ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY
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Anjugramam - Kanyakumari Main Road, Palkulam, Variyoor P.O. - 629 401, Kanyakumari District.

DEPARTMENT OF BIOMEDICAL ENGINEERING

VII Semester

OBT357 BIOTECHNOLOGY IN HEALTH CARE

UNIT- 4 OUT PATIENT & IN-PATIENT SERVICES

4.4. Physical medicine & Rehabilitation

Physical Medicine and Rehabilitation (PM&R), also known as physiatry, is a medical specialty dedicated to improving the lives of people with physical impairments or disabilities. Physiatrists—PM&R physicians—are experts in the diagnosis, treatment, and prevention of conditions affecting the brain, muscles, bones, nerves, and spine. Their approach is holistic, focusing on the whole person rather than isolated symptoms, to restore function, manage pain, and enhance quality of life without relying primarily on surgery.

Important Principles and Scope

PM&R emphasizes non-surgical interventions to help patients regain independence in daily activities, work, and recreation. It addresses a broad range of conditions, including:

- **Musculoskeletal disorders**: Musculoskeletal disorders (MSDs) are injuries or pain in the body's joints, ligaments, muscles, nerves, tendons, and structures that support the limbs, neck, and back. They can be caused by a sudden exertion or repetitive movements over time.

  - ✓ **Common Types of MSDs:**
    - **Carpal Tunnel Syndrome**: A condition that causes numbness, tingling, or weakness in the hand due to a pinched nerve in the wrist
    - **Tendinitis:** The inflammation or irritation of a tendon, a thick cord that attaches muscle to bone.

- **Osteoarthritis:** A degenerative joint disease that occurs when the protective cartilage on the ends of your bones wears down over time, leading to pain and stiffness.
- **Back Pain:** This can be caused by a variety of MSDs, including muscle strains, slipped discs,

❒ **Neurological conditions**: Neurological conditions are diseases of the central and peripheral nervous systems. This includes the brain, spinal cord, cranial nerves, peripheral nerves, nerve roots, autonomic nervous system, neuromuscular junction, and muscles. These disorders can affect a person's ability to think, move, speak, and feel.

✓ **Common Neurological Conditions:**

- **Stroke:** Occurs when blood flow to a part of the brain is interrupted or reduced, preventing brain tissue from getting oxygen and nutrients.
- **Parkinson's Disease:** A progressive disorder of the central nervous system that affects movement, often including tremors.
- **Multiple Sclerosis (MS):** An unpredictable, often disabling disease of the central nervous system that disrupts the flow of information within the brain, and between the brain and body.
- **Epilepsy:** A central nervous system (neurological) disorder in which brain activity becomes abnormal, causing seizures or periods of unusual behavior, sensations, and sometimes loss of awareness.
- **Alzheimer's Disease:** A progressive neurological disorder that causes the brain to shrink and brain cells to die.
- **Spinal Cord Injury:** Damage to the spinal cord that results in a loss of function, such as mobility or feeling.
- **Brain Tumors:** An abnormal mass of tissue in which cells grow and multiply uncontrollably, seemingly unchecked by the controls that regulate normal cells.
- **Cerebral Palsy:** A group of disorders that affect a person's ability to move and maintain balance and posture.

- ❖ **Headaches and Migraines:** Headaches are a common neurological condition, and migraines are a severe type of headache often accompanied by other symptoms like nausea, vomiting, or sensitivity to light and sound

- ❒ **Chronic pain and spasticity**: From various sources, including post-surgical recovery or amputations. **Spasticity** is a neurological condition characterized by a continuous, involuntary muscle contraction that causes stiffness and tightness. It is a motor disorder caused by damage to the central nervous system (brain or spinal cord), which disrupts the signals that control muscle movement.
- ❒ **Pediatric and geriatric issues**: Pediatric issues are the unique medical and developmental challenges that affect **infants, children, and adolescents**. Their care differs from adult medicine due to their rapid growth and development, which can impact how diseases present and are treated.

