INDEX

A
AAC. See Augmentative and alternative communication
AAROM. See Active assisted range-of-motion exercises
ABC. See Acinetobacter baumannii-calcoaceticus; American Board for Certification in Orthotics, Prosthetics and Pedorthics
Able-bodied ("normal") gait
energy conservation and, 539, 540
gait cycle, 540
six determinants of gait, 540
Access to Sailing
contact information, 682
AccessSportAmerica
contact information, 682
Accreditation Council for Graduate Medical Education
pain management recommendations, 13
Accufuser pumps, 244
Acetaminophen
burn casualties and, 297
mechanism of action, 248
phantom limb pain treatment, 248
residual limb or stump pain treatment, 233
Achilles Track Club
contact information, 682
Paralympics sponsor, 15
Acinetobacter baumannii-calcoaceticus
battle wounds and, 194
heterotopic ossification and, 210
prevalence of multidrug-resistant form, 194
soldiers returning from Operation Enduring Freedom/Operation Iraqi Freedom and, 197
ACL. See Anterior cruciate ligament
Active assisted range-of-motion exercises
considerations for use of (exhibit), 329
Active duty service
benefits delivery at discharge, 82
financial assistance for purchasing a vehicle, 82
fitness criteria, 61
healthcare benefits, 82
home loan guaranty benefits, 82
individuals with major limb amputations and, 2, 54–55
insurance programs, 81–82
Medal of Honor pension payments, 82
MHS healthcare services mission, 4
need for longitudinal studies to track injured service members who return to active duty, 734
phase four of the physical therapy rehabilitation program and, 479–482, 489–490
recommendations for daily use prosthesis, 578–579
retirement and disability compensation and, 61–62
specially adapted housing grants, 82
Veterans Benefits Administration benefits for, 81–82
vocational rehabilitation and employment, 82
Active range-of-motion exercises
burn edema and, 301, 302, 304
considerations for use of (exhibit), 330
heterotopic ossification and, 329
safety of, 329
skin grafts and, 315
Active reserve service
retirement and disability compensation, 61–62
Activities of daily living
acute phase of burn casualty rehabilitation, 333–335
adaptations for self-care, 333, 496, 497, 500, 522
aids for dressing, 337–338
avoiding trauma or shearing the skin surface, 336
bathing safety aids, 337
benefits of independent performance of, 333
bilateral upper extremity activity of daily living task sample technique options and considerations (table), 501–502
bilateral upper limb amputees and, 500–503
burn casualties and, 319, 333–338
circulatory changes and, 336
classifications of, 333
communications, 335, 338
donning pressure garments, 337
electronic aids to, 335, 426, 714–715
factors influencing outcome of functional activity programs, 333
family involvement and, 333
home accessibility aids, 338
home management responsibilities, 335
housekeeping aids, 338
independence and, 333
intermediate phase of burn casualty rehabilitation, 319, 335–336
kitchen modifications, 338
long-term phase of burn casualty rehabilitation, 336–338
one-handed, 514
phase one of the upper limb amputee protocol of care and, 496–497
phase two of the upper limb amputee protocol of care and, 500–503
phase three of the upper limb amputee protocol of care and, 511–514
prosthetic training, 511–514
reading and writing, 335, 338
safety and, 333
self-feeding and, 333–334, 336, 496, 500
self-grooming, 334, 336
speed of performance and, 333
spinal cord injuries and, 425–426
toileting skills, 335, 337, 496
work-hardening programs, 336
Activity-based therapy
locomotor training, 423–424
spinal cord injuries and, 423–424
Actuators
characteristics, 727
“cobot,” 727
hydraulic motors, 727
Acupuncture
phantom limb pain treatment, 249
Acute abdomen
spinal cord injury and, 432–433
Acute rehabilitation programs
description, 46
Acute respiratory failure
spinal cord injuries and, 428
A.D. See Autonomic dysreflexia
Adapted Adventures
contact information, 682
Adapted housing
home accessibility aids, 338
kitchen modifications, 338
specially adapted housing grants, 81, 82
VA Prosthetic and Sensory Aids Service and, 72
Adapted Sports Association
contact information, 682
Adapted Sports Center
contact information, 682
Adaptive Aquatics
Ambulation.

AmbIT pumps, 244

Amateur Softball Association

Allografts

All Out Adventures

Alcohol and substance abuse

Air guns/shooting

Air Force Wounded Warrior Program

Ahrenholz, D.H.

Agent Orange

Age factors

Afghanistan. See Operation Enduring Freedom/Operation Iraqi Freedom

Aerobics/physical fitness

Aerobic training. See Strength training and cardiovascular conditioning

Advisory Committee of the Secretary of Veterans Affairs on Prosthetics and Special Disability Populations

Advisory Committee of the Secretary of Veterans Affairs on Prosthetics and Special Disability Populations creation of, 7–8

Advisory Committee of the Secretary of Veterans Affairs on Prosthetics and Special Disability Populations mission and vision statements, 8

Adult day healthcare

Veterans Health Administration and, 73

Advanced phase of upper limb prosthetic rehabilitation. See also Phase four of the upper limb amputee protocol of care

challenges to rehabilitation, 636–637

heterotopic ossification and, 637

interruptions to the rehabilitation process and, 636

neuromas and, 636–637

residual limb and, 635–636

surfacng shrapnel and, 637

Adventure Pursuit

contact information, 683

Air Force rehabilitation center, Pawling, NY

Air Force Wounded Warrior Program

description, 107

Air guns/shooting

opportunities available to amputees, 672

Air Force rehabilitation center, Pawling, NY

Alcohol and substance abuse

posttraumatic stress disorder and, 349

All Out Adventures

contact information, 683

Allografts

burn casualties and, 313

Amateur Softball Association

competitive wheelchair softball regulation, 678

AmbIT pumps, 244

Ambulation. See also Gait analysis and training

arm swing and, 476

assistive devices and, 461–462, 477–478

average energy costs of prosthetic ambulation (table), 546

backward walking, 479

contraindications, 423

evaluation of the amputee’s potential for, 461

goals for spinal cord injuries, 423

in parallel bars, 461

pelvic rotation and, 476

phase one of the physical therapy rehabilitation program and, 461–462

phase three of the physical therapy rehabilitation program and, 476

sidestepping, 479

stride length, width, and cadence, 476–477

swing-through gait, 423

trunk rotation and, 476

American Academy of Physical Medicine and Rehabilitation

VA collaboration with, 49

American Board for Certification in Orthotics, Prosthetics and Pedorthics

prosthetist certification, 554

American Burn Association

morphine recommendation, 298

American Canoe Association

contact information, 683

Disabled Paddlers Committee, 676

American College of Sports Medicine

amount of exercise guidelines, 332

American Dancewheels Foundation, Inc.

contact information, 683

American Legion

present-day role, 29

support programs, 111

American Medical Association

Guides to Evaluation of Permanent Impairment, 63

American Medical Rehabilitation Providers Association

VA collaboration with, 49

American Red Cross

relaying information to families, 349

support programs, 111

tours of government buildings for amputees, 523

American Society of Anesthesiologists

“Practice Guidelines for Acute Management in the Perioperative Setting,” 233–234

Task Force on Preoperative Fasting guidelines, 299

American Society of Plastic Surgery

reconstructive surgery definition, 358

American Society of Regional Anesthesia

central neuroaxis blockade guidelines, 238

Web site, 238

American Spinal Injury Association

Impairment Scale, 418

spinal cord injury classification, 418–419

standard neurological classification of spinal cord injury worksheet (figure), 419

American Wheelchair Bowling Association

c ontact information, 683

regulations for disabled players, 673

American Wheelchair Table Tennis Association

competitive table tennis regulation, 679

contact information, 683

Americans with Disabilities Act

provisions, 710

America’s Athletes With Disabilities

c ontact information, 683

Amitriptyline

phantom limb pain treatment, 247, 248

Amoxicillin

surgical site infection treatment, 196

Amputation Coalition of America

Limb Loss Research and Statistics Program, 598

Amputee care programs. See also Individuals with limb amputations; US Department of Orthopaedics and Rehabilitation; specific programs

advances in prosthetics and, 14

continuing education program element, 12

database element, 12

graduate medical education and research element, 11

historical background, 5–7, 20–37

interdisciplinary teams, 10–11, 608

key elements of, 8–15

medical management element, 12–13
Index

military medical disability system and, 15
nonmedical attendants and, 14, 268
organizational structure element, 9–10
outcomes measures and, 15
pain management element, 13–14
patient flow chart at WRAMC’s amputee service (figure), 9
peer and psychosocial support programs element, 14–15
prevention program element, 12
staffing ratio element, 11
suggested staffing ratios for amputee care (table), 11
surgical considerations element, 12
Amputee Coalition of America
description, 525
peer visitor program, 500
support programs, 14
Amputee counselors. See also Rehabilitation counseling
limb amputation and, 142
Amputees. See Individuals with limb amputations
Amyotrophic lateral sclerosis
presumptive condition for veterans who served in Southwest Asia, 77
Anemia
burn casualties and, 294
Anterior cord syndrome
description, 420
Anterior cruciate ligament
knee instability and, 176–177
Anthrax vaccine
development of, 5
Antibiotics. See also specific drugs
antibiotic beads, 180
bursitis treatment, 181
infection treatment, 177, 178, 179
ototoxicity of, 388, 389
postoperative infections in heterotopic ossification and, 160
preoperative prophylactic antibiotics for lower limb amputations, 134
prophylactic, 193–194
protocol for management of infections for amputee/extremity trauma patients, 196–197
Surgical Infection Prevention Project guidelines for antibiotic prophylaxis, 194–195
surgical site infection treatment, 196
urinary tract infections and, 441
Anticonvulsants. See also specific drugs
benefits of, 246
burn casualties and, 297
phantom limb pain treatment, 246
posttraumatic seizure prophylaxis, 13, 406
Antidepressants. See also specific drugs
burn casualties and, 297
phantom limb pain treatment, 247–248
side effects, 247–248
sleep problem treatment, 271
Antihistamines. See also specific drugs
pruritus treatment, 347–348
Antioxidants
hearing loss prevention and, 393
Anxiety
burn casualties and, 348
traumatic brain injury and, 405
treatment, 271, 348
Aortic aneurysms
lower limb amputations and, 218
Archery
opportunities available to amputees, 672
prosthetic examples, 651–652
upper limb prosthetic considerations, 644
Arem, A.J.
scar tissue research, 318
Armed Forces Amputee Care Program
database estimate of soldiers with major limb loss in uniform, 63
Army Ten Miler
description, 524
Army Wounded Warrior program
description and goals, 106
family management specialist locations (table), 113
Arnold, Gen. Henry “Hap”
prosthesis improvements and, 6
support for the “whole patient” concept, 33
AROM. See Active range-of-motion exercises
Aronson, N.E.
major pathogens from war trauma-associated infections, 194
Artificial condyles
joint disarticulations and, 722–723
surgical implantation of, 723
Artificial intelligence
description and examples, 726
Artificial limb research. See also Prosthetics
actuators, 727
artificial condyles, 722–723
artificial intelligence, 726
control systems, 723–726
limb interface systems, 722–723
mechatronics, 726–728
neural-machine interfaces, 724–726
power sources, 726–727
sensors and controls, 728–729
sockets and liners, 722
summary of issues, 729
transmissions, 727–728
ASIA. See American Spinal Injury Association
ASIA Impairment Scale
spinal cord injury grades, 418
ASP. See Adaptive sports program
Aspiration
Heimlich maneuver training and, 428–429
risk factors, 428
spinal cord injuries and, 428–429
swallowing evaluation, 428
Assessment of the vestibular system. See also Vestibular system
injuries
balance evaluation, 389
causes of imbalance and vertigo, 389
computerized dynamic posturography, 389
computerized dynamic visual acuity test, 389
contradictions to screenings, 389
importance of, 389–390
rotary chair test, 389
subjective visual vertical test, 389
videoystagmography/electronystagmography, 389
Assistive devices. See also Wheelchairs
augmentative and alternative communication, 713–714
benefits of, 696
case presentation (exhibit), 716
proper fit and, 696
rehabilitation robotics, 712–713
seating systems, 704–708
sports and recreation equipment, 708–710
summary of issues, 717
transportation, 710–712
Assistive technology. See also Prosthetics; Wheelchairs
assessment and, 696
future research needs, 737–738
goal of, 696
home environment and movable features and, 696
use changes over the course of rehabilitation, 696–697
VA Prosthetic and Sensory Aids Service, 71–72
AT. See Assistive technology
Athletes. See also specific sports
rehabilitative programs, 36
Athletics. See also Lower limb prosthetics for sports and recreation; Sports and recreation opportunities; Upper limb prosthetics for sports and recreation; specific sports
adaptive sports program, 524
mild traumatic brain injury and, 405
prosthetics and, 522–523
recreational and sports activities, 523
“tactical athletes” description, 452, 732
Atkins, D.J.
informal measures for upper limb amputees using body-powered prostheses, 601
“Unilateral Upper Extremity Amputation: Activities of Daily Living Assessment,” 513, 519
An Atlas and Compendium of Burn Splints, 320
Atypical antipsychotics. See also specific drugs
burn casualties and, 348, 349
sleep problem treatment, 271, 348
Audiologic injury from blast exposure
blast injuries to the ear (figure), 384
distance away from the blast and, 383
extent of damage, 383
incidence of, 383
symptoms, 383, 384
tympanic membrane rupture, 383
Auditory temporal processing and patterning tests
description and uses, 390
Augmentative and alternative communication
aided symbols, 713
comprehensive assessment and, 713
goals of, 713
language representation, 713–714
unaided symbols, 713
Auoy, Y.
regional anesthesia and analgesia research, 234, 237
Austin, K.G.
temperature regulation in burn casualties, 360
Automobile crashes
spinal cord injuries and, 416, 417
Autonomic dysreflexia
description, 429–430
fractures and, 437
spinal cord injuries and, 429–430
symptoms, 430
AW2. See Army Wounded Warrior program
Axial flaps
burn casualty reconstructive surgery and, 359
B
Bach, S.
incidence of phantom limb pain (table), 239
“Phantom Limb Pain in Amputees During the First 12 Months Following Limb Amputation, After Preoperative Lumbar Epidural Blockade,” 239
Bacitracin
topical treatment of skin grafts, 315
Baclofen
spasticity treatment, 406–407, 438
Balance
single leg balance, 460–461
adaptive equipment and, 526
decision to use a prosthesis, 526
donning and doffing challenges, 630–631
electric prosthesis fitting, 631
fabricating prostheses for specific activities of daily living, 631
independent harnessing of prostheses, 631
interim phase of upper limb prosthetic rehabilitation and, 629–632
prosthesis considerations, 526–527
prosthesis design, 629–630
residual limb length and, 526
support system for, 526
terminal devices and, 503
training considerations, 526–527
unilateral and bilateral amputee goals for myoelectric and body-powered prostheses (exhibit), 507–508

Billiards
opportunities available to amputees, 673
Binaural interaction tests
description and uses, 390
Biological dressings
burn casualties, 312–313
Biomedical research mission of MHS
description, 5
Birbaumer, N.
global anesthesia and analgesia research, 239
Bisphosphonates
heterotopic ossification treatment, 159, 208, 209, 210–211, 437–438
hypercalcemia treatment, 433
Bladder and renal calculi
spinal cord injuries and, 441
Bladder carcinoma
spinal cord injuries and, 441
Bladder management
spinal cord injuries and, 440–441
Blast exposure
audiologic injury from, 383–384
mechanisms of injury, 608
spinal cord injuries and, 417
traumatic brain injury and, 402–403
BlazeSports America
contact information, 683
Blind persons
prosthesis considerations, 577, 632–633
upper limb amputations and, 141
Blind Rehabilitation Service
blind rehabilitation center, 75
handbook, 76
mission, 75
outpatient specialists, 76
Visual Impairment Center to Optimize Remaining Sight Program, 75–76
Visual Impairment Services Outpatient Program, 75
Bliss, Dr. D. Willard
surgical work during the Civil War, 22
written description of Cunningham’s surgery, 25
Blomberg, S.
regional anesthesia and analgesia research, 236
Board for Orthotic/Prosthetic Certification
prosthetist certification, 554
BOC. See Board for Orthotic/Prosthetic Certification
Bock, Otto
C-Leg, 726
Ergo Arm, 727
MyoBoy prosthesis, 600
Occupational Therapist Upper Extremity Functional Evaluation, 601
SensorHand Speed hand, 726
Upper Extremity Prosthetic Functional Activity Checklist, 601
Body garments
applying the new garment for the first time, 355
burn casualties and, 322, 324, 354–355
independently donning and doffing, 497
initial fitting for, 355
measuring for, 354
odor and, 355
reassessment of fit, 355
wearing 23 hours a day, 355
Body-powered upper limb prosthetics
advantages/disadvantages of (table), 611
bilateral upper limb amputees and, 631
control harness issues, 611
description, 610
elbow units, 617
interscapulothoracic amputations and, 629
maintenance issues, 611
residual limb length and, 610
styloid disarticulation and, 626
terminal devices and, 614
transhumeral amputations and, 628
wrist units, 616

Body symmetry
techniques for, 498
Bone scans
heterotopic ossification diagnosis, 209
physical therapy and, 479
Bones
future research needs, 736
guidelines for skeletal treatment (table), 621
issues in lower limb prosthetics, 577
surgical principles for, 620
Booth, D.M.
neuroma research, 161
Borgeat, A.
regional anesthesia and analgesia research, 236, 238
Botulinum toxin
spasticity treatment, 438
Boulias, C.
upper limb amputation research, 601
Bowel management programs
spinal cord injury and, 432
Bowling
opportunities available to amputees, 673
Box and block test, 15
Boylan, J.F.
regional anesthesia and analgesia research, 236
BPPV. See Benign paroxysmal positioning vertigo
Bradbrook, D.
acupuncture research, 249
Bradley, Gen. Omar
Veterans Administration head, 6
Bradycardia
spinal cord injuries and, 429
Brain-machine interfaces
advantages and disadvantages of, 724
Braun, J.A.
pressure ulcer research, 434
Breckenridge Outdoor Education Center
contact information, 683
Bronchospasm
perioperative regional anesthesia and analgesia risk, 238
Brooke Army Medical Center, San Antonio, TX
center of excellence for burn patients, 3–4
occupational therapy and, 494
“Targeted Reinnervation in Upper Limb Amputees to Improve
xxxii
Care of the Combat Amputee

