

# Index

Page numbers in *italics* refer to illustrations.

## A

activities of daily living  
   Barthel Index 10, 13, 100, 134  
   energy demands 74  
   inactivity and 74  
   and motor deficits 8  
   self-help assistance 145  
   *see also* everyday competence  
 acute phase management/therapy 8, 17–23, 25–47, 51–54  
   case studies 17–19, 23, 26–27  
   nursing care 137–142  
   parameters 3  
 adaptations/adaptive changes 59–62, 124  
   after stroke 55  
   balance 90, 91  
   loading of paretic limb 99, 100  
   movement patterns 124  
 aerobic components, physical therapy 83–84  
 aerobic fitness, assessment 135  
 age, as prognostic factor 13  
 age-related changes  
   balance 87–88  
   standing up 103  
 alcohol consumption, as risk factor 6  
 alteplase 33, 34  
 ambulance, patient transfer 22–23  
 ambulation, community 110  
 aneurysm  
   and subarachnoid hemorrhage 45, 46  
   therapy 46–47  
 angiography 37, 43, 46  
   *see also* CT angiography  
 ankle-foot orthoses (AFOs) 119  
 anterior cerebral artery, infarction areas 7, 7  
 anticoagulation 37, 40, 44  
 anticonvulsants 38, 40, 41, 44, 47  
 aphasia 19, 20, 143–144  
 arm  
   exercise, self-administered 131  
   length 120  
   movement 120–121  
   muscles, and postural adjustments 86, 86  
   *see also* upper limb  
 arm cycling 81, 129, 131, 132  
 arrhythmia, as risk factor 6

arterial dissection, therapy 40  
 Ashworth Scale, Modified 58, 135  
 aspiration, prophylaxis 141–142  
 aspirin 37  
 associated movements 58  
 atrial fibrillation, as risk factor 6  
 attention focusing 63–64  
 AVERT study 49–50

## B

back massage 141  
 balance  
   and adaptations 90, 91  
   age-related changes 87–88  
   assessment 134  
   biomechanical description 85–88  
   functional problems 88–90  
   lower limbs in 75–76  
   pusher syndrome 94  
   and sensory dysfunction 90  
   skill maximization 98–99  
   training guidelines 85–99  
 balance training  
   sitting 90, 91–94, 94  
   standing 95, 96–99, 98–99  
 Barthel Index (BI) 10, 13, 100, 134  
 Beck Depression Index 14  
 bed sores 140  
 behavioral contract 131  
 Berg Balance Scale 134  
 best interest standards 164  
 best respect standards 164–165  
 bicycle ergometry 84  
 bimanual actions 120–121  
 bimanual training 128–129, 130  
 biomechanical descriptions  
   balance 85–88  
   manipulation 121–123, 122  
   reaching 120–121, 121  
   sitting down 102–103  
   standing up 100–102  
   walking 111–113  
 bleeding, avoidance during lysis 139  
   *see also* hemorrhage; intracerebral hemorrhage  
 blood pressure  
   acute phase parameter 3  
   at emergency scene 21–22  
   high, as risk factor 5–6

- monitoring after admission 31
- body temperature
  - at emergency scene 22
  - monitoring after admission 31–32
- body transport 88–89
- body weight support, in treadmill walking 115, 116
- brain maps 70–71
- brain reorganization 72–73
  - and paretic limb use 130
- brainstem lesions 8

