

Index

- 10–20 international EEG electrode placement system 9–10, 40, 41
- acetylcholine
 - role in REM sleep 4
 - role in wakefulness 2
- actigraphy 29–30
- acute insomnia 35–6
- adenosine
 - role in NREM sleep 3
 - role in REM sleep 4
- adjustment insomnia 102
- adolescents, delayed sleep phase type 67
 - see also* childhood sleep disorders
- advanced sleep phase type (ASPT) 56, 57–9, 60, 67–9
 - behavioral treatment strategies 69
 - chronotherapy 69
 - clinical presentation 60, 67–8
 - diagnostic criteria 60, 67–8
 - epidemiology 68
 - genetic factors 68
 - in the elderly 233–7
 - light therapy 68–9
 - melatonin therapy 69
 - “morning” types (“larks”) 68
 - pathophysiology 68
 - treatment 68–9
- age and sleep stage distribution 16–18
 - adolescence 18
 - birth to one year 17
 - newborn 17
 - normal aging 18
 - one to three years 17
 - three to twelve years 17
- alcohol, self-medication for insomnia 105
- alcohol abuse, and sleep disturbance 180, 181–2
- adolescence, sleep stage distribution 18
 - see also* childhood sleep disorders
- alpha waves 15
- American Academy of Sleep Medicine (AASM) classification 129
- amphetamines, effects on wakefulness 2
- amyotrophic lateral sclerosis 164
- ankylosing spondylitis and sleep 200
- anorexia nervosa and sleep 180, 183
- antidepressant drugs, effects on sleep 173–4
- antipsychotic medication, effects on sleep 180–1
- anxiety disorders 175–8
 - clinical features 175–6
 - epidemiology 175–6
 - polysomnographic findings 176–8
 - sleep features 176–8
 - subjective complaints about sleep problems 176
- apnea, definition 129
- apnea/hypopnea index (AHI) 129
- articular diseases and sleep 199–201
- asthma and sleep 190–2
- auto-titrating positive airway pressure, OSA treatment 151–2
- automatic behavior *see* parasomnias; violent parasomnias
- back pain and sleep 198–9
- “BEARS” algorithm for screening 210, 211
- behavioral characteristics of sleep 1
- behavioral insomnia of childhood 103, 212–13
- behavioral treatment strategies
 - advanced sleep phase type 69
 - delayed sleep phase type 67

- behaviorally induced insufficient sleep syndrome 91–2
 - causes 91
 - differential diagnosis 92
 - symptoms 91
 - therapeutic options 92
- benzodiazepine receptor agonists (BZRAs) 104
- benzodiazepines
 - RLS treatment 126
 - worsening of OSA 27
- beta-blockers, effects on sleep 27
- beta waves 15
- bilevel, OSA treatment 149–51
- bipolar disorder *see* mood disorders
- blood pressure circadian rhythm 186, 187
- brain
 - structures involved in NREM sleep generation 2–3
 - structures involved in REM sleep generation 3–4
- brain lesions, and hypersomnia 92
- brainstem reticular formation, role in wakefulness 1–2
- bulimia nervosa and sleep 180, 183
- cabergoline 125
- caffeine
 - effects on NREM sleep 3
 - use in shift work sleep disorder 74
- CAP (cyclic alternating pattern) 13–14
- CAP rate 13–14
- CAP time 13–14
- cardiovascular disease and sleep 186–90
 - blood pressure circadian rhythm 186, 187
 - circadian rhythms of cardiovascular parameters 186, 187
 - congestive heart failure 188–9
 - myocardial infarction 186, 187
 - nocturnal angina 189
 - nocturnal arrhythmia and sudden death 189–90
 - obstructive sleep apnea (OSA) 187–8
 - sudden cardiac death 186, 187, 189–90
- cataplexy 32, 79–86
 - antcataplectic medication 85
 - see also* narcolepsy, with cataplexy
- catathrenia (nocturnal groaning) 54
- catecholamines, role in wakefulness 2
- central sleep apnea (CSA) 129–37
 - central hypopnea 129–30
 - characteristics 129–30
 - classification 132
 - definition 129–30
 - differential diagnosis 104
 - due to Cheyne–Stokes breathing 130, 132–5
 - following nasal CPAP titration 136
 - hypercapnic CSA 132, 136–7
 - idiopathic (primary) CSA 135, 136
 - nonhypercapnic CSA 132–6
 - pathophysiology 130–2
 - primary (idiopathic) CSA 135, 136
 - sleep onset or sleep transition CSA 136
- cerebral blood flow, changes during sleep 1
- childhood sleep
 - definition of “enough” sleep 208–9
 - healthy sleep habits 211–12
 - normal sleep in children 208–10
 - sleep architecture 210
 - sleep duration at different ages 208–9
- childhood sleep disorders 27
 - “BEARS” algorithm for screening 210, 211
- behavioral insomnia of childhood
 - 103, 212–13
- circadian rhythm disorders 217–18
- common sleep disorders 212–22
- delayed sleep phase type (DSPT) 67, 217–18
- disturbances which can present as insomnia 214
- excessive somnolence disorders 215–17
- healthy sleep habits 211–12
- ICSD-2 classification 212
- insomnia 212–14
- medications for insomnia 214
- narcolepsy 215–17
- nightmares 220
- nighttime fears 214
- NREM parasomnias 218–20
- obstructive sleep apnea (OSA) 214–15
- parasomnias 218–20
- prevalence 208, 209
- restless legs syndrome (RLS) 220–1
- screening for 210, 211

