

Index

- acromegaly, 1, 63
- Adults with Incapacity Act 2000 (Scotland), 294
- advance refusals
 legal and regulatory issues, 294–295
- Airtraq™, 206
- airway adjuncts, 75
- airway alert form, 166
- airway damage (iatrogenic), 104–106
 airway stenosis, 105–106
 dental trauma, 104
 key points, 108
 laryngeal trauma, 104
 nasal/oral cavity, 104
 oesophageal perforation, 106
 pharyngeal perforation, 106
 unilateral vocal cord paralysis, 105
 vocal function, 104
- airway damage (non-iatrogenic trauma), 106–108
 airway assessment, 106–107
 blunt airway trauma, 107
 caustic airway injury, 108
 external laryngeal trauma, 106, 107–108
 internal laryngeal trauma, 106, 108
 key points, 108
 penetrating injuries of the airway, 107–108
 thermal airway injury, 108
 types of laryngeal trauma, 106
- airway exchange catheters, 164
- airway management
 basic principles, 43
 human factors in crisis situations, 50–51
 “squirt, puff, squirt” practice, 49
 techniques for the obstructing airway, 49–50
 use of neuro-muscular blocking drugs (NMBDs), 47–49
 use of sedation, 47
- Airway Management Device (AMD™), 83
- airway management planning, 43–47
 airway strategy, 44
 algorithms and flow-charts, 44
 evaluation of the patient, 43
 follow-up on a difficult airway, 45–47
 preparation for difficulty, 44
 routine or default intubation strategy, 44–45
- airway management with limited resources. *See* resource constrained environments
- airway patency, 33–34
- airway perforation, signs and symptoms of mediastinitis, 166
- airway reflexes, 28–34
 airway patency, 33–34
 anaesthetic agents and laryngeal reflexes, 30–33
 factors affecting sensitivity of upper airway reflexes, 29–30
 laryngospasm, 29
 pharyngeal dilator muscles, 33–34
 reflexes from the larynx, 29
 reflexes from the nasopharynx, 28
 reflexes from the nose, 28
 reflexes from the pharynx, 28
 upper airway reflexes and receptors, 28–30
- airway stenosis, iatrogenic, 105–106
- alfentanil, 31, 170–171, 266
- American Society of Anesthesiologists (ASA) difficult airway algorithm, 15
- anaemia, 67
- anaemic $\dot{V}O_2$ deficits, 10–11
- anaemic hypoxia, 9, 10
- anaesthesia
 airway adjuncts, 75
 bag and mask ventilation, 74–75
 basic airway care, 73
 causes of hypoxaemia during, 13–14
 Guedel (oropharyngeal) airway, 75
 mechanisms of airway obstruction, 73–74
 nasopharyngeal airway, 75
 predicting airway problems after, 60–61
- anaesthesia facemasks, 74–75
- anaesthetic agents and laryngeal reflexes, 30–33
 benzodiazepines, 31–32
 desflurane, 31
 enflurane, 30–31
 ether, 31
 halothane, 30–31
 inhalation anaesthetic agents, 30–31
 intravenous anaesthetic agents, 31–33
 isoflurane, 30–31
 local anaesthetic agents, 32–33
 opioids, 31
 propofol, 31
 sevoflurane, 31
 thiopentone, 31
- anatomy, 1–7
 bronchial tree, 5–6
 cervical spine, 6–7
 epiglottis, 3–4
 glottis, 3–4
 larynx, 3–4
 mouth, 1–2
 mouth opening and gape, 6
 nose, 2–3
 temporo-mandibular joint, 6
 trachea, 5–6
 upper airway, 21
- angioneurotic oedema, 1
- ankylosing spondylitis, 244
- apnoea
 index, 64
 rate of arterial desaturation, 11–13
- apnoeic reflex, 28
- armoured tracheal tubes, 98–99
- Arndt blocker, 257–258
- arterial desaturation rate in apnoea, 11–13

- asleep fiberoptic intubation, 133–136
 combined techniques, 136
 direct techniques, 133
 fiberoptic assisted intubation through SADs, 133–136
- aspiration problem, 169–175
 airway problems with cricoid pressure, 172–173
 alternatives to cricoid pressure, 174
 anaesthetic technique, 170–171
 cricoid pressure, 171–172
 cricoid pressure technique, 173–174
 effects of pulmonary aspiration, 169
 failed intubation, 174–175
 incidence of pulmonary aspiration, 169
 patients at higher risk of aspiration, 169–170
 patients who need rapid sequence induction, 169–170
 rapid sequence induction technique, 170–171
 rapid sequence induction with cricoid pressure, 169
- atracurium, 265
- Australian Incident Monitoring Study, 203
- awake fiberoptic intubation, 130–134
 airway evaluation, 130
 conscious sedation, 131, 132
 explanation and consent, 130–131
 include a back-up plan, 130
 monitoring, 131
 obese patients, 207
 oxygenation, 131–132
 practical tips, 132–134
 premedication, 131
 topical anaesthesia of the upper airway, 132
- awake insertion of LMA, 276
- awake laryngoscopy, 276
- bag and mask ventilation, 74–75
- Baker–Rendell–Soucek mask, 74
- Barcroft's classification of hypoxia, 9–10
- bariatrics, 203–207
 adjuncts to securing the airway, 206
 airway shape, 203
 airway techniques, 205–207
 alterations in airway anatomy, 203–204
 alterations in respiratory physiology, 204–205
 awake fiberoptic intubation, 207
 body fat distribution, 203
 body mass index (BMI), 203
- current UK bariatric anaesthesia practice, 207
 definitions of morbid obesity, 203
 definitions of obesity, 203
 desaturation rate of obese patients, 204
 effects of postural change on the airway, 204
 effects of weight loss on the airway, 204
 extubation, 207
 fat deposition and airway management, 203
 functional residual capacity (FRC) of obese patients, 204
