14, 16, 20, 22, 29, 34, 35, 37, 41, 42, 44–48, 53, 54, 119, 121, 125, 167, 184, 185, 192, 196, 198, 207–209, 231–235, 237–240, 243–248, 250, 251, 281–283, 287, 288, 291

Tongue base, 10, 11, 37, 42, 45, 46, 53, 121, 125, 207, 209, 232, 237–240, 244, 247, 282, 283, 287, 288, 291
 resection, 237–244
Tonsillectomy, 36, 37, 45, 48, 53, 200, 206, 210, 239, 246
Transoral, 42, 48, 165, 166, 250, 251, 292, 299
Transoral robotic surgery (TORS), 42, 46, 48, 251
Transoral endoscopic adenoidectomy, 165, 166
Transorally, 167, 295
Turbinate, 14, 23, 24, 28, 29, 46, 48, 141, 147–151, 153, 155–157
Turbineotomy, 149, 295

U

Ulcer, 190
Upper airway surgery, 122
Uvulopalatopharyngoplasty (UPPP), 17, 20, 36, 37, 44, 45, 53, 55, 70, 76, 186, 190–192, 195–198, 208, 209, 286, 291

V

Vallecula, 244, 247, 250, 283, 287
Velopharyngeal insufficiency (VPI), 45, 47, 166, 167, 170, 190–193, 195, 197–199, 205
Velum, 19, 22, 44, 121, 126, 127
Vertical, 150, 202, 285–287, 296, 297, 300
Vestibule, 292, 295, 299
Vicryl, 146, 161, 162, 195, 202, 214, 240, 295
V-Loc, 208, 210
VOTE, 20, 22, 35, 41, 44, 121, 125, 132, 208, 232, 238, 244
VPI, *see* Velopharyngeal insufficiency
V-Y mucosal closure, 295

W

Wakeful, 237
WebCeph, 288