## C

- calf muscle, stiffness 135
- cardiac function, monitoring after admission 31
- cardiovascular complications, prevention 138
- care plan 136–137
  - see also* nursing care; patient care
- case discussion, ethical 164
- case studies
  - acute therapy 26–27, 28–29
  - emergency/acute management 17–19, 23
  - ethical issues 148–149, 162–163
  - risk factors for stroke 6–7
  - thrombolysis 36
  - washing assistance 144
- center of pressure (COP) 87, 101
- cerebellar lesions 8
- cerebral edema 47
  - therapy 32, 38–39
- cerebral hemorrhage 2, 3
  - see also* intracerebral hemorrhage
- cerebral infarction 2
- cerebral ischemia, symptoms 19
- cerebral vein thrombosis, therapy 40–41
- chest massage 141
- cigarette smoking, as risk factor 6
- circuit training classes 68, 69, 81, 82, 99
  - task-oriented 127
  - walking on footprints 98, 99
- clinical examination, at emergency scene 21
- Clinical Test for Sensory Interaction in Balance 134
- closed chain exercises 74, 75
- cocontraction, muscles 57–58
- cognition, and postural control 85
- communication assistance 143–144
- community ambulation 110
- community support 54
- comorbidity, during rehabilitation 14
- complications
  - aspiration prophylaxis 141–142
  - cardiovascular 138
  - prophylactic measures 139
  - therapy 38–40
  - thrombosis prophylaxis 141
- computed tomography *see* cranial CT; CT angiography
- computer-aided training 132–133
- concentric vs. eccentric, muscle contractions 75, 76, 77, 78

- consciousness, state of 22, 29, 38, 44, 138
  - ethical issues 149, 150, 156, 157, 162
- consent, informed 149–150, 164
- constipation prophylaxis 146
- constraint, on nonparetic limb 130–131
- constraint-induced movement therapy (CIMT) 72
- constraint-specific training 131
- contextual information 66
- continence
  - as prognostic factor 13
  - training 145–146
- contraversive pushing 94
- convalescence, motor, after stroke 8–9
- coordination, lower limbs 76
- cortical plasticity 70
- costs, of stroke 5, 16
- coughing reflex 140, 141
- course of illness, after stroke 9–15
- cranial CT 26, 27, 27, 43, 43
- CT angiography 27, 45, 47
  - subarachnoid hemorrhage 45

## D

- daily activities *see* activities of daily living
- death *see* dying process; mortality
- decision-making
  - external influences 161–162
  - internal formation 160–161
  - and patient's wishes 157–159
- decision model 160, 163–164
- deconditioning 83
- decubital ulcers 140
- deep venous thrombosis, therapy 40
- demonstration, of movements 64–65
- depression, as prognostic factor 14, 15
- dexterity, manual 123
- diabetes mellitus, as risk factor 6
- diagnosis, after stroke unit admission 28
- differential diagnosis, stroke symptoms 19–20
- disorders, caused by stroke 7–8
- disuse, of paretic limbs, negative effects 72
- dressing, assistance 144
- drugs, patient history 20–21
- dying process 155–157
- dynamometer 78, 81, 82, 108
  - grip force 131, 133
- dynamometry, isokinetic 81, 117, 117
- dyarthria 19, 20, 30, 143
- dystonia 59

## E

- early mobilization 48–50
  - and exacerbation of injury 72
- early supported discharge (ESD) 8–9
- eccentric-concentric exercise 75, 76, 77, 78
- quadriceps 117, 117

electrical stimulation *see* functional electrical stimulation  
 electrolyte administration 32  
 electromyographic (EMG) feedback 127  
 embolism 1, 2  
 emergency management 17–23  
   case studies 17–19, 23  
 emergency vehicle, patient transfer 22–23  
 EMG *see* electromyographic feedback  
 endurance  
   maximizing 83–84  
   walking 117–118  
 environment  
   and neuroplasticity 70–73  
   rehabilitation 73–74  
 ethical case discussion 164  
 ethical questions 148–166  
 everyday competence  
   limitations after stroke 12–15  
   and prognosis 10–11  
   *see also* activities of daily living  
 evidence-based recommendations, for rehabilitation 84, 133  
 exercise capacity 135  
 exercises  
   on dynamometer 78, 81, 82  
   heels lower and raise on a step 78, 80  
   nonweightbearing 81–82, 82  
   and pain 124  
   program 131  
   sit-to-stand 81, 81  
   squatting 78, 80  
   step up and step down 78, 79  
   weightbearing 78, 79–80, 81, 81  
   *see also* task-oriented training; training  
 external ventricle drainage (EVD) 44, 47