 gender differences in the airway, 204
 positioning the patient, 205–206
 predictors of airway difficulty, 205
 predictors of difficult intubation, 205
 predictors of difficult mask ventilation, 205
 pulmonary function tests, 204
 respiratory mechanics in obese patients, 204
 risk factors for difficult airway, 203
 techniques for pre-oxygenation, 206
 V/Q mismatch, 204
- benzocaine, 32–33
- benzodiazepines, 31–32
- Berman airway, 127
- bleeding and haemorrhage control maxillofacial trauma, 219–220
- blind intubation techniques, 138–143
- blind nasal intubation (awake or under anaesthesia), 277–279
- blind oral (digital) intubation, 279–280
- blind oral or nasal intubation, 138–139
- body mass index (BMI), 203
- Brandt™ cuff system, 97
- bronchial blocker, 257–259
- bronchial tree, functional anatomy, 5–6
- bronchoscopy, 272–273
- Bullard laryngoscope, 198
- can't intubate, can't oxygenate (CICO) situation. *See* lost airway
- can't intubate, can't ventilate (CICV) situation, 45, 55
 obese patients, 205
See also lost airway.
- capsaicin, 28
- Care Quality Commission, 37
- caustic airway injury, 108
- cellular hypoxia
 final common pathway, 16–18
 membrane potential and cell death, 16–18
- cellular respiration, mitochondria, 9
- central sleep apnoea, 63
- cervical spine
 anatomy, 250–252
 functional anatomy, 6–7
 instability, 247–249, 250
 stenosis, 247
 terminology and definitions, 250
- cervical spine disease, 244–249
 difficult intubation, 244–245
 post-operative airway obstruction, 245–246
 spinal cord injury during anaesthesia, 246–249
- cervical spine injury
 clearing the cervical spine, 247
- Chandy manoeuvre, 142
- chlorine dioxide (Tristel), 39
- Cidex-OPA, 39
- cigarette smokers, sensitivity of upper airway reflexes, 30
- cisatracurium, 265
- CJD (Creutzfeldt-Jacob disease) transmission, 36
- classic Laryngeal Mask Airway (cLMA), 76, 77–81
- Clinical Human Factors Group, 51
- Cobra Perilaryngeal Airway (CobraPLA™), 83
- cold chemical sterilisation, 39–40
- complex sleep apnoea, 63
- consent and refusal for airway management techniques, 287–289, 293–295
- Consumer Protection Act 1987, 295
- Cook Mekler Cricothyroidotomy kit, 184
- Coopdech blocker, 257
- corporate manslaughter, 297
- Corporate Manslaughter and Corporate Homicide Act 2007, 297

Index

- CPAP (continuous positive airway pressure)
 for obstructive sleep apnoea, 67–69
 ICU patient, 272
- cranio-cervical extension, 59–60
- cranio-cervical flexion/extension
 and mouth opening ability, 6
- Creutzfeldt-Jacob disease (CJD)
 transmission, 36
- cricoid pressure, 171–172
 airway problems with, 172–173
 alternatives to, 174
 and lost airway, 179
 correct technique, 173–174
- cricothyroidotomy, 4–5, 181–186
 choice of technique, 186
 Cook Mekler Cricothyroidotomy kit, 184
 emergency cricothyroidotomy, 181–182
 large bore devices, 184–185
 Portex Cricothyroidotomy kit, 184
 pre-pubescent children, 186
 small cannula devices, 182–183
 surgical cricothyroidotomy, 186
 types of cricothyroidotomy, 182
 types of equipment available, 182
 using scalpel, 281
 VBM Quicktrach, 184
 what not to use, 186
- cricothyrotomy, 23, 50
- damages and settlements, 296
- decontamination, definition, 36
- decontamination of airway
 equipment, 36–40
 cold chemical sterilisation, 39–40
 definition of decontamination, 36
 definition of disinfection, 36
 definition of sterilisation, 36
 ethylene oxide, 40
 guidelines on infection control, 37–40
 heat sterilisation, 38–39
 single use disposable equipment, 37–38
 transmissible spongiform encephalopathies (TSE), 36
 UK legal framework, 37
- dental anaesthesia, 223–226
 airway for conservation procedures, 225–226
 airway for exodontia, 224–225
 anaesthetic technique, 223–224
 dental conservation procedures, 223
 exodontia, 223
- history of, 223
 indications for general anaesthesia, 223
 induction, 224
 maintenance, 226
 paediatric patient management, 224
 recovery, 226
 specific airway problems, 226
 types of dental surgery, 223
- dental trauma, iatrogenic, 104
- dento-alveolar surgery, 210–211
- desaturation following the use of succinylcholine, 15–16
- desflurane, 31
- diabetes (type II, adult onset), 64
- diabetes mellitus, 203
- diazepam, 31–32
- difficult airway, 53–61
 aftermath of an airway disaster, 46
 airway alert form, 166
 and lung isolation, 259–260
 background conditions or disease, 53–54
 causes of difficulty, 53–54
 causes of morbidity and mortality, 61
 definition, 53
 difficult direct laryngoscopy, 54–55
 difficult intubation, 55
 difficult mask ventilation, 54
 difficult tracheotomy/ostomy, 55
 documentation and communication, 61
 drug issues, 53
 equipment and location factors, 53
 flexible fibreoptic intubation, 128–130
 follow-up, 45–47
 ICU patients, 264
 non-patient factors, 53
 operator and assistant factors, 53
 patient factors, 53–54
 preparation for, 44
 stiffness, deformity or swelling, 53
 types of difficulty, 54–55
 unwanted reflex activities, 53
See also can't intubate, can't ventilate (CICV); extubation of the difficult airway; paediatric difficult airway.