258 Index

- childhood sleep disorders (cont.)
 - sleep architecture and clinical sleep disorders 210
 - sleep-disordered breathing 214–15
 - sleep-related movement disorders 220–2
 - sleep-related rhythmic movement disorder (RMD) 221–2
- cholinergic neurons, role in wakefulness 2
- chronic insomnia 35–6
- chronic obstructive pulmonary disease (COPD) and sleep 192–4, 195
- chronic pain and sleep 197
- chronic paroxysmal hemicrania 166
- chronopharmacology 202
- chronotherapy 202
 - advanced sleep phase type 69
 - delayed sleep phase type 67
- circadian rhythm sleep disorders
 - advanced sleep phase type (ASPT) 56, 57–9, 60, 67–9
 - characteristics 56
 - definition 56
 - delayed sleep phase type (DSPT) 56, 57–9, 60, 63, 64–7
 - genetic factors 27
 - in childhood 217–18
 - irregular sleep/wake rhythm 56, 57–9, 60, 71–2
 - jet lag disorder 56, 57–9, 60, 75–6
 - non-24-hour sleep/wake syndrome 56, 57–9, 60, 69–71
 - shift work sleep disorder 56, 57–9, 60, 72–4
 - types of disorder 56, 57–9, 60
- circadian rhythm sleep disorders in the elderly 233–7
 - clinical presentation 233–6
 - delayed and advanced sleep phases 233–6
 - diagnosis 236
 - treatment 236–7
- circadian rhythms
 - and core body temperature 63
 - and dim light melatonin onset (DLMO) 63
 - assessment of circadian timing 63
 - cardiovascular parameters 186, 187
 - definition 56
 - effects of physical activity 61
 - light as a zeitgeber 61, 62
 - melatonin as a zeitgeber 61
 - period of human circadian rhythms 56–61
 - phase response curve for light 61, 62
 - properties 56–61
 - response to the light/dark cycle 60–1, 62
 - role of the suprachiasmatic nucleus (SCN) 56–61
 - zeitgebers (temporal cues) 60–1, 62
- classification of normal sleep states 9
- clomipramine 85
- clonazepam 105, 126
- cluster headaches 165
- cognitive therapy, insomnia treatment 108–9
- comorbid diseases 25
 - and sleep disturbance 27
 - optimization of treatment 109
- comorbid insomnia 35–6, 102
- compelling hypnagogic hallucinations 247
- computer-based EEG analysis *see* EEG analysis, computer-based
- confusional arousals 48–50
- congestive heart failure, and sleep 188–9
- connective tissue diseases and sleep 199–201
- continuous positive airway pressure (CPAP) therapy
 - CSA treatment 133–5
 - OSA treatment 148–50
- core body temperature, and circadian rhythms 63
- corticosteroids, and sleep onset difficulty 27
- CSF hypocretin-1 levels 79
- cyclic alternating pattern (CAP) 13–14
- daytime sleepiness, side effects of
 - medications 27 *see also* excessive daytime sleepiness (EDS)
- delayed sleep phase type (DSPT) 56, 57–9, 60, 63, 64–7
 - adolescents 67
 - behavioral treatment strategies 67
 - children 67
 - chronotherapy 67
 - clinical presentation 60, 64
 - diagnostic criteria 60, 64
 - epidemiology 64
 - “evening” types (“night owls”) 64
 - genetic factors 65

- in childhood 217–18
- in the elderly 233–7
- light therapy 63, 65–6
- melatonin therapy 66
- pathophysiology 64–5
- treatment 65–7
- delta waves 15, 16
- dementia and sleep disturbances 181, 237–9
 - clinical presentation 237
 - diagnosis 237–8
 - sundowning concept 237
 - treatment 238–9
- dementia risk, and RBD 25
- depression, and sleep disturbance 27
 - see also* mood disorders
- diabetes mellitus, and sleep disturbance 27
- dialysis, and sleep disorders 195–7
- diaphragmatic breathing, insomnia
 - treatment 108
- difficulties maintaining sleep, evaluation
 - 37–9
- dihydroergocryptine 125
- dim light melatonin onset (DLMO), and
 - circadian rhythms 63
- disorders of arousal 47–50, 242–7
 - and human violence 246–7
 - central pattern generators 243–4
 - common features 47–8
 - comorbidities 48
 - confusional arousals 48–50
 - effects of sleep deprivation 245
 - lesion/stimulation studies 244
 - locomotor centers 243–4
 - pathophysiology 243–6
 - pharmacologic effects 245
 - sleep *drunkenness* (sleep *inertia*) 245
 - sleep terrors 50
 - sleepwalking 48–50
 - SRED 47, 49, 50
 - state dissociation 244–5
 - treatment 246
- dissociative disorders 50–1
- dissociative fuges 50–1
- dopamine, role in wakefulness 2
- drug side effects, RLS 117
- drug use
 - and sleep problems 27
- cause of insomnia 103
 - sleep disturbance evaluation 27
- Duchenne muscular dystrophy 164
- duration of sleep
 - effects on sleep stages 18–19
 - factors affecting 18–19
 - genetic effects 18–19
 - natural long and short sleepers 18–19
- eating disorders and sleep disturbance
 - 180, 183
- EEG (electroencephalogram) 1
- EEG analysis
 - conventional scoring 10–13
 - scoring of sleep microstructure 13–14
- EEG analysis, computer-based 14–16
 - alpha waves 15
 - beta waves 15
 - combination of features 16
 - delta waves 15, 16
 - development of new criteria 16
 - K complexes 15
 - limitations of conventional staging 16
 - period analysis 16
 - sigma activity 15–16
 - signal preprocessing 15–16
 - sleep spindles 15, 16
 - slow-wave activity (sleep intensity) 15–16
 - spectral analysis 15–16
 - theta waves 15
 - transformation into wavelets 16
 - use of fast Fourier transform algorithms (FFT) 15–16
 - vertex sharp waves 15
- EEG electrode placement 9–10, 40, 41
- EEG patterns
 - active wakefulness 11
 - calm wakefulness 11
 - cyclic alternating pattern (CAP) 13–14
 - K complexes 11
 - movement time 11
 - NREM sleep stages 2–3, 11
 - phasic events 11
 - REM sleep 3, 4, 11
 - saw-tooth waves 11
 - sleep cycles 11–13
 - sleep spindles 11

