

NOVEMBER PERSPECTIVE

As we reflect upon the past 50 years of the Cardiovascular & Pulmonary (CVP) Academy, this month we reflect on the impact physical therapists have had in cardiac rehab, airway clearance, and early mobility as our clinical specialty has played a key role in each. Let us be reminded where it began for our profession, how it evolved, where we are as physical therapists today, and to hear from some of the PTs who guided the profession.

Cardiac Rehabilitation

Cardiac rehabilitation, as we know it today, has undergone significant transformations over the years. In 1958, Dr. Paul Dudley White, et al. published *Rehabilitation of the Cardiovascular Patient*, based on research and clinical observations. The paper advocated to establish rehabilitation goals based on the patient's lifestyle and to assess a patient's functional capacity. This concept of cardiac rehab was so novel and innovative, that previous textbooks and treatments until 1968 focused primarily on 2 weeks of bed rest and 6 weeks of hospitalization for patients recovering after cardiac events. Strict multi-stage protocols primarily with sitting and standing for the first week post-event weren't developed until the 1960s with eventual progression to ambulation during the second week post-event to assure patient safety. Physical therapists were key practitioners responsible for progressing mobility levels for these acutely ill cardiac patients. As more data was collected about myocardial recovery, protocols became less prescriptive and more freedom to assess physiologic response and customize treatment became routine. Thus, as medical knowledge and practices advanced, the approach to cardiac rehab shifted dramatically.

Physical therapists were instrumental in transforming the approach to progressive mobility. They introduced the concept of structured exercise programs tailored to the needs of cardiac patients. These programs not only helped improve patients' physical mobility but also played a crucial role in their overall recovery and quality of life. The expertise of physical therapists in exercise physiology, cardiac anatomy, and cardiovascular function was essential in designing safe exercise regimens, monitoring patients' progress, and providing invaluable education on lifestyle changes.

From the 1970s onward, new theories of risk stratification, data on the safety of exercise in the acute phase, and pressures in the era of managed care contributed to advancements in not only what we recognize today as phase I cardiac rehab, but also to PT's footprint with complex hospital courses, critical care, early mobility in the ICU, and lengths of stay. However many medical centers and PTs still followed 10-day protocols for myocardial infarction into the early 1980s. Early guidelines, risk stratifications, indications, precautions, and contraindications that PTs followed were rooted in evidence from collaboration with the American Heart Association, American College of Cardiology, and American College of Sports Medicine (ACSM). In the past 2 decades, the CVP Academy has established clinical practice guidelines for evidence based practice in the cardiac population.

Table 1. Post Myocardial Infarction Rehabilitation Protocol Inpatient Program ^{1*}							
Step	Physician† Date	Ward Activity Level	Physical Therapy Program	Pre Exercise		Post Exercise	
				Pulse	Blood Pressure	Pulse	Blood Pressure
1		Bedrest, self feed at 45° w/arms & trunk supported	Initial interview. Explanation of program				
2		Same as 1, plus AM care. Brush teeth, wash in bed	Passive range of motion exercising of all extremities (5× each) in bed Active plantar and dorsiflexion of ankles several times a day				
3		Same as 2, plus dressing activity Dangle legs 10 minutes, three times a day	Active exercising in recumbent position: shoulder rotation, alternate hip flexion and extension, alternate hip abduction and adduction (5 reps each)				
4		Same as 3 May stand for short periods at bedside	Same as 3 Increase repetitions to 10 each				
5		Sit at bedside Stand to dress, shave, groom	Same as 4 but upper extremity done while standing				
6		All self care Walk with attendant to bathroom for non-vigorous shower	Same as 4 but all exercises done out of bed Slow walk 100 feet once a day				
7		Same as 6 May sit outside room for one hour at a time	Same as 6 Slow walk 100 feet three times a day				
8		Same as 7	Same as 7 but add trunk twist (10 reps)				
9		Same as 8 but may walk about freely on ward	Same as 8 but increase repetitions to 15 each				
10		Same as 9	Same as 9 Add slow half-knee bends, 5 reps				
11		Same as 10 Walk down 1 stairwell w/attendant	Same as 10 but do 10 reps of half-knee bends				
12		Same as 11 Walk up 1 stairwell w/attendant	Same as 11 but do 15 reps of all exercises				
13		Same as 12	Same as 12				
14		Same as 13	Same as 13 but do 20 reps of all exercises				

^{*}Tripler Army Medical Center: Post Myocardial Infarction Rehabilitation Protocol, in-house document, May 1974
[†]Prior to being done, each step must be initialed and dated by attending physician

Phase I cardiac rehab protocol from 1974.