- difficult airway cart
 resource constrained environments, 283
- difficult airway prediction, 55–56, 58–60
- combining tests, 57–58
 conscious level, 59
 cranio-cervical extension, 59–60
 dental health, 59
 examination, 59–60
 history, 58
 inter-dental distance, 59
 Mallampati grading, 59
 mandibular protrusion, 59
 mouth opening, 59
 predicting airway problems after anaesthesia, 60–61
 predictors in obese patients, 205
 “quick look” laryngoscopy, 60
 radiology, 60
 sterno-mental distance, 60
 symptoms, 59
 tests, 56–58
 thyro-mental distance, 60
 ultrasound, 60
 upper lip bite test (ULBT), 59
- Difficult Airway Society
 Airway Alert Form, 166
 audit of serious airway problems, 51
 failed intubation guidelines, 180
 flow-charts, 44
 guidelines, 110, 149
 lost airway study, 178
 website, 44, 166
- difficult direct laryngoscopy, 54–55
- difficult intubation, 55
 cervical spine disease, 244–245
 obstetric patients, 189–192
- difficult mask ventilation, 54
- difficult tracheotomy/ostomy, 55
- direct laryngoscopy, 110–119
 anatomical basis, 110–111
 blind tracheal intubation with the Macintosh laryngoscope, 115–116
 Macintosh technique, 112–115
 nasotracheal intubation, 118–119
 pharmacology, 111
 preparation, 112
 role of alternative techniques, 118
 straight laryngoscope (paraglossal technique), 116–118
 unanticipated difficulty, 110
- disinfection, definition, 36
- distraction techniques, 213
- diving response, 28
- DNAR (do not attempt resuscitation)
 decisions by patients, 288–289

- DNAR (do not attempt resuscitation) orders, 294–295
- double-lumen tube (DLT), 255–257, 258
- double-tube intubation, 280
- Down's syndrome, 63, 226
- Easytube, 89
- end of life care, legal and regulatory issues, 294–295
- enflurane, 28, 30–31
- ENT surgery, 227–243
 - airway compromise, 236–243
 - extubation and recovery, 229
 - facemask, 227
 - factors affecting airway safety and maintenance, 227
 - flexible laryngeal mask airway (FLMA), 228–229
 - FLMA for nasal surgery, 228
 - FLMA for tonsillectomy, 228–229
 - head and neck surgery, 236–243
 - laryngeal mask airway, 227
 - laryngeal surgery, 229–230
 - laryngectomy, 236
 - laryngoscopy anaesthetic techniques, 230–235
 - oral tracheal tube, 229
 - pharyngolaryngectomy, 236
 - radical neck dissection, 236
 - upper airway tumours, 236
- epiglottis, functional anatomy, 3–4
- epiglottitis, paediatric patient, 200–201
- Epworth Sleepiness Score, 64
- ether, 31
- ethical issues, 287–291
 - advance refusal of treatment, 288–289
 - consent and refusal relating to specialist airway procedures, 287–289
 - consent for anaesthesia, 287
 - consent for 'awake' airway techniques, 288
 - decision to withhold intubation and ventilation, 263–264
 - decisions on behalf of incompetent adults, 289
 - duty to contribute to good standards, 290
 - guidance on achieving valid consent, 287
 - patient involvement in teaching and training, 289–290
 - patients with DNAR (do not attempt resuscitation) decisions, 288–289
 - principle of respect for autonomy, 287
 - refusal of a specific airway technique, 288–289
 - research involving human subjects, 290
 - substituted decision making, 289
 - teaching and training involving patients, 289–290
- ethylene oxide sterilisation, 40
- etomidate, 170, 265
- excessive daytime sleepiness (EDS). *See* obstructive sleep apnoea
- extraglottic airway device (EAD), 76
- extrathoracic airway obstruction classification, 24
- extubation, 158–168
 - airway exchange catheters, 164
 - conduct of extubation, 160–161
 - factors producing problems, 158–160
 - obese patients, 207
 - prevalence of problems, 158
 - weaning from assisted ventilation, 267
- extubation flow-chart, 161
- extubation management, 161–163
 - deep vs. awake extubation, 162
 - exchanging the tracheal tube for an LMA, 162–163
 - extubation flow-chart, 161
 - patient position, 161
 - uncomplicated, low-risk airway, 161–162
- extubation of the difficult airway, 163–166
 - airway alert form, 166
 - airway exchange catheters, 164
 - difficult extubation strategies, 163–164
 - follow-up of a difficult airway, 166
 - laryngospasm, 165–166
 - risk of airway perforation, 166
 - symptoms and signs of mediastinitis, 166
- extubation problems
 - aspiration, 160
 - deranged lung function, 160
 - factors producing problems, 158–160
 - hypoxaemia, 160
 - inadequate airway patency, 158