260 Index

- EEG patterns (cont.)
 - slow-wave activity as sleep intensity indicator 15
 - transient phenomena (phasic events) 13–14
 - use in classification of sleep stages 9
 - see also* polysomnography
- elderly people
 - changes in sleep architecture 225
 - EEG readings 225
 - electrophysiological features 225
 - impact of aging on sleep 224–5
 - physiological changes affecting sleep 225
 - subjective sleep perception 224–5
- elderly people and sleep disorders
 - circadian rhythm sleep disorders 233–7
 - insomnia 226–8, 229
 - obstructive sleep apnea (OSA) 230–2
 - periodic limb movement disorder (PLMD) 232–3
 - primary disorders affecting sleep 226–37
 - restless legs syndrome (RLS) 232–3, 234–5
 - sleep-disordered breathing 230–2
 - sleep disturbance in dementia 237–9
- electromyogram *see* EMG
- electrooculogram *see* EOG
- EMG (electromyogram) 1
 - use in classification of sleep stages 9
 - use in polysomnography 9–10
- end-stage renal disease (ESRD)
 - and RLS 117
 - and sleep 195–7
- endocrine system, effects of sleep
 - disturbance 201, 203–4
- endocrinological disorders, and
 - hypersomnia 93
- enuresis 27, 54
- EOG (electrooculogram) 1
 - use in classification of sleep stages 9
 - use in polysomnography 9–10
- epilepsy and sleep 167–9
 - effects of sleep deprivation 25
 - effects on sleep architecture 167
 - epileptic seizures during sleep 167
 - periodic limb movements during sleep (PLMS) 168–9
 - REM sleep behavior disorder (RBD) 52–3
 - sleep apnea and epileptic seizures 158, 168
 - sleep disturbance 27
- Epworth Sleepiness Scale (ESS) 32–3, 36, 78–9
- ergot-dopamine agonists, RLS treatment 125
- eszopiclone 104, 105
- “evening” type sleep pattern 64
- excessive daytime sleepiness (EDS) 78
 - assessment 30–5
 - cataplexy with narcolepsy 32
 - characteristics 30
 - distinction from fatigue 30, 33, 34, 35
 - Epworth Sleepiness Scale (ESS) 32–3
 - Fatigue Severity Scale (FSS) 34, 35
 - hypersomnia algorithm 30, 31
 - hypnagogic hallucinations 32
 - multiple sleep latency test (MSLT) 33–4, 35
 - narcolepsy 30, 31, 32
 - nocturnal polysomnogram 33, 34–5
 - OSA 32
 - range of possible causes 30
 - RLS diagnostic criteria 32
 - sleep paralysis 32
 - snoring 32
 - Stanford Sleepiness Scale (SSS) 33–4
- excessive somnolence disorders
 - behaviorally induced insufficient sleep syndrome 91–2
 - CSF hypocretin-1 levels 79
 - definition 78
 - diagnostic methods 78, 79
 - due to adverse effects of medication 93
 - due to medical conditions 92–4
 - due to substance abuse 93
 - due to underlying psychiatric disorder 93
- excessive daytime sleepiness (EDS) 78
- ICSD-2 classification 78, 79
- idiopathic hypersomnia 78, 86–8
- in childhood 215–17
- Kleine–Levin syndrome 88–91
- menstrual-related hypersomnia 88–91
- narcolepsy 78, 79–86
 - recurrent hypersomnia 88–91
 - sleep-onset REM periods (SOREMP) 79
 - types of disorder 78, 79
- expert witness guidelines 250
- extreme environments, effect on sleep
 - stage distribution 21–2

- familial advanced sleep phase syndrome 27
- family history of sleep disorders 27
- fast Fourier transform algorithms (FFT) 15–16
- fatal familial insomnia (FFI) 52–3
- fatigue, side effects of medications 27
- Fatigue Severity Scale (FSS) 34, 35, 36
- fibromyalgia syndrome (FMS) and sleep 27, 198, 199
- flurazepam 104
- forensic sleep medicine *see* violent parasomnias
- Friedman palate position score 27
-
- gabapentin 126
- gamma-aminobutyric acid (GABA), role in NREM sleep synchrony 3
- gastroesophageal reflux and sleep 194–5
- generalized anxiety disorder *see* anxiety disorders
- genetic disorders, and hypersomnia 93
- genetic factors in sleep disorders 27
 - advanced sleep phase type (ASPT) 68
 - delayed sleep phase type (DSPT) 65
 - narcolepsy 81
- genetic influences on sleep duration 18–19
- glutamate 2
-
- head trauma, and hypersomnia 92
- headache and sleep 165–6
 - chronic paroxysmal hemicrania 166
 - cluster headaches 165
 - headache as cause of sleep disorders 166
 - headache as consequence of sleep disorders 165
 - hypnic headache syndrome 166
 - migraine and sleep 165–6
- high altitude, effects on sleep stage distribution 21
- histamine 2
- hypercapnic CSA 132, 136–7
- hypersomnia algorithm 30, 31
- hypersomnias *see* excessive somnolence disorders
- hypertension
 - OSA 25
 - sleep disturbance 27
- hypnagogic hallucinations 32, 79–86, 247
- hypnic headache syndrome 166
-
- hypnopompic hallucinations 32, 79–86
- hypnotic drug abuse and sleep disturbance 182
- hypocretinergic hypothalamic system 2
- hypopnea, definition 129
- hypothalamus, role in wakefulness 2
-
- ICSD-2 classification
 - advanced sleep phase type 60, 67–8
 - childhood sleep disorders 212
 - delayed sleep phase type 60, 64
 - hypersomnias of central origin 78, 79
 - idiopathic hypersomnia 86–7
 - irregular sleep/wake rhythm 60, 71
 - jet lag disorder 60, 75
 - narcolepsy 81
 - non-24-hour sleep/wake syndrome 60, 69, 70
 - parasomnias 47
 - shift work sleep disorder 60, 72–3
 - sleep disorders with EDS 78, 79
- ICSD-2 insomnia diagnoses 102–3
 - adjustment insomnia 102
 - behavioral insomnia of childhood 103
 - idiopathic insomnia 103
 - inadequate sleep hygiene 103
 - insomnia due to a drug or substance 103
 - insomnia due to a medical condition 103
 - insomnia due to mental disorder 103
 - paradoxical insomnia 103
 - psychophysiological insomnia 102–3
- idiopathic (primary) CSA 135, 136
- idiopathic hypersomnia 86–8
 - classification 86–7
 - diagnosis 78, 87
 - differential diagnosis 87–8
 - ICSD-2 classification 86–7
 - pathophysiology 87
 - symptoms 86–7
 - therapy 88
- idiopathic insomnia 103
- immune system, effects of sleep disturbance 201–2, 203–4
- infectious disease and sleep 201–2, 203–4
- insomnia
 - acute and chronic types 35–6
 - and sleep habits 36