  - ✓ **Congenital Conditions:** Health problems present from birth, such as congenital heart defects or spina bifida.
  - ✓ **Infectious Diseases:** Children are more susceptible to common infectious diseases, and their immune systems are still developing.
  - ✓ **Developmental Milestones:** Issues with growth, cognitive development, and motor skills are key concerns.
  - ✓ **Immunization:** Ensuring children receive timely vaccinations is a critical public health issue.
  - ✓ **Psychosocial Factors:** The emotional and social well-being of the child and their family plays a major role in their overall health.

Physiatrists lead multidisciplinary teams that may include physical therapists, occupational therapists, speech-language pathologists, psychologists, and vocational counselors. Treatment plans are personalized, incorporating evidence-based strategies to prevent complications and promote long-term wellness.

4.4.1 Inpatient Services in PM&R

Inpatient rehabilitation occurs in hospital-based or specialized facilities where patients require 24-hour medical supervision and intensive therapy. This setting is ideal for

those with severe conditions who need structured, multidisciplinary care to regain independence before transitioning home or to less intensive programs. Patients typically receive at least 3 hours of therapy per day, 5-7 days a week, in a combination of physical, occupational, and speech therapy.

Important features and services include:

- **Intensive Therapy Programs**: Customized plans for recovery from acute injuries, post-surgery rehabilitation, or management of complex disabilities like spinal cord injuries, strokes, or traumatic brain injuries. This may involve robotics, gaming technology, or adaptive equipment to enhance mobility and function.
- **Medical Oversight**: Round-the-clock monitoring by physiatrists, including medication management, pain control, electrodiagnostic testing (e.g., EMG/nerve conduction studies), and procedures like joint injections.
- **Holistic Support**: Psychological counseling, nutritional guidance, social work for discharge planning, and family education. Facilities often include simulated real-life environments (e.g., kitchens or community replicas) to practice daily skills.
- **Common Conditions Treated**: Amputations, burns, cerebral palsy, orthopedic injuries, and pediatric rehab needs.
- **Duration and Transition**: Stays can last from days to weeks, depending on progress. Subacute inpatient options provide less intensive care for those transitioning from acute settings, often in skilled nursing facilities.
- **Examples from Providers**: At Johns Hopkins, inpatient units offer 7-day-a-week services with access to diagnostics and specialty consultations. UPMC and Cedars-Sinai provide full-spectrum inpatient care in dedicated institutes, while VA facilities emphasize economical, evidence-based treatment for veterans.

Inpatient rehab is often more costly than outpatient but is covered by many insurance plans for qualifying medical needs. Admission typically requires a physician referral, and it's recommended for patients who cannot safely manage at home.

4.4.2 Outpatient Services in PM&R

Outpatient services allow patients to receive rehabilitation without overnight stays, making them suitable for less acute conditions, follow-up care, or maintenance therapy. Sessions are scheduled in clinics, often 1-3 times per week, with exercises to perform at home. This setting promotes independence and is more cost-effective for stable patients.

Important features and services include:

- **Therapy Sessions**: Physical therapy for strength and mobility, occupational therapy for daily activities, speech therapy for communication/swallowing issues, and specialized programs like sports medicine or injury prevention.
- **Diagnostic and Procedural Care**: Follow-up evaluations, targeted injections, electrodiagnosis, and chronic pain management. Telemedicine options may be available for remote monitoring.
- **Long-Term Management**: Ongoing support for chronic conditions, including vocational rehab, recreational therapy (e.g., music or art), integrative health (e.g., yoga, massage), and support groups.
- **Common Conditions Treated**: Musculoskeletal issues, post-inpatient recovery, neurological sequelae, cardiac/pulmonary rehab, and pediatric or cancer-related needs.
- **Flexibility and Accessibility**: Offered at multiple clinic locations, with options for home-based or community programs. Providers like Penn Medicine and NYU Langone's Rusk Rehabilitation emphasize patient-centered, whole-person care in outpatient settings.
- **Examples from Providers**: Mayo Clinic and UT Southwestern offer outpatient services across campuses for a wide range of needs. UPMC has over 60 outpatient locations in Pennsylvania, partnering with therapy networks for comprehensive access.

Outpatient care requires patient motivation for home exercises and may have therapy session limits based on insurance. It's generally less expensive overall, with lower out-of-pocket costs depending on coverage.

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