## F

fallers, poststroke 100  
 family members, guidance 147  
 feedback, electromyographic 127  
 feeding, artificial 151, 155, 156  
   *see also* nasal stomach tube; percutaneous endoscopic gastrostomy  
 fingers  
   in grasping 120, 121, 122  
   tracking exercises 128  
 fluid administration 32  
 foot placement  
   and standing up 65, 102, 103, 103, 105, 105–106  
   and stepping 97  
 forward step-downs 97  
 Framingham Study 11  
 Fugl-Meyer Scale 100, 134  
 functional electrical stimulation (FES) 117, 126, 127  
 function, global measures 134  
 Functional Independence Measure (FIM) 134  
 functional motor recovery *see* motor recovery/con-  
   valescence

functional problems  
   balance 88–90  
   standing up 103–104, 103–104  
   upper limb 123–124  
   walking 112  
 Functional Reach Test 134  
 functional reorganization  
   in cortical tissue 71  
   and strength 75  
 functional tasks 65, 67  
 functional tests  
   arm 133  
   reaching and manipulation 133  
   standing up 110  
   walking 119

## G

gait  
   analysis 112–113, 113  
   initiating 87  
   tests 134  
   training 116  
   *see also* walking  
 Gait Trainer 116  
 glabrous skin, palm 123  
 glenohumeral joint  
   positioning 125  
   and shoulder pain 124–125  
 glove, on nonparetic hand 129, 130–131  
 glucose  
   acute phase parameter 3  
   monitoring after admission 31  
 gluteal taping 117, 118  
 goal setting 65–66  
 goniometer 133  
 grasp  
   aperture 120  
   locking 121  
   during movement 123  
   supporting 121  
   task- and object-specific 122  
   training 128, 129  
   *see also* manipulation  
 grip  
   exercises 128, 129  
   force 123, 124  
 grip force dynamometer 131, 133  
 group training  
   balance 98  
   physical therapy 68, 68–69, 69

## H

hand  
   configurations 121, 122  
   cupping tasks 128  
   dexterity 123  
   functional anatomy 121

swollen 146–147  
*see also* bimanual; grasp; manipulation; manual  
 hand class 126  
 Haptic Walker 116  
 harness  
   in balance training 95, 95  
   in walking training 115, 115  
 health-related quality of life 15, 135  
 heart *see* atrial; cardiac; cardiovascular  
 heels lower and raise on a step 78, 80  
 hemihypesthesia 19  
 hemiparesis 19  
 hemiplegic shoulder 146  
 hemorrhage, cerebral 2, 3  
   *see also* intracerebral hemorrhage  
 hemorrhagic stroke therapy 42–47  
 heparin 32, 37  
 hip extension  
   and gluteal taping 117, 118  
   during walking 114, 114  
 hormone replacement, as risk factor 6  
 hyperlipidemia, as risk factor 6  
 hypertension, as risk factor 6  
 hypertonus 59  
 hypoperfusion, systemic 1

**I**

ICF classification 14  
 impairments 54–59  
   adaptive changes 59–62  
   motor control loss 57–58  
   spasticity 58–59  
   weakness 55–57  
 incidence, of stroke 4  
 incontinence, causes 145  
 index finger, in grasping 120, 121  
 indication, medical, defined 152–154  
 infections, therapy 39  
 information, contextual 66  
 informed consent 149–150, 164  
 internal carotid artery  
   aneurysm 46  
   stenosis 32, 37  
 intersegmental coordination *see* limb segment coordination  
 intra-arterial lysis 139  
 intracerebral hemorrhage 1, 3, 42–44  
   diagnosis 43, 43  
   surgery 44–45  
   therapy, conservative 43–44  
 intracortical microstimulation techniques (ICMS) 71  
 ischemic stroke 1  
   acute therapy 25–42  
   causes 1  
   secondary prophylaxis 37  
   therapeutic measures 32

**J**

joints  
   adaptive changes 61  
   support moment of force 75, 111

**K**

kinematics  
   standing up 101, 101  
   walking 111  
 kinetic chain exercises 74, 75, 75  
 kinetics  
   standing up 101, 101  
   walking 111, 111