262 Index

- insomnia (cont.)
 - definition 35–6
 - evaluation tools 36
 - in childhood 212–14
 - pathophysiology 97–8
 - predisposing–precipitating–perpetuating model 36, 97–8
 - prevalence 97
 - primary and comorbid types 35–6
 - types of problems associated with 35–6
- insomnia diagnosis
 - comorbid insomnia 102
 - CSA differential diagnosis 104
 - differential diagnosis 104
 - ICSD-2 criteria 102–3
 - measurement of sleep 101–2
 - OSA differential diagnosis 104
 - physical examination 101
 - PLMD differential diagnosis 104
 - primary insomnia 102
 - RLS differential diagnosis 104
 - secondary insomnia *see* comorbid insomnia
 - sleep history 98, 99–100, 101
- insomnia evaluation 35–6, 37
- insomnia in the elderly 226–8, 229
 - clinical presentation 226
 - diagnosis 226–7
 - treatment 227–8, 229
- insomnia model 36
- insomnia treatments (nonpharmacologic) 105
 - cognitive therapy 108–9
 - diaphragmatic breathing 108
 - mental imagery 108
 - optimization of treatment for comorbid illnesses 109
 - paradoxical intention 108
 - progressive muscle relaxation 108
 - sleep hygiene 107–8
 - sleep restriction 106–7
 - stimulus control 106
- insomnia treatments (pharmacologic) 104–5
 - alcohol (self-medication) 105
 - benzodiazepine receptor agonists (BZRAs) 104
 - clonazepam 105
 - eszopiclone 104, 105
 - flurazepam 104
 - half-life of the medication 105
 - melatonin 104
 - OTC sleep aids 104, 105
 - ramelteon 104
 - temazepam 104
 - trazodone 105
 - triazolam 104
 - zaleplon 104
 - zolpidem 104
- insulin resistance
 - and OSA 25
 - and sleep 201, 203–4
- International Classification of Sleep Disorders, 2nd edition (ICSD-2) 25–6
- International RLS Score (IRLS) 118, 120
- iron deficiency and RLS 117
- irregular sleep/wake rhythm 56, 57–9, 60, 71–2
 - clinical features 60, 71
 - diagnostic criteria 60, 71
 - epidemiology 71
 - light therapy 72
 - melatonin therapy 72
 - pathophysiology 71–2
 - treatment 72
- jet lag disorder 56, 57–9, 60, 75–6
 - clinical presentation 60, 75
 - diagnostic criteria 60, 75
 - epidemiology 75
 - light therapy 75–6
 - melatonin therapy 76
 - pathophysiology 75
 - treatment 75–6
- K complexes 11, 15
- Kleine–Levin syndrome 88–91
- “lark” sleep pattern 68
- levodopa 2, 123
- light
 - as a zeitgeber 61, 62
 - phase response curve 61, 62
- light/dark cycle, response to 60–1, 62
- light therapy
 - advanced sleep phase type 68–9
 - delayed sleep phase type 63, 65–6
 - irregular sleep/wake rhythm 72