Outpatient cardiac rehabilitation, or phase II cardiac rehab, was introduced in the 1960s. Programs monitored patients with portable telemetry and vital signs in response to exercise and primarily focused on improving aerobic conditioning with physician supervision.

While Dr. Gunnar Borg began his work on the rating of perceived exertion scale in the field of exercise physiology in 1957, it wasn't until 1970 that the scale from 6-20 that we use today had been validated in the cardiac population and correlated to heart rate.

In 1978, the Clinical Exercise Physiology Graduate Program at the University of Wisconsin—La Crosse, began to offer an 8-week internship in cardiac rehabilitation. That same year, the university also developed their comprehensive cardiac rehab workshop, with curriculum from ACSM and AACVPR, which has since evolved into a 4-day workshop.

The Centers for Medicare and Medicaid Services (CMS) recognized phase II cardiac rehab in 1982 as a standard part of patient recovery. Instead of PTs billing for therapeutic exercise (CPT code 97110), CPT codes 93797 and 93798 were designated specifically for up to 36 sessions of cardiac rehab per cardiac event. National Coverage Determination was initially for medically supervised exercise and allowed other clinical providers such as nurses, exercise physiologists, and dietitians to also bill for traditional cardiac rehab services.

The American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) was founded in 1985 to recognize the many health disciplines responsible for care of patients with cardiac and pulmonary disease. The organization continues to focus on education, prevention, rehabilitation, research, and disease management in the cardiovascular and pulmonary population and establish guidelines for cardiac and pulmonary rehab programs. 1985 is also when board certification of cardiovascular and pulmonary physical therapy was recognized as a specialty area of practice by the APTA.

Research of the relaxation response and the mind-body connection by Dr. Herbert Benson, randomized trials utilizing the concept of lifestyle medicine by Dr. Dean Ornish, and the diet-and-exercise program of Nathan Pritikin were eventually introduced to traditional cardiac rehab programs. This allowed cardiac rehab to evolve from a primary focus of exercise into a program of secondary prevention and lifestyle change that incorporated a multidisciplinary team including cardiologists, PTs, RNs, exercise physiologists, dietitians, pharmacists, and behavioral health professionals. In 2010, CMS recognized intensive cardiac rehab (ICR) with its own CPT codes for its peer-reviewed clinical research improving cardiovascular outcomes with increased frequency and duration of cardiac rehab interventions up to 72 sessions per cardiac event.

Physical therapists continue to work in inpatient and outpatient cardiac rehab today. Larger academic medical centers and healthcare enterprises frequently offer PTs the opportunity to work in both settings. Both settings are also part of the curriculum for CVP residencies.

Chest Physical Therapy

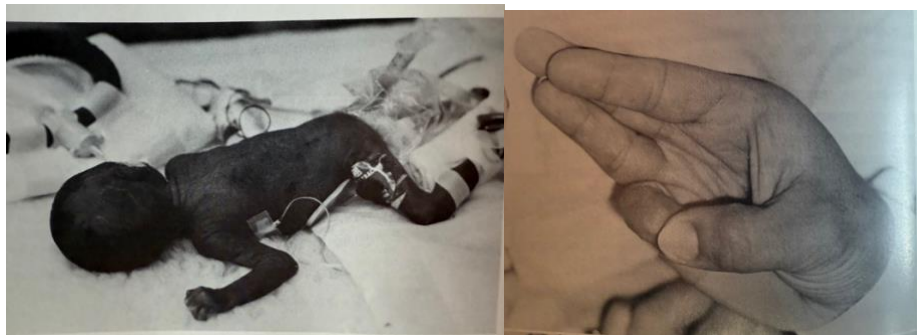
The benefits of bronchial drainage were described by Ewart as early as 1901, with the use of positioning to improve respiratory function dating back to Hypocrites. This section describes cardiopulmonary physical therapy treatment in the United States by members of the Cardiopulmonary Section, now the Academy of Cardiovascular and Pulmonary Physical Therapy.