**L**

language difficulties 143–144  
   *see also* speech  
 learned nonuse 61, 124  
 learning environment, and neuroplasticity 70  
 learning transfer 66  
 left cerebral hemisphere lesion 7  
 leg  
   muscle, and postural adjustments 86, 86  
   raising 88–89  
   *see also* lower limb  
 legal issues, in treatment 149–150  
 level walking 115, 115  
 lid removal, as bimanual task 130  
 life-prolonging measures 151, 155, 156, 166  
 life-sustaining measures 151, 156, 166  
 limb segment coordination 57, 73, 75, 76, 76, 120, 127  
 Lite-Gait 116  
 living will 148, 149, 157, 158  
 loading  
   alternate 98  
   of paretic limb 99, 100  
 local lysis 36–37  
 locking grasp 121  
 lower limb, segments 76, 76  
   *see also* leg  
 lysis  
   intra-arterial 139  
   local 36–37  
   observation and care after 139  
   systemic intravenous 138–139

**M**

manipulation  
   biomechanical description 121–123, 122  
   measurement 133  
   training guidelines 120–133  
   training of 128  
   *see also* grasp

manual dexterity 123  
 massage, respiratory stimulation 141  
 maximizing skills *see* skill maximization  
 measurement  
   balance training 99  
   manipulation 133  
   reaching 133  
   standing up and sitting down 110  
   task-specific training 131  
   walking 119–120  
 medical indication, defined 152–154  
 medications, patient history 20–21  
 mental practice 66–67  
   arm exercise 132  
   standing exercises 109  
 middle cerebral artery, infarction areas 7, 7  
 minimum motor criteria 131  
 mitt, restraining, on nonparetic hand 130–131  
 mobilization 52, 53  
   early 32, 48–50  
 modeling 64–65  
 Modified Ashworth Scale 58, 135  
 Modified Tardieu Scale 59, 135  
 monitoring, guidelines 137  
 mortality, after stroke 4–5, 11, 48  
 MOTomed 82  
 motor activity, global measures 134  
 Motor Activity Log 130  
 Motor Assessment Scale 133, 134, 135  
 motor control loss 57–58, 123  
 motor function, improvement 129  
 motor learning 62–63, 66  
   training effects 71  
 motor maps 70–71  
 motor patterns, adaptive 61, 62  
 motor performance, global measures 134  
 motor recovery/convalescence 8–9  
   optimizing 51–135  
 motricity index 14, 135  
 movements  
   associated 58  
   shape 65, 73  
 multisegment systems, limbs 76, 120, 124  
   *see also* limb segment coordination  
 muscle activity  
   cocontraction 57–58  
   contractions, concentric vs. eccentric 75, 76, 77, 78  
   exercises, during standing 107, 108  
   and postural adjustments 86, 86  
   in standing up 101–102  
   in walking 112  
 muscle endurance, maximizing 83–84  
 muscle force 55–56, 74  
   activating 117, 117, 118  
   contralateral side 56  
   generation 78  
   peak 57  
 muscle length  
   adaptive changes 56, 61  
   preserving 82–83

  shortening 61, 125  
 muscle stiffness 56, 60, 135  
 muscle strength  
   vs. functional performance 75  
   testing 133  
 muscle stretching, active vs. passive 82–83, 83  
 muscle training, action patterns 77  
 muscle weakness 55–57, 74, 123

## N

nasal stomach tube 32, 44, 142  
 National Institutes of Health Stroke Scale (NIHSS) 10, 14, 29–30  
 neglect, assistance 147  
 neural changes, adaptive 61  
 neural reorganization 72  
 neurological rehabilitation, measurement 133–135  
 neuroplasticity 70–73  
 NIH Stroke Scale *see* National Institutes of Health Stroke Scale (NIHSS)  
 nine-hole peg test 133, 134, 135  
 nonlinear recovery 13  
 nonuse, learned 61–62, 124  
 nonweightbearing exercises 81–82, 82  
 Nottingham Health Profile 15  
 nursing care  
   acute phase 137–142  
   rehabilitation phase 142–147  
 nutrition  
   after admission 32  
   artificial 151, 155, 156  
   *see also* feeding; nasal stomach tube; percutaneous endoscopic gastrostomy