- jet lag disorder 75–6
- non-24-hour sleep/wake syndrome 70
- shift work sleep disorder 74
- limit-setting sleep disorder *see* behavioral insomnia of childhood
- lisuride 125
- maintenance of wakefulness test (MWT) 39, 42
 - indications for use 42
 - use in excessive somnolence disorders 78–9
- Mallampati classification, risk for OSA 27–8
- mania *see* mood disorders
- mazindol 84–5
- medical conditions
 - and sleep 201–2, 203–4
 - indications for polysomnography 202, 207
 - insomnia caused by 103
 - assessment of sleep disturbance 202, 207
- medical conditions causing hypersomnia 92–4
 - brain lesions 92
 - endocrinological disorders 93
 - genetic disorders 93
 - head trauma 92
 - metabolic conditions 93
 - Parkinson's disease 92
 - therapeutic options 94
 - toxic conditions 93
- medications
 - chronopharmacology 202
 - daytime sleepiness and fatigue 27
 - effects on sleep 27, 202, 205–6
 - hypersomnia side effect 93
 - RLS side effect 117
- medicolegal evaluation of violent
 - parasomnias 249–51
 - automatisms and the law 249
 - clinical and laboratory evaluation 250–1
 - expert witness guidelines 250
 - role of alcohol or drugs 248
 - role of the sleep medicine specialist 250
- melatonin as a zeitgeber 61
- melatonin therapy 104
 - advanced sleep phase type 69
 - delayed sleep phase type 66
 - irregular sleep/wake rhythm 72
 - jet lag disorder 76
 - non-24-hour sleep/wake syndrome 71
 - shift work sleep disorder 74
- menstrual-related hypersomnia 88–91
- mental disorders, insomnia caused by 103
 - see also* psychiatric disorders
- mental imagery, insomnia treatment 108
- metabolic conditions, and hypersomnia 93
- methadone 125–6
- methylphenidate 83, 85
- migraine and sleep 165–6
- mixed apneas 129, 131
- modafinil 74, 83, 84, 85
- mood disorders 170–5
 - clinical features 170–1
 - diagnosis 170–1
 - effects of antidepressant drugs on sleep 173–4
 - epidemiology 170–1
 - polysomnographic findings 172–3
 - sleep features 171–5
 - subjective complaints about sleep problems 171–2
 - therapeutic use of sleep deprivation 174–5
- “morning” type sleep pattern 68
- movement time, in PSG recording 11
- multiple personality disorder 50–1
- multiple sclerosis and sleep 166–7
 - daytime fatigue 166–7
 - sleep disorders 167
- multiple sleep latency test (MSLT)
 - 33–4, 35, 39, 42
 - indications for use 42
 - use in excessive somnolence disorders 78
- Munchausen syndrome by proxy 248
- muscle atonia in REM sleep 3, 4
- MWT *see* maintenance of wakefulness test
- myasthenia gravis 165
- myocardial infarction and sleep 25, 186, 187
- myotonic dystrophy 164–5
- narcolepsy 79–86
 - age of onset 81
 - comorbidities 80–1
 - CSF hypocretin levels 81
 - diagnosis 78, 81, 84
 - differential diagnosis 82, 83
 - EDS 30, 31, 32, 79–86

264 Index

- narcolepsy (cont.)
 - frequent patient complaints 79–81
 - genetic factors 27, 81
 - hypnagogic/hypnopompic hallucinations 79–86
 - ICSD-2 categories 81
 - in childhood 215–17
 - loss of hypocretin neurons 81
 - physical consequences 80–1
 - possible autoimmune cause 81
 - psychosocial consequences 81
 - sleep paralysis 79–86
 - symptomatic 81
 - symptoms 79–86
 - with cataplexy 27, 79–86
 - without cataplexy 81
- narcolepsy treatment options 82–5
 - antcataplectic medication 85
 - behavioral coping strategies 82
 - clomipramine 85
 - drug therapies 82–5
 - mazindol 84–5
 - methamphetamine 83, 85
 - modafinil 83, 84, 85
 - phenelzine 85
 - selective serotonin reuptake inhibitors 85
 - selegiline 85
 - sodium oxybate (gamma-hydroxybutyrate) 83–4, 85
 - stimulants 83
 - treatment adherence issues 85–6
- neurodegenerative disorder risk, and RBD 25
- neurological disease risk and sleep disorders 25
- neurological disorders and RLS 117
- neurological examinations 28
- neuromuscular diseases and sleep 163–5
 - amyotrophic lateral sclerosis 164
 - breathing physiology during NREM sleep 163
 - breathing physiology during REM sleep 163
 - Duchenne muscular dystrophy 164
 - myasthenia gravis 165
 - myotonic dystrophy 164–5
 - prevalence of breathing abnormalities 163
 - sleep architecture 163–4
 - treatment of sleep-disordered breathing 165
- neurophysiological characteristics of sleep 1
- “night owl” sleep pattern 64
- nightmares 50–1, 220
- nighttime fears in children 214
- nocturnal angina 189
- nocturnal arrhythmia and sudden death 189–90
- nocturnal polysomnogram, EDS
 - assessment, 33, 34–5
- nocturnal seizures and violence 247
- non-24-hour sleep/wake syndrome 56, 57–9, 60, 69–71
 - clinical presentation 60, 69, 70
 - diagnostic criteria 60, 69, 70
 - epidemiology 69–70
 - light therapy 70
 - melatonin therapy 71
 - pathophysiology 70
 - treatment 70–1
- non-CAP condition 13–14
- non-ergot dopamine agonists, RLS
 - treatment 124–5
- non-rapid eye movement sleep *see* NREM (non-rapid eye movement) sleep
- nonarticular musculoskeletal pain and sleep 198–9
 - back pain 198–9
 - fibromyalgia syndrome (FMS) 198, 199
- nonhypercapnic CSA 132–6
- norepinephrine
 - role in REM sleep 4
 - role in wakefulness 2
- normal sleep states
 - classification 9
 - early research 9
 - factors affecting sleep stage distribution 16–22
 - polysomnography 9–16
- NREM (non-rapid eye movement)
 - parasomnias, in childhood 218–20
- NREM (non-rapid eye movement) sleep 1
 - brain structures involved in generation 2–3
 - EEG patterns 2–3
 - effects of caffeine 3
 - in sleep cycles 11–13
 - K complexes 11

