

PROSTHETICS, ORTHOTICS, & MEDICAL DEVICES

OBJECTIVES

Patient Care

Residents are expected to:

Perform a focused PM&R related History and Physical exam for patients with amputation and dysvascular disease, detailing skin or residual limb status and neurological issues which will affect the prosthesis prescription.

- Prescribe adult and pediatric prosthetics and therapy with appropriate activity restrictions and precautions. This would include complete prosthetic prescriptions for: a young, otherwise healthy, transtibial, and transfemoral amputee and an older, dysvascular, transtibial, and transfemoral amputee
- Prescribe a pre-amputation care plan and pre-prosthetic training program
- Coordinate care with consultants (e.g., goal-directed therapy, orthotic/prosthetic prescriptions)
- Prescribe functionally and neurologically appropriate orthoses, prostheses, and durable medical equipment
- Screen patients to determine who is an appropriate candidate for a prosthetic device and the appropriate timing for prosthetic fitting
- Evaluation, identification, and management of limb deficiency / amputation
- Prescribe adult and pediatric orthoses for patients with neurological or musculoskeletal disorders
- Perform an assessment / evaluation / “check out” of an orthosis, prosthesis, wheelchair, or other durable medical equipment
- Prescribe a wheelchair / seating system for an adult and a pediatric patient with neurological or musculoskeletal disorders including hemiplegia, quadriplegia, or paraplegia

Understand, recognize, assess, and manage the following secondary problems of amputees:

- Phantom sensation
- Phantom pain
- Choking phenomenon of the distal residual limb
- Verrucous hyperplasia
- Contractures

- Depression and adjustment disorder following an amputation
- Evaluate and manage skin problems utilizing various techniques of prevention and various modalities for managing edema and skin breakdown
- Evaluate and manage additional amputation complications of the skin, bony overgrowth, and infection
- Understand, recognize, assess, and manage prosthetic and pathologic gait deviations as they relate to prosthetic and orthotic setup and alignment
- Identify important considerations in the rehabilitation evaluation and management of the geriatric amputee
- Describe management of the foot in peripheral vascular disease and diabetes
- For UE amputees, discuss the steps of prosthetic training and the body motion used to operate the prosthesis
- Measure a patient for and instruct him/her in the use of a cane
- Prescribe the appropriate orthotic or shoe modifications for various skeletal deformities of the insensate foot
- Understand the differences between power wheelchairs and power scooters, including the benefits and limitations of each

Medical Knowledge:

Residents are expected to:

- Learn to evaluate and prescribe assistive devices and technology, including: orthotics, prosthetics, wheelchairs and positioning, ADL aids, interfaces and environmental controls, augmentative/alternative communication, environmental accessibility, electrical stimulation, and dynamic splinting
- Discuss the epidemiology & common causes of limb amputation
- Discuss indications for amputation and the process of determining the amputation level, including hip disarticulation, AKA, BKA, and Symes, and review basic aspects of pre- and post-op surgical care
- Discuss the various components of an upper extremity and lower extremity prosthesis and the indications/contraindications for the use of each component
- Explain the purpose of a removable rigid dressing
- Understand and outline the steps in the fabrication of a prosthesis
- Explain the benefits of early prosthetic fitting and ambulation
- Discuss the timing of prosthesis for congenital and acquired pediatric amputees
- Discuss the differences between a pediatric and adult amputee
- Discuss ambulatory prognosis based upon level of amputation
- Discuss life expectancy and causes of death after amputation
- Demonstrate knowledge of the rehabilitation management of edema