## O

object-specific training, sensory awareness 132  
 obstacle course 119  
   in balance training 89, 89, 98, 98  
   test 134  
 open chain exercises 74, 75, 75  
 orthoses 119  
 oxygen, acute phase parameter 3  
 oxygen saturation, at emergency scene 21, 22

## P

pain  
   and rehabilitation 10  
   in shoulder 124–125  
   treatment 125  
 palliative treatment 152  
 palm, and grasping 123  
 paralysis 8, 56  
 paramedics, tasks in emergency 20–23  
 paresis 8, 56

paretic limb, forced use 129–131  
 partial reversible ischemic neurological deficit (PRIND) 3  
 patient  
   best interest standards 164  
   best respect standards 164–165  
   consent 149–150  
   drug history 20–21  
   living will 148  
   role in rehabilitation 54  
   wishes, and decision-making 157–159, 161  
 patient care 136–147  
   history 138  
   planning 138  
   *see also* nursing care  
 peg test, nine-hole 133, 134, 135  
 percutaneous endoscopic gastrotomy (PEG) 32, 39, 44  
 persistent vegetative state 156, 158–159  
 perturbation, and postural adjustment 87  
 physical activity 51  
 physical inactivity 6, 74  
 physical therapy 9, 16  
   aerobic components 83–84  
   delivery 67–70  
   early 52  
   group training 68, 68–69, 69  
   and neuroplasticity 70  
   time spent in 51, 70, 73, 74, 84  
 picking up exercises 128, 129  
 plasminogen 33  
 pneumonia 32  
   prophylaxis 140–141  
 postural adjustment 85, 86, 86  
 postural sway 78, 85, 87, 87, 89, 100  
 pouring water, as bimanual task 130  
 practice, mental 66–67  
 pressure sores, therapy 40  
 pressure ulcers 32  
   prevention 140  
 prevalence, of stroke 4  
 prognosis  
   after stroke 9–11  
   defined 154–155  
   prediction models 10  
 prophylactic measures 139–142  
   aspiration 141–142  
   constipation 146  
   pneumonia 140–141  
   pressure ulcers 140  
   thrombosis 141  
 propulsion, lower limbs in 75, 76  
 pulmonary embolism, therapy 40  
 pusher syndrome 94

## Q

quadriceps muscle, exercise 75, 82, 117, 117  
 quality of life  
   after discharge 54, 84

  after stroke 15  
   family members 152  
   health-related 15, 135  
   quiet standing 85, 87, 87, 89

## R

ramp, walking 97  
 Rankin scale 11  
   modified (MRS) 49  
 reaching  
   biomechanical description 120–121, 121  
   far forward 109, 110  
   measurement 133  
   motion analysis 121  
   training device 126  
   training guidelines 120–133  
   training of 126, 127, 127, 127–128, 128  
   when sitting 87, 88, 90, 91–94  
 realism, task-oriented training 123  
 recombinant tissue plasminogen activator (rt-PA) 33  
   vs. new agents 41  
   scientific background 33–34  
 recovery 13  
 recruitment times, muscle 124  
 rehabilitation 51, 52  
   cardiac vs. stroke 74  
   clinical focus 55, 59, 61  
   and comorbidity 14  
   and endurance 83–84  
   environment 70, 73–74  
   measurement 133–135  
   neurological 13  
   and neuroplasticity 70  
   and pain 10  
   patterns 9–10  
   task-oriented training 55  
   time spent in 73–74  
 rehabilitation centers 8, 51  
 rehabilitation phase, nursing care 142–147  
 repetitions 66–67, 127  
   and neural reorganization 73  
 respiratory function, monitoring 29, 31  
 respiratory stimulation massage 141  
 response speed, in balance training 98  
 reversible ischemic neurological deficit (RIND) 3  
 right cerebral hemisphere lesion 7  
 risk factors  
   case study 6–7  
   for everyday limitations 15  
   for stroke 5–7  
 robot-aided training 70, 132–133

## S

seat height 81, 100, 100, 102, 106  
 segment coordination, limbs 57, 73, 75, 76, 76, 78, 120, 127