- role of adenosine 3
- role of GABA 3
- role of serotonin 3
- sleep spindles 11
- NREM sleep stages, EEG patterns 11
- obesity, and sleep disturbance 25, 27
- obsessive–compulsive disorder
 - see* anxiety disorders
- obstructive apnea
 - definition 129
 - mixed apneas 129, 131
 - with abdominal paradox 129, 130
- obstructive sleep apnea (OSA) 137–53
 - and cardiovascular disease 187–8
 - and EDS 32
 - and RBD 52–3
 - characteristics 137–8
 - differential diagnosis 104
 - genetic factors 27
 - health risks 25
 - in childhood 214–15
 - in postmenopausal women 26–7
 - pathophysiology and pathogenesis 138–42
 - prevalence 137–8
 - risk factors 138–42
 - worsening by medications 27
- obstructive sleep apnea (OSA) in the elderly 230–2
 - clinical presentation 230
 - diagnosis 230–1
 - treatment 231–2
- obstructive sleep apnea (OSA) morbidity
 - cardiac arrhythmias 144
 - cardiac ischemia 144–5
 - cardiovascular system 142–6
 - heart failure 143
 - hypertension 142–3
 - metabolic syndrome 146
 - pulmonary hypertension 143–4
 - stroke 145
- obstructive sleep apnea (OSA) risk
 - Mallampati score 27–8
 - phenotypic risk factors 27–8
- obstructive sleep apnea (OSA) treatment
 - 146–53
 - auto-titrating positive airway pressure 151–2
 - bariatric surgery 146–7
 - behavioral modifications 147
 - bilevel 149–51
 - CPAP therapy 148–50
 - oral appliances 148
 - pharmacologic approaches 148
 - positional therapy 147
 - positive airway pressure therapy 148–52
 - surgical approaches 152–3
 - weight loss 146
- opiates, RLS treatment 125–6
- opioids, worsening of OSA 27
- osteoarthritis and sleep 199–200
- OTC sleep aids 104, 105
- oxycodone 125–6
- pain and sleep
 - ankylosing spondylitis 200
 - articular, rheumatological, and connective tissue diseases 199–201
 - back pain 198–9
 - chronic pain 197
 - fibromyalgia syndrome (FMS) 198, 199
 - nonarticular musculoskeletal pain 198–9
 - osteoarthritis 199–200
 - rheumatoid arthritis 200–1
 - rheumatological disorders 197
- panic attacks, nocturnal 50–1
- panic disorder *see* anxiety disorders
- paradoxical insomnia 103
- paradoxical intention, insomnia treatment 108
- parasomnia overlap disorder (POD)
 - and RBD 52–3
- parasomnias
 - catathrenia (nocturnal groaning) 54
 - characteristics 47
 - confusional arousals 48–50
 - definition 47
 - disorders of arousal 47–50
 - enuresis 54
 - ICSD-2 criteria 47
 - in childhood 218–20
 - nightmares 50–1
 - REM behavior disorder (RBD) 51–3
 - REM sleep parasomnias 50–4
 - sleep paralysis 53–4
 - sleep terrors 50

266 Index

- parasomnias (cont.)
 - sleepwalking 48–50
 - SRED 47, 49, 50
 - see also* violent parasomnias
- Parkinson's disease and sleep 157–9
 - hypersomnia 92
 - periodic leg movement disorder (PLMS) 158
 - prevalence of sleep disorders 157
 - REM sleep behavior disorder (RBD)
 - 158–9, 160, 162
 - restless legs syndrome (RLS) 158
 - sleep-disordered breathing 157–8
- Parkinson's disease risk, and RBD 25
- parkinsonism evaluation 28
- patient complaints, sleep disturbance
 - evaluation 25
- pergolide 125
- period analysis (EEG analysis) 16
- periodic limb movement disorder (PLMD)
 - 113–14, 115, 158
 - diagnosis 35
 - differential diagnosis 104
- periodic limb movement disorder (PLMD)
 - in the elderly 232–3, 234–5
 - clinical presentation 232
 - diagnosis 233
 - treatment 233, 234–5
- periodic limb movements 114
 - effects of SSRIs 27
- epilepsy 168–9
- personality disorders and sleep
 - disturbances 183–4
- phasic events, REM sleep 11
- phenelzine 85
- phenotypic risk factors for sleep
 - disorders 27–8
- phototherapy *see* light therapy
- physical activity, effects on circadian
 - rhythms 61
- physical examination, sleep disturbance
 - evaluation 27–8
- polar regions, effects on sleep stage
 - distribution 21
- polysomnography (PSG) 9–16, 39–41
 - 10–20 international EEG electrode
 - placement system 9–10, 40, 41
 - active wakefulness 11
 - analysis (automatic) 14–16
 - analysis (conventional) 10–14
 - calm wakefulness 11
 - computer-based analysis 14–16
 - cyclic alternating pattern (CAP) 13–14
 - definition 9
 - definition of sleep architecture terms 41
 - EEG 9–10
 - EMG 9–10
 - EOG 9–10
 - indications for use in medical
 - disorders 202, 207
 - K complexes 11
 - movement time 11
 - NREM sleep stages 11
 - phasic events 11
 - REM sleep 11
 - sampling frequency 10
 - saw-tooth waves 11
 - scoring of sleep microstructure 13–14
 - scoring of sleep states and stages 10–13
 - signal recording and amplification 10
 - sleep cycles 11–13
 - sleep macrostructure 10–13
 - sleep microstructure 13–14
 - sleep spindles 11
 - spectral analysis 10
 - transient EEG phenomena (phasic
 - events) 13–14
- ponto-geniculo-occipital (PGO) phasic
 - spikes in REM sleep 3, 4
- positive airway pressure therapy
 - CSA treatment 133–5
 - OSA treatment 148–52
- postmenopausal women, sleep
 - disturbance 26–7
- posttraumatic stress disorder (PTSD) 50–1, 248
 - see also* anxiety disorders
- pramipexole 124–5
- predisposing–precipitating–perpetuating
 - model of insomnia 36, 97–8
- pregnancy
 - prevalence of RLS 26
 - RLS diagnosis 117
 - sleep disturbance during 26
- primary (idiopathic) CSA 135, 136
- primary insomnia 35–6, 102