- Evaluate and develop a differential diagnosis for a painful limb in the amputee
- Describe the various phases of gait, indicate changes in joint angles, analyze forces and identify the active muscles
- List the six major determinants of gait and know how they help decrease energy requirement
- Learn the increased energy requirements to walk with different types of prosthesis
- Learn how patient co-morbidities (stroke, diabetes, cardiovascular disease, diabetes, renal failure) will affect prosthetic choice
- Describe indications for and specifics of drugs used for phantom pain
- Discuss the various causes of foot drop
- Evaluate various types of AFO's, KAFO's, and HKAFO's and their indications and contraindications
- Discuss the implications of materials, components, and design in the prescription of various types of lower limb orthoses
- Discuss the differences between static and dynamic bracing and the rationale for the use of each type
- List six reasons for the use of orthotics
- Explain the biomechanics of a single- and dual-chamber ankle joint in the AFO
- List component parts of a standard commercial shoe and the significance of each part
- Review the various types of mobility devices available for children
- Discuss the effectiveness of immobilization (spinal orthotics, halo vest, SOMI, cervical collars, and TLSO) and discuss possible complications of these devices
- Understand the principles of spinal stability
- Discuss the various components of a wheelchair and the indications/contraindications for the use of each component
- Explain the special considerations needed to appropriately prescribe a wheelchair for a pediatric patient
- Discuss different types of canes, crutches, and walkers and know the advantages and disadvantages of each

Practice-based Learning and Improvement

Residents are expected to:

- Become proficient in the use of the hospital's computer system in order to obtain medical records, lab results, imaging study results, and other ancillary notes
- Critically review and analyze appropriate literature regarding prosthetics, orthotics, & medical devices
- Prepare lectures for the didactic lecture series, to further enhance PM&R knowledge

- Educate and supervise junior residents, rotators and medical students who are spending time on the rotation

Interpersonal & Communication Skills

Residents are expected to:

- Explain basic residual limb management techniques to patients and families
- Educate patients and families about possible complications associated with amputations (contractures, contralateral foot ulcers, etc.)
- Appropriately convey medical and prognostic information to the patient, the patient's family, and allied health staff
- Communicate with the orthotist / prosthetist regarding appropriate orthotic / prosthetic treatment plans
- Develop effective presentation skills
- Develop appropriate communication skills when working with medical/surgical consultants from other specialties
- Develop rapport with patients and patients' families
- Develop skills in team management and leadership while working with the consult team members, pediatric team members and while participating in the various team and family conferences
- Work as a part of the referral development team to enhance the efficiency of the admission process
- Develop skills in team management and leadership
- Identify and overcome obstacles to effective communication and care with the elderly rehabilitation patient
- Identify and overcome obstacles to effective communication and care for non-English speaking patients and patients of differing cultures

Professionalism

Residents are expected to:

- Demonstrate professional and courteous communication to the patient, the patient's family, referring physicians and allied health staff
- Demonstrate ability to serve non-English speaking and English speaking patients equally through the use of interpreters when needed
- Recognize cultural / ethnic diversity and how that reflects differences in prosthetic and orthotic management
- Demonstrate understanding of cultural, age, religion, and gender differences in patients
- Understand and adhere to HIPPA regulations

- Demonstrate understanding of cultural, age, religion, and gender differences in pediatric and adolescent patients
- Understand the ethical principles involved in managing children who have congenital disease or trauma
- Demonstrate traits of reliability and punctuality
- Demonstrate sensitivity to patients' perception of disability

Systems-based Practice:

Residents are expected to

- Understand Medicare guidelines and K-code levels for prosthetic prescriptions
- Advocate for all patients equally within the healthcare system
- Determine appropriate discharge disposition for patients, including acute rehab, subacute rehab, ECF, home health, and outpatient therapy
- Become familiar with discharge planning, educational and vocational planning, transitional planning, and adjustment to disability support
- Become involved with administrative aspects of pediatric care, including principles of organizational behaviors and leadership, quality assurance, cost efficiency, knowledge of health care systems, community resources, and support services regulations pertaining to service provision (external reviews, inpatient services, outpatient services, home care, school based programs and capabilities), skills for effective advocacy, medical legal aspects (child protective services, guardianship, liability)
- Review indications for radiographs, electrodiagnostic studies, vascular studies, CT, and MRI scans with patients and discuss the indications for invasive procedures
- Understand management limitations and when to request appropriate medical/surgical consultations from other specialties
- Coordinate care for patients and ensure a smooth transition at the time of discharge
- Assess the efficacy of rehabilitation on maintaining achieved gains and reducing long-term costs
- Understand vocational rehabilitation services available for amputees
- Discuss vocational outcome and issues after amputation
- Describe characteristics of appropriate home features and van features for wheelchair dependent individuals
- Discuss and utilize community, healthcare, social, and financial resources that may be available to enhance function, care, and safety in the amputee rehabilitation patient

References

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