Myoelectric Prosthesis Function,” 530
Brooks, Rep. Jack B. sponsor of the bill making the VA an executive department, 68
Brown, N. chart for estimating burn size (figure), 284
Brown, Col. (Ret.) Paul W. heterotopic ossification research, 209
Browder, N. chart for estimating burn size (figure), 284
Brown, D.L. regional anesthesia and analgesia research, 236
Brown-Séquard syndrome description, 420
Brown University VA Prosthetic and Sensory Aids Service collaboration with, 72
Buckley, J. gait analysis and training research, 546
Bupivacaine burn casualties and, 298
Burden, A.L. characteristics of burn scars, 351
Burgess technique transtibial amputations, 166, 169
Burial and interment allowances Veterans Benefits Administration, 79
Burn casualties average burn size, 169
Burn patient mortality graph (figure), 279
Burd, A.L. characteristics of burn scars, 351
Burn shock description, 279
Burn wound excision excision to fascia, 309
Burn-related amputations electrical burns and, 345–346
Burn wound excision full-thickness burns, 307–309
circumferential measurement of, 300
long-term management, 305–306
management of, 301–306
mechanism of, 299–300
Burn wound excision intermediate phase management, 305
Burn wound excision long-term management, 305–306
Burn wound excision mechanism of, 299–300
Burn wound excision pathogenesis of tissue edema, 300
Burn wound excision positioning and, 302
Burn wound excision positioning and splinting devices used to manage edema (table), 303–304
Burn wound excision postoperative splinting and positioning (table), 306
Burn wound excision volumetry and, 300–301
Burn wound excision mortality rate from burn injuries, 169
Burn wound excision pain management, 297–299
Burn wound excision pathophysiology of burns, 279–280
Burn wound excision perioperative challenges, 298
Burn wound excision plastic and reconstructive surgery, 358–359
Burn wound excision rehabilitation of, 299–349
Burn wound excision scar management, 349–358
Burn wound excision severity of burns, 282–286
Burn wound excision special considerations, 359–361
Burn wound excision special senses and, 359–360
Burn wound excision summary of issues, 361
Burn wound excision synthetic skin substitutes and, 307, 312–313
Burn wound excision thermal injuries, 280
Burn wound excision thermoregulation and, 360
Burn-related amputations electrical burns and, 345–346
Burn-related amputations lower limb joint contracture and, 173
Burn-related amputations Operation Enduring Freedom/Operation Iraqi Freedom and, 345
Burn-related amputations phantom limb pain and, 346
Burn-related amputations preserving length of limbs and, 346
Burn-related amputations prosthetic fitting and, 170–171, 346
Burn-related amputations surgical principles, 169–170
Burn-related amputations treatment, 181–182
Bursitis aspiration and, 181, 182
description, 180
diagnostic difficulties, 181
myodesis and, 180–181
surgical considerations, 182
Burn shock description, 279
Burn shock excision to fascia, 309
tangential, 308–309
Bush, Pres. George H.W. comments on the US Department of Veterans Affairs, 68
Bush, Pres. George H.W. comments on the US Department of Veterans Affairs, 68
C-C-Leg compared with mechanical knee and RHEO KNEE, 547–548
description and uses, 726
Cable-driven prostheses. See Body-powered upper limb prosthetics
CAD. See Computer-aided design
calcitonin heterotopic ossification treatment, 158
phantom limb pain treatment, 248
CAM. See Computer-aided manufacturing
Camping opportunities available to amputees, 673–674
wheelchair designs for, 709
Canalith repositioning therapy benign paroxysmal positioning vertigo, 392
Canoeing opportunities available to amputees, 674
upper limb prosthetic considerations, 646
Canoeing opportunities available to amputees, 674
CAP. See Computer and Electronic Accommodation Program
Caplan, R. regional anesthesia and analgesia research, 234
Carbamazepine burn casualties and, 297
Carbamazepine phantom limb pain treatment, 246
Carbamazepine multidrug-resistant organism treatment, 195
Cardiac arrest
<table>
<thead>
<tr>
<th>Term</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal cord injuries and, 429</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular conditioning. See Strength training and cardiovascula-</td>
<td></td>
</tr>
<tr>
<td>r conditioning</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td></td>
</tr>
<tr>
<td>silent myocardial infarction, 430</td>
<td></td>
</tr>
<tr>
<td>spinal cord injuries and, 430</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular system. See also Deep venous thrombosis; Strength</td>
<td></td>
</tr>
<tr>
<td>training and cardiovascular conditioning</td>
<td></td>
</tr>
<tr>
<td>autonomic dysreflexia, 429–430</td>
<td></td>
</tr>
<tr>
<td>bradycardia, 429</td>
<td></td>
</tr>
<tr>
<td>cardiac arrest, 429</td>
<td></td>
</tr>
<tr>
<td>cardiovascular disease, 430</td>
<td></td>
</tr>
<tr>
<td>critical care of burn casualties and, 292–293</td>
<td></td>
</tr>
<tr>
<td>heart rate and rhythm, 293</td>
<td></td>
</tr>
<tr>
<td>hemodynamic therapy, 293</td>
<td></td>
</tr>
<tr>
<td>Karvonen method for determining heart rate range (exhibit), 332</td>
<td></td>
</tr>
<tr>
<td>myocardial contractility, 293</td>
<td></td>
</tr>
<tr>
<td>orthostatic hypotension, 421, 430</td>
<td></td>
</tr>
<tr>
<td>physical activity during rehabilitation and, 293</td>
<td></td>
</tr>
<tr>
<td>preload augmentation, 293</td>
<td></td>
</tr>
<tr>
<td>regional anesthesia and analgesia risks to, 236–237</td>
<td></td>
</tr>
<tr>
<td>spinal cord injuries and, 429–430</td>
<td></td>
</tr>
<tr>
<td>topics of concern for amputees, 218</td>
<td></td>
</tr>
<tr>
<td>vasopressor use, 293</td>
<td></td>
</tr>
<tr>
<td>ventricular afterload, 293</td>
<td></td>
</tr>
<tr>
<td>ventricular preload, 292–293</td>
<td></td>
</tr>
<tr>
<td>Caregivers</td>
<td></td>
</tr>
<tr>
<td>involvement with the rehabilitation process, 47–48</td>
<td></td>
</tr>
<tr>
<td>CARFs. See Commission on Accreditation of Rehabilitation Facili-</td>
<td></td>
</tr>
<tr>
<td>ties</td>
<td></td>
</tr>
<tr>
<td>Carlson, D.E.</td>
<td></td>
</tr>
<tr>
<td>relationship between burn size and energy expenditure, 295–296</td>
<td></td>
</tr>
<tr>
<td>Carpus amputations. See Hand and carpus amputations</td>
<td></td>
</tr>
<tr>
<td>Case managers</td>
<td></td>
</tr>
<tr>
<td>description and role, 45, 47, 48</td>
<td></td>
</tr>
<tr>
<td>Case studies</td>
<td></td>
</tr>
<tr>
<td>an experience of the preventive medical psychiatry service</td>
<td></td>
</tr>
<tr>
<td>(exhibit), 269</td>
<td></td>
</tr>
<tr>
<td>family intervention (exhibit), 273</td>
<td></td>
</tr>
<tr>
<td>use of empathic exposure (exhibit), 270</td>
<td></td>
</tr>
<tr>
<td>use of hypnosis in treating phantom limb pain (exhibit), 270</td>
<td></td>
</tr>
<tr>
<td>using reframing and affirming techniques (exhibit), 270</td>
<td></td>
</tr>
<tr>
<td>wheelchair use (exhibit), 716</td>
<td></td>
</tr>
<tr>
<td>Casting</td>
<td></td>
</tr>
<tr>
<td>acute phase of burn casualty rehabilitation, 325–326</td>
<td></td>
</tr>
<tr>
<td>intermediate phase of burn casualty rehabilitation, 326</td>
<td></td>
</tr>
<tr>
<td>long-term phase of burn casualty rehabilitation, 319, 326</td>
<td></td>
</tr>
<tr>
<td>Plaster of Paris advantages, 325</td>
<td></td>
</tr>
<tr>
<td>serial casting for burn casualties, 325–326</td>
<td></td>
</tr>
<tr>
<td>uses of, 325</td>
<td></td>
</tr>
<tr>
<td>Cauda equina syndrome</td>
<td></td>
</tr>
<tr>
<td>description, 420</td>
<td></td>
</tr>
<tr>
<td>pain presentation, 439</td>
<td></td>
</tr>
<tr>
<td>prognosis, 420–421</td>
<td></td>
</tr>
<tr>
<td>CDC. See Centers for Disease Control and Prevention</td>
<td></td>
</tr>
<tr>
<td>Cefazolin</td>
<td></td>
</tr>
<tr>
<td>surgical prophylaxis, 194</td>
<td></td>
</tr>
<tr>
<td>surgical site infection treatment, 196</td>
<td></td>
</tr>
<tr>
<td>Cefotetan</td>
<td></td>
</tr>
<tr>
<td>surgical site infection treatment, 196</td>
<td></td>
</tr>
<tr>
<td>Cefuroxime</td>
<td></td>
</tr>
<tr>
<td>surgical prophylaxis, 194</td>
<td></td>
</tr>
<tr>
<td>Cellulitis</td>
<td></td>
</tr>
<tr>
<td>pressure ulcers and, 436</td>
<td></td>
</tr>
<tr>
<td>Center for the Intrepid</td>
<td></td>
</tr>
<tr>
<td>description, 10, 20</td>
<td></td>
</tr>
<tr>
<td>fundraising campaign for, 20</td>
<td></td>
</tr>
<tr>
<td>Centers for Disease Control and Prevention</td>
<td></td>
</tr>
<tr>
<td>contact precaution guidelines, 198</td>
<td></td>
</tr>
<tr>
<td>estimate of the number of persons in the United States living</td>
<td></td>
</tr>
<tr>
<td>with major limb amputation in 1996, 7</td>
<td></td>
</tr>
<tr>
<td>Healthcare Infection Control Practices Advisory Committee MDRO</td>
<td></td>
</tr>
<tr>
<td>guidelines, 194</td>
<td></td>
</tr>
<tr>
<td>increasing rates of drug-resistant Acinetobacter as a cause for</td>
<td></td>
</tr>
<tr>
<td>bloodstream infections, 194</td>
<td></td>
</tr>
<tr>
<td>physical activity effect on physical and mental well-being, 642</td>
<td></td>
</tr>
<tr>
<td>traumatic brain injury case estimates, 400</td>
<td></td>
</tr>
<tr>
<td>work-related amputation data, 601</td>
<td></td>
</tr>
<tr>
<td>Centers of excellence. See also specific centers creation of, 6</td>
<td></td>
</tr>
<tr>
<td>future research needs, 738</td>
<td></td>
</tr>
<tr>
<td>level V care and, 3–4</td>
<td></td>
</tr>
<tr>
<td>Central auditory processing disorders. See Central auditory system</td>
<td></td>
</tr>
<tr>
<td>damage</td>
<td></td>
</tr>
<tr>
<td>Central auditory system damage</td>
<td></td>
</tr>
<tr>
<td>assessment of, 390–391</td>
<td></td>
</tr>
<tr>
<td>auditory training and, 392</td>
<td></td>
</tr>
<tr>
<td>blast exposure and, 387</td>
<td></td>
</tr>
<tr>
<td>“cortical deafness,” 387</td>
<td></td>
</tr>
<tr>
<td>general management strategies, 392–393</td>
<td></td>
</tr>
<tr>
<td>treatment and diagnosis challenges, 387</td>
<td></td>
</tr>
<tr>
<td>treatment and rehabilitation, 392–393</td>
<td></td>
</tr>
<tr>
<td>Central cord syndrome</td>
<td></td>
</tr>
<tr>
<td>description, 420</td>
<td></td>
</tr>
<tr>
<td>Central vestibular damage</td>
<td></td>
</tr>
<tr>
<td>traumatic brain injury and, 386–387</td>
<td></td>
</tr>
<tr>
<td>Cephalosporins</td>
<td></td>
</tr>
<tr>
<td>surgical prophylaxis, 194</td>
<td></td>
</tr>
<tr>
<td>Cernak, I.</td>
<td></td>
</tr>
<tr>
<td>traumatic brain injury research, 403</td>
<td></td>
</tr>
<tr>
<td>Certified Rehabilitation Counselors competencies included, 96–97</td>
<td></td>
</tr>
<tr>
<td>CFI. See Center for the Intrepid</td>
<td></td>
</tr>
<tr>
<td>Challenge Aspen</td>
<td></td>
</tr>
<tr>
<td>contact information, 683</td>
<td></td>
</tr>
<tr>
<td>Challenge magazine, 525</td>
<td></td>
</tr>
<tr>
<td>Challenged Athletes Foundation contact information, 684</td>
<td></td>
</tr>
<tr>
<td>Paralympic Games and, 36</td>
<td></td>
</tr>
<tr>
<td>Chemical burns</td>
<td></td>
</tr>
<tr>
<td>causes, 280</td>
<td></td>
</tr>
<tr>
<td>incidence of, 280</td>
<td></td>
</tr>
<tr>
<td>mechanism of damage, 281</td>
<td></td>
</tr>
<tr>
<td>treatment, 280–281</td>
<td></td>
</tr>
<tr>
<td>Child care</td>
<td></td>
</tr>
<tr>
<td>phase of the upper limb amputee protocol of care and, 520–521</td>
<td></td>
</tr>
<tr>
<td>Chlorpromazine</td>
<td></td>
</tr>
<tr>
<td>dysautonomia treatment, 407</td>
<td></td>
</tr>
<tr>
<td>Cholesteatomas</td>
<td></td>
</tr>
<tr>
<td>complications of, 385</td>
<td></td>
</tr>
<tr>
<td>tympanic membrane perforation and, 385</td>
<td></td>
</tr>
<tr>
<td>Chhopart amputations</td>
<td></td>
</tr>
<tr>
<td>description, 135–136</td>
<td></td>
</tr>
<tr>
<td>equinus deformity and, 133–134, 155</td>
<td></td>
</tr>
<tr>
<td>Christopherson, R.</td>
<td></td>
</tr>
<tr>
<td>regional anesthesia and analgesia research, 235</td>
<td></td>
</tr>
<tr>
<td>Cisplatin</td>
<td></td>
</tr>
<tr>
<td>ototoxicity of, 388, 389</td>
<td></td>
</tr>
<tr>
<td>Gitalopram</td>
<td></td>
</tr>
<tr>
<td>depression treatment, 271</td>
<td></td>
</tr>
<tr>
<td>Civil War</td>
<td></td>
</tr>
<tr>
<td>amputations performed, 21, 118</td>
<td></td>
</tr>
<tr>
<td>Invalid Corps of the Union Army, 54</td>
<td></td>
</tr>
<tr>
<td>mortality risk from fractures, 193</td>
<td></td>
</tr>
</tbody>
</table>
prosthetics advances, 23
survival rate for amputation procedures, 21
US Sanitary Commission and, 23–24, 26
volunteer role, 24, 26
Whitman’s observations and philanthropic work, 21–22
Cleveland, Mather
description of the need for amputation, 30
Clindamycin
surgical site infection treatment, 196
Clinical Practice Recommendations for Issuance of Recreational
and Sports Equipment, 671, 715
Clinton, Pres. Bill
National Cemetery Administration creation and, 82
Clonidine
autonomic dysreflexia treatment, 430
combined with mexiletene, 247
dosage considerations, 247
phantom limb pain treatment, 233, 247
residual limb or stump pain treatment, 233
Closure of wounds
contamination and, 121
dry dressings and, 121–122
heterotopic ossification and, 123–124
indications and timing for definitive closure, 121–124
infection and, 121–122
negative pressure dressings, 121
nutritional support and, 122
topical wound care solutions, 122
treatment of retained fragments or foreign bodies and, 123
Clotting bandages
development of, 5
Coalition to Salute America’s Heroes
support programs, 111
Cobot concept
description, 727
Cochlear injuries
blast exposure and, 385–386
initial presentation of, 386
mechanism of, 385
sensorineural hearing loss and, 385–386
signs of, 385
sound pressure levels and, 385
Cognitive function
domains of cognitive functioning and representative neuro-
psychological tests (table), 409
traumatic brain injury and, 404, 405, 408–409
Colchicine
heterotopic ossification treatment, 158
Colon
neurogenic bowel, 432
Colorado Discover Ability Integrated
contact information, 684
Colostomy
spinal cord injury and, 432
Combat amputee care
advances in firepower and, 20
Civil War and, 21–26
current conflicts, 37
current military transport and patient evacuation, 20–21, 608
historical background, 5–7, 20–37
Korean conflict and, 33
technological innovations in the field of medicine and, 20
transportation advances and, 20
Vietnam War and, 33–37
World War I and, 26–28
World War II and, 30–33
Combat casualty care mission of MHS, 2–4
Combat-related special compensation
basis for, 62
Combat support hospitals
level III care and, 3
Combat veterans
documents to substantiate combat service, 77
National Defense Authorization Act VA healthcare package, 77
Commissary privileges
eligibility for, 85
Commission on Accreditation of Rehabilitation Facilities
directory of rehabilitation providers, 49
VA agreement with, 43
Communication
activities of daily living issues, 335, 338
augmentative and alternative communication, 713–714
Community reintegration of burn casualties
acute phase of burn casualty rehabilitation, 343
discharge from the hospital and, 344
intermediate phase of burn casualty rehabilitation, 344
long-term phase of burn casualty rehabilitation, 344
purpose of programs for, 344
Community reintegration of upper limb amputees
anxiety and, 523
occupational therapy considerations, 522–523
survey of, 530
therapeutic outings, 523
Community residential care
Veterans Health Administration and, 73
Compensated work therapy
description, 101
Compensation. See Retirement and disability compensation;
Veterans Benefits Administration
Complications associated with rehabilitation of burn casualties
neurologic, 346–348
orthopaedic, 345–346
psychological, 348–349
Complications associated with rehabilitation of individuals with
spinal cord injuries
cardiovascular, 429–430
dermatologic, 433–436
endocrinologic, 433
gastrointestinal, 430–433
genitourinary, 440–442
health maintenance, 442–443
musculoskeletal, 436–438
neurologic, 438
pain, 438–440
psychological, 442
pulmonary, 427–429
Compression. See also Body garments
burn edema and, 302, 305, 306
burn scars and, 352, 353–354
skin grafts and, 172
Compression dressings
benefits of, 462
compliance with, 462–463
stump shrinker socks and, 462
Compressorgrip sleeves
description, 497
Computed tomography
heterotopic ossification diagnosis, 209
infection monitoring, 197
three-dimensional modeling, 211–213
Computer-aided design
limb interface systems, 722
Computer-aided manufacturing
limb interface systems, 722
“Squirt Shape” technique, 722
Computer and Electronic Accommodation Program
Dentistry research, 247
Day treatment programs
description, 47
DD 214 form
description, 55
VA benefits and, 55, 77
de Visme, V.
regional anesthesia and analgesia research, 234
Deathe, A.B.
upper limb amputation research, 602
Debridement
autolytic and enzymatic, 204–205
contraindications for, 205
importance of, 193
infection and, 178, 179
insufficient versus excessive, 202
mechanical, 205
restoring moisture balance and, 205–206
sharp, 204
techniques for, 204–205
wound care and management and, 202, 204–205
Deep brain stimulation
phantom limb pain treatment, 248
Deep partial-thickness burns
compression garments and, 322, 324
description, 282
dressing considerations, 307
range-of-motion exercises and, 330
treatment, 282
Deep venous thrombosis
burn casualties and, 294
consequences of, 206
incidence in trauma patients, 206–207
individuals with spinal cord injuries and, 429
medical prophylaxis, 12–13, 207, 429
minimizing immobilization and, 207
physical prophylaxis, 207
risk factors, 12, 206, 429
traumatic brain injury and, 406
treatment, 429
Defense Advanced Research Projects Agency
partnerships with, 12
upper limb prosthetics research, 527–528
Defense and Veterans Brain Injury Center
database of individuals who have received care, 49
description and role, 49
educational materials, 406
number of US service members sustaining TBI, 400
screening for TBI, 272
traumatic brain injury centers, 42
VA PSC collaboration with, 48–49
Defer, P.A.
one osteomyoplastic transtibial amputation technique case studies, 166
Definitions. See Terminology; specific terms
Dental services
combat veterans and, 77
Dependency and indemnity compensation
Veterans Benefits Administration, 79
Dependents Educational Assistance Program
description, 81
Depression
burn casualties and, 349
pharmacological treatment, 271
spinal cord injuries and, 442
traumatic brain injury and, 405
Dermatologic issues. See also Skin; Skin disorders
pressure ulcers, 433–436
spinal cord injuries, 433–436
upper limb amputations, 599
Desensitization
compression techniques, 497
desensitization programs, 346–347
multiple exposure / progressive desensitization, 530–531
Desipramine
phantom limb pain treatment, 247
Diabetes mellitus
spinal cord injuries and, 433
Diazepam
spasticity treatment, 438
Dichotic speech tests
description and uses, 390
Dillingham, Dr. Timothy
care of amputees as a major problem for the military, 494
motivational therapeutic programs and, 35–36
upper limb amputation research, 598
Diphenhydramine
pruritus treatment, 347–348
Disabilities of the Arm Shoulder Hand questionnaire
description and uses, 15, 601–602
Disability compensation
Veterans Benefits Administration, 79
Disabled American Veterans
creation of, 29
description and programs, 111, 524
Paralympics sponsor, 15
present-day role, 29
Disabled Archery, USA
archery regulations, 672
contact information, 686
Disabled Sports, USA
aerobics/physical fitness videotapes, 672
contact information, 686
Nordic and Alpine skiing regulation, 678
Disabled Sports USA
Paralympics sponsor, 15, 36, 524
Disabled Veterans Act, 96
Discharge planning
follow-up care, 525
resources for patients, 525
Disease-related amputations, 4, 7
Diuretics
ototoxicity of, 388
Divorce
spinal cord injuries and, 442
DoD. See US Department of Defense
Donning prostheses. See Donning/doffing prostheses
Dole-Shalala Commission. See President’s Commission on Care for America’s Returning Wounded Warriors
Domiciliary care
Veterans Health Administration and, 73–74
Donning/doffing prostheses
bilateral upper extremity prosthetic sample donning and doffing strategies and considerations (table), 514
bilateral upper limb amputees and, 630–631
body-powered, 511
goals of, 509
interim phase of upper limb prosthetic rehabilitation and, 623
myoelectric type, 509–511
phase three of the upper limb amputee protocol of care and, 509–511, 512
range of methods for, 509
sample donning method for a transhumeral amputee (figure), 513
sample donning methods for a transradial amputee with a body-powered pin lock suspension prosthetic system (figure), 512
Dressings. See also Compression dressings
biological, 312–313
bolster, 307
burn wounds, 307
contact, 307
Dakin moist-to-dry, 180
for donor sites, 313–314
dry dressings, 121–122
heterotopic ossification and, 158
immediate postoperative prosthesis, 129–130
negative pressure dressings, 121, 315
pressure ulcers and, 435
rigid dressings, 128–129, 137–138, 173
silver-nylon, 307
soft dressings, 128
subatmospheric pressure dressings, 158, 172, 180
synthetic skin substitutes, 307
Driving
car adaptations, 425
driver's training for individuals with spinal cord injuries, 425
phase four of the upper limb amputee protocol of care and, 521
prosthetic examples, 659–660
upper limb amputations and, 601
upper limb prosthetic considerations, 646–647
wheelchair use and, 711–712
DSUSA. See Disabled Sports, USA
Duodenum
spinal cord injury and, 431
superior mesenteric artery syndrome, 431
DVBIC. See Defense and Veterans Brain Injury Center
DVT. See Deep venous thrombosis
Dynamic response feet
energy storage and return design, 555–556
vertical, shock-absorbing pylons for, 556–558
Dynamic splints
corrective, 324
description, 324
long-term phase of burn casualty rehabilitation and, 324–325
uses for, 319, 324
Dysphagia
spinal cord injuries and, 431
E
EADLs. See Electronic aids to daily living
Early postoperative prosthesis
interim phase of upper limb prosthetic rehabilitation and, 622–623
surgical considerations, 623
Eastern Amputee Golf Association
contact information, 686
Edelstein, J.E.
upper limb amputation research, 600
Edema. See also Burn edema
residual limb management, 622, 636
Education programs
Veterans Benefits Administration, 80–81
“Effects of Regional Anesthesia on Phantom Limb Pain Are Mirrored in Changes in Cortical Reorganization” (Birbaumer), 240–241
Elbow and humerus amputations. See also Elbow units for upper limb prosthetics
general surgical considerations, 131–133
handling of the median, radial, and ulnar nerves, 133
interim phase of upper limb prosthetic rehabilitation and, 626–627
prosthetic recommendations (table), 630
shoulder disarticulations, 133
transhumeral amputations, 132–133
Elbow disarticulation
advantages and disadvantages of, 131–132
surgical considerations, 619
Elbow units for upper limb prosthetics. See also Elbow and humerus amputations
description, 617
transhumeral amputations and, 627–628
Electric-powered wheelchairs
description and uses, 422–423, 425
foot and leg supports, 706
goal of, 701
power-base design, 702
seat elevation systems, 708
seating system, 702
sensory-motor impairments and, 701
tilt frames and reclining backrests, 707
traditional frame design, 701–702
Electric Wheelchair Hockey Association
contact information, 687
Electrical burns
amputations and, 346
burn casualty reconstructive surgery, 359
causes, 281
mechanism of damage, 281–282
mortality from, 281
muscle damage from, 281–282
Electrically powered upper limb prosthetics. See also Myoelectric prostheses
advantages/disadvantages of (table), 610
battery maintenance, 610
bilateral upper limb amputees and, 631
control methods, 609–610
description, 609
early postoperative prosthesis and, 622
elbow units, 617
interscapulothoracic amputations and, 629
repair issues, 610
styloid disarticulation and, 625–626
terminal devices and, 614–615
transhumeral amputations and, 628
transradial amputations and, 626
wrist units, 616
Electromyography
gait analysis, 537
knee prosthesis comparison, 547
Electronic aids to daily living
burn casualties and, 335
commercial availability, 715
description, 714
evaluation for, 714–715
spinal cord injuries and, 426
use display and user control interface, 714
Electronic pumps
patient-controlled analgesia and, 244
Electrophysiologic tests
description and uses, 390–391
late-latency response, 390
middle-latency response, 390
Elizaga, A.M.
continuous peripheral nerve block research, 241
EMEDS. See Expeditionary medical support
Emergency medical care
Veterans Health Administration and, 74
Emerging consciousness programs
description, 46
EMG. See Electromyography
Endocrine system
spinal cord injuries and, 433

topics of concern for amputees, 219
Energy expenditure
average energy costs of prosthetic ambulation (table), 546
gait analysis and training and, 536, 539, 546
Environmental controls. See Electronic aids to daily living
Ephedrine sulfate
orthostatic hypotension treatment, 430
Epidural burns
description, 282
Epidural analgesia
evidence-based studies demonstrating benefits, 239–240
evidence-based studies demonstrating no benefit, 240
mechanism of, 233
Epidural anesthesia
benefits of, 234–236
catheter placement, 242
risks of, 236–239
solutions for, 244
techniques for, 242
Epinephrine
dosage considerations, 237
Epinephrine toxicity
perioperative regional anesthesia and analgesia risk, 238
Epoetin alfa
red blood cell stimulation, 13
EPO. See Early postoperative prosthesis
EPWs. See Electric-powered wheelchairs
Equipment for sports and recreation. See also Sports and recreation opportunities; specific sports
basketball wheelchairs, 708–709
camping, 709
cycling, 709–710
hiking, 709
hockey, 710
racing, 709
skiing, 710
tennis, 709
track and field sports, 709
waterskiing, 710
wheelchair rugby, 709
Ertl, Janos
osteomyoplastic transtibial amputation technique, 165–169
ESBL. See Extended-spectrum beta-lactamase
Esophagitis
spinal cord injuries and, 431
Esophagus
dysphagia, 431
esophagitis, 431
Etidronate disodium
heterotopic ossification treatment, 345, 437–438
Evaluation of the less-than-successful amputee
medical history, 155–156
physical examination, 156–157
Exchange privileges
eligibility for, 85
Expeditionary medical support
level II care and, 3
Extended-spectrum beta-lactamase
carbenem treatment, 195