 - inadequate reversal of neuromuscular blockade, 159
 - inadequate ventilatory drive, 160
 - prevalence, 158
 - sequelae of airway stimulation, 160
- facemask anaesthesia with spontaneous + assisted ventilation, 275
- facial trauma. *See* maxillofacial trauma
- failed intubation, 174–175
- Fastrach™ (intubating LMA), 82
- fatal familial insomnia, 36
- fauces and pillars, 1
- fentanyl, 31, 170–171, 266
- fiberoptic-assisted intubation through SADs, 133–136
- fiberoptic-assisted retrograde intubation, 139
- Fick's law, 11
- flexible (reinforced) LMA (fLMA), 81
- flexible fiberoptic equipment, 121–123
 - camera control unit (CCU), 122
 - closed circuit television (CCTV) monitor, 122
 - parts of the fibrescope, 121–122
 - setting up the fibrescope, 123
 - use of a CCU with the fibrescope, 123
- flexible fiberoptic intubation, 121–136
 - anticipated difficult airway, 128–130
 - asleep fiberoptic intubation techniques, 133–136
 - awake fiberoptic intubation technique, 130–134
 - clinical applications in difficult airways, 128–130
 - equipment, 121–123
 - fiberoptic endoscopic anatomy, 125–127
 - holding the fibrescope, 123
 - learning dexterity and coordination on models, 124–125
 - manipulating the tip of the fibrescope, 123–124
 - nasotracheal fiberoptic endoscopy, 125–126
 - orotracheal fiberoptic endoscopy, 127
 - position of the endoscopist and patient, 125
 - retrograde intubation techniques, 136
 - technique of railroading, 127–128
 - tracheal tube selection, 127
 - unanticipated difficult airway, 130
- flexible indirect laryngoscopy. *See* flexible fiberoptic intubation
- flexible LMAs and LMs (single use), 82

Index

- flow-volume loops, 23–25
 flumazenil, 31–32
 Fraser Ruling, 293
 functional residual capacity (FRC)
 obese patients, 204
 paediatric airway, 193
 Gastro-LT, 86
 General Medical Council (GMC)
 Good Practice guide, 290
 genioglossus muscle, 33
 Gigasept, 39
 glossopharyngeal nerve, 1
 glottis, functional anatomy, 3–4
 glutaraldehyde, 39
 glycogen storage diseases, 1, 63
 gross negligence and manslaughter, 297
 Guedel airway, 75, 196
 halothane, 28, 30–31
 head and neck surgery, 236–243
 Health and Social Care Act (2008), 37
 heat sterilisation, 38–39
 Heliox, 20–21
 histotoxic hypoxia, 9, 10
 human factors
 in airway management, 50–51
 lost airway situations, 186–187
 Hurler syndrome, 195
 Hygiene Code, 37
 hypertension, 64
 hypopnoea, 64
 hypothyroidism, 63, 67
 hypoxaemia, during anaesthesia,
 13–14
 hypoxaemic $\dot{V}O_2$ deficits, 11
 hypoxaemic hypoxia, 9, 10, 17
 hypoxia, Barcroft's classification, 9–10
 i-gel™, 86–87, 141
 iatrogenic airway damage. *See* airway
 damage (iatrogenic)
 ICU (intensive care unit), 262–273
 airway assessment, 264
 airway management challenges, 262
 airway management skills
 required, 262
 airway obstruction in the intubated
 patient, 266
 analgesic agents for longer term
 intubation and IPPV, 266
 bronchoscopy, 272–273
 changing tracheostomy tubes, 271
 choice of drugs for intubation, 265
 choice of tracheostomy tubes, 270
 complications of endotracheal
 intubation, 266
 control of the airway during
 tracheostomy, 269
 CPAP (continuous positive airway
 pressure), 272
 decision to withhold intubation and
 ventilation, 263–264
 decisions to perform tracheal
 intubation, 263
 difficult airway, 264
 ethical considerations in tracheal
 intubation, 263–264
 extubation, 267
 humidification of airway with
 tracheal tube, 266
 indications for tracheal intubation,
 262
 indications for tracheostomy,
 267–268
 intubation sequence, 266
 long-term respiratory support, 272
 NIV (non-invasive ventilation), 272
 open versus percutaneous
 tracheostomy, 268–269
 PDT techniques, 269–270
 percutaneous dilational
 tracheostomy (PDT), 268–269
 physiotherapy and tracheal suction,
 266
 preparation for tracheal intubation,
 264–265
 removal of tracheostomy tube
 (decannulation), 271–272
 route of intubation, 262
 sedative agents for longer term
 intubation and IPPV, 266
 timing of tracheostomy, 267–268
 tracheal (translaryngeal) intubation,
 262–267
 tracheal extubation, 267
 tracheostomy, 267–272
 types of tracheal tubes, 262
 weaning from assisted ventilation,
 267
 indirect laryngoscopy. *See* flexible
 fiberoptic intubation; rigid
 indirect laryngoscopy
 infection control, UK legal
 framework, 37