- seizures 22, 40, 44
- self-efficacy 135
- self-initiated movements 90
  - head and trunk 95, 96
- sensation
  - assessment 135
  - testing 133
- Sensorimotor Active Rehabilitation Trainer (SMART) 126
- sensory awareness, object-specific training 132
- sensory dysfunction, and balance 90
- sensory input, in manipulation 123
- Sensory Interaction in Balance, Clinical Test for 134
- shape of movements 65, 73
- shortening, muscle 61, 125
- shoulder
  - flexors 124
  - hemiplegic 146
  - pain 124–125
- sinus thrombosis, therapy 40–41
- sitting
  - balance training 90, 91–94, 92–94, 94, 95, 96–99, 98–99
  - balance when reaching 87, 88
  - and reaching 90, 91–94
- sitting down 102–103
  - assessment 134
  - biomechanical description 102–103
  - functional problems 104, 104
  - measurement 110
  - practicing 106–107
  - skill maximization 109
  - from standing (SIT) 99, 100
  - task-oriented training 104–105
  - training guidelines 99–110
- sitting exercise 52, 53
- sit-to-stand (STS) motion 64–65, 65, 99, 100, 101, 101–102
  - repetitive 81, 81
  - see also* standing up
- skill development 62–63
- skill maximization
  - balance 98–99
  - standing up and sitting down 109
  - walking 117–118
- skill training, and neuroplasticity 70–73
- smoking, as risk factor 6
- spasticity 58–59
- speech
  - difficulties 143–144
  - slurred 19, 20, 30, 143
- speed
  - in balance training 98
  - in treadmill walking 116
  - in walking 110–111, 117–118, 119–120
- splinting 133
- spontaneous recovery 13
- squatting 78, 80
- stair walking/climbing 69, 116, 117, 118
- standing
  - balance 88–89
  - balance training 95, 96–99, 98–99
  - and Barthel Index 100
  - exercise 52, 53
  - quiet 85, 87, 87, 89
  - from sitting *see* sit-to-stand (STS) motion
- standing up
  - age-related changes 103
  - assessment 134
  - biomechanical description 100–102
  - functional problems 103–104, 103–104
  - kinematics 101, 101
  - kinetics 101, 101
  - measurement 110
  - mental practice 109
  - muscle activity 101–102
  - practicing 106, 107
  - skill maximization 109
  - strength training 108, 108
  - task-oriented training 104–105
  - training guidelines 99–110
  - vertical ground reaction force 105, 106
  - to walk 102
  - see also* sit-to-stand (STS) motion
- stenosis 28, 37
- step-downs, forward 97
- stepping 87, 88–89
  - with alternate limbs 98
  - to pick up 98
  - to touch 97
- Step Test 134
- step up and step down, exercise 78, 79
- stiffness, muscles 56, 58, 60
- stimulation massage, respiratory 141
- stool incontinence 146
- strength–muscle force 135
- strength training 74–75, 131, 132
  - guidelines 81
  - for standing 108, 108
  - in walking 116–117
- stretch, active vs. passive 82–83, 83
- stretch reflex 58, 59
- stretch–shortening cycle 77
- stride length measures 134
- stroke
  - acute 17
  - classification 1
  - cost of 5
  - definition 1–3
  - disorders caused by 7–8
  - incidence 4
  - ischemic *see* ischemic stroke
  - mortality after 4–5, 11, 48
  - prevalence 4
  - risk factors 5–7
  - survival after 4–5
  - symptoms, differential diagnosis 19–20
- stroke support groups 54
- stroke units 25–26, 51, 136–137
  - diagnosis and monitoring 28

technical equipment 137  
 subarachnoid hemorrhage (SAH) 1, 45–47  
   and aneurysm 45, 46  
   diagnosis 45–46  
   therapy 46–47  
 subluxation, glenohumeral joint 125  
 support, lower limbs in 75  
 supporting grasp 121  
 survival, after stroke 4–5  
 swallowing difficulties 20, 22, 32, 43, 141–142  
 swallowing therapist 25  
 sway, postural 78, 85, 87, 88, 89, 100  
 swollen hand 146–147  
 symptoms, differential diagnosis 19–20  
 systemic intravenous lysis 138–139