F

Faber, A.W.
principles of psychological treatment of burn casualties, 348
Face masks
burn scar management and, 354
Facial burns
burn casualty reconstructive surgery and, 359

burn scar management, 354
sensory issues, 359–360
Family intervention
purpose of, 273
support group therapy sessions, 273
Family members
assistance for, 47
family intervention (exhibit), 273
future research needs, 735
Heimlich maneuver training and, 428–429
involvement with the rehabilitation process, 47–48, 268, 349
as nonmedical attendants, 14, 268
preexisting conflicts among, 273
spinal cord injuries and, 426–427
support for, 273
support from, 268
support group therapy sessions, 273
traumatic brain injury and, 272, 406
FATS. See Firearm Training System
FCEs. See Functional capacity evaluations
Federal Aviation Administration
dual controls for flying, 675
Fencing
opportunities available to amputees, 674–675
Fentanyl
burn casualties and, 297
epidural anesthesia and, 244
phantom limb pain treatment, 245
transdermal, 245
Fertility
polytrauma patients and, 219
spinal cord injuries and, 441–442
Finger, thumb, and partial hand amputations. See also Hand and carpus amputations
interim phase of upper limb prosthetic rehabilitation and, 625
Finucane, B.T.
regional anesthesia and analgesia research, 236
Firearm Training System
description, 528
firearms training simulator data (table), 529
Firearms
air guns/shooting, 672
prosthetic examples, 663–664
safety issues, 648
trap and skeet shooting, 679
upper limb prosthetic considerations, 648
Fisher, Arnold
Center for the Intrepid and, 20
continuous peripheral nerve block research, 240
Fisher, Ken
Center for the Intrepid and, 20
Fisher House Foundation
assistance for families and caregivers, 48, 111
description, 20
Fishing
competitive bass fishing, 675
opportunities available to amputees, 675
prosthetic examples, 660–662
upper limb prosthetic considerations, 647–648
Fishing Has No Boundaries
contact information, 687
Fitzgerald, S.G.
wheelchair activity patterns, 701
Fitzsimons General Hospital, Denver CO
Brown’s career, 6
reluctance of staff to send patients to VA hospitals, 7
Five Function Wrist units
description, 527
Flap grafts
Flaps
burn reconstructive surgery and, 358–359
“flaps of opportunity” for lower limb amputations, 134
pressure ulcer surgery and, 435–436
skin grafts and, 311
transtibial amputations and, 136–137

Fleet hospitals
level III care and, 3

Fletchall, S.
upper limb amputees fitted with prostheses, 527

Flexibility
phase one of the physical therapy rehabilitation program and, 454
phase one of the upper limb amputee protocol of care and, 497–498
phase two of the physical therapy rehabilitation program and, 465
phase two of the upper limb amputee protocol of care and, 503

Flowers, K.R.
static progressive splints, 325

Fluid resuscitation program for burn casualties
abdominal compartment syndrome and, 288, 289
burn shock and, 288
compartment syndrome and, 288–289
components, 280
consequences of over resuscitation, 288–289
equations for, 288
eschar syndrome and, 288–289
formulas (table), 280
reduction in mortality rates and, 280
sodium ion and, 279–280
Starling equation (exhibit), 288

Fluoroquinolone
surgical site infection treatment, 196

Flying
opportunities available to amputees, 675

Foot amputations
Chopart, 135–136
Lisfranc-level, 135
partial foot, 134–136
postoperative casting, 135–136
transmetatarsal, 134–135

Football
opportunities available to amputees, 675

Ford, R.P.
regional anesthesia and analgesia research, 235

Forearm. See Wrist and forearm amputations

Forward surgical teams
level II care and, 3
“4” profile designators
medical evaluation boards and, 58

Fractures
phase four of the physical therapy rehabilitation program and, 481
spinal cord injuries and, 433, 436–437

Franco, C.D.
regional anesthesia and analgesia research, 237

Franco-Prussian War
mortality risk from fractures, 193

Franks, Gen. (Ret.) Frederick
return to duty after limb amputation, 54

Franks, Gen. (Ret.) Frederick, Jr.
success of Vietnam-era amputee care example, 7

Free flaps
burn casualty reconstructive surgery and, 358–359
Freedom’s Wings International
contact information, 687

Friberg, O.
low back pain research, 251

Frierson, R.L.
social isolation after limb loss, 268

Full-thickness burns
average total body-surface area and, 283
compression garments and, 322, 324
description, 282
dressing considerations, 307
excision of, 307–309
range-of-motion exercises and, 330
split-thickness skin grafts and, 308
treatment, 282

Full-thickness pinch grafts
usefulness of, 171

Full-thickness skin grafts
burn casualties and, 310
donor sites, 310
healing time, 310

Fuller, George R.
prosthetics development, 23

Functional assessment and activities
ambulation, 476
arm swing, 476
ascending and descending stairs, 473
assistance devices, 477–478
backward walking, 479
bed mobility, 453
benefits to recovery, 465
description, 100–101
excessive lateral trunk movement, 478
falls/recovery, 471–472
floor to standing position, 472
gait training, 477–478
multidirectional movements, 479
pelvic rotation, 476
phase one of the physical therapy rehabilitation program and, 453–454
phase two of the physical therapy rehabilitation program and, 470
phase three of the physical therapy rehabilitation program and, 471–479
picking up objects, 473
resistive rollover drills, 478
sidestepping, 479
standing progression with prosthetic limb, 474–475
stride length, width, and cadence, 476–477
transfers, 453
trunk rotation, 476
weight-shifting progression, 474
wheelchair management, 453–454

Functional capacity evaluations
custom FCE protocols, 521–522
description, 521
flexibility of, 521
medical evaluation boards and, 522

Functional Status Outcomes Database
description, 49

Furosemide
hypercalcemia treatment, 433

Gabapentin
burn casualties and, 297
phantom limb pain treatment, 246
side effects, 246

Gage, J.R.
gait assessment research, 536
Gailey, R.S.
amputee mobility predictor, 15
Gait analysis and training. See also Ambulation
able-bodied (“normal”) gait, 539–540
advanced gait training, 476
ankle kinematics and kinetics, 541–542, 543–544
assistive devices and, 477–478
average energy costs of prosthetic ambulation (table), 546
backward walking, 479
computerized gait assessment, 538–539
effect of, 548
energy expenditure, 546
evolutionary change from quadruped to biped locomotion, 536
excessive lateral trunk movement and, 478
external joint moments, 536, 538
Gait deviations in lower limb amputations, 540–541
gait laboratory dependent therapeutic interventions, 548
hip disarticulation and, 576
hip kinematics and kinetics, 542, 545
historical background, 536
importance of evaluating, 218
initial contact through midstance, 541–545
intent of amputee gait assessment, 536
internal joint moments, 536
knee kinematics and kinetics, 542, 544–545
myodesis failure and, 162
observational assessment, 538
Ovid database review, 548
pre-swing, 543, 544
prosthetic components and, 547–548
prosthetic feet and, 555
prosthetic mass and, 546–547
resistive gait training, 476
resistive rollover drills and, 478
self-selected walking velocity, 536
sidestepping, 479
six determinants of gait, 540
stance period definition, 536
standardized assessment, 541
stride length, width, and cadence, 476–477, 536
summary of issues, 548
swing, 536, 543
swing-through gait, 423
temporal and spatial measurements, 536
terminal stance heel strike, 545
terminology of, 536–538
time dimensions of the gait cycle (figure), 537
transfemoral amputees and, 544–545
transpelvic amputees and, 541–544
trunk and pelvis kinematics, 542–543, 545
walking speed parameter, 536

galbladder
cholelisitiasis and, 431–432
spinal cord injury and, 431–432

galsworthy, john
philanthropic support for disabled World War I soldiers, 26–27

ganesh, a.
continuous peripheral nerve block research, 243–244

gaps-in-noise test
description and uses, 390

gastric ulcers
spinal cord injury and, 431

gastrointestinal system
acute abdomen, 432–433
bowel problems, 432
colon problems, 432
critical care of burn casualties and, 291–292
Curling’s ulcer incidence, 292
duodenum problems, 431
enteral feedings, 291
esosophagus problems, 431
gallbladder problems, 431–432
ileum problems, 432
oral cavity problems, 430–431
pancreas problems, 431
spinal cord injuries and, 430–433
stomach problems, 431

gel liners
description and uses, 563

General surgical principles for casualties with limb loss. See also
Special surgical considerations for casualties with limb loss;
Surgical considerations
amputee counselors/visitors, 142–143
delayed amputation versus limb salvage, 141–147
dressings, 128–130
elbow and humerus, 131–133
energy expenditure for amputation (table), 133
hand and carpus, 130–131
hip disarticulation and hemipelvectomy, 140
historical background, 118
immediate postoperative prosthesis, 129–130
indications and timing for definitive closure, 121–124
limb salvage versus amputation, 118–119
lower limb amputations, 133–140
multiple injured limb amputees, 141
muscle tension, 125
myodesis, 124–125, 164–165
myofascial closure, 124–125
myoplasty, 124
nerve management, 120–121, 127
open wound management, 121
partial foot amputation, 134–136
partners/mentors and, 142
rigid dressings, 128–129
skin traction, 126
soft dressings, 128
soft tissue and muscle management, 120, 122, 124–126
surgical goals, 119–120
Syne ankle disarticulation, 136
tenodesis, 125
through-knee and transfemoral amputation, 138–140
tourniquet use, 118
transstibial amputation, 136–138
upper limb amputations, 130–133
upper versus lower extremity considerations, 121
wound management at point of injury, 118–121
wrist and forearm, 131

Genitourinary system
bladder and renal calculi, 441
bladder carcinoma, 441
bladder management, 440–441
sexual function and fertility, 441–442
spinal cord injuries and, 440–442
urinary tract infection, 441

Geriatric evaluation and management
Veterans Health Administration and, 73
Geriatric research, education, and clinical centers
Veterans Health Administration and, 73
“get up and go” test, 15
Giaufre, e.
peripheral nerve block research, 234
Gitter, A.J.
gait analysis and training research, 546–547
Glasgow Coma Scale
traumatic brain injury assessment, 400
Glenohumeral amputations
interim phase of upper limb prosthetic rehabilitation and, 629
prosthetic recommendations (table), 633
surgical considerations, 620
Global war on terror. See also Operation Enduring Freedom/Oper-
ation Iraqi Freedom
advances in amputee care, 732
blast exposure injuries, 402–403
challenges for US military forces, 2
launching of, 2
National Guard and reserve soldiers and, 4
Navy Safe Harbor program and, 107
return to duty after limb amputation and, 54
Gloves
compression gloves for hand burn management, 357
Isotoner edema gloves, 305
GMEs. See Graduate medical education
Goldthwait, Joel
vocational rehabilitation work, 28
Golf
lower limb prosthesis and, 591
opportunities available to amputees, 676
prosthetic examples, 654–655
upper limb prosthetic considerations, 645
Gottschalk, F.
adductor mechanism repair technique, 163
Graduate medical education
importance of, 4, 11
programs, 4
Graham, L.
upper limb amputation research, 600
Grass, J.
regional anesthesia and analgesia research, 235
Green, H.
cultured autologous keratinocyte (epidermal) skin grafts and,
312
Grief
burn casualties and, 349
grieving process after limb loss, 267–268
phase two of the upper limb amputee protocol of care and, 500
Grieger, T.A.
psychiatric disorder association with trauma, 266
Guides to Evaluation of Permanent Impairment, 63
Guinard, J.P.
regional anesthesia and analgesia research, 235
Gulf War veterans
presumptive conditions considered for disability compensa-
tion, 77
Gunawardena, N.S.
physical profiles for combat-injured soldiers with unilateral
transstibial amputations, 155
Guttmann, Sir Ludwig
wheelchair sports, 36, 670, 674–675
GWOT. See Global war on terror

Hand burns
compression and, 352, 357–358
continuous passive motion devices and, 328
custom hand and wrist splints (table), 323
depth and location importance, 283
dorsal hand as most common site for, 283
location issues, 283, 284
long-term phase of burn casualty rehabilitation, 317
peripheral neuropathies and, 347
plastic and reconstructive surgery issues, 359
range-of-motion exercises and, 357–358
splinting issues, 320–321, 322–324
vascular support for, 352
Hand Rehabilitation Center
adaptive splints for burn casualties, 325
Handcycling
opportunities available to amputees, 673
recumbent hand cycles, 709–710
Handicapped Scuba Association
contact information, 687
Hanger, James Edward
prosthetics development, 23
Hard sockets
description and uses, 563–564
Harmonic drives
efficiency rates, 728
Harris, W.W.
osteomyoplastic transtibial amputation technique case studies,
166
Harvey, C.
family support group therapy sessions, 273
Head, Henry
mirror therapy research, 250
Headphones
hearing loss prevention, 393
Health education mission of MHS, 4–5
Healthcare Cost and Utilization Project, Nationwide Inpatient
Sample
categorization of data, 598
Healthcare services to active duty and military beneficiaries mis-
sion of MHS, 4
Hearing aids
alternatives for individuals with upper limb amputations, 392
classification of, 391
digital programmable type, 391–392
FM system for, 392
remote control options, 392
selection criteria, 392
tinnitus and, 393
Hearing conservation
headphones and, 393
hearing protectors, 393
Hearing Handicap Inventory for Adults
description, 388
Hearing loss
audiologic injury from blast exposure, 383–384
audiometric evaluation of, 388
blast injuries to the ear (figure), 384
burn casualties and, 359, 360, 384
causes, 382
central auditory system damage, 387, 392–393
concussion traumatic brain injury, 382, 386, 388, 389, 390, 391
diagnostic tests, 388–391
incidence in combat veterans, 382
inner ear injury, 385–386
interim phase of upper limb prosthetic rehabilitation and, 633
middle ear injury, 384–385
noise-induced, 382–383
ototoxic monitoring protocol, 388–389
ototoxicity, 383, 386, 388–389
outer ear injury, 384
patient questionnaires, 388
peripheral hearing loss, 391–392
prevention of, 393
reevaluation of, 391
summary of issues, 393–394
tinnitus, 387, 393
treatment and rehabilitation, 391–393
types of, 382–387
vestibular injury, 386–387, 392
Hearing protectors
hearing loss prevention, 393
Heat
scar management and, 353
Hematologic considerations
critical care of burn casualties, 294
Hematoma
perioperative regional anesthesia and analgesia risk, 238
Hemipelvectomy
general surgical considerations, 140
Hemostatic bandages
description, 37
Heparin. See Low-molecular-weight heparin
Herndon, Dr. James
Gen. Franks’ care and, 7
Heroes to Hometowns
description, 109
Heterografts
burn casualties and, 313–314
donor sites, 313–314
Heterotopic ossification
active range-of-motion exercises and, 329
burn casualties and, 329, 345
conservative treatment recommendation, 159
description, 157, 345, 437
diagnosis of, 209, 406
future research needs, 736
grading for, 159
historical background, 157, 209
incidence of, 13, 209, 211, 437
infection and, 178–179
lower limb amputations and, 134
mechanism of, 208
pathogenesis, 157, 406
percentage of combat-related amputees with, 157
postinjury onset of, 210–211
presentation of, 437
prevalence of, 157, 437
prophylactic and prevention modalities, 158–160
prosthesis considerations, 577
rehabilitation challenges, 208–209
risk factors for, 157–158, 209–210, 406
secondary effects of, 13
spinal cord injuries and, 437–438
surgical considerations, 159–161, 211–213
description, 211–213
traumatic brain injury and, 210, 406
measurement and, 159, 208, 210–211, 345, 435–437
upper limb prosthetics and, 637
vacuum-assisted closure devices and, 126
wound closure and, 123–124
wound infection and, 210
WRAMC experience with, 209–211
Hiking
lower limb prosthesis and, 591
wheelchair designs for, 709
Hines Veterans Administration Hospital
spinal cord injury center, 416
Hip disarticulation
alignment and, 576
gait and, 576
hip and knee joint considerations, 576
prosthesis biomechanics, 576
prosthesis socket design, 575
Hip disarticulations
general surgical considerations, 140
wound complications, 140
Hirai, M.
residual limb pain research, 155
Hirstein, W.
phantom limb pain research, 232
Historical background. See also Medical history
combat amputee care, 5–7, 20–37, 494
gait analysis and training, 536
heterotopic ossification, 157, 209
mortality risk from fractures, 193
pain management, 230
return to duty, 54
spinal cord injuries, 416
sports and recreation opportunities, 670
sports-related prostheses, 642
surgical amputations, 118
HO. See Heterotopic ossification
Hoagland, F.T.
socket problems research, 156
Hockey
opportunities available to amputees, 676
sled hockey, 676, 710
upper limb prosthetic considerations, 648
Hoge, C.W.
psychiatric disorder association with trauma, 266
traumatic brain injury research, 404–405
Holistic care
team approach to, 7, 8
Home-based primary care
Veterans Health Administration and, 72
Home hospice care
Veterans Health Administration and, 73
Home repair responsibilities
phase of the upper limb amputee protocol of care and, 519
Homeless veterans
Veterans Health Administration and, 76
Homemaker and home health aide program
Veterans Health Administration, 73
Homografts
burn casualties and, 313
Hook-style terminal devices
description, 614
programming of, 615
Hoover, A.
wheelchair activity patterns, 701
Horlocker, T.T.
regional anesthesia and analgesia research, 235
Horseback riding
opportunities available to amputees, 676
Huang, L.
characteristics of burn scars, 351
HUD. See US Department of Housing and Urban Development
Human Engineering Research Laboratories
partnerships with, 12
Humeral neck amputations
interim phase of upper limb prosthetic rehabilitation and, 629
prosthetic recommendations (table), 633
surgical considerations, 620
Humerus. See also Elbow and humerus amputations
humeral osteotomy technique, 174–176
Hunt, J.L.
hand burn outcomes, 283
Hunting
opportunities available to amputees, 676
Hybrid upper limb prosthetics
advantages/disadvantages of (table), 612
description, 612
Hydralazine
autonomic dysreflexia treatment, 430
Hydraulic prosthetic knees
description, 559
Hydromorphone
phantom limb pain treatment, 245
Hypercalcemia
spinal cord injuries and, 433
Hyperpigmentation
burn casualties and, 350, 351–352
Hypertension
walking in a prosthesis and, 218
Hypertrophic scarring
burn casualties and, 350, 351–352
Hypnosis
case study (exhibit), 272
description of technique, 271–272
iBOT transporters
advantages and disadvantages, 703
description and uses, 703
Iceross Seal-In liners
description and uses, 722
IDTs. See Interdisciplinary teams
Ileum
loss of gastrointestinal mobility and, 432
spinal cord injury and, 432
Immediate postoperative prosthesis
advantages and disadvantages, 129–130
Improvised explosive devices
amputation injuries and, 318, 345, 608
devastating injuries from, 42, 345
multi-system comorbidities, 118
traumatic brain injury and, 400
use in current conflicts, 37
In Motion magazine, 525
Inadvertent epidural spread
perioperative regional anesthesia and analgesia risk, 238
Individuals with Disabilities Education Act
provisions, 710
Individuals with limb amputations. See also Amputee care programs;
specific types of limb amputations
active duty service and, 2
cardiovascular and metabolic topics of concern, 218
changes in patient population, 7
disease-related amputations, 4
endocrine system topics of concern, 219
evaluation of the less-than-successful amputee, 155–157
future research needs, 734–738
grieving process after limb loss, 267–268
hearing loss and, 382–394
long-term effects, 217–219
musculoskeletal topics of concern, 218
outcomes research needs, 734
psychiatric interventions, 266–273
spinal cord injuries and, 424–425
“tactical athletes” description, 452, 732
traumatic brain injury and, 7, 219, 272, 404–405, 494
types of postamputation pain, 155–156
Infection. See also Methicillin-resistant Staphylococcus aureus;
Multidrug-resistant organisms; specific types of infection
antibiotic susceptibility testing, 194–195
blood transfusions and, 200
classification of, 177–178
contact precautions, 198
debridement and, 178, 179
differentiating between colonization and true infection, 195
fever in returning service members, 200
fracture characteristics and, 193
heterotopic ossification and, 178–179, 210
high incidence of, 177
hospital management of, 179
inflammatory markers, 197
laboratory evaluation, 178
local wound adjuncts and, 203
management at military tertiary care centers, 194–195
nutrition and, 177
osseointegration and, 723
osteomyoplastic transtibial amputations and, 168
perioperative regional anesthesia and analgesia risk, 239
postoperative infections in heterotopic ossification, 159–161
presentation, 178
prophylactic antibiotics and, 193–194
protocol for management of infections for amputee/extremity
trauma patients, 196–197
signs and symptoms of, 203
skin loss in burn patients and, 307
surgical considerations, 179
surgical infection management and follow-up, 195–196
Surgical Infection Prevention Project guidelines for antibiotic
prophylaxis, 193–194
surgical site infections, 195–196
treatment, 177–179
tympanic membrane perforation association with ear infec-
tions, 385
wound closure and, 121–122
Infectious Diseases Society of America
treatment guidelines for surgical site infections, 195–196
Inferior vena cava filters
deep venous thrombosis treatment, 429
Inner ear injuries
cochlear injury, 385–386
Inserts
burn scar management, 356–358
elastomers and, 357
hot and cold gel pads, 357
pressure and, 356
silicone gel sheeting, 357
silicones and, 356–357
wound healing and, 356, 357
Institute of Rehabilitation, New York University
Rusk’s principles of rehabilitation and, 33
Insurance programs
family service members’ group life insurance, 80
service-disabled veterans insurance, 80
Service Members Group Life Insurance, 79–80
service members’ traumatic injury protection, 80
Veterans Benefits Administration and, 79–80, 82
veterans’ group life insurance, 80
veterans’ mortgage life insurance, 80
Interdisciplinary teams
amputee care program, 10–11, 608
composition of, 44–45, 554
Polytrauma System of Care and, 44–45
role of, 44
Interim phase of upper limb prosthetic rehabilitation
bilateral amputee considerations, 629–632
burn casualties and, 634–635
donning and doffing prostheses, 623
eye postoperative prosthesis fitting, 622–623
fabrication of the definitive prosthesis, 624
hearing loss and, 633
level-specific recommendations, 625–629
lower extremity injury / loss and, 634
maintenance tasks, 624–625
transition from EPOP to preparatory version of the prosthesis, 623–624
traumatic brain injury and, 634
visually impaired persons, 632–633
International Amputee Soccer Association
prosthesis requirements, 584
International Classification of Functioning, Disability, and Health, 601
International Committee of the Red Cross
length-preserving amputation techniques, 122
war wound treatment discussion, 121
International Paralympic Committee
use of assistive devices in the water, 583–584
International Shooting Committee for the Disabled
shooting regulations, 672
International Wheelchair Aviators
contact information, 687
International Sports Organization for the Disabled
classification system, 671
International Standards for Neurological Classification of Spinal Cord Injury, 418
International Standards Organization
wheelchair standards, 698
International Wheelchair and Amputee Sports Federation
fencing regulations, 675
International Wheelchair Aviators
contact information, 687
Internet. See also Web sites
career guidance, 99
military support systems Internet addresses (table), 110
Interosseous amputations
interim phase of upper limb prosthetic rehabilitation and, 629
prosthetic recommendations (table), 633
surgical considerations, 620
Interwar period
military “reconstruction centers,” 29
Intrepid Fallen Heroes Fund
description, 20
IONSYS
patient-controlled analgesia and, 245
IPOP. See Immediate postoperative prosthesis
Iraq. See also Operation Enduring Freedom / Operation Iraqi Freedom
US Armed Forces Amputee Patient Care Program work with
Iraqi prosthetic and rehabilitation specialists, 554–555
Iraq War Veterans
support programs, 111
ISOD. See International Sports Organization for the Disabled
Isotoner edema gloves
burn edema management, 305
Israeli wars
spinal cord injuries and, 416
Iverson, G.L.
traumatic brain injury research, 404
Jaeger, H.
calcitonin research, 248
Jahangiri, M.
epidural analgesia research, 239
James A. Haley VA Hospital
vocational rehabilitation model program, 96, 103
Jebson-Taylor hand function test, 15
John’s Golf Course
contact information, 687
Johns Hopkins Bloomberg School of Public Health
Limb Loss Research and Statistics Program, 598
Joint Commission on Accreditation of Healthcare Organizations
outcomes-based practices recommendations, 15
pain management recommendations, 13
Joint contractures. See also Tissue contractures
lower extremity contracture, 172–173
positioning and, 454
spinal cord injuries and, 438
upper extremity contracture, 173
Joint War Committee of the British Red Cross
description and role, 28
Jones, L.E.
over-use injuries in unilateral amputees, 514
upper limb amputation research, 601
K
Kastner, J.
gait analysis and training research, 547
Katsuly-Liapis, I.
epidural analgesia research, 239–240
Kayak Adventures
contact information, 688
Kayaking
opportunities available to amputees, 676
prosthetic examples, 657
upper limb prosthetic considerations, 646
Keloid scarring
burn casualties and, 350–351
Kerrigan, D.C.
gait assessment research, 540
Ketamine
burn casualties and, 297, 298
dosage considerations, 247
mechanism of action, 247
phantom limb pain treatment, 247
residual limb pain treatment, 233
Kiellhofner, Gary
Model of Human Occupation, 494
Kinesiotherapists
description and role, 45
Kirke, Maj. Gen. Norman Thomas
Army Surgeon General role, 33
multidisciplinary amputee centers and, 33
Kishbaugh, D.
study of return to duty after limb amputation, 54
Kissin, I.
regional anesthesia research, 241
Knee disarticulation prostheses
benefits of disarticulation, 570
knee selection considerations, 571
socket design, 570
suspension, 570–571
Knee instability. See also Through-knee amputations
anterior cruciate ligament deficiency and, 176–177
short residual limb with an unstable fibula and, 176, 177
Korean conflict
number of amputations and reasons for, 33
survival rate for casualties, 400
Veterans Readjustment Assistance Act and, 96
Koren, D.
Index