 Infection Control Committees and
 Teams, 37
 infection control guidelines,
 decontamination of airway
 equipment, 37–40
 inhalational burns, 108
 inhaled foreign body, paediatric
 patient, 199–200
 intubating laryngeal mask, 92, 141–143
 intubating LMA (ILMA), 82
 intubation through LMA, 280
 isoflurane, 28, 30–31
 jet ventilation techniques, 234–235
 ketamine, 265
 ketamine anaesthesia with
 spontaneous breathing, 274–275
 Klippel-Feil syndrome, 244
 kuru, 36
 laminar flow, 19–20
 Lanz™ cuff system, 97
 Larson's manoeuvre, 166
 laryngeal fractures, 215–216
 laryngeal surgery, 229–230
 laryngeal trauma
 external, 107–108
 iatrogenic, 104
 internal, 108
 Laryngeal Tube (LT), 83
 laryngeal tube suction-mark II
 (LTS-II), 86
 laryngectomy, 236
 laryngectomy (Montandon) tube, 102
 laryngoscopy anaesthetic techniques,
 230–235
 closed systems, 230–231, 232
 induction technique for
 laryngoscopy, 231
 intermittent apnoea technique, 233
 jet ventilation techniques, 234–235
 open systems, 230–231, 232
 spontaneous/insufflation ventilation
 technique, 232–233
 laryngoscopy under anaesthesia with
 spontaneous breathing, 276–277
 laryngospasm, 28, 165–166, 178–179
 laryngotracheal injuries, 215–216
 larynx
 airway reflexes, 29
 anatomy, 3–4
 laser tracheal tubes, 99

- Lasting Power of Attorney for welfare, 295
- Le Fort classification, 215
- legal and regulatory issues, 293–297
- Adults with Incapacity Act 2000 (Scotland), 294
 - advance refusals, 294–295
 - breaches of duty, 296
 - competence to practice, 295
 - consent and refusal for airway management techniques, 293–295
 - consequences of a catastrophic outcome, 296–297
 - corporate manslaughter, 297
 - damages and settlements, 296
 - decisions on behalf of incapacitated adults, 295
 - developing new products, 295
 - DNAR (do not attempt resuscitation) orders, 294–295
 - end of life care, 294–295
 - gross negligence and manslaughter, 297
 - Lasting Power of Attorney for welfare, 295
 - Mental Capacity Act 2005, 294, 295
 - negligence claims, 293–294
 - non-standard use of medical devices, 295
 - product regulation, 295–296
 - quality of information provided to patients, 293–294
 - refusal of a proposed airway technique by a competent patient, 294
 - reusing ‘single-use’ devices, 295
 - risks which must be disclosed to patients, 293–294
 - role of guidelines, 296
 - standards of care, 296–297
- lidocaine, 32–33
- light wand, pediatric use, 199
- lighted stylet intubation, 277
- light-guided intubation, 140–141
- likelihood ratio, definition, 57
- limited resources. *See* resource constrained environments
- LMA Supreme™, 87–88
- lost airway, 178–187
- airway device misplacement or failure, 179
 - anaesthetic trauma, 179
 - breathing system malfunction, misassembly or occlusion, 179
 - causes, 178–179
 - cricothyroidotomy, 181–186
 - definition, 178
 - depth of anaesthesia, 178–179
 - effects of anaesthetic drugs, 178–179
 - external compression of natural airway, 179
 - how to avoid a lost airway, 180–181
 - human factors, 186–187
 - ICU patients, 268
 - incidence, 178
 - laryngospasm, 178–179
 - medical problems, 179
 - oxygen requirement of adult patients, 178
 - pathophysiology, 178
 - patient characteristics, 179
 - RCA and DAS study, 178
 - recognition and diagnosis, 180
 - training for emergencies, 186–187
 - use of cricoid pressure, 179
 - use of neuromuscular blocking drugs, 178–179
- Ludwig’s angina, 50, 220
- lung isolation. *See* thoracic anaesthesia
- Macintosh laryngoscope, 112–115
- Magill tubes, 92
- Magill, Ivan, 91, 255
- Mallampati grading, 59
- mandible, 2
- mandibular advancement devices (MAD), 69
- mandibular protrusion, difficult airway prediction, 59
- maxilla, 2
- maxillofacial sepsis, 220–221
- maxillofacial surgery, 209–221
- airway assessment, 209
 - airway management for maxillofacial sepsis, 220–221
 - airway management for maxillofacial trauma, 214–220
 - dento-alveolar surgery, 210–211
 - nasal route of intubation, 209–210
 - orthognathic surgery, 212–214
 - secondary surgery, 211–212
 - throat packs, 210
 - tracheostomy, 212
 - tumours of the upper airway, 211–212
- maxillofacial trauma, 214–220
- aetiology, 214
 - associations with other injuries, 215
 - bleeding and haemorrhage control, 219–220
 - classification of injuries, 215
 - initial management, 216–217
 - intubation methods, 217–219