- prion disorders 52–3
- progressive muscle relaxation, insomnia treatment 108
- propoxyphene 125–6
- psychiatric disorders
 - and hypersomnia 93
 - as cause of sleep disturbances 170 *see also* mental disorders *and specific disorders*
- psychogenic dissociative states 248
- psychophysiological insomnia 102–3
- ramelteon 104
- rapid eye movement sleep *see* REM (rapid eye movement) sleep
- RBD *see* REM sleep behavior disorder
- reciprocal interaction model of REM sleep 4
- recurrent hypersomnia 88–91
 - diagnosis 90, 91
 - etiology 89–90
 - ICSD-2 classification 88
 - symptoms 88–9
 - therapeutic options 91
- REM (rapid eye movement) sleep 1
 - brain structures involved in generation 3–4
 - characteristics 3
 - EEG patterns 3, 4, 11
 - effects of sleep deprivation 20–1
 - in sleep cycles 11–13
 - muscle atonia 3, 4
 - phasic events 11
 - ponto-geniculo-occipital (PGO) phasic spikes 3, 4
 - reciprocal interaction model 4
 - REM ‘sleep-on’ and ‘sleep-off’ cells 4
 - role of acetylcholine 4
 - role of adenosine 4
 - role of norepinephrine 4
 - role of serotonin 4
 - saw-tooth waves 11
- REM sleep behavior disorder (RBD) 51–3
 - and PD 158–9, 160, 162
 - and violence 247
 - evaluation 28
 - health risks 25
- REM sleep parasomnias 50–4
- research, early work on sleep states 9
- respiratory disease and sleep 168, 190–4, 203–4
 - asthma 190–2
 - chronic obstructive pulmonary disease (COPD) 192–4, 203–4
- respiratory disturbance index (RDI) 129
- respiratory effort related arousals (RERAs) 129, 131
- restless legs syndrome *see* RLS (restless legs syndrome)
- reticular formation of the brainstem, role in wakefulness 1–2
- rheumatoid arthritis and sleep 200–1
- rheumatological diseases and sleep 197, 199–201
- RLS (restless legs syndrome)
 - and PD 158
 - effects of SSRIs 27
 - genetic factors 27
 - in childhood 220–1
 - prevalence in pregnancy 26
- RLS clinical features 113–16
 - clinical presentation 113
 - epidemiology 114–15
 - pathophysiology 115–16
- periodic limb movement disorder (PLMD) 113–14, 115
- periodic limb movements 114
- RLS diagnosis 116–21
 - actigraphy 121
 - associated features of RLS 116
 - association with neurological disorders 117
 - clinical interview 118, 119, 120
 - clinical neurophysiologic examination 118
 - diagnostic criteria 32
 - effects of drugs and medications 117
 - effects of iron deficiency 117
 - end-stage renal disease and uremia 117
 - essential criteria 116
 - forms of RLS 116–17
 - idiopathic (primary) RLS 117
 - in pregnancy 117
 - International RLS Score (IRLS) 118, 120
 - laboratory tests 118
 - movement recordings 121
 - neurological examination 118
 - polysomnography 118–21

268 Index

- RLS diagnosis (cont.)
 - primary (idiopathic) RLS 117
 - RLS Diagnostic Index (RLS-DI) 118, 119
 - secondary RLS 117
 - suggested immobilisation test (SIT) 121
 - supportive clinical features 116
- RLS Diagnostic Index (RLS-DI) 118, 119
- RLS differential diagnosis 104, 121–2
- RLS evaluation 28
- RLS in the elderly 232–3, 234–5
 - clinical presentation 232
 - diagnosis 233
 - treatment 233, 234–5
- RLS treatment 122–7
 - augmentation 123, 126–7
 - benzodiazepines 126
 - cabergoline 125
 - clonazepam 126
 - dihydroergocryptine 125
 - ergot-dopamine agonists 125
 - gabapentin 126
 - levodopa 123
 - lisuride 125
 - methadone 125–6
 - non-ergot dopamine agonists 124–5
 - opiates 125–6
 - oxycodone 125–6
 - pergolide 125
 - pharmacological treatments 122, 123–6
 - pramipexole 124–5
 - propoxyphene 125–6
 - ropinirole 124–5
 - rotigotine 125
 - tramadolol 125–6
 - treatment/management 122, 123, 124
- ropinirole 124–5
- rotigotine 125
- Sahel region, effects on sleep stage
 - distribution 21
- saw-tooth waves, REM sleep 11
- schizophrenia 178–81
 - classification of subtypes 178, 179
 - clinical features 178
 - DSM-IV diagnostic criteria 178, 179
 - epidemiology 178
 - polysomnographic findings 179–80
 - sleep effects of antipsychotic medication 180–1
 - sleep features 178–81
 - sleep problems and stage of disorder 178–9
 - subjective complaints about sleep disturbance 178–9
- scoring of sleep microstructure 13–14
- scoring of sleep stages
 - computer-based developments 16
 - development of new criteria 16
- scoring of sleep states and stages 9, 10–13
- secondary insomnia *see* comorbid insomnia
- selective serotonin reuptake inhibitors (SSRIs)
 - effects on PLMs and RLS 27
 - narcolepsy treatment 85
- selegiline 85
- serotonin
 - role in NREM sleep 3
 - role in REM sleep 4
- shift work sleep disorder 56, 57–9, 60, 72–4
 - caffeine 74
 - clinical presentation 60, 72–3
 - diagnostic criteria 60, 72–3
 - epidemiology 73
 - light therapy 74
 - melatonin therapy 74
 - modafinil 74
 - pathophysiology 73
 - treatment 73–4
- sigma activity 15–16
- sleep
 - as an active state 1
 - behavioral characteristics 1
 - changes in cerebral blood flow 1
 - characteristics 1
 - distinction from wakefulness 1
 - neurophysiological characteristics 1
- sleep apnea
 - see* central sleep apnea (CSA); obstructive sleep apnea (OSA)
- sleep architecture
 - childhood sleep 210
 - definition of terms 41
- sleep cycles 11–13
- sleep deprivation
 - and epileptic seizure risk 25
 - effects on sleep stage distribution 20–1