posttraumatic stress disorder research, 405
psychiatric disorder association with trauma, 266
Krebs, D.E.
gait assessment research, 536

L
Labyrinthine damage
benign paroxysmal positioning vertigo and, 386
blast exposure and, 386
causes of, 386
Ménière’s disease and, 386
noise exposure and, 386
ototoxicity and, 386
symptoms of, 386
Lambert, A.W.
epidural analgesia research, 240
Landstuhl (Germany) Regional Medical Center
level IV care and, 3, 107
Language representation methods
description and uses, 713–714
LaNoue, Gen. (Ret.) Alcide
heterotopic ossification research, 209
osteomyeloplastic transtibial amputation technique case studies, 166
Laxatives
spinal cord injury and, 432
Lazzaro, J.J.
electronic bill of rights for the physically challenged, 529
LEAP. See Lower Extremity Assessment Project
LeBlanc, M.
upper limb amputation research, 600–601
Lehmann, J.F.
gait analysis and training research, 547
Leishmaniasis
fever cause, 200
Level I care
description, 3
Level II care
description, 3
Level III care
description, 3
Level IV care
description, 3
Level V care
description, 3–4
Level VI care
description, 4
Levetiracetam
posttraumatic seizure prophylaxis, 13
Levi, L.
traumatic brain injury research, 403
Lidocaine
burn casualties and, 298
dosage considerations, 236–237, 247
phantom limb pain treatment, 247
Lierz, P.
continuous peripheral nerve block research, 241
Life insurance. See Insurance programs
Limb interface systems
artificial condyles, 722–723
sockets and liners, 722
Limb Loss Research and Statistics Program
amputation estimates, 598
focus of, 599
outcomes data, 599
“use” and “satisfaction” measurements, 599–600
Limb salvage
achieving equal limb length and, 145–147
amputation after attempted limb salvage, 143–145
amputee counselors/visitors and, 142–143
bilateral amputation and, 145–147
bone defects or nonunion of fractures and, 145
compared with amputation, 118–119
decision debate, 141
degree of muscle loss and, 119
delayed amputation compared with, 141–147
factors impacting, 119
goal of, 119, 126
hospital resources and, 119
injuries to joints above the level of amputation and, 145
modern medical advances and, 118
partners/mentors and, 142
scoring systems, 118
upper limbs, 130
vascular injury and, 145
Lippmann, S.R.
social isolation after limb loss, 268
Lisfranc-level amputations
description, 135
Lithium ion batteries
power source for artificial limbs, 726
Lithium polymer batteries
power source for artificial limbs, 726–727
Liu, S.S.
regional anesthesia and analgesia research, 236
Livneh, H.
coping response research, 102
Loan guaranty program
servicing assistance, 81
specially adapted housing grants, 81, 82
Local anesthesia
burn casualties and, 297
Local anesthesia toxicity
regional anesthesia and analgesia risk, 236–237
treatment, 237
Locomotor capabilities index, 15
Loeser, J.D.
opioid research, 246
Long, C.L.
ebb and flow phases of burn casualties, 294
Lovenox
dep deep venous thrombosis prophylaxis, 207
Low back pain
incidence in individuals with amputations, 218, 250
leg length and, 251
Low molecular weight heparin
dep deep vein thrombosis prophylaxis, 12–13, 206, 207, 294, 429
Lower Extremity Assessment Project
limb salvage and, 119
through-knee amputations, 138
Lower extremity joint contracture
causes, 172
functional return and, 172
preventing, 172–173
prosthetic fitting and, 172
Treatment, 172
Lower limb amputations. See also Lower limb prosthetics; Physical therapy
achieving equal limb length and, 145–147
bilateral transfemoral amputations, 141
bilateral transtibial amputations, 141
bone defects or nonunion of fractures and, 145
cardiovascular topics of concern, 218
changes in patient population, 7
closure, 134
energy expenditure for amputation (table), 133
“flaps of opportunity,” 134
gait deviations and, 540–541
hemipelvectomy, 140
heterotopic ossification and, 134
hip disarticulation, 140
injuries to joints above the level of amputation and, 145
interest of amputees in sports and recreation activities, 582
interim phase of upper limb prosthetic rehabilitation and, 634
musculoskeletal concerns, 218
optimizing functional outcome, 133
partial foot amputation, 134–136
pneumatic tourniquets and, 134
prosthetic demands and, 121
severe upper extremity injury and, 141
spinal cord injury and, 424
surgical considerations, 133–140
Syme and long transtibial amputations, 136
through-knee, 138
transfemoral, 138–140
transtibial amputations, 136–138

Lower limb joint contracture
burn amputees and, 173
management of, 173
rigid dressings and, 173
surgery and, 173

Lower limb prosthetics
active duty military protocols, 578–579
advances in, 14
blind individuals and, 577
bone issues, 577
combined torsion and vertical shock units, 562
comorbidities affecting the rehabilitation prescription, 576–577
component overview, 555–564
gel liners, 563
goals of, 554
hard sockets, 564
hip disarticulation and transpelvic socket design, 575–576
joint function and condition and, 577
knee disarticulation, 570–571
knee units, 558–561
multidisciplinary team approach and, 554
multiple limb loss and, 576–577
orthotist role, 554
positional rotators, 562
prosthetic feet, 555–558
prosthetic socks, 563–564
prosthetist role, 554–555
quick release couplings, 562
recommendations for daily use prosthesis, 578–579
skin issues, 577
socket interfaces, 563–564
soft tissue issues, 577
summary of issues, 579
Syme prosthesis, 564–565
torsion units, 561–562
transfemoral flexible liner with rigid frame, 564
transtibial prostheses, 571–575

Lower limb prosthesis for sports and recreation. See also Upper limb prosthesis for sports and recreation
alignment considerations, 585
capabilities of the user and, 582
combined torsion and vertical shock units, 562
cycling, 588–589
general-use utility prosthesis, 584
high impact, 589–590
leg amputation, 584–586
march, 591
multiple limb loss and, 592
orthotic and prosthesis options, 581
participation without the prosthesis, 584–585
performance considerations, 583
physical factors associated with the injury and, 583
prosthetic feet, 584, 585–586
running, 587–588
skiing, 589–590
soccer, 587
summarized issues, 592
survey of disabled competitors in the 1996 Paralympic Games, 582
understanding the functional and biomechanical demands of a sport, 592
value of sports and recreation, 582
winter sports, 590

LRMs. See Language representation methods
LTI Boston Digital Arm System
description, 728

Lund, C.
chart for estimating burn size (figure), 284
rule of nines for burn severity, 282

M
M4L. See Marine Wounded Warrior Regiment
Madden, J.H.
scar tissue research, 318
Mafenide acetate
topical treatment of skin grafts, 315–316
Magnetic resonance imaging
heterotopic ossification diagnosis, 209
identification of inflammation-related pathology, 157
ostiomyelitis, 436
postrauematic syringomyelia, 439
Magneto rheologic prosthetic knees
description, 559–560
Maier, C.
calcitonin research, 248
Malaria
returning service members and, 200
Malcolm Grow Medical Center
PDES Joint Pilot Program and, 56
Malone, J.M.
upper limb amputees fitted with prostheses, 527
Manual wheelchairs
arm support, 706
armrests and footrests, 699–700
back height, 699
design importance, 698
foot and leg supports, 706
propulsion and skills, 700–701
rear axle position, 700
rear wheel camber, 700
seat and back angles, 699
seat depth, 699
seat height, 699
seat support, 705
seat width, 699
skills training importance, 701
sling seats, 705
standard type, 698
tilt frames and reclining backrests, 707
ultralight type, 698–699
wheels and tires, 700

Marine Corps League
support for wounded veterans, 107
support programs, 111

Marine Wounded Warrior Regiment
description and services, 106–107
hometown link locations, 114–115

Marjolin’s ulcer
chronic recurring draining fistulae and, 183

Marks, A.A.
prosthetics development, 23

Marquardt, E.
humeral osteotomy technique, 175
Marquardt humeral osteotomy
motion and control improvements, 175
postoperative management, 175–176

Marx, Capt. Robert S.
Disabled American Veterans of the World War I and, 29

Massachusetts Institute of Technology
VA Prosthetic and Sensory Aids Service collaboration with, 72

Massage
burn edema and, 305
burn scar management, 352–353
MDROs. See Multidrug-resistant organisms

Meal preparation
phase of the upper limb amputee protocol of care and, 520

MEBs. See Medical evaluation boards

Mecamylamine
autonomic dysreflexia treatment, 430

Mechanism of pain
phantom sensations and phantom limb pain, 231–232
residual limb pain, 232–233

Mechatronics
actuators, 727
power sources, 726–727
sensors and controls, 728
transmissions, 727–728

Medal of Honor
pension payments for recipients, 82

Medical evaluation boards
burn casualties and, 360–361
current legacy system, 56–58
description and role, 56
“fitness” determination, 56
functional capacity evaluations and, 522
membership of, 59
narrative summary and, 59
option for soldiers who do not agree with MEB findings, 59
proposed pilot system, 58–59
“3” or “4” profile designators, 58
VA Schedule for Rating Disabilities and, 56

Medical history
evaluation of less-than-successful amputees, 155–156
phase one of the upper limb amputee protocol of care and, 495–496
range-of-motion exercises and, 326–327
types of postamputation pain, 155–156

Medical issues. See also specific injuries and issues
infectious disease issues, 193–200
long-term effects of limb amputation, 217–219
musculoskeletal topics of concern, 218

pulmonary embolism, 206–207
weight-bearing progression, 207–208
wound care management, 200–206

Medical management
element of amputee care programs, 12–13

Medical military occupational specialty retention boards
description and role, 59–60
membership of, 60

Medical Outcomes Study Short Form 36-Item Health Survey, 15

Medications. See also specific medications, classes of medications, and disorders
ototoxicity, 383
for pain management, 245–248, 297
psychiatric disorders, 270–271

Melendez, D.
upper limb amputation research, 600–601

Mellier, Y.
continuous peripheral nerve block research, 240

Melzack, R.
“neuromatrix theory” of phantom limb pain, 232

Ménière’s disease
causes, 386
symptoms, 386

Mentors
limb amputation and, 142

Meperidine
phantom limb pain treatment, 245

Mepivacaine
burn casualties and, 298

Meshed skin grafts
burn casualties and, 310

Metabolic system
critical care of burn casualties and, 292
protein needs of burn casualties, 296

topics of concern for amputees, 218

Methadone
burn casualties and, 297
phantom limb pain treatment, 245

Methanol fuel cells
power source for artificial limbs, 727

Methicillin-resistant Staphylococcus aureus
antibiotic treatment, 196
prevalence of, 194

Methylprednisolone
neuroprotection for spinal cord injuries, 417

Metoclopramide
slow gastric emptying treatment, 431

Mexiletene
administration of, 247
combined with clonidine, 247
dosage considerations, 247
phantom limb pain treatment, 247
residual limb or stump pain treatment, 233

MHS. See Military Health System

Microprocessor prosthetic knees
description, 560

Midazolam
dysautonomia treatment, 407

Middle ear injuries
ossicular disruption, 385
tympanic membrane perforation, 384–385