 - laryngeal fractures, 215–216
 - laryngotracheal injuries, 215–216
 - nasal intubation, 217–218
 - penetrating injuries to the face, 216
 - tracheostomy, 217
- McCoy laryngoscope, 4
- mediastinitis
- risk with difficult airway, 166
 - signs and symptoms, 166
- Medical Devices Directive, 295
- Medicines and Healthcare Products Regulatory Agency (MHRA), 295
- Mental Capacity Act 2005, 294, 295
- metabolic syndrome, 64
- Microcuff™ tubes, 96
- microlaryngoscopy tubes, 99
- midazolam, 31–32, 170, 265, 266
- misplacement of tracheal tubes. *See* tracheal tube misplacement
- mitochondria, cellular respiration, 9
- Monitored Anesthesia Care (MAC), 47
- Montandon tube, 102
- morphine, 266
- mouth, functional anatomy, 2
- mouth opening and gape, 6
- cranio-cervical flexion/extension, 6
 - difficult airway prediction, 59
 - subluxation of the jaw, 6
- Murphy tubes, 92
- myxoedema, 1
- narcolepsy, 67
- nasal airway reflexes, 28
- nasal conchae, 3
- nasal intubation, maxillofacial trauma, 217–218
- nasal route of intubation, 209–210
- nasal turbinates, 3
- nasal/oral cavity, iatrogenic damage, 104
- nasopharyngeal airway, 75
- nasopharynx, 2
- airway reflexes, 28
- nasotracheal intubation, 118–119
- National Health Service Litigation Authority (NHSLA), 296

Index

- needle cricothyrotomy, 23
- negligence claims, 293–294
See also legal and regulatory issues.
- Nernst equation, 18
- neuro-muscular blocking drugs (NMBDs), 44, 47–49
- NIV (non-invasive ventilation) ICU patient, 272
- nose, functional anatomy, 2–3
- NuCidex, 39
- O₂ delivery ($\dot{V}O_2$) deficits
 anaemic $\dot{V}O_2$ deficits, 10–11
 differential effects, 10–11
 hypoxaemic $\dot{V}O_2$ deficits, 11
 stagnant $\dot{V}O_2$ deficits, 10–11
- obesity. *See* bariatrics
- obesity hypoventilation syndrome, 63
- obstetrics, 189–192
 airway management and pregnancy, 189
 concerns about the airway in anaesthesia, 189
 difficult and failed intubation, 190–192
 general anaesthesia, 189–192
 incidence of lost airway, 178
 management of the known difficult case, 192
 non-anaesthetic airway problems, 189
 regional anaesthesia, 189
- obstructive sleep apnoea, 2, 50, 59, 203
 clinical presentation, 65–67
 CPAP (continuous positive airway pressure) therapy, 67–69
 definition, 63–64
 diagnostic criteria, 63–64
 history, 65
 in children, 71
 investigations, 67
 mandibular advancement devices (MAD), 69
 physical examination, 66
 polysomnography investigations, 67
 presentation, 63–64
 prevalence, 63
 surgical treatments, 69
 treatments, 67–69
- obstructive sleep apnoea and anaesthesia, 69–71
 anaesthetic technique, 70
 children with sleep apnoea, 71
 post-operative management, 70–71
 pre-operative assessment, 69–70
- oesophageal detector device (ODD), 153–154
- oesophageal perforation, iatrogenic, 106
- opioid anaesthetic agents, 31
- oropharyngeal airway, 75
- orthognathic surgery, 212–214
- ortho-phthalaldehyde, 39
- paediatric airway, 193–201
 acute epiglottitis, 200–201
 anatomical and physiological differences, 193
 basic airway techniques, 194
 fiberoptic techniques, 197–199
 functional residual capacity (FRC), 193
 inhalation of a foreign body, 199–200
 intubating the child with airway obstruction, 199–201
 laryngoscopy, 194
 LMA (laryngeal mask airway), 195
 LMA insertion and removal techniques, 195
 management of the difficult airway, 195–199
 oxygen consumption rate, 193
 positioning of the paediatric patient, 194
 rapid sequence induction in neonates and young children, 201
 tracheal tubes, 99–101, 194–195
 video-laryngoscopes, 198
- paediatric difficult airway
 Bullard laryngoscope, 198
 conduct of anaesthesia, 196
 direct laryngoscopy, 197
 light wand, 199
 management, 195–199
 preparation for anaesthesia, 196
 recognition of the difficult airway, 196
 Trachlight, 199
 video-laryngoscopes, 198
- paediatric patients
 age range, 193
 cricothyroidotomy, 186
 dental anaesthesia, 224
 obstructive sleep apnoea, 71
- palatoglossal and palatopharyngeal arches, 1
- palatoglossal and palatopharyngeal muscles, 1
- paraglossal technique, 116–118
- Parker Flex tip, 92
- penetrating injuries
 of the airway, 107–108
 to the face, 216
- peracetic acid, 39
- Perasafe, 39
- pharyngeal dilator muscles, 33–34
 central activity, 33–34
 control of activity, 33–34
 genioglossus, 33
 local reflexes, 33
 phasic activity, 33–34