## T

taking a step 87, 88–89  
 tapping tasks 128  
 Tardieu Scale, Modified 59, 135  
 task-oriented training 74–75, 75, 78–82  
   balance 90, 92–94, 95, 96–99, 98–99  
   protocol 131  
   real tasks 123  
   shoulder 125  
   sitting down 104–105  
   standing up 104–105  
   upper limb 125–133, 127  
   walking 114  
 tasks  
   attention focus 63–64  
   functional 65, 67  
 temperature, acute phase parameter 3  
 terminal care 153, 155, 156  
 testing *see* measurement  
 therapy  
   acute 25–47  
   aneurysm 46–47  
   arterial dissection 40  
   cerebral edema 38–39  
   deep venous thrombosis 40  
   hemorrhagic stroke 42–47  
   infections 39  
   intracerebral hemorrhage 42–44  
   pressure sores 40  
   pulmonary embolism 40  
   seizures 40  
   sinus and cerebral vein thrombosis 40–41  
   *see also* rehabilitation; treatment  
 thrombolysis 33–37  
   case studies 36  
   complications 35  
   contraindications 34–35  
   indication 34  
   procedure 35–36  
   scientific background 33–34  
 thrombosis  
   after admission 32  
   vs. cerebral hemorrhage 2

prophylaxis 141  
   sinus and cerebral vein 40–41  
 thrombus 1, 2  
 thumb  
   abduction 124  
   in grasping 120, 121  
 time, in physical therapy 51, 70, 73, 74, 84  
 timing, bimanual actions 120  
 toilet training 145–146  
 towel folding, as bimanual task 130  
 training  
   constraint-specific 131  
   effects of task and context 76, 87, 120  
   in groups, physical therapy 68, 68–69, 69  
   and pain 124  
   task-oriented *see* task-oriented training  
   *see also* exercises  
 training guidelines  
   balance 85–99  
   reaching and manipulation 120–133  
   standing up and sitting down 99–110  
   walking 110–120  
 transient ischemic attack (TIA) 3, 17  
 treadmill walking 12, 66, 84, 115, 115–116  
 treatment  
   ethical issues 150–152  
   legal justification 149–150  
   palliative 152  
   *see also* rehabilitation; therapy  
 treatment plan 136–137  
 trunk movement, and standing up 102, 106  
 tube nutrition 32, 44, 142  
 TUG Test 134

## U

ulcers, pressure 32, 140  
 upper limb  
   forced use of paretic 129–131  
   functional recovery 123  
   function testing 135  
   grasp during movement 123  
   movement organization 120  
   segments 120, 124  
   *see also* arm  
 Upper Limb Exerciser 132  
 upper motor neuron (UMN) lesions 55, 55, 56

## V

vegetative state, persistent 156, 158–159  
 verbal instructions 64–65  
 vertical ground reaction force (VGRF) 105, 106  
 virtual finger 122  
 virtual hand 133  
 virtual reality training 70, 132–133  
 viscoelasticity, tissues 83  
 vital functions 21, 137



## W

## walking

- aids 119
- and balance 89
- biomechanical description 110–111, 111–113
- exercise 52, 53
- on footprints 98, 99
- functional problems 112
- gait analysis 112–113, 113
- level 115, 115
- measurement 119–120, 134
- muscle activity 112
- over obstacles 89, 89, 98, 98
- on ramp 97
- rehabilitation 9, 12
- skill maximization 117–118
- speed *see* walking speed
- stairs 69, 116, 117, 118

tests 119–120, 134

training guidelines 110–120

treadmill training 115, 115–116

on uneven surface 67, 67

*see also* gait

walking speed 119–120

and everyday activities 14

as prognostic factor 13

washing, assistance 144–145

water pouring, as bimanual task 130

weakness 55–57

*see also* muscle weakness

weightbearing exercises 74–75, 75, 76, 78, 79–80, 81, 81

will, living 148, 149, 157, 158

wishes, of patient 157–159

Wolf Motor Function Test 130, 133, 135

Wolf's Minimum Motor Criteria 131