Midodrine
orthostatic hypotension treatment, 430

Mild traumatic brain injury
acute effects, 404
athletes and, 405
blast exposure and, 402–403
cognitive function and, 404, 408  
description, 405  
educational and psychological therapies, 405–406  
functional recovery and, 402  
Operation Enduring Freedom / Operation Iraqi Freedom and, 400  
pathophysiology, 401  
persistent symptoms after, 404  
postconcussion symptoms, 404  
symptom treatment, 405  
Military and veteran support systems. See Support programs  
Military Health System  
biochemical research mission, 5  
combat casualty care mission, 5  
combat casualty care mission, 2–4  
health education mission, 4–5  
healthcare services to active duty and military beneficiaries  
mission, 4  
levels of care, 2–4  
military readiness mission, 4  
missions of, 2–5  
need for flexibility within, 2  
Military medical disability system  
challenges of navigating, 15  
Military readiness mission of MHS, 4  
Military Severely Injured Center  
description, 107–108  
programs, 107–109  
Military Severely Injured Service Center  
description and role, 48  
Military treatment facilities  
level V care and, 3–4  
multidisciplinary team approach to amputee care, 554, 608  
Military war tasks  
examples of, 480  
Firearm Training System and, 528  
firearms training simulators, 480, 529  
 immediate action drills and reacting to combat, 480  
phase four of the physical therapy rehabilitation program and, 480  
phase four of the upper limb amputee protocol of care and, 519  
rescues and buddy carries, 480  
road marching, 480  
site picture drills and room clearing drills, 480  
Millbank, Jeremiah  
philanthropic work, 28  
Miniaturized resuscitation devices  
description, 37  
Minimal Data Set  
description and uses, 602  
Mirror therapy  
state for, 250  
phantom limb pain treatment, 250  
Mirtazapine  
residual limb pain treatment, 233  
sleep problem treatment, 271  
Mittenberg, W.  
mild traumatic brain injury treatment, 405–406  
MMRBs. See Medical military occupational specialty retention boards  
Mobility issues for burn casualties  
acute phase of burn casualty rehabilitation, 338–340  
categories of mobility activities, 339  
continuum of mobility activities throughout the phases of burn rehabilitation (figure), 339  
factors in determining appropriate mobility activities, 339  
intermediate phase of burn casualty rehabilitation, 340  
long-term phase of burn casualty rehabilitation, 340  
Mobility issues for individuals with spinal cord injuries  
description, 421  
Mobility issues in physical therapy  
bear mobility, 453  
transfers, 453  
wheelchair management, 453–454  
Model of Human Occupation (Kielhofner), 494  
Modig, J.  
regional anesthesia and analgesia research, 235  
Moll, J.H.  
osteomyoplastic transtibial amputation technique case studies, 166  
Monaural low-redundancy speech tests  
description and uses, 390  
Montgomery GI Bill  
active duty service members, 80  
Selected Reserve, 80  
Morgan, C.A.  
psychiatric disorder association with trauma, 266  
Morphine  
burn casualties and, 298  
dysautonomia treatment, 407  
epidural anesthesia and, 244  
phantom limb pain treatment, 245  
Mortgage life insurance, 80  
Motorized prosthetic knees  
description, 560  
Mountaineering  
prosthetic examples, 666–667  
upper limb prosthetic considerations, 650  
MRI. See Magnetic resonance imaging  
MRSA. See Methicillin-resistant Staphylococcus aureus  
MTBI. See Mild traumatic brain injury  
Mulroy, M.  
regional anesthesia and analgesia research, 235  
Multidrug-resistant organisms. See also specific organisms  
antibiotic choice and, 194  
antibiotic susceptibility testing and, 194–195  
clearing protocol summary chart (table), 199  
contact precautions, 198–200  
definition of, 194  
soldiers returning from Operation Enduring Freedom / Operation Iraqi Freedom and, 197–198  
successful control measures, 198  
Multifunctional wheelchairs  
description, 703  
iBOT transporters, 703  
Multimodal pain management  
American Society of Anesthesiologists practice guidelines, 233–234  
basis for, 233–234  
medications, 245–248  
multiple sites of action (figure), 233  
nontraditional therapies, 248–250  
rationale for, 233–234  
regional anesthesia and analgesia, 234–244  
treatment modalities, 234–244  
Murdoch, G.  
gait assessment research, 536  
Murray, C.K.  
extremity wounds with concomitant infection, 194  
Muscle tension  
description, 125  
Muscles. See also Musculoskeletal system; Strength training and cardiovascular conditioning  
“four Cs,” 120, 121  
guidelines for muscle attachment (table), 620  
importance to ultimate function, 120, 124  
management of, 124–126  
muscle tension, 125
myodesis, 124–125, 620
myofascial closure, 124–125
myoplasty, 124, 620
strength training for, 330–332
surgical guidelines for muscle attachment, 620
tenodesis, 125
Musculocutaneous flaps
burn casualty reconstructive surgery and, 358
Musculoskeletal system. See also Heterotopic ossification; Muscles
chronic upper limb disorders, 438
contractures, 438
fractures, 433, 436–437
spinal cord injuries and, 436–438
topics of concern for amputees, 218
weight-bearing restrictions and, 207–208
Mustard agent
burns from, 281
MWWR. See Marine Wounded Warrior Regiment
Myodesis
adductor mechanism repair and, 162–163
bursitis and, 180–181
description, 124–125, 620
failure in transfemoral amputations, 162–164
failure in transradial amputations, 165
failure in transtibial amputations, 164–165
physical examination features of failure of, 162, 164
revision surgery, 164–165
Myoelectric prostheses. See also Electrically powered upper limb prosthetics
advances in, 724
controls training for myoelectric prosthesis by level of amputation (figure), 517
donning/doffing issues, 509–511
intuitive use of, 723–724
sensory feedback and, 724
targeted muscle reinnervation and, 725–726
“Targeted Reinnervation in Upper Limb Amputees to Improve Myoelectric Prosthesis Function,” 530
unilateral and bilateral amputee goals for myoelectric and body-powered prostheses (exhibit), 507–508
Myoplasty
description, 124, 620
failure in transhumeral amputations, 165
failure in transradial amputations, 165
failure in transtibial amputations, 164–165
Myosite testing and training
electrode attachment, 506
electrode site identification, 504–505
initial training, 505–506
MyoSoft software, 505
prosthesis fit timing, 504
MyoSoft software
description and uses, 505
N
N-methyl-D-aspartate
traumatic brain injury neuroprotection, 406
Narrative summaries
medical evaluation boards, 59
NARSUMs. See Narrative summaries
National Ability Center
contact information, 688
National Alliance for Accessible Golf
contact information, 688
National Amputee Golf Association
contact information, 688
National Archery Association
oversight of archers with disabilities, 672
National Association of State Directors of Veterans Affairs
State Benefits Seamless Transition Program, 111
National Call to Service
educational assistance, 81
National Cemetery Administration
description and mission, 82
program areas, 82–83
National Collegiate Athletic Association
regulations for disabled basketball players, 673
regulations for disabled football players, 675
National Defense Authorization Act
VA healthcare package, 77
National Disabled Veterans Summer Sports Clinic, 14–15
National Disabled Veterans Winter Sports Clinic
description and activities, 11, 14, 36
opportunities available to amputees, 676
National Electronic Injury Surveillance System
upper limb amputation incidence, 598–599
National Guard soldiers
MHS military readiness mission and, 4
physical disability evaluation system and, 55
Servicemembers Group Life Insurance and, 79
Veterans Benefits Administration and, 78
National Health Interview Survey–Disability estimates of amputation prevalence, 598
limitations of, 598
National Institute on Disability and Rehabilitation Research
spinal cord injury care, 416
study of late seizures in traumatic brain injury, 406
National Naval Medical Center
PDES Joint Pilot Program and, 56
physical medicine and rehabilitation residency program, 5
National Park Service
Office of Special Populations, 673
National recreational events
Veterans Health Administration and, 74, 75
National Research Council
location of VA hospitals near medical schools recommendation, 6
prosthetic devices committee, 33
National Rifle Association Disabled Shooting Services
contact information, 688
National Sports Center for the Disabled
contact information, 688
National Veterans Foundation
support programs, 111
National Veterans Wheelchair Games
description, 11, 15, 36, 524, 670
description and activities, 676–677
eligibility for, 676–677
wheelchair activity patterns studies, 700–701
National Wheelchair Basketball Association
contact information, 689
description and activities, 673
National Wheelchair Poolplayers Association
contact information, 689
National Wheelchair Shooting Federation
contact information, 689
shooting regulations, 672
National Wheelchair Softball Association
contact information, 689
Native Americans
direct home loans, 81
Naturalization
N-400 Application for Naturalization, 83
preference for veterans, 83–84
Navy Safe Harbor program
description, 107
NCA. See National Cemetery Administration
Neff, G.
humeral osteotomy technique, 175
Negative pressure dressings
burn casualties and, 315
description, 121, 497
Nerve injuries. See also Peripheral nerve injuries
prevention of, 238
regional anesthesia and analgesia risk, 237–238
sources of, 238
treatment of, 238
Nerve management
cauterization of the nerve end, 127
descriptions, 237
end loop anastomosis, 127
ligation, 127
nerve capping, 127
neuroma prevention, 120, 127
retaining as much nerve function in the residual limb as possible, 120–121
sciatic nerve, 127
targeted reinnervation, 127
traction neurectomy, 127
transection of nerves, 120
Neural-machine interfaces
brain-machine interfaces, 724
descriptions, 724–725
peripheral nerve interfaces, 724–725
targeted muscle reinnervation, 725–726
Neurogenic bowel
spinal cord injury and, 432
Neuroleptic drugs. See also specific drugs
anxiety treatment, 271
Neurologic complications
spinal cord injuries and, 438
Neurological issues in burn casualties
changes in reflexes and tactile information, 346
desensitization programs, 346–347
peripheral neuropathies, 347
temperature desensitization, 347
texture desensitization, 346–347
Neuromas
blood vessel proximity and, 162
evaluation of, 161
formation of, 161
pain from, 155
percentage of amputees experiencing, 161
peroneal nerve, 161
phantom limb pain and, 232
prevention of, 120, 127
prosthetic socket modifications and, 161
sciatic nerve, 161–162
superficial radial nerve, 161
treatment, 636–637
upper limb prosthetics and, 636–637
Neuromonics Tinnitus Treatment
descriptions and uses, 393
Neurophysiology of pain
modulation, 231
nociceptive pathway, 230–231, 233, 297
perception, 231
transduction, 231
transmission, 231
Neuropsychologists
descriptions and role, 45
NHIS-D. See National Health Interview Survey–Disability
Nickel cadmium batteries
power source for artificial limbs, 726
Nikolajsen, L.
edepidural analgesia research, 240
ketamine research, 233, 247
“Randomised Trial of Epidural Bupivacaine and Morphine in Prevention of Stump and Phantom Pain in Lower-Limb Amputation,” 240
Nitroglycerine
autonomic dysreflexia treatment, 430
Noise-induced hearing loss
intermittent exposure to loud noise and, 382
mechanism of, 382
steady-state exposure to loud noise and, 382–383
Nonsteroidal antiinflammatory drugs
adverse effects, 248, 297
burn casualties and, 297
heterotopic ossification treatment, 158, 160, 208, 209, 210, 345, 438
impaired healing response and, 204
limitations of, 248
mechanism of action, 248
multimodal pain management and, 233
phantom limb pain treatment, 248
residual limb or stump pain treatment, 232–233
Nontraditional pain therapies
acupuncture, 249
deep brain stimulation, 248
mirroring therapy, 250
spinal cord stimulation, 248
sympathetic blocks, 249
transcutaneous electrical nerve stimulation, 248
North American Riding for the Handicapped Association
contact information, 689
Northeast Passage
contact information, 690
Northwestern University
“Squirt Shape” technique, 722
Nortriptyline
phantom limb pain treatment, 247, 248
NSAIDs. See Nonsteroidal antiinflammatory drugs
Nursing home care
Veterans Health Administration and, 73
NuStep machines
rehabilitation of burn casualties and, 332
Nutrition
amino acids and, 296
available energy stores (table), 295
carbohydrate needs of burn casualties, 296
critical care of burn casualties, 291, 294–296
descriptions, 295
enteral feedings, 291
goals of nutrition support, 294
importance to wound management and rehabilitation, 294
initiating support early, 294–295
protein needs of burn casualties, 296
trace element requirements of burn casualties, 296
vitamin and mineral requirements of burn casualties, 296
wound closure and, 122
O
Observational gait assessment
compared with computerized gait assessment, 536
descriptions, 538
accuracies in, 536
Occupational Therapist Upper Extremity Functional Evaluation
descriptions and uses, 601
Occupational therapists
descriptions and role, 45, 494
preprosthetic phase of upper limb prosthetic rehabilitation role, 622
spinal cord injuries rehabilitation role, 425–426, 427
traumatic brain injury rehabilitation role, 408
vocational rehabilitation and, 97
wound care and dressing and, 497
Occupational therapy
adaptive sports program, 524
community reintegration survey, 530
concomitant injuries and, 525–526
discharge planning, 525
Firearm Training System, 528
focus of, 494
four-phase upper limb amputee protocol of care, 494–523
goal of, 494
importance of, 494
multiple exposure/progressive desensitization, 530–531
overlap between phases of, 494
phase one: initial management and protective healing, 495–498
phase two: preprosthetic training, 499–506
phase three of the upper limb amputee protocol of care, 506–515
phase four of the upper limb amputee protocol of care, 515–523
recent advancements in prosthetic development and their impact on treatment, 527–531
rehabilitation factors, 525–527
research updates, 528
summary of issues, 531
targeted reinnervation, 527, 530
voice recognition software, 528–530
O’Donnell, M.L.
psychiatric disorder association with trauma, 266
OEF. See Operation Enduring Freedom/Operation Iraqi Freedom
OEF/OIF program
description, 48
Office of Vocational Rehabilitation and Education
description and services, 102–103
OH. See Orthostatic hypotension
OIF. See Operation Enduring Freedom/Operation Iraqi Freedom
OIH. See Opioid-induced hyperanalgesia
On-Q pumps, 244
ONET career guidance Web site, 99
Ong, B.Y.
regional anesthesia and analgesia research, 239
Operation Enduring Freedom/Operation Iraqi Freedom. See also Global war on terror; OEF/OIF program
Acinetobacter baumannii-calcoaceticus infections and, 197
common causes of injuries, 400
deep venous thrombosis incidence, 206–207
early postoperative prosthesis and, 623
delayed care, 3
five leading diagnoses for veterans, 71
hearing loss incidence, 382
heterotopic ossification and, 197, 208, 209, 211
importance of graduate medical educational programs and, 4
incidence of concomitant spinal cord injury and amputations, 424
launching of, 2
level IV care and, 3
limb amputation data, 7, 494
multidrug-resistant organism prevalence, 196
number of patients sustaining major limb loss, 118
osteomiyoplastie transtibial amputations and, 167–168
osteoarthritis of hip and knee, 405
posttraumatic stress disorder prevalence, 405
posttraumatic stress disorder prevalence and, 405
psychological issues, 342
Q fever and, 200
reduction in mortality from combat injuries, 42
spinal cord injuries and, 416
support programs, 111
survival rate for casualties, 400
traumatic brain injury estimates, 400, 405
upper limb damage, 600
US prosthetic and rehabilitation specialists and, 554–555
VHA usage data, 71
Operation First Response
description, 111
Operation Helping Hand
assistance for families and caregivers, 48
Operation Iraqi Freedom. See also OEF/OIF program; Operation Enduring Freedom/Operation Iraqi Freedom
Operation Warfighter program
description and goals, 108
Opioid-induced hyperanalgesia
description, 233
Opioids. See also specific drugs
burn casualties and, 297, 298
epidural anesthesia and, 244
future research needs, 737
narcotic conversion chart (table), 246
opioid-induced hyperanalgesia, 233
oral choices, 245–246
phantom limb pain treatment, 245–246
short- and long-term sequelae, 246
side effects, 298
OPUS-UE. See Orthotics and Prosthetics Use Survey--Upper Extremity
Oral cavity
dental caries, 430–431
periodontal disease, 430–431
Oral hygiene
phase one of the upper limb amputee protocol of care and, 496
phase two of the upper limb amputee protocol of care and, 500
Order of St John
description and role, 28
Orthostatic hypotension
risk factors, 430
spinal cord injuries and, 421, 430
treatment, 430
wheelchair use and, 421
Orthotic and Prosthetic Assistance Fund
Paralympic Games and, 36
Orthotics and Prosthetics Use Survey--Upper Extremity
description and uses, 602
Orthotists
role of, 554
Osteoarthritis
incidence in amputations, 218
Osteomyelitis
posttraumatic, 197
pressure ulcers and, 436
treatment difficulties, 196–197
Osteomyoplastie transtibial amputations
benefits of, 169
bone-bridging and, 166–167
controversy over, 166–167, 168–169
current wars and, 167–168
description, 165–166
infection risk, 168
proponents of, 166
Osteoporosis
spinal cord injuries and, 433
Otoprotectants
description, 393
Ototoxicity
clinical symptoms, 383
individual susceptibility to, 383
labyrinthine damage and, 386
monitoring protocol, 388–389
previous noise exposure and, 383

Outcome measures
Functional Status Outcomes Database, 49
future research needs, 734
performance-based measurement tools and devices, 15
self-reporting measures, 15

Outer ear injuries
blast exposure and, 384
burn patients and, 384

Outpatient services
Blind Rehabilitation Service, 76
Polytrauma System of Care and, 46–47
Veterans Health Administration and, 74

Outpatient therapy
description, 46–47

Oxacillin
surgical site infection treatment, 196

Oxandrolone
wound healing and, 292

Oxycodone
burn casualties and, 297
phantom limb pain treatment, 245

P
PACT program. See Preservation-Amputation Care and Treatment program

Pain management. See also specific medications
acute phase of burn management and, 298
benefits of, 230
burn casualties and, 297–299, 348
chronic pain, 230, 297
element of amputee care programs, 13–14
future research needs, 251, 736–737
group therapy and counseling, 297
historical background, 230
impacts of pain, 297
interdisciplinary approach, 297
low back pain, 250–251
mechanisms of pain, 231–232
multimodal pain management, 233–250
neurophysiology of pain, 230–231, 297
noncompliance with medical treatment plans and, 297
nontraditional therapies, 248–250, 297
pain definition, 297
phase one of the upper limb amputee protocol of care and, 498
posttraumatic stress disorder and, 409
predictors of burn pain, 297
regional anesthesia and analgesia, 234–244
spinal cord injuries and, 438–440
summary of, 251
traumatic brain injury and, 409
treatment modalities, 234–244

Pancreas
spinal cord injury and, 431

Panerai, A.E.
antidepressant research, 248

Paralympic Games
affiliated nonprofit organizations, 36
description, 36, 677
guiding principles, 677
sponsors, 15, 36
survey of disabled competitors in the 1996 games, 582
Paralyzed Veterans of America Bass Tour, 675
care information, 690
description and activities, 110, 524
National Trapshoot Circuit, 679
National Veterans Wheelchair Games sponsor, 676
Paralympics sponsor, 15, 36
partnerships with, 12
present-day role, 29
programs, 110–111, 524

Partridge, B.L.
regional anesthesia and analgesia research, 238

Pasqua, Col. Paul F., M.D.
Advisory Committee of the Secretary of Veterans Affairs on Prosthetics and Special Disability Populations head, 7–8
“Rehabilitation of the Combat Amputee--Consensus Conference and Creating a Roadmap for the Future,” 733

Passive/cosmetic restoration option for upper limb prosthetics
advantages/disadvantages of (table), 613
description, 612
materials for, 612

Passive range-of-motion exercises
burn edema and, 301, 304
comatose casualties and, 327
cONSiderations for use of (exhibit), 328
continuous passive motion devices, 327–328
large burns and, 327
skin grafts and, 315

Patient-controlled analgesia
advantages of, 245
electronic pumps and, 244
IONSYS, 245
modalities (table), 245

Patzakis, M.J.
antibiotic prophylaxis research, 193

PCA. See Patient-controlled analgesia

PDES. See Physical disability evaluation system

PDES Joint Pilot Program
challenges, 63
customer satisfaction and, 63
description, 56
disability evaluation system Joint Pilot Program timeline overview (figure), 57

PDR. See Permanent disability retirement

Peak performance training
description, 500

PEBs. See Physical evaluation boards

Peer support programs
description, 14–15
phase two of the upper limb amputee protocol of care and, 500
Peer visitors, 20, 142–143, 500, 735

Peleg, K.
traumatic brain injury research, 403

Pension programs
Veterans Benefits Administration, 79

Pereira, C.P.
ebb and flow phases of burn casualties, 294

Perioperative regional anesthesia and analgesia
avoiding general anesthesia side effects and, 234
benefits of, 234–236
bronchospasm and, 238
burn casualties and, 298
continuous peripheral nerve block studies demonstrating benefits, 240–241
continuous peripheral nerve block studies demonstrating no benefit, 241
continuous peripheral nerve blocks, 240–241, 243–244
decreasing blood loss and, 235
decreasing deep vein thrombosis and, 235
decreasing hospital costs and, 235
electronic pumps for, 244
epidural catheter technique, 242
epidural studies demonstrating benefits, 239–240
epidural studies demonstrating no benefit, 240
epinephrine toxicity and, 238
evidence-based medicine in the prevention of phantom limb pain, 239–241
failure of the technique, 238
hematoma and, 238
improved postoperative analgesia and, 235
improving early recovery period and, 235
improving operating room efficiency and, 235–236
improving patient satisfaction and, 236
inadvertent epidural spread and, 238
infection and, 239
improved patient outcome and, 235
improving operating room efficiency and, 235
improving patient satisfaction and, 236
inadvertent epidural spread and, 238
infection and, 239
intraoperative hemodynamic stability and, 234
local anesthesia toxicity and, 236–237
localization techniques, 243
nerve injury and, 237–238
peripheral catheters for, 244
peripheral nerve blocks, 242
phrenic blockade and, 238
pneumothorax and, 237
risks of, 236–239
routine volumes and rates for regional anesthesia techniques in adults (table), 242
solutions used for, 244
techniques of, 241–244
Peripheral catheters
description, 244
Peripheral nerve blocks
benefits of, 234–236
burn casualties and, 298
complications of, 299
hematoma and, 238
historical background, 230
local anesthesia toxicity and, 236–237
lower extremity blocks, 242
mechanism of, 233
nerve injury and, 237–238
nerve stimulation technique, 243
outpatient follow-up, 299
risks of, 236–239
safety of, 234
techniques for, 242
Peripheral nerve entrapment
risk factors, 439–440
spinal cord injuries and, 439–440
Peripheral nerve injuries. See also Nerve injuries
clinical evaluation, 213–215
electrodiagnostic evaluation, 215–216
mechanism of recovery, 216–217
patient identification, 213
physical therapy and, 481
presentation of, 213
rehabilitation intervention, 217
surgical intervention, 217
Peripheral nerve interfaces
description, 724
problems with, 724–725
Peripheral neuropathies
burn casualties and, 347
causes of, 347
hand injuries and, 347
muscle testing and, 347
prevention of, 347
pruritus and, 347–348
Permanent disability retirement
physical evaluation boards and, 61
Pet care
phase four of the upper limb amputee protocol of care and, 520–521
Peterson, K.
major pathogens from war trauma-associated infections, 194
Pezzin, L.E.
upper limb amputation research, 600
Phantom limb pain
burn-related amputations and, 346
duration of, 231
evidence-based medicine in the prevention of, 239–241
future research needs, 737
historical background, 230
incidence of phantom limb pain (tables), 239, 240
management of, 13–14
mechanism of, 231–232
“neuromatrix theory,” 232
origin of the term, 230
percentage of amputees experiencing, 155
possible causes of, 232
significance of, 230
treatment, 233, 245–248
use of hypnosis in treating phantom limb pain (exhibit), 270
“Phantom Limb Pain in Amputees During the First 12 Months Following Limb Amputation, After Preoperative Lumbar Epidural Blockade” (Bach), 239
Phantom sensations
description, 155
duration of, 231
mechanism of, 231
percentage of amputees experiencing, 155
teleoscopy, 231–232
Pharmacological interventions. See Medications; specific medications and classes of medications
Phase one of the physical therapy rehabilitation program
ambulation with assistive devices, 461–462
balance, 460
bed mobility, 453
bedside calisthenics, 458
cardiovascular endurance, 458
compression dressing education, 462–463
core stabilization, 454, 456–457
early postoperative rehabilitation guidelines, 455
flexibility, 454
functional activities, 453–454
goals for progression to phase 2, 463
lower body ergometer exercises, 458
muscle strengthening, 454, 456–457
transfers, 453
treadmill use, 458
upper body ergometer exercises, 458
wheelchair management, 453–454
WRAMC military amputee rehabilitation protocol, 462–463
Phase one of the upper limb amputee protocol of care
activities of daily living, 496–497
basic rehabilitation goals (exhibit), 495
body symmetry, 498
desensitization, 497
evaluation, 495–496
exercise, 498
flexibility, 497–498
functional evaluation, 496
pain management, 498
prehension evaluations, 496
psychological support, 498
wound healing, 497
Phase two of the physical therapy rehabilitation program
Phase two of the upper limb amputee protocol of care. See also
Preprosthetic phase of upper limb prosthetic rehabilitation
myosite testing and training, 504–506
postural exercises and strengthening, 503–504
psychological support, 499–500
unilateral and bilateral amputee rehabilitation goals (exhibit), 499

Phase three of the physical therapy rehabilitation program
functional activities, 471–479
goals for progressing to phase four, 479

Phase four of the upper limb amputee protocol of care
activities of daily living, 511–514
controls training for body-powered prosthesis by level of amputation (figure), 516
controls training for myoelectric prosthesis by level of amputation (figure), 517
donning/doffing prostheses, 509–514
focus and goals of, 506
initiation of controls training, 511
muscle strengthening and endurance, 515
operational prosthetic knowledge and performance, 508–509
residual limb tolerance/care, 509
unilateral and bilateral amputee goals for myoelectric and body-powered prostheses (exhibit), 507–508
“Unilateral Upper Extremity Amputation: Activities of Daily Living Assessment” (figure), 517

Phase four of the physical therapy rehabilitation program
abdominal/visceral trauma and, 480
comorbidity considerations, 480–482
core stabilization, 479
fractures and, 481
military task training/military operations, 480
multiple limb loss issues, 481–482
peripheral nerve injuries and, 481
recreational/sports activities, 479
traumatic brain injury and, 482
vestibular damage and, 481