- pharyngeal perforation, iatrogenic, 106
- pharyngolaryngectomy, 236
- pharynx, airway reflexes, 28
- physics of air flow, 19–21
 laminar flow, 19–20
 turbulent flow, 20–21
- physics of distensible airways, 21–25
 anatomy of the upper airway, 21
 critical instability at points of narrowing, 22
 flow-volume loops, 23–25
 needle cricothyrotomy, 23
 physics of the Sanders injector, 25–27
 Starling resistor, 22
 variable vs. fixed obstruction, 24
- Pierre Robin sequence, 63, 226
- polar tubes, 98
- post-test probability, 57
- pre-oxygenation, 14–15
 exponential wash-in of O₂, 15
 O₂ content of blood, 15
- propofol, 31, 166, 170–171, 265, 266
- ProSeal LMA (PLMA), 84–86
- radical neck dissection, 236
- radiology, difficult airway prediction, 60
- RAE tubes, 98
- rapid sequence induction, 169
 indications for, 169–170
 neonates and young children, 201
 technique, 170–171
 with cricoid pressure, 169
- receiver operating characteristic (ROC) curves, 58
- reinforced tracheal tubes, 98–99
- remifentanyl, 31, 266

- research involving human subjects
 ethical issues, 290
- resource constrained environments,
 274–283
 awake insertion of LMA, 276
 awake laryngoscopy, 276
 blind nasal intubation (awake or
 under anaesthesia), 277–279
 blind oral (digital) intubation,
 279–280
 cricothyroidotomy using
 scalpel, 281
 double tube intubation, 280
 face mask anaesthesia with
 spontaneous + assisted
 ventilation, 275
 intubation through LMA, 280
 laryngoscopy under anaesthesia
 while maintaining spontaneous
 breathing, 276–277
 lighted stylet intubation, 277
 oesophageal and tracheal
 intubation, 280
 retrograde intubation using guide
 wire through cricoid membrane,
 280–281
 reverse transillumination, 277
 rigid bronchoscopy and intubation
 with bougie/airway exchange
 catheter, 280
 spontaneous breathing under
 ketamine anaesthesia, 274–275
 submental intubation, 279
 suggested items for difficult airway
 cart, 283
 tracheostomy, 282–283
 universal principles of airway
 management, 274
- retrograde fibreoptic intubation, 136
- retrograde intubation, 136–140
 complications, 140
 fibreoptic assisted, 139
 retrograde pull technique, 140
 technique, 139
 using guide wire through cricoid
 membrane, 280–281
- reverse transillumination, 277
- rheumatoid arthritis, 244
- rigid bronchoscopy and intubation
 with bougie/airway exchange
 catheter, 280
- rigid indirect laryngoscopy, 144–150
 advantages and disadvantages,
 148–149
 bladed indirect laryngoscopes,
 146–147
 choice of RIL device, 149
 comparison with direct
 laryngoscopy, 148
 comparison with flexible fibreoptic
 intubation, 148–149
 definition, 144
 evaluation of RIL devices, 149
 future of, 149
 indirect laryngoscopes with
 tube-guiding system, 147
 optical stylets, 146
 variety of devices and systems, 144
- rocuronium, 170–171, 265
- Royal College of Anaesthetists
 audit of serious airway problems, 51
 lost airway study, 178
- Sanders injector, 25–27
- sedation, 47
- sensitivity, definition, 56
- sevoflurane, 31, 224
- Siker laryngoscope, 144
- single use disposable equipment, 37–38
- single use flexible LMAs and LMs, 82
- single-use devices
 reuse of, 295
- sleep apnoea syndrome, 63
- sleep disorders, 63
- Smith Portex Fome-Cuf™ tube, 97
- Smith Portex soft seal cuff, 97
- sneezing reflex, 28
- soft palate, 2
- specificity, definition, 56–57
- spinal conditions, terminology and
 definitions, 250
- spinal cord injury (SCI), 252–254
 during anaesthesia, 246–249
- “squirt, puff, squirt” practice, 48
- stagnant $\dot{V}O_2$ deficits, 10–11
- stagnant hypoxia, 9, 10
- standard LMAs (single use and reusable), 82
- standards of care, legal and regulatory
 issues, 296–297
- Starling resistor, 22
- sterilisation, definition, 36
- Sterilox, 39
- sterno-mental distance, 60
- straight laryngoscope (paraglossal
 technique), 116–118
- streamlined liner of the pharynx
 airway (SLIPA™), 88
- Structured Oral Examination, sample
 questions and answers,
 299–311
- subglottic airway, 4–5
- subluxation of the jaw, mouth opening
 ability, 6
- submandibular intubation, 1
- submental intubation, 279
- succinylcholine, 170–171
 desaturation following use of, 15–16
- sugammadex, 45, 171, 265
- super-oxidized water (Sterilox), 39
- supraglottic airway devices (SADs),
 50, 76–89
 Airway Management Device
 (AMD™), 83
 classic Laryngeal Mask Airway