- health risks 25
- therapeutic use in depression 174–5
- sleep-disordered breathing 129, 214–15
- sleep-disordered breathing in the
 - elderly 230–2
 - clinical presentation 230
 - diagnosis 230–1
 - treatment 231–2
- sleep disorders
 - ICSD-2 descriptions 25–6
 - range of 25
 - relation to comorbid diseases 25
- sleep disturbance, health risks 25
- sleep disturbance evaluation 25–8
 - childhood sleep problems 27
 - chronic comorbid diseases 27
 - drug use 27
 - during pregnancy 26
 - effects of medications 27
 - family history 27
 - Friedman palate position score 27
 - genetic factors 27
 - in women 26–7
 - Mallampati score 27–8
 - neurological examinations 28
 - parkinsonism evaluation 28
 - patient complaints 25
 - phenotypic risk factors 27–8
 - physical examination 27–8
 - postmenopausal women 26–7
 - RBD evaluation 28
 - RLS evaluation 28
 - sleep history 25–6
 - social history 27
 - systematic approach 25
- sleep drunkenness 245 *see also* idiopathic hypersomnia
- sleep habits, and insomnia 36
- sleep habits assessment 29–30
 - actigraphy 29–30
 - sleep log 29, 30, 36
- sleep history 25–6
 - for insomnia diagnosis 98, 99–100, 101
- sleep hygiene
 - inadequate 103
 - insomnia treatments 107–8
- sleep hypnogram 42, 43
- sleep inertia 245
- sleep intensity, EEG slow-wave activity 15
- sleep log 29, 30, 36
- sleep loss, effects on sleep stage
 - distribution 20–1
- sleep macrostructure 10–13
- sleep medicine specialist, expert witness
 - guidelines 250
- sleep microstructure 13–14
- sleep-onset association disorder *see* behavioral insomnia of childhood
- sleep-onset difficulty, effects of
 - corticosteroids 27
- sleep-onset REM periods (SOREMP) 79
- sleep paralysis 32, 53–4, 79–86
- sleep-related eating disorder (SRED) 47, 49, 50
- sleep-related movement disorders, in
 - childhood 220–2
- sleep-related rhythmic movement disorder (RMD), in childhood 221–2
- sleep restriction, insomnia treatment 106–7
- sleep spindles 11, 15, 16
- sleep stage distribution
 - age effects 16–18
 - and duration of sleep 18–19
 - and timing of sleep 20
 - at high altitude 21
 - effects of extreme environments 21–2
 - effects of sleep loss and sleep deprivation 20–1
 - factors affecting 16–22
 - in polar regions 21
 - in space 21–2
 - in the tropics 21
- sleep states, early research 9
- sleep terrors 50
- sleep/wake disorders in stroke patients 162, 163, 168
- sleep/wake homeostatic regulation, model 3
- sleep/wake state control mechanisms 1–2
- sleepwalking 27, 248
- sleepwalking 27, 48–50
- slow-wave activity, EEG indicator of sleep
 - intensity 15–16
- snoring and EDS 32
- social history, sleep disturbance
 - evaluation 27

270 Index

- sodium oxybate (gamma-hydroxybutyrate)
 - 83–4, 85
- space travel, effects on sleep stage
 - distribution 21–2
- spectral analysis (EEG analysis) 15–16
- Stanford Sleepiness Scale (SSS) 33–4
- state-dependent violence 241–2
- state dissociation, disorders of arousal 244–5
- status dissociatus and RBD 52–3
- stimulant drug abuse and sleep
 - disturbance 182
- stimulus control, insomnia treatment 106
- stress and sleep problems 27
- stroke and sleep 159–62
 - cardiovascular effects of OSA 159–60
 - sleep apnea and outcome of stroke 161–2
 - sleep apnea as consequence of stroke 161
 - sleep apnea as risk factor for stroke 25, 160–1
 - sleep/wake disorders in stroke
 - patients 162, 163, 168
 - snoring as risk factor 159–60
- substance abuse and hypersomnia 93
- substance abuse and sleep disturbance 181–2
 - alcohol 180, 181–2
 - hypnotics 182
 - stimulants 182
- substance P 2
- sudden cardiac death 186, 187, 189–90
- suggested immobilisation test (SIT) 121
- “sundowning” in dementia patients 237
- surgical approaches, OSA treatment 152–3
- symptomatic narcolepsy 81
- systemic lupus erythematosus (SLE)
 - and sleep 201
- temazepam 104
- temporal cues (zeitgebers) 60–1, 62
- theta waves 15
- timing of sleep, effects on sleep stage
 - distribution 20
- toxic conditions, and hypersomnia 93
- tracé alternant* activity in babies 17
- tramadolol 125–6
- transformation into wavelets (EEG analysis) 16
- trazodone 105
- triazolam 104
- tropics, effects on sleep stage distribution 21
- vertex sharp waves 15
- violent behavior, and disorders of
 - arousal 246–7
- violent parasomnias
 - case example 240–1
 - compelling hypnagogic hallucinations 247
 - conditions associated with automatic
 - behavior 242–8
 - disorders of arousal 242–7
 - malingered 248
 - medicolegal evaluation 249–51
 - Munchausen syndrome by proxy 248
 - neurologic conditions 242–8
 - nocturnal seizures 247
 - posttraumatic stress disorder 248
 - psychiatric conditions 248
 - psychogenic dissociative states 248
 - REM sleep behavior disorder 247
 - sleepwalking 248
 - state-dependent violence 241–2
- wakefulness
 - control mechanisms 1–2
 - EEG patterns 11
 - effects of amphetamines 2
 - role of acetylcholine 2
 - role of brainstem reticular formation 1–2
 - role of catecholamines 2
 - role of cholinergic neurons 2
 - role of dopamine 2
 - role of hypothalamus 2
 - role of levodopa 2
 - role of norepinephrine 2
- zaleplon 104
- zeitgebers (temporal cues) 60–1, 62
- zolpidem 104