Phase four of the upper limb amputee protocol of care. See also
Advanced phase of upper limb prosthetic rehabilitation
adaptive equipment and environmental modifications, 522
advanced prosthetic training: unilateral and bilateral, all levels (exhibit), 519
characteristics of advanced prosthetic rehabilitation, 515–519
child care and pet care, 520–521
driver’s training, 521
exercise prescription considerations, 522
goals of, 515
meal preparation, 520
military warrior tasks, 519
outcome of, 515
recreational and sports activities, 523
shopping, 519–520
timing of, 515
vocational planning and training, 521–522
yard work, home repair, and maintenance, 519

Phenol
spasticity treatment, 438
Phenoxycbenzamine
autonomic dysreflexia treatment, 430
Philanthropy
definition of, 20
role in the care of the combat amputee, 20–37
Phrenic blockage
derioperative regional anesthesia and analgesia risk, 238

Physiatrists
description and role, 45
role of, 8

Physical Disability Evaluation System
burn casualties and, 360
goals of, 360

Physical disability evaluation system
continuation on active duty, 61
Joint Pilot Program, 56, 57, 63
medical evaluation boards and, 56–59
medical military occupational specialty retention boards, 59–60
overview, 55–56
physical evaluation boards and, 55, 60–61

Physical evaluation boards
DA Form 199 and, 60
description and role, 56
“fitness” determination, 56
formal meeting, 60–61
informal meeting, 60
legacy system and, 56–58
membership of, 59, 60
permanent disability retirement list and, 61
temporary disability retirement list and, 61, 63
US Army Physical Disability Agency authority and, 56
VA disability compensation and, 62

Physical examination of the less-than-successful amputee
donning and doffing the prosthesis and, 156
MRI for identification of inflammation-related pathology, 157
passive and active range-of-motion and, 156
radiographic examination, 156–157

Physical medicine and rehabilitation. See also Physical therapy
partnering with orthopaedic specialists for inpatient and outpatient care, 8
residency program at WRAMC, 5, 11

Physical therapists
description and role, 45, 452
prosthetic training role, 452
traumatic brain injury rehabilitation role, 407–408

Physical therapy
bedside management, 453
bilateral transfemoral amputees, 453, 461, 491–492
bilateral transtibial amputees, 453
body image issues and, 482
Dexa Scans and, 479
description and role, 45
four-phase rehabilitation program, 452–482, 486–490
phase one: initial management, 453–464, 486–487
phase three: prosthetic/ambulation phase, 470–479, 488–489
phase four: progressive activities/return to active duty, 479–482, 489–490
physical therapy evaluation, 452–453
role, 452
summary of issues, 482
WRAMC military amputee rehabilitation protocol, 486–491

Physically Challenged Bowhunters of America, Inc.
contact information, 690
Pinto, M.A.
osteomyoplastic transtibial amputation technique case studies, 166
Pinzur, M.S.
continuous peripheral nerve block research, 241
osteomyoplastic transtibial amputation technique case studies, 166
upper limb amputation research, 600
Pittelkow, M.R.
cultured autologous keratinocyte (epidermal) skin grafts and, 312
Planetary gears
efficiency rates, 727
Plastic and reconstructive surgery
burn casualties, 358–359
hand burns, 359
reconstructive process, 358
skin flaps, 358–359
timing of, 358, 359
PLP. See Phantom limb pain
PMP service. See Preventive medical psychiatry service
PM&R. See Physical medicine and rehabilitation
PNBs. See Peripheral nerve blocks
Pneumatic prosthetic knees
description, 559
Pneumonia
mortality from, 428
spinal cord injuries and, 428
Pneumothorax
regional anesthesia and analgesia risk, 237
PNs. See Polytrauma network sites
Polymyxins
multidrug-resistant organism treatment, 194–195
Polytrauma
Army Medical Department VA polytrauma liaison program, 88
care of the service member with polytrauma and limb loss, 267–268
definition, 42
future research needs, 736
hearing loss and, 382
psychiatric interventions and, 267–268
rehabilitation challenges, 494
Polytrauma and Blast-Related Injuries Quality Enhancement Research Initiative
description, 48
priority research areas, 48
Polytrauma network sites
description and role, 43, 44
Polytrauma points of contact
description and role, 43, 44
Polytrauma rehabilitation centers
Army and Marine liaisons at, 48
description and role, 43–44
family and caregiver support and, 47–48
Polytrauma support clinic teams
description and role, 43, 44
Polytrauma System of Care
acute rehabilitation program, 46
case management, 47, 48
components, 43–44
Consolidated Appropriations Act and, 43
coordination of care, 47
day treatment program, 47
development of, 42–43
emerging consciousness program, 46
family and caregiver support, 47–48
interdisciplinary teams, 44–45
outcome measures, 49–50
outpatient therapy, 46–47
polytrauma network sites, 43, 44
polytrauma points of contact, 43, 44
polytrauma rehabilitation centers, 43–44, 47–48
polytrauma support clinic teams, 43, 44
polytrauma telehealth network, 43, 47
research collaborations, 48–49
residential transitional rehabilitation program, 46
scope of services, 44–47
specialized programs, 46–47
subacute rehabilitation program, 46
Web site, 48
Polytrauma telehealth network
description and role, 43, 47
Ponsford, J.
mild traumatic brain injury treatment, 406
Positional rotators
description and uses, 562
Positioning
burn edema and, 302
burn scar management, 353
intermediate phase of burn casualty rehabilitation and, 319
joint contractures and, 454
long-term phase of burn casualty rehabilitation and, 319–320
positioning and splinting devices used to manage edema (table), 303–304
postoperative splinting and positioning (table), 306
repositioning techniques, 304
Post-9/11 GI Bill
educational assistance, 80
Post-Vietnam Era Veterans’ Educational Assistance Program
description, 80
Posttraumatic stress disorder
alcohol and substance abuse and, 349
blast-related injuries and, 403
burn casualties and, 349
cognitive function and, 408
incidence in combat injured soldiers, 266
Operation Enduring Freedom/Operation Iraqi Freedom and, 400, 405
pain management and, 297, 409
response to polytrauma and limb loss, 267
risk factors, 405
stress reduction strategies, 349
treatment, 271
Posttraumatic syringomyelia
orthostatic hypotension and, 430
peripheral nerve entrapment and, 440
spinal cord injuries and, 439
treatment, 439
Power-assisted wheelchairs
pushrim-activated systems, 702–703
user safety and, 703
Power soccer
opportunities available to amputees, 677
Power sources
characteristics of, 726
lithium polymer batteries, 726–727
methanol fuel cells, 727
nickel cadmium batteries, 726
PPCAs. See Polytrauma points of contact
PRAA. See Perioperative regional anesthesia and analgesia
Prazosin
autonomic dysreflexia treatment, 430
posttraumatic stress disorder treatment, 271
sleep problem treatment, 271
PRCs. See Polytrauma rehabilitation centers
Pregabalin
burn casualties and, 297
phantom limb pain treatment, 246
side effects, 246
Pregnancy
spinal cord injuries and, 442
Preprosthetic phase of upper limb prosthetic rehabilitation. See also Phase two of the upper limb amputee protocol of care
exercise options, 643
occupational therapist role, 622
patient education, 621
prosthetic assessment and rehabilitation team formation, 621
rehabilitation team, 618
residual limb management, 622
surgical considerations, 618–621
Preservation-Amputation Care and Treatment program
description, 12, 42
Preservation of Upper Limb Function Following Spinal Cord Injury,
438
President’s Commission on Care for America’s Returning
Wounded Warriors
PDES Joint Pilot Program and, 56
recommendations, 63
Pressure ulcers
causes, 434
checking skin daily for, 434
clinical practice guideline, 433
complications from, 436
cost of treating, 433–434
depth body wall tissue location, 434
elementary forces and, 434
morbidity and mortality and, 433
National Pressure Ulcer Advisory Panel pressure ulcer stages
(table), 435
risk factors, 434
specialized wheelchair cushions and, 434
spinal cord injuries and, 416, 433–436
surgical treatment, 434–436
treatment, 434–436
Preventive medical psychiatry service
case study (exhibit), 269
contemporary model of intervention and, 269
evolution of, 269
follow-up and, 273
role, 268–269
“Therapeutic Intervention for the Prevention of Psychiatric
Stress Disorders,” 269–270
traumatic brain injury and, 272–273
Priority groups
Veterans Healthcare Administration and, 77
Prisoners of war
presumptive conditions considered for disability compensa-
tion, 76
Project Healing Waters
description, 524
PROM. See Passive range-of-motion exercises
Promoting Amputee Life Skills program
description, 500
Prosthetic and Sensory Aids Service
adaptive equipment for sports and recreation, 715
collaboration with DoD and non-DoD organizations, 72
description and goals, 71–72
home adaptations and, 72
Web site, 72
Prosthetic feet
articulated, 557–558
dynamic response, 555–558
energy storage and return design, 555–556
foot shells, 555
function classification, 555
gait and, 555
golf and, 591
heel height adjustability, 558
hiking and, 591
inversion/eversion and, 558
microprocessor ankle/foot, 558
rock climbing and, 589–590
specialty feet for running, 555
sports and recreation and, 584, 585–586
Syme amputations and, 565
transtibial prosthesis and, 568
winter sports and, 590
Prosthetic knees
axis issues, 558–559
cadence control, 559–560
constant friction and, 559
geometric locks, 560–561
microprocessor, 560
motorized, 560
pneumatic/hydraulic/magnetorheologic, 559–560
polycentric, 559
single axis, 558–559
stanch flexion and, 560–561
user-activated locks, 561
Prosthetic Profile of the Amputee
description and uses, 602
Prosthetic rehabilitative process
phase one: preprosthetic, 577–578, 618–622
phase two: initial prosthetic, 578
phase three: basic prosthetic, 578
phase four: advanced prosthetic, 578, 635–637
Prosthetic socks
description and uses, 563–564
Prosthetics. See also Artificial limb research; Donning/doffing
prostheses; Lower limb prosthetics; Lower limb prosthetics
for sports and recreation; Upper limb prosthetics; Upper limb
prosthetics for sports and recreation
advanced prosthetic training: unilateral and bilateral, all levels
(exhibit), 519
advances in, 14, 642
average energy costs of prosthetic ambulation (table), 546
balance between physical, psychological, and prosthetic reha-
bilitation, 642–643
bilateral upper amputee amputees and, 526–527
biomechanics and human movement considerations, 643
C-Leg compared with mechanical knee and RHEO KNEE,
547–548
chest expansion and, 508–509
Civil War and, 23
defining, 511
defining controls training, 511
controls training, 511
defining controls training for body-powered prosthesis by level
of amputation (figure), 516
defining controls training for myoelectric prosthesis by level of ampu-
tation (figure), 517
defining donning/doffing, 509–514
fitting issues with burn casualties, 170–171, 346
future research needs, 735–736
gait analysis and training and, 546, 547–548
operational prosthetic knowledge and performance, 508–509
phase of the upper limb amputee protocol of care and, 515–523
physical therapist role in training, 452
prehensile terminal devices for body-powered systems, 508
preprosthetic training, 465–470, 499–506
prosthesis fit timing, 504
radiographs for prosthesis fit and alignment, 157
reasons for low prosthetic use by patients, 174–175
recent advancements in prosthetic development and their
impact on treatment, 527–531
scapular depression and shoulder extension and abduction
and, 508
scapular protraction, retraction, and shoulder flexion and, 508
standing progression with prosthetic limb, 474–475
targeted reinnervation, 527, 530
“Targeted Reinnervation in Upper Limb Amputees to Improve
Myoelectric Prosthesis Function,” 530
terminology, 509
type of prosthesis and its effect on functional activities, 530
unilateral and bilateral amputee rehabilitation goals (exhibit),
499
wearing schedule, 509
Prosthetics Clinical Management Program
Index

description, 72
Prosthetists
educational requirements, 554
interim phase of upper limb prosthetic rehabilitation and, 623
preprosthetic phase of upper limb prosthetic rehabilitation and, 618
role of, 554–555
PSAS. See Prosthetic and Sensory Aids Service
PSC. See Polytrauma System of Care
Psychiatric disorders. See also specific disorders
“battle mind mentality” and, 266
body image concerns and, 267
case studies (exhibits), 269, 270, 272, 273
care of the combat amputee index, 554–555
concerns of the service member with polytrauma and limb loss, 267–268
defense mechanisms and, 267
factors interfering with recovery, 268
family interventions, 273
follow-up to interventions, 273
grieving process after limb loss, 267–268
hypnosis and, 271–272
importance of sleep, 271
pharmacology and other treatment interventions for anxiety, depression, and pain, 270–271
preventive medical psychiatry service, 268–273
response to polytrauma and limb loss, 267–268
risk factors, 266
separation anxiety and, 266–267
summary of interventions, 274
“survivor guilt” and, 266–267
therapeutic intervention for preventing, 269–270
traditional responses to combat and injury and, 266–267
trauma as a risk factor for, 266
traumatic brain injury associated with polytrauma and amputation and, 272
Psychological considerations for burn casualties
anxiety, 348
challenges of treatment for psychological effects of combat burns, 348
delirium, 348–349
grief and depression, 349
pain management and, 348
posttraumatic stress disorder, 349
principles of psychological treatment, 348
sleep problems and nightmares, 348
Psychological considerations for individuals with spinal cord injuries
associated traumatic brain injury, 442
marital adjustment and discord, 442
premorbid personality, 442
reactive depression and suicide, 442
Psychological support
methods of, 498
phase one of the upper limb amputee protocol of care and, 498
phase two of the upper limb amputee protocol of care and, 499–500
Psychologists
vocational rehabilitation and, 97
Psychosocial adaptation to amputation
description, 102
upper limb prosthetics and, 637
Psychosocial aspects of burn casualty rehabilitation
acute phase, 340–342
anticipation of pain, 341
dealing positively with symptoms, 343
desensitization techniques, 341
emotional adjustment to acute burns, 341
intermediate phase of burn casualty rehabilitation, 342
leaving the burn unit and, 342
long-term phase of burn casualty rehabilitation, 342–343
losses and changes related to the injury, 341
normal responses to major burn injuries, 342
psychological shock reaction to severe burns, 341
relaxation techniques, 341–342
return to duty, 340–341, 342–343
returning to routine life, 342–343
returning to work in the area where the injury occurred, 343
sensory deprivation and, 342
trauma survivors’ groups, 343
Psychosocial issues in traumatic brain injury
cognitive changes and, 404
functional limitations and, 403–404
Psychosocial support programs
description, 14–15
PT/BRI QUERI. See Polytrauma and Blast-Related Injuries Quality Enhancement Research Initiative
PTN. See Polytrauma telehealth network
PTSD. See Posttraumatic stress disorder
Pulmonary system. See Respiratory system
PVA. See Paralyzed Veterans of America

Q
Q fever
returning service members and, 200
Q-TFA. See Questionnaire for persons with a transfemoral amputation
Quad rugby
opportunities available to amputees, 677
Questionnaire for persons with a transfemoral amputation, 15
Quetiapine fumarate
sleep disturbance treatment, 13, 271
Quick release couplings
description and uses, 562
Quick Speech-in-Noise Test
description and uses, 590

R
Radcliffe, C.W.
transfemoral prosthesis research, 571, 572
Radiation
presumptive conditions considered for disability compensation for veterans exposed to, 76–77
Radiation therapy
heterotopic ossification, 158, 160, 209, 345, 438
Radiographs
heterotopic ossification diagnosis, 209
infection monitoring, 197
neuroma evaluation, 161
osteomyelitis and, 436
prosthesis fit and alignment and, 157
residual limb examination, 156–157
weight-bearing, 157
Ramachandran, V.S.
mirror therapy research, 250
phantom limb pain research, 232
Rancho Los Amigos
full body observational gait analysis form, 536
Random or local flaps
burn casualty reconstructive surgery and, 359
“Randomised Trial of Epidural Bupivacaine and Morphine in Prevention of Stump and Phantom Pain in Lower-Limb Amputation” (Nikolajsen), 240
Range-of-motion
preventing loss of, 454
Range-of-motion exercises. See also specific types
acute phase of burn casualty rehabilitation, 326–330
burn edema and, 301–302, 305, 306
burn scars and, 351, 353, 357–358
categories (exhibit), 327
heterotopic ossification and, 345, 406
intermediate phase of burn casualty rehabilitation, 319, 329–330
long-term phase of burn casualty rehabilitation, 330, 332
mental concentration and energy and, 329–330
relaxation techniques and, 329–330
showering and dressing changes and, 328–329
skin grafts and, 314, 315
Reagan, Pres. Ronald
signing of the bill making the VA an executive department, 68
REALifelines program. See Recovery and Employment Assistance Lifelines program
Recovery and Employment Assistance Lifelines program
description, 108
Recreational/motivational activities. See also Lower limb prosthetics for sports and recreation; Sports and recreation opportunities; Upper limb prosthetics for sports and recreation criticism of, 7
development of programs, 6–7
phase four of the physical therapy rehabilitation program and,
phase four of the upper limb amputee protocol of care and,
523
Recreational therapists
description and role, 45
Red Cross Institute for Crippled and Disabled Men
description and role, 28, 29
Reduced Friction Donning System
donning sock and socket design for, 509–511
Reed, Maj. Walter
yellow fever research, 5
Regional anesthesia and analgesia. See Perioperative regional anesthesia and analgesia
Rehabilitation Act, 96
Rehabilitation counseling
Certified Rehabilitation Counselor designation, 96
competencies included, 96–97
description, 96
Rehabilitation Engineering and Assistive Technology Society of North Americacredential levels, 697
wheelchair standards, 698
Rehabilitation nurses
description and role, 45
Rehabilitation of burn casualties. See also Physical therapy activities of daily living and, 319, 333–338
biomechanics of skin and scar, 317–320
bone and joint changes, 345
burn edema, 299–306
 cardiovascular conditioning, 330–332
casting issues, 325–326
community reintegration, 343–344
complications associated with rehabilitation, 345–349
goal of, 343
interaction between medical care and rehabilitation of burn casualties (figure), 300
mobility issues, 338–340
psychosocial aspects, 340–343
risk of overheating and, 332
sexuality issues, 344–345
skin grafts, 309–317
splinting issues, 320–325
strength training, 330–332
transitioning to outpatient programs, 332
wound and skin care, 306–309
Rehabilitation of spinal cord injuries. See also Physical therapy activity-based therapy, 423–424
functional outcome, 421
mobility, 421
walking, 423
wheelchair use, 421–423
“Rehabilitation of the Combat Amputee—Consensus Conference and Creating a Roadmap for the Future,” 733
“Rehabilitation of the Combat-Wounded Amputee” (Brown), 6–7
Rehabilitation of traumatic brain injury patients. See also Physical therapy challenges of, 407
cognitive function and, 408–409
eye rehabilitation importance, 408
life-long need for, 407
mental health assessment and, 408
multidisciplinary teams, 407
neuropsychological evaluation and, 408
occupational therapist role, 407
physical therapist role, 407–408
Rehabilitation psychologists
description and role, 45
Rehabilitation robotics
benefits and disadvantages of, 712
categories of, 712
manipulation aids, 712–713
Renal considerations
acute renal failure, 292
critical care of burn casualties and, 292
renal replacement therapy, 292
Report to Congress on the Current Status of the Department of Defense and Department of Veterans Affairs Disability Evaluation System Pilot Program, 63
Research. See also specific areas of research and study authors
advancement of medical interventions, 736–737
advancement of surgical interventions, 736
amputee care centers of excellence, 738
artificial limbs, 722–729
challenges of current research, 733
consensus conference results, 733–738
DoD partnership with the VA, 11
formal measures, 601–602
future research needs, 732–738
geriatric research, 73
hearing loss and, 393
importance of, 11
informal measures, 601
outcomes research and cost-effectiveness studies, 734
Polytrauma System of Care research collaborations, 48–49
programmatic goals and opportunities, 732–733
rehabilitation and therapeutic interventions, 734–736
reliability issues, 601
summary of issues, 738
support programs, 737
technology, 737–738
traumatic brain injury outcomes, 402
upper limb prosthetics, 527–531, 637
“use” and “satisfaction” measurements, 599–600
validity issues, 601
Reserve soldiers
education programs, 80–81
MHS military readiness mission and, 4
physical disability evaluation system and, 55
retirement and disability compensation and, 62
Servicemembers Group Life Insurance and, 79
Social Security and, 84
Veterans Benefits Administration and, 78
Residential transitional rehabilitation programs
description, 46
graph displaying the difference in various strain rates of tissue (figure), 319

heat and, 353

hyperpigmentation, 351

hypertrophic scarring, 350, 351–352

inserts for, 356–358

keloid scarring, 350–351

management issues, 349–358

management of, 349–358

massage and, 352–353

positioning and, 353

range-of-motion exercises and, 353

scar tissue compared with normal dermis, 318

serial casting for, 325–326

splinting and, 353

strain rate and, 318

stress relaxation of tissue (figure), 319

stress relaxation principle and, 318

tissue creep (figure), 319

tissue contractures and, 349–350

tissue contractures and the incidence of burn scar contractures (figure), 287

vibration therapy, 353

SCDs. See Sequential compressive devices

Schmalz, T.
gait analysis and training research, 546

Schoppen, T.
functional outcome in geriatric amputees, 405

SCI. See Spinal cord injuries

Scott, R.E.
cultured autologous keratinocyte (epidermal) skin grafts and, 312

Scuba diving
opportunities available to amputees, 678

Screeing systems
arm support, 706

back supports, 705–706

body dynamics and, 704

custom, 705

foot supports, 706

head support, 706–707

leg supports, 706

modular, 705

physical-motor assessment and, 704

prefabricated, 704–705

reclining backrests, 707

seat elevation systems, 708

seat support, 705

standing systems, 707–708

tilt frames, 707

Seizures
regional anesthesia and analgesia and, 236

Selective serotonin reuptake inhibitors
posttraumatic stress disorder treatment, 271