 (cLMA), 76, 77–81
 classification, 77
 Cobra Perilaryngeal Airway
 (CobraPLA™), 83
 Combitude, 88–89
 Easytube, 89
 efficacy in different situations, 76–77
 Fastrach™ (intubating LMA), 82
 fibreoptic-assisted intubation
 through SADs, 133–136
 first generation SADs, 77–83
 flexible (reinforced) LMA (fLMA), 81
 flexible LMAs and LMs
 (single use), 82
 Gastro-LT, 86
 history of development, 76
 i-gel™, 86–87
 intubating LMA (ILMA), 82
 intubation through, 141–143
 Laryngeal Tube (LT), 83
 laryngeal tube suction-mark II
 (LTS-II), 86
 LMA Supreme™, 87–88
 positioning, 76
 ProSeal LMA (PLMA), 84–86
 safety of different SADs, 76–77
 second generation SADs, 77, 84–89
 single use flexible LMAs and LMs, 82
 standard LMAs (single use and
 reusable), 82
 streamlined liner of the pharynx
 airway (SLIPA™), 88
- suxamethonium, 166, 265

Index

- Syndrome X, 64
 teeth, damage to, 1
 temporo-mandibular joint
 functional anatomy, 6
 thermal airway injury, 108
 thiopentone, 31, 170–171
 thoracic anaesthesia, 255–260
 bronchial blocker, 257–259
 combined tracheal tube and
 bronchial blocker, 255
 double-lumen tube (DLT),
 255–257, 258
 endobronchial tube, 255
 indications for lung separation, 255
 lung isolation and the difficult
 airway, 259–260
 selective lung ventilation, 255
 throat packs, 210
 thyro-mental distance, 60
 tongue, large or swollen, 1
 tonsils, 1
 trachea, functional anatomy, 5–6
 tracheal intubation
 alternative techniques, 138–143
 blind intubation techniques,
 138–143
 blind oral or nasal intubation,
 138–139
 Difficult Airway Society guidelines,
 110
 direct laryngoscopy, 110–119
 flexible fiberoptic intubation,
 121–136
 intubating laryngeal mask, 141–143
 intubation through a supraglottic
 airway, 141–143
 light-guided intubation, 140–141
 misplacement of tracheal tubes,
 151–157
 pharmacology for direct
 laryngoscopy, 111
 retrograde intubation, 136–140
 rigid indirect laryngoscopy, 144–150
 unanticipated difficulty, 110
 tracheal tube misplacement, 151–157
 corrective action in suspected
 bronchial intubation, 156
 corrective action in suspected
 oesophageal intubation, 155
 differentiating between tracheal and
 oesophageal intubation, 151–155
 distinguishing between tracheal and
 bronchial intubation, 155–156
 excluding bronchial intubation,
 155–156
 excluding misplacement in an
 exotic space, 156
 excluding oesophageal intubation,
 151–155
 reasons for confirming tracheal
 intubation, 151
 routine for confirmation of tracheal
 intubation, 157
 tests for confirmation in adverse
 circumstances, 157
 tracheal tubes, 91–101
 armoured tubes, 98–99
 connectors, 98
 cuffs, 95–98
 designs, 91–92
 history, 91
 key points, 102
 laser tubes, 99
 length, 94
 markings on the tube or packaging,
 92–93
 microlaryngoscopy tubes, 99
 Murphy eye, 92
 Murphy tubes, 92
 nomenclature, 92
 polar tubes, 98
 RAE tubes, 98
 reinforced tubes, 98–99
 sizing (internal diameter), 94
 special tubes, 98–101
 tubes for monitoring recurrent
 laryngeal nerve function, 99
 tubes for paediatric practice, 99–101
 variety of construction materials, 91
 variety of designs, 91
 ventilator-associated pneumonia, 96
 tracheostomy, 4–5
 ICU patient, 267–272
 maxillofacial surgery, 212
 maxillofacial trauma, 217
 resource constrained environments,
 282–283
 tracheostomy tubes, 101–102
 design, 101
 fenestrated tracheostomy tubes, 102
 laryngectomy (Montandon)
 tube, 102
 metal tracheostomy tubes, 101
 sizing, 101
 tracheostomy speaking valves, 102
 Trachlight, 140–141
 paediatric use, 199
 transmissible spongiform
 encephalopathies (TSE), 36
 Trendelenburg tilt, 2
 trisomy 21, 1
 Tristel, 39
 Trust Clinical Negligence Scheme, 38
 tumours of the upper airway,
 211–212, 236
 turbulent flow, 20–21
 ultrasound, difficult airway
 prediction, 60
 unilateral vocal cord paralysis, 105
 Univent tube, 257
 upper airway reflexes, factors affecting
 sensitivity, 29–30
 upper airway tumours, 211–212, 236
 upper lip bite test (ULBT), 59
 uvulopalatopharyngoplasty
 (UPPP), 69
 variant Creutzfeldt-Jacob disease
 (vCJD) transmission, 36
 VBM Quicktrach, 184
 vecuronium, 265
 ventilator-associated pneumonia,
 96, 101
 Venturi principle, 26
 video-laryngoscopes, 198
 vocal cords, unilateral vocal cord
 paralysis, 105
 vocal function, iatrogenic
 damage, 104
 Z-drugs, 65
 zaleplon, 65
 zolpidem, 65
 zopiclone, 65