Self-care. See Activities of daily living

Self-feeding
burn casualties and, 333–334, 336

phase one of the upper limb amputee protocol of care and, 496

phase two of the upper limb amputee protocol of care and, 500

Self-selected walking velocity
energy expenditure and, 536

Selles, R.W.
gait analysis and training research, 546

Semper Fi Fund
support programs, 111

SensorHand Speed hand
description and uses, 726

Sensors and controls
microcontrollers, 728

Sensory deficits. See also Hearing loss; specific deficits

acute phase of burn casualty rehabilitation and, 360

burn casualties and, 359–360

intermediate phase of burn casualty rehabilitation and, 360

long-term recovery and, 360

safety issues, 360

September 11, 2001

Global War on Terror and, 2

Sequential compressive devices
deep venous thrombosis and, 206, 207

Sertraline
depression treatment, 271

Servicemembers Group Life Insurance
program description, 79–80

Servicemen’s Readjustment Act, 96

Severity of burns
age and, 282

associated illnesses and injuries, 284

body diagrams of equal size burn depicting the difference that location of burn has on functional areas (figure), 287

burn depth, 282–284, 308

burn size, 282

burn terminology (table), 285

clinical relevance, 285–286

development and number of burn scar contractures relation to extent of TBSA, 285–286

deep partial-thickness burns, 282

depression treatment, 271

development and number of burn scar contractures relation to extent of TBSA, 285–286

depression treatment, 271

depression treatment, 271

epidermal burns, 282

evaluation and, 273

evaluation of burn scar contractures, 355

full-thickness burns, 282

graph displaying the relationship between total body surface area burned and the incidence of burn scar contractures (figure), 287

hand burns, 283

impact on survival, 285

location issues, 284

Lund and Browder chart for estimating burn size (figure), 284

rule of nines body chart for estimating burn size (figure), 283

rule of nines for, 282, 283

rule of nines for, 282, 283

subdermal burns, 282

Sexual function
concerns of individuals with limb amputations, 267

external appliances and, 441

polytrauma patients and, 219

rehabilitation of burn casualties and, 344–345

spinal cord injuries and, 441–442

SGLI. See Servicemembers Group Life Insurance

Sheet grafts
burn casualties, 309

Sheridan, R.
community reintegration of burn casualties, 343

Sherman, R.A.
phantom limb pain research, 231

Shinseki, Gen. (Ret.) Eric
return to duty after limb amputation, 54

Shopping
phase of the upper limb amputee protocol of care and, 519–520

Short Form-36 Health Survey
upper limb amputations and, 601

Shoulder units for upper limb prosthetics
description, 618

Sickness impact profile, 15

Silver-nylon dressings
burn casualties, 307
Silver sulfadiazine
  topical treatment of skin grafts, 316
6-minute walk test, 15
Skiing
  adaptive sports equipment for, 710
  monoskis, 710
  outriggers for, 710
Skin. See also Dermatologic issues
  biomechanical components, 317–318
  collagen network, 317
  intermediate phase of burn casualty rehabilitation and, 319
  long-term phase of burn casualty rehabilitation and, 319–320
  properties of, 317
  prosthesis considerations, 317
  successive length induction curves (figure), 317
  tissue elongation and, 318
  tissue hysteresis (figure), 317
  tolerance to high activity, 584–585
Skin care
  burn casualties and, 306–309, 317–320
Skin disorders. See also Dermatologic issues
  challenges of, 182
  chronic conditions requiring surgery, 183
  common disorders in individuals with limb amputations, 156
  physical examination and, 156
  soft tissue coverage and, 183–184
  squamous cell carcinoma, 183
  surgical scars and, 156
  terminal edema, 182–183
  verrucous hyperplasia, 183
Skin grafts
  adherence of, 310–311
  allografts, 313
  burn casualties, 309–317
  chronic nonhealing wounds, 317
  covering fresh grafts, 311
  cultured autologous keratinocyte (epidermal), 312–313
  dressing changes and, 315
  flap grafts, 311
  full-thickness, 310
  full-thickness pinch grafts, 171
  graft-bolstering techniques, 171–172
  heterografts, 313–314
  homografts, 313
  immediate post operative period and, 311
  interim phase of upper limb prosthetic rehabilitation and, 634–635
  intermediate phase of burn casualty rehabilitation and, 314–316
  late wound problems after, 172
  long-term phase of burn casualty rehabilitation, 316–317
  lower limb joint contracture and, 173
  meshed, 310
  recurrent complications from, 171
  rejection of, 313
  sheet grafts, 309
  shrinker compression stockings and, 172
  splints and, 311
  split-thickness, 171, 308, 309–310
  topical treatments, 315–316
Skin traction
  benefits of, 126
  vacuum-assisted closure devices and, 126
Slalom
  opportunities available to amputees, 678
Sled hockey. See Hockey
Sleep disorders
  burn casualties and, 348
  pharmacological treatment, 13, 271
Smallpox vaccine
  development of, 5
Smith, D.G.
  review of a large cohort of transtibial amputees, 155
Snow skiing
  opportunities available to amputees, 678
  prosthetic examples, 665
  upper limb prosthetic considerations, 649
Soccer
  power soccer, 677
  prosthetic examples, 658
  upper limb prosthetic considerations, 646
Social Security Administration
  benefits for veterans and dependents, 84–85
  Supplemental Security Income, 84, 85
  Web site, 84
Social workers
  case managers, 45, 47, 48
  individuals with spinal cord injuries, 427
  vocational rehabilitation and, 97
Society of Automotive Engineers
  Adaptive Devices Subcommittee, 711
Socket interfaces
  gel liners, 563
  hard sockets, 564
  prosthetic socks, 563–564
  transfemoral flexible inner liner with rigid frame, 564
Soft dressings
  advantages and disadvantages, 128
  application of, 128
Soft tissue
  effect of condition of on the level of amputation, 145
  final level of amputation and, 122
  importance to ultimate function, 120
  management of, 124–126
  myofascial closure, 124–125
  prosthesis considerations, 577
  retained bone and, 123
  skin disorders and, 183–184
  socket interfaces and, 723
  surgical considerations, 620–621
  transfemoral amputations and, 164
Softball
  competitive wheelchair softball, 678
Software
  Dragon Naturally Speaking, 529
  MyoSoft software, 505
  voice recognition, 528–530
Soldiers Rehabilitation Act, 96
Spanish Civil War
  importance of debridement of wounds, 193
Spasticity
  presentation of, 438
  spinal cord injuries and, 417–418, 438
  surgical treatment, 438
  traumatic brain injury and, 406–407
  treatment, 417–418, 438
Special surgical considerations for casualties with limb loss. See also General surgical principles for casualties with limb loss;
  Surgical considerations
  burn management, 169–171
  bursitis, 180–182
  Ertl procedure, 165–169
  evaluation of the less-than-successful amputee, 155–157
  heterotopic ossification, 157–161
  history and, 155–156
  infection, 177–180
  joint contractures, 172–174
  knee instability, 176–177
Marquardt humeral osteotomy, 174–176
myodesis failure and lack of soft tissue padding, 162–165
osteomyoplastic transtibial amputation, 165–169
physical examination, 156–157
skin grafts, 171–172
skin problems, 156, 182–184
Speech language pathologists
description and role, 45
Spina bifida allowance
Veterans Benefits Administration, 79
Spinal cord injuries
activity-based therapy, 423–424
anterior decompression and, 417
bowl management program, 432
cardiovascular complications, 429–430
clinical syndromes, 420–421
common causes, 416
common neurological category of, 416
complete injuries, 418, 423, 425–426
complication prevention and management, 427–443
concomitant traumatic amputation and, 424–425
continuing education, 75
deep venous thrombosis and, 206
demographics of, 416
dermatologic complications, 433–436
driver’s training and community mobility, 425
educational topics for patients, family members, and caregivers, 427
endocrine system issues, 219
endocrinologic complications, 433
examples of activities available to individuals with spinal cord injuries (exhibit), 426
expected functional outcome for complete spinal cord injury (table), 422
functional outcome, 421
gastrointestinal complications, 430–433
genitourinary complications, 440–442
gray matter damage, 417
health maintenance, 442–443
heterotopic ossification and, 210, 345
historical background, 416
housing, finances, and community reintegration, 427
incomplete injuries, 418
initial rehabilitation, 421–427
life expectancy, 416
living skills, 426
men and, 416
mobility issues, 421
mortality from, 416, 427
musculoskeletal disorders, 436–438
national recreational events, 75
nerve root injury, 417
neurologic evaluation: myotomal levels (table), 418
neurological assessment and classification, 418–421
neurological disorders, 438
nonpenetrating type, 416–417
organization of a spinal cord injury unit, 443
pain and, 438–440
pathophysiology of, 416–418
patient and family education, 426–427
penetrating type, 416, 417
percentage of the US population experiencing, 416
prevalence, 416
psychological issues, 442
pulmonary complications, 427–429
secondary processes and, 417
self-care, 425–426
spasticity and, 417–418, 438
spinal cord injury clinical syndromes (table), 420
“spinal shock,” 421
standard neurological classification of spinal cord injury worksheet (figure), 419
summary of issues, 443
types of, 416–417
Veterans Health Administration services, 74–75
vocational and avocational pursuits, 426
walking goals, 423
wheelchair use, 421–423
white matter damage, 417
zone-of-injury recovery, 418
Spinal cord stimulation
phantom limb pain treatment, 248
Splinting
acute phase of burn casualty rehabilitation, 320–321
assessing skin integrity and, 320
axilla splints, 322
burn casualties and, 319, 320–325, 353
burn edema and, 304, 306
burn scar management, 353
custom hand and wrist splints (table), 323
definition, 320
dynamic, 319, 324
ear grafts and, 321
elbow splints, 322
goal of, 321
heterotopic ossification and, 345
intermediate phase of burn casualty rehabilitation, 321–324
knee and ankle splints, 324
long-term phase of burn casualty rehabilitation, 324–325
long-term phase of burn-patient rehabilitation and, 319
mouth appliances, 321
neck immobilization, 321–322
positioning and splinting devices used to manage edema (table), 303–304
postoperative splinting and positioning (table), 306
prefabricated splints, 320, 321
skin grafts and, 311
static splints, 322, 324
wrist and hand splints, 320–321, 322–324
Split-thickness skin grafts
complications from, 171
donor sites, 309
full-thickness burns and, 308
healing time, 309
Sports. See Athletics; Lower limb prosthetics for sports and recreation; Sports and recreation opportunities; Upper limb prosthetics for sports and recreation; specific sports
Sports and recreation opportunities. See also Equipment for sports and recreation
aerobics/physical fitness, 672
air guns/shooting, 672
archery, 672
assistive technology, 671–672
availability of individual assessments for adaptive recreation and sports equipment, 671–672
basketball, 673
bicycling/handcycling, 673
billiards, 673
bowling, 673
camping, 673–674
canoeing, 674
classification of disabled athletes, 671
Clinical Practice Recommendations for Issuance of Recreational and Sports Equipment, 671
curling, 674
fencing, 674–675
Index

- fishing, 675
- flying, 675
- football, 675
- golf, 676
- historical background, 670
- hockey, 676
- horseback riding, 676
- hunting, 676
- kayaking, 676
- National Disabled Veterans Winter Sports Clinic, 676
- National Veterans Wheelchair Games, 676–677
- Paralympic Games, 677
- power soccer, 677
- quad rugby, 677
- road racing, 677
- scuba diving, 678
- skiing, 678
- softball, 678
- summary of issues, 680
- swimming, 679
- table tennis, 679
- tennis, 679
- therapeutic benefits, 670
- track and field, 679
- trap and skeet shooting, 679
- waterskiing, 680
- weightlifting, 680
- Squamous cell carcinoma
  - chronic recurring draining fistulae and, 183
- “Squirt Shape” technique
  - description, 722
- SSA. See Social Security Administration
- SSIs. See Surgical site infections
- SSWV. See Self-selected walking velocity
- Stairs
  - step-by-step method for ascending/descending, 473
  - step-over-step method for ascending/descending, 473
- *Staphylococcus aureus*. See also Methicillin-resistant *Staphylococcus aureus*
  - battle wounds and, 194
  - surgical site infections and, 196
- State Benefits Seamless Transition Program
  - description, 111
- States
  - public vocational rehabilitation system, 103
  - state veterans’ home programs, 73
- Static splints
  - static progressive, 324, 325
  - uses for, 322, 324
- Steering. See Driving
- Step activity monitor, 15
- Stoke Mandeville Games
  - description, 36
- Stomach
  - spinal cord injury complications, 431
- Strength training and cardiovascular conditioning
  - acute phase of burn casualty rehabilitation, 330–332
  - bedside chairs and, 331
  - considerations for burn casualties, 330–332
  - core stabilization, 454, 456–457, 469, 473
  - dynamic stump exercises, 465–467
  - early ambulation and, 332
  - intermediate phase of burn casualty rehabilitation, 332
- Karvonen method for determining heart rate range (exhibit), 332
- long-term phase of burn casualty rehabilitation, 332
- multiple planes of motion and, 466
- phase one of the physical therapy rehabilitation program and, 454, 456–458
- phase one of the upper limb amputee protocol of care and, 498
- phase two of the physical therapy rehabilitation program and, 465–470
- phase two of the upper limb amputee protocol of care and, 503–504
- phase three of the upper limb amputee protocol of care and, 515
- postural positions that strengthen the hip musculature, 465–466
- progressive resistive exercise for uninvolved limbs, 468
- risk of overheating and, 332
- semisupine resisted pelvic rotation drills, 467
- therapeutic exercise (bedside and/or mat), 454
  - tilt tables and, 331–332
- *Streptococcus spp*
  - battle wounds and, 194
- Stress reduction strategies
  - posttraumatic stress disorder and, 349
- Stryker pumps, 244
- STSGs. See Split-thickness skin grafts
- Stump pain. See Residual limb pain
- Styloid level amputations
  - interim phase of upper limb prosthetic rehabilitation and, 625–626
  - prosthetic recommendations for (table), 627
  - surgical considerations, 619
- Subacute rehabilitation programs
- Subatmospheric pressure dressings
  - heterotopic ossification and, 158
  - infected residual limbs and, 180
  - skin grafts and, 172
- Subdermal burns
  - description, 282
  - range-of-motion exercises and, 330
- Superior mesenteric artery syndrome
  - spinal cord injury and, 431
- Supplemental Security Income
  - eligibility, 84, 85
- Support programs
  - Air Force Wounded Warrior Program, 107
  - Army Wounded Warrior program, 106, 113, 737
  - combat-related injury and rehabilitation pay, 108–109
  - Computer and Electronic Accommodation Program, 108
  - future research needs, 737
  - Heroes to Hometowns, 109
  - Marine Wounded Warrior Regiment, 106–107, 114–115, 737
  - Military Severely Injured Center, 107–109, 737
  - military severely injured support systems, 106–110
  - military support systems Internet addresses (table), 110
  - Navy Safe Harbor program, 107, 737
  - Operation Warfighter program, 108
Paralyzed Veterans of America, 110–111
REALifelines program, 108
regional resources and support organizations, 113–116
resources at WRAMC, 116
services offered by, 109, 110
Traumatic Servicemembers’ Group Life Insurance, 108
travel authorizations for family members, 109
veteran service organizations and other opportunities, 110–111
vocational rehabilitation and, 102–103
Surgical considerations. See also General surgical principles for casualties with limb loss; Plastic and reconstructive surgery; Special surgical considerations for casualties with limb loss anticipated functional outcome, 12
artificial condyles, 723
burn casualties, 307–309
future research needs, 736
goals of surgery, 119–120
guidelines for residual limb length, 619–620
heterotopic ossification, 159–161
limb-salvaging decisions, 12
mangled extremity severity scores, 12
muscle attachment guidelines, 620
osseointegration, 723
preprosthetic phase of upper limb prosthetic rehabilitation, 618–621
pressure ulcers, 434–436
spasticity, 438
Surgical Infection Prevention Project
guidelines for antibiotic prophylaxis, 193–194
Surgical site infections
categorization of, 195
diagnosis of, 195
implant infections, 196
Infectious Diseases Society of America treatment guidelines, 195–196
“Survivor guilt”
role in psychological adjustment, 266–267
Swimming
opportunities available to amputees, 679
prosthetic examples, 658–659
swimming without a prosthesis, 646
upper limb prosthetic considerations, 646
Syme amputations
abnormal keratosis and, 155
general surgical considerations, 136
Syme prosthesis
biomechanics and socket strength, 565
foot options, 565
socket design and suspension, 564
Sympathetic blocks
phantom limb pain treatment, 249
Syndrome of inappropriate antidiuretic hormone
spinal cord injuries and, 433
Synthetic skin substitutes
burn casualties and, 307, 312–313
Table tennis
opportunities available to amputees, 679
Tactical Combat Casualty Course, 5
TAPES. See Trinity Amputation and Prosthetic Experience Scale
description and uses, 602
Targeted muscle reinnervation. See also Targeted reinnervation combined with advanced signal processing techniques, 725–726
description, 725
EMG control signals and, 725
sensory feedback and, 726
Targeted reinnervation. See also Targeted muscle reinnervation
description, 522
future research needs, 736
goal of, 530
nerve management technique, 127
“Targeted Reinnervation in Upper Limb Amputees to Improve Myoelectric Prosthesis Function,” 530
“Targeted Reinnervation in Upper Limb Amputees to Improve Myoelectric Prosthesis Function,” 530
Task-specific upper limb prostheses
advantages/disadvantages of (table), 613
description, 613
Taylor, M.B.
gait analysis and training research, 546
Taylor, S.M.
functional outcome in amputees, 405
TBI Model Systems Program
VA collaboration with, 49
TBSA. See Total body-surface area
TDRL. See Temporary disability retirement list
TDs. See Terminal devices
Team River Runner
Paralympics sponsor, 15
TEC Interface
Vacuum-Assisted Socket System, 722
Technical climbing. See also Rock climbing
prosthetic examples, 666–667
upper limb prosthetic considerations, 650
TED hose
depth venous thrombosis and, 206, 207
Telehealth services
Veterans Health Administration and, 73
Telemedicine and Advanced Technology Research Center
pilot study on voice recognition software, 529
Temperature regulation
burn casualties and, 360
Temporary disability retirement list
physical evaluation boards and, 61
policy change, 63
Tennis
opportunities available to amputees, 679
wheelchairs for, 709
Tenodesis
description, 125
TENS. See Transcutaneous electrical nerve stimulation
Terminal devices
bilateral upper limb amputees and, 503, 527
interchangeability issues, 614
prehensile, 508
upper limb prosthetics, 614–615
Terminal edema
description and monitoring of, 182–183
Terminology
amputation level nomenclature, 608
burn terminology (table), 285
gait analysis and training, 536–538
prosthetics, 509
Tetanus immunization
wound infection and, 193
Texas Assistive Devices
description, 527
TFAs. See Transfemoral amputations
Thera-Band
description and uses, 504
“Therapeutic Intervention for the Prevention of Psychiatric Stress Disorders”
components, 269–270
empathic exposure and, 270
Xiv
intervention timing, 270
Thermal burns
causes, 280
percentage of military burn casualties, 280
Three-dimensional gait and motion analysis, 15
“3” profile designators
medical evaluation boards and, 58
medical military occupational specialty retention boards and, 58
Through-knee amputations
general surgical considerations, 138
Thumb amputations. See Finger, thumb, and partial hand amputations; Hand and carpus amputations
Tilt tables
burn casualty rehabilitation and, 331–332
orthostatic hypotension and, 421
Tinnitus
causes, 387
characteristics of, 387
evaluation of, 391
related health problems, 387
treatment and rehabilitation, 393
Tinnitus Handicap Inventory
description, 388
Tinnitus Retraining Therapy
description and uses, 393
Tissue contractures. See also Joint contractures
burn casualties and, 327, 330, 349–350
inflammatory phase of wound healing and, 350
range-of-motion exercises and, 330
Tizanidine
spasticity treatment, 406–407, 438
TM perforation. See Tympanic membrane perforation
TMR. See Targeted muscle reinnervation
Tobacco use
impaired healing response and, 204
oral cavity problems and, 430
respiratory complications in individuals with spinal cord injuries and, 429
Toileting skills
burn casualties and, 335, 337
phase one of the upper limb amputee protocol of care and, 496
phase two of the upper limb amputee protocol of care and, 500
Tolerico, M.L.
wheelchair activity patterns, 700–701
Torsion components
combined torsion and vertical shock, 562
description, 561–562
Total body-surface area
development and number of burn scar contractures relation to extent of TBSA, 285–286
full-thickness burns and, 283
graph displaying the relationship between total body surface area burned and the incidence of burn scar contractures (figure), 287
Touch Bionic elbow
description, 728
Tourniquets
pneumatic, 134
use and application of, 118
Track and field sports
opportunities available to amputees, 679
wheelchair designs for, 709
Transcortical and transmetacortical level amputations. See also Hand and carpus amputations
surgical considerations, 619
Transcutaneous electrical nerve stimulation
phantom limb pain treatment, 248
Transfemoral amputations. See also Bilateral transfemoral amputees; Transfemoral prostheses
gait analysis and training, 544–545
general surgical considerations, 138–140
hip flexion and, 140
joint contracture and, 172
low back pain and, 250
myodesis failure, 162–164
osteoarthritis and, 218
physical therapy issues, 454
soft tissue padding and, 164
stair ascending/descending techniques, 473
Transformal prosthetics. See also Transmetatarsal amputations
alignment, 574–575
biomechanics, 574
cycling and, 589
elastic belt suspension, 573–574
hip joint and pelvic band suspension, 574
ischial containment sockets, 571–572
locking gel liners, 573
quadrilateral sockets, 572
running and, 587–588
sealing liners, 573
Silesian belt suspension, 573
socket design, 571–572
sports and recreation and, 585
suction by skin contact, 572–573
suspension, 572–574
winter sports and, 590
Transfemoral prostheses
flexible liners with rigid frame, 564
Transhumeral amputations
elevation or shoulder instability above, 177
interim phase of upper limb prosthetic rehabilitation and, 627–628
myoplasty failure, 165
prosthetic recommendations (table), 632
surgical considerations, 620
Transition Assistance Online, 99
Transmetatarsal amputations
description, 134–135
Transmissions
characteristics, 727
continuously variable transmissions, 729
harmonic drives, 729
planetary gears, 727, 728
Transpelvic amputations
alignment and, 576
gait and, 576
prosthesis biomechanics, 576
prosthesis socket design, 575
Transportation issues
accessibility, 710
Transportation Security Administration
Military Severely Injured Center assistance, 109
Transradial amputations
elevation or shoulder instability above, 177
interim phase of upper limb prosthetic rehabilitation and, 626
myoplasty failure, 165
myodesis failure, 165
prosthetic recommendations (table), 628
surgical considerations, 619
Transtibial amputations. See also Bilateral transtibial amputees;
Transstibial prostheses
advantages of, 136
Burgess technique, 166, 169
distal bone bridge synostosis technique, 137
flaps for, 136–137
gait analysis and training, 541–544
general surgical considerations, 136–138
joint contracture and, 172–173
knee instability and, 177
low back pain and, 250
myodesis failure, 164–165
myoplasty failure, 164–165
osteoarthritis and, 218
physical therapy issues, 453, 454, 466
radiographs needed, 136
rigid dressings for postoperative care, 137–138
stair ascending/descending techniques, 473
studies of patients with, 155

Transtibial prostheses. See also Transtibial amputations
alignment of, 568, 569
biomechanics, 568–569
correct height for, 568–569
foot selection and, 568
mechanical lock mechanisms, 567
patellar tendon-bearing sockets, 565
running and, 586–587
sleeves for suspension, 566
socket design, 565–566
suction suspension, 567
supracondylar/supracondylar suprapatellar socket design, 566–567
suspension, 566–568
total surface bearing sockets, 565–566
vacuum-assisted suction, 567–568
winter sports and, 590

Transverse tarsal amputations
description, 135–136

Trap and skeet shooting
opportunities available to amputees, 679

Traumatic brain injury. See also Mild traumatic brain injury
acceleration/deceleration injuries, 402
acute medical care, 406–407
assistive devices for ambulation and, 461
behavioral effects, 272, 403–404
blast effects, 402–403
brain injury severity levels (table), 402
CDC estimates of cases in the United States, 400
closed, 400
cognitive function and, 404, 405, 408–409
complications from, 272
contact injuries, 402
cumulative blast exposures and, 400
decompressive craniectomy and, 406
deep venous thrombosis and, 406
definition of, 400
delayed diagnosis of, 400
Department of Defense consensus on traumatic brain injury
definition (exhibit), 401
description, 400
domains of cognitive functioning and representative neuropsychological tests (table), 409
drug-based neuroprotection, 406
dysautonomia and, 407
educational resources for families, 48
emergency preadmission care, 406
endocrine system concerns, 219
family support and, 272, 406
hearing loss and, 382, 386, 388, 389, 390, 391
heterotopic ossification and, 210, 211, 406
hyperarousal and, 272
impact on the military, 400
interim phase of upper limb prosthetic rehabilitation and, 634
injuries and questionnaires and, 408
limb amputations and, 7, 219, 272, 404–405, 494
military service members compared with civilians, 400
monetary cost estimate, 400
mood and emotional problems and, 272
occupational therapist role, 408
outcomes research needs, 402
pain management, 409
pathophysiology of, 400–402
penetrating, 400
physical therapy and, 480–482
polytrauma and, 46, 272
polytrauma centers and, 272
posttraumatic seizure prophylaxis, 13, 406
rehabilitation and, 272, 407–409
screening for, 272, 388
spasticity and, 406–407
summary of issues, 409
survival rate, 400
treatment, 405–406
“treatment failure” and, 408–409
VA centers, 42, 272
venous thromboembolisms and, 207

Traumatic Servicemembers’ Group Life Insurance
description and coverage, 108

Travel expenses
travel authorizations for family members, 109, 268
Veterans Health Administration and, 76

Trazodone
sleep problem treatment, 271

Treatments for multimodal pain management
medications, 245–248
nontraditional therapies, 248–250
regional anesthesia and analgesia, 234–244

Trees, D.
mobility activities for burn casualties, 339

TRICARE
military medical disability system coordination, 15
President’s Commission on Care for America’s Returning Wounded Warriors recommendations, 63

Trinity Amputation and Prosthetic Experience Scale, 15

Trudeau, D.L.
cognitive function research, 408

Truman, Pres. Harry S
prosthesis improvements and, 6

TSA. See Transportation Security Administration

TTAs. See Transtibial amputations

Tubegrip
description, 497

Tuman, K.J.
regional anesthesia and analgesia research, 234–244

Tupper, J.W.
zebrafish research, 161

Turo, N.
phantom limb pain research, 231

Tympanic membrane perforation
cholesteatomas and, 385
ear infections and, 385
mechanism of injury, 384–385
ossicular disruption and, 385
prevalence of, 385

Ultrasound
benefits of, 243
perioperative regional anesthesia and analgesia and, 243

“Unilateral Upper Extremity Amputation: Activities of Daily Living Assessment” (Atkins), 513, 519

United Kingdom
Joint War Committee of the British Red Cross, 28
Order of St John, 28
Index
Care of the Combat Amputee

Department of Defense consensus on traumatic brain injury definition (exhibit), 401

developing an amputee program within, 7–8

establishment of an amputee patient care program, 2

focus of research after the Vietnam War, 732

identification and treatment of psychological issues stemming from Operation Enduring Freedom/Operation Iraqi Freedom, 342

Memorandum of Understanding with the VA, 42

military liaisons, 45

Military Severely Injured Center, 107–108

mission and vision statements for the amputee program, 8

nonmedical attendants and, 14, 268

Operation Warfighter program, 108

prosthetist classification, 554

relationship with VA, 4, 72

research partnership with the VA, 11

Reservists Education Assistance Program eligibility and, 81

vocational rehabilitation and, 102–103

US Department of Health and Human Services

Uniform Data System, 49

US Department of Homeland Security

Reservists Education Assistance Program eligibility and, 81

US Department of Housing and Urban Development

contact information, 83

Veteran Resource Center, 83

US Department of Labor

Recovery and Employment Assistance Lifelines program, 108

US Department of Orthopaedics and Rehabilitation

centers of excellence concept, 10

creation of, 8

interdisciplinary teams, 10–11

organizational structure, 9–10

physiatrist role, 8

prosthetist classification, 554

staffing ratios, 11

suggested staffing ratios for amputee care (table), 11

US Department of Veterans Affairs. See also Polytrauma System of Care; VA Schedule for Rating Disabilities; Veterans Benefits Administration

Advisory Committee of the Secretary of Veterans Affairs on Prosthetics and Special Disability Populations, 7–8

application for health and other benefits, 86

benefits provided by other agencies, 83–85

central office, 68

challenges of navigating the system, 68

Clinical Practice Recommendations for Issuance of Recreational and Sports Equipment, 671, 715

collaboration with the US Department of Defense, 733

Commission on Accreditation of Rehabilitation Facilities and, 43, 49

contact information, 684

creation of a specialized system of care for combat amputees, 7–8

current budget, 68

description, 68–69

disease-related amputations and, 4

eligibility for adaptive recreation and sports equipment, 672

focus of research after the Vietnam War, 732

“hostilities” definition, 77

identification and treatment of psychological issues stemming from Operation Enduring Freedom/Operation Iraqi Freedom, 342

key VA programs and personnel, 87–88

location of VA hospitals near medical schools recommendation, 6

Memorandum of Understanding with DoD, 42

mission, 68

National Cemetery Administration, 68, 82–83

need for flexibility within, 2

OEF/OIF program, 48

Office of Seamless Transition, 107

organization of, 68–69

organizational chart (figure), 69

overview, 68–89

Paralympics sponsor, 15

perception of transfer to VA hospitals as a decrement in care, 7

Preservation Amputation Care and Treatment program, 12, 42

Prosthetic and Sensory Aids Service, 71–72, 715

Prosthetics and Sensory Aids Service, 672

quality of care recognition, 49–50

Rehabilitation Research and Development Service, 11

relationship with DoD, 4, 72

research partnership with DoD, 11

specialized training in rehabilitation techniques, 42–43

sports and recreation opportunities and, 671–672

State Benefits Seamless Transition Program, 111

traumatic brain injury centers, 42, 272

Veterans Benefits Administration, 68, 78–82

Veterans Health Administration, 68, 70–78

vocational rehabilitation specialists and, 98

Web site, 86

what every veterans affairs beneficiary needs to know, 85–87

what military healthcare providers need to know, 87–88

US Disabled Alpine Ski Team

contact information, 691

US Fencing Association

contact information, 691

US Golf Association

contact information, 691

US Handcycling Federation

contact information, 691

regulations for disabled cyclers, 673

US Marine Corps

Marine Wounded Warrior Regiment, 106–107

MHS levels of care and, 3–4

number of wounded per month, 107

US Military Academy

Peak performance training, 500

US National SCI Statistical Center

spinal cord injury data, 416

US Navy

MHS levels of care and, 3–4

Navy Safe Harbor program, 107

US Olympic Committee/US Paralympics

contact information, 691–692

US Paralympics

Paralympics sponsor, 15

US Quad Rugby Association

contact information, 692

US Sanitary Commission

historical background and role, 23–24, 26

US Sled Hockey Association

contact information, 692

US Small Business Administration

outreach to veterans, 84

US Table Tennis Association

competitive table tennis regulation, 679

US Tennis Association

competitive wheelchair tennis regulation, 679

contact information, 692

US Wheelchair Swimming, Inc.

contact information, 693

US Wheelchair Weightlifting Association

weightlifting regulation, 680

US Wheelchair Weightlifting Federation
contact information, 693
USA Swimming
   competitive and recreational swimming governance, 679
USA Volleyball
   contact information, 693
USAISIR. See US Army Institute of Surgical Research
UTIs. See Urinary tract infections

V
VA. See US Department of Veterans Affairs
VA Schedule for Rating Disabilities
   medical evaluation boards and, 56
   recommended reform of, 63
VA Voluntary Services
   assistance for families and caregivers, 48
VACs. See Vacuum-assisted closure devices
Vacuum-assisted closure devices
   skin traction and, 126
   uses of, 126, 497
Vacuum-Assisted Socket System
   description and uses, 722
van der Linde, H.
   gait analysis and training research, 547
Vancomycin
   MRSA infection treatment, 196
   surgical prophylaxis, 194
Vascular surgery
   failure rate, 33
   improvements in during the Vietnam War, 33, 35
   Korean conflict and, 33
VASRD. See VA Schedule for Rating Disabilities
VBA. See Veterans Benefits Administration
Vehicle control. See Driving
Vehicle purchases
   financial assistance for, 82
Venous thromboembolisms
   combat amputees with concomitant fractures and, 207
Verrucous hyperplasia
   description and management of, 183
Vertigo. See Labyrinthine damage
Vestibular system injuries. See also Assessment of the vestibular system
   central vestibular damage, 386–387
   importance of early diagnosis, 382
   labyrinthine damage, 386
   misdiagnosis of, 382
   physical therapy and, 481
   treatment and rehabilitation, 392
Vet Centers
   description and Web site, 74
Veterans benefits. See also Veterans Benefits Administration
   DD 214 form and, 62, 77
   list of, 62
Veterans Benefits Administration
   active duty personnel benefits, 81–82
   area offices, 78
   compensation and pension programs, 79
   education programs, 80–81
   insurance programs, 79–80
   loan guaranty program, 81
   mission, 78
   Office of Vocational Rehabilitation and Education, 102–103
   vocational rehabilitation and employment program, 79, 82, 102–103
   Web site, 78
Veterans Claims Act, 86
Veterans Health Administration
   accessories for adaptive equipment, 715
   adaptive sports equipment eligibility, 715
   assistive technology, 71–72
   authorization for, 70
   Blind Rehabilitation Service, 75–76
   changes in the veteran population, 71
   combat veterans and, 77
   community-based outpatient clinics, 74
   continuing education, 75
   current OEF/OIF VA population compared with the general VHA population, 71
   domiciliary care, 73–74
   emergency medical care in external facilities, 74
   enrollment in, 78
   foreign medical program, 77
   healthcare programs, 72–74
   homeless veterans, 76
   long-term care, 72
   mission, 71
   national rehabilitation special events, 74
   noninstitutional care, 72–73
   nursing homes, 73
   presumptive conditions considered for disability compensation, 76–77
   priority groups, 78
   Prosthetic and Sensory Aids Service, 71–72, 715
   Prosthetics Clinical Management Program, 72, 715
   “recreational leisure equipment” definition, 715
   “recreational sports equipment” definition, 715
   rehabilitation centers, 4
   role of, 70
   spinal cord injury and, 74–75
   things to remember about VHA (exhibit), 78
   travel expenses and refunds, 76
   usage data, 71
   vet centers, 74
   veterans integrated service networks, 70–71
   Veterans integrated service networks
   description and locations, 70–71
   Veterans’ Medical Programs Amendments, 42
   Veterans of Foreign Wars
   support programs, 111
   Veterans on the Lake Resort
   contact information, 693
   Veterans Programs Enhancement Act
   National Cemetery Administration creation and, 82
   Veterans Readjustment Assistance Act, 96
   VHA. See Veterans Health Administration
   Vibration therapy
      burn scar management, 353
   Vicodin
      phantom limb pain treatment, 245
   VICTORS. See Visual Impairment Center to Optimize Remaining Sight Program
   Videonystagmography/electronystagmography
      description and uses, 389
   Vieira, Z.E.
      regional anesthesia and analgesia research, 237
   Vietnam Veterans of America Foundation
      present-day role, 29
   Vietnam War
      advances in amputee care, 6–7
      benefits for children of female Vietnam veterans born with certain defects, 79
      circular amputations and, 118
      improvements in resuscitation and vascular surgery, 33, 35
      lower extremity wounds and reasons for, 33
      motivational therapeutic programs and, 35–36

Ixix
osteomyoplastic transtibial amputation and, 166
rehabilitative athletics and, 36
spinal cord injuries and, 416
survival rate for casualties, 400
VISNs. See Veterans integrated service networks
VISOR. See Visual Impairment Services Outpatient Program
Visual impairment. See also Blind persons
prosthesis considerations, 577, 632–633
Visual Impairment Center to Optimize Remaining Sight Program
description, 75–76
Visual Impairment Services Outpatient Program
description, 75
Vitamin K
heterotopic ossification treatment, 158
Vloka, J.D.
regional anesthesia and analgesia research, 236
Vocational rehabilitation
age issues, 98
assessment and career exploration phase, 98–99
background for, 96–98
baseline function and, 99–100
basic components, 98–101
compensated work therapy, 101
cultural values and, 96
definition, 96
development of the rehabilitation plan, 99
follow-up services, 101
functional assessment and, 100–101
functional capacity evaluations, 521–522
future research needs, 734
individual choice and, 101
individual's strengths and weaknesses and, 97–98
intervention strategies and training, 101
legislation involving, 96
long-term needs and outcomes and, 98
model system for, 96, 103
outcomes, 97
phase of the upper limb amputee protocol of care and, 521–522
planning pragmatically for employment, 97
preinjury character traits and, 97
process of, 98–101
psychosocial adaptation to amputation, 102
public vocational rehabilitation system, 103
rehabilitation counselors and, 96–97
rehabilitation professionals, 96–97
spinal cord injuries and, 426
supports and systems for, 102–103
tenets of, 97–98
transferring past work experience to future employment options, 98
Veterans Benefits Administration and, 79, 82, 102–103
Voice recognition software
description and uses, 528–530
Volleyball
prosthetic examples, 658
upper limb prosthetic considerations, 646
Vollum, Dr. Edward P.
evacuation of soldiers after the battle of Gettysburg, 24
VR. See Vocational rehabilitation
VR&E. See Office of Vocational Rehabilitation and Education
VTEs. See Venous thromboembolisms

W

Walking. See Ambulation
Wall, P.D.
mirror therapy research, 250

Wall-Alonso, E.
activity factor for weight maintenance, 296
Walter Reed Army Hospital
specialty amputee rehabilitation program, 5–6
Walter Reed Army Medical Center
bilateral transfemoral protocol, 491–492
center of excellence for service members with amputations, 4
designation as the primary site for amputee care in the United States, 8
Military Advanced Training Center, 10
military amputee rehabilitation protocol, 486–491
occupational therapy and, 494
patient flow chart at WRAMC’s amputee service (figure), 9
PDES Joint Pilot Program and, 56
physical medicine and rehabilitation residency program, 5
PM&R residency program, 11
preventive medical psychiatry service, 268–273
resources at, 116
“Targeted Reinnervation in Upper Limb Amputees to Improve Myoelectric Prosthesis Function,” 530
traumatic brain injury treatment, 400
Warfarin
deep venous thrombosis treatment, 429
Warrior transition units
DD214 document and, 55
description and role, 54–55
medical evaluation board proposed pilot system and, 58
Water Skiers With Disabilities Association
contact information, 693
Water sports. See also specific sports
lower limb prosthesis and, 590
Waters, J.H.
regional anesthesia and analgesia research, 234
Waterskiing
adaptive sports equipment for, 710
opportunities available to amputees, 680
prosthetic examples, 665
upper limb prosthetic considerations, 648–649
Waxman, K.
formula for the protein needs of burn casualties, 296
Web sites. See also Internet
American Council on Education military training programs, 99
American Society of Regional Anesthesia, 238
Marine Wounded Warrior Regiment hometown link locations, 114–115
ONET, 99
Polytrauma System of Care, 48
Social Security Administration, 84
Transition Assistance Online, 99
US Department of Veterans Affairs, 86
useful resources and organizations for veterans, 116
VA Prosthetic and Sensory Aids Service, 72
Vet Centers, 74
Veterans Benefits Administration, 78
Veterans Health Administration foreign medical program, 77
Web site addresses of organizations helpful to injured service members (table), 55
Weight-bearing restrictions
bone stimulators, 208
energy requirements and, 208
fracture healing and, 208
timely and thorough musculoskeletal system evaluations and, 207–208
tolerance determination, 208
ultrasound, 208
Weight training
opportunities available to amputees, 680
A World to Care For: The Autobiography of Howard A. Rusk, M.D. (Rusk). 5

World War I
blast-related injuries, 403
Galsworthy’s philanthropic work, 26–27
importance of debridement of wounds, 193
international conference on “after-care” of disabled soldiers, 26
mortality risk from fractures, 193
“reconstruction aides” role, 28
rehabilitation programs, 27–28

World War II
Baruch’s role, 33
blast-related injuries, 403
improvements in surgical technique, blood transfusions, and antibiotics, 30
Kirk’s role, 33
number of amputations and reasons for, 30, 118
percentage of lower extremity wounds, 30
prosthetic improvements, 6
rehabilitation schedule, 30–31
Rusk’s role, 5, 31, 33
spinal cord injuries and, 416
survival rate for casualties, 400
upper extremity injuries, 30

Wound care and management. See also Closure of wounds; Dressings
abnormal wound healing, 202–204
acute phase of healing and, 306–309
burn casualties and, 306–309, 315
burn wound excision, 307–309
chronic inflammation, 202
debridement and, 202
desiccation versus maceration, 203
dressings, 307
epithelialization and, 202–203
granulation and, 202–203
hemostasis phase, 201
impaired healing response, 203–204
importance of, 200
infection related to skin loss, 307
inflammation phase, 201
open wounds, 121
phase one of the upper limb amputee protocol of care and, 497
pressure ulcers, 435
proliferation phase, 201–202
rehabilitation goals, 306
remodeling phase, 202
signs and symptoms of infection, 203
wound healing phases, 201–202
wound treatment, 204–206

Wounded, Ill, and Injured Overarching Integrated Product Team
Report to Congress on the Current Status of the Department of Defense and Department of Veterans Affairs Disability Evaluation System Pilot Program, 63

Wounded Warrior Project
adaptive sports, 111
description, 111
goals of, 111
motto of, 111
Paralympics sponsor, 15

Wounded Warriors
description and role, 48
WRAMC. See Walter Reed Army Medical Center

Wrist and forearm amputations
general surgical considerations, 131
Wrist units for upper limb prosthetics
actuation methods, 616–617
bilateral upper limb amputees and, 631
 capabilities of, 616
 co-contraction control method, 617
 “quick-slow” or “fast access” control methods, 616–617
 WSUSA. See Wheelchair Sports, USA
 WTUs. See Warrior transition units
 Wu, C.L.
   clonidine research, 247
   opioid research, 246
   regional anesthesia and analgesia research, 236

Y

Yard work responsibilities
   phase of the upper limb amputee protocol of care and, 519
 Yeager, M.P.
   regional anesthesia and analgesia research, 236
 Yellow Ribbon Fund
   Paralympics sponsor, 15

Z

Z-plasty
   burn casualty reconstructive surgery and, 359
 Zolpidem
   sleep problem treatment, 271
 Zone of injury
   spinal cord injury recovery and, 418
   upper limb amputations and, 130
Major David Rozelle had his foot amputated due to injuries incurred from an improvised explosive device blast that struck his Humvee while he was serving as a company commander in Iraq. After undergoing surgery and rehabilitation at Walter Reed Army Medical Center (WRAMC), Major Rozelle asked to continue on active duty and return to Iraq to complete his tour. His request was granted, and this photograph was taken on his second tour. Major Rozelle was the first soldier with a major limb amputation to return to the theater of combat operations. After completing his tour in Iraq, Major Rozelle returned to WRAMC to work within the Armed Forces Amputee Care Program, helping other service members injured in Iraq or Afghanistan to maximize their potential. He also helped lead the design and construction of the Military Advanced Training Center at WRAMC. After completing this assignment, he served as aide-de-camp for the Surgeon General of the Army, and later attended the Marine Corps University. At the time of printing, Major Rozelle had returned to the Cavalry Corps and was once again assigned to a combat unit. In addition to Major Rozelle’s many military accomplishments, he has also completed the Iron Man Triathlon and several marathons.

Photograph: Courtesy of Major David Rozelle.
Care of the Combat Amputee Index