In the late 1960s & early 1970s many hospitals had a chest physical therapy service separate from the PT department. Physical therapists performed postural drainage, manual techniques of percussion and vibration, breathing exercises, manual cough assistance techniques, and tracheal suctioning and some had extended hours. Some of these included:

- Massachusetts General Hospital in Boston, started by Mica Rie, PT
- The R Adams Shock Trauma Center in Baltimore
- Beth Israel Hospital in Boston
- Johns Hopkins Hospital in Baltimore, trained by Dilys Williams, PT
- University of North Carolina Hospital Chapel Hill, a prominent research center for CF

In the early years, auscultation was not part of the physical therapy curriculum. Physical therapists relied on the physician telling them “what areas of the lung to work on,” a daily chest x-ray, tactile fremitus, the patient’s audible secretions, the medical record, and the patient’s response to position changes to determine treatment interventions. Today, auscultation directs treatment intervention, particularly with postural drainage, to determine if there has been trans bronchial aspiration, most often from the left lower lobe to right upper lobe. The prone position was used when clinically indicated, including patients who were intubated and sedated. We now know that the improvements in oxygenation with prone positioning, sometimes preventing intubation, may have been more related to changes in ventilation and perfusion ratios.

Airway clearance techniques, including percussion and vibration (sometimes referred to as rib springing) differed throughout the country and generated some debate as to the best technique. Early research demonstrated that these interventions were equally effective or better than therapeutic bronchoscopy in removing retained secretions, clearing lobar collapse and infiltrates, at times preventing the need for intubation. Chest physical therapy was less expensive, did not require physician involvement, and had a lower risk of infection.



A neonate positioned prone for postural draining. Percussion was given using a hand “tented” technique.

Physical therapists also treated patients with alveolar proteinosis in the operating room as part of a bronchopulmonary lavage. Willy Hammon conducted several studies and concluded that manual techniques were superior in removing proteinaceous material from the alveoli.

In 1982, Jeanne Decesare, PT, and colleagues, studied 10 cystic fibrosis patients using Krypton 81 scintigraphy as a reliable tool to evaluate regional ventilation before and after postural drainage with percussion and vibration. This study supported targeted treatment for patients with advanced disease and sputum production and challenged prophylactic daily postural drainage for patients with mild disease and minimal sputum production with chest physical therapy.

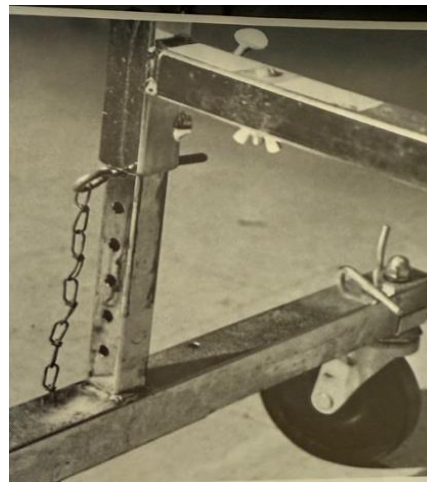
In 1983, P Cristina Imle, a PT, published a protocol for brain injury patients with intracranial pressure monitoring in the Cardiopulmonary Section Newsletter, using the Trendelenberg position when indicated. Intracranial pressure was closely monitored and found that patients could tolerate up to 10 minutes in the head-down position, if indicated by clinical exam.



Meryl Cohen with her classmates (left). Nancy Ciesla assists to turn a patient (right).

Female therapists frequently wore white dresses. Pink was worn with caps in the Trauma Center. Gloves were not used so much.

Therapists who wanted toned arms were known to request the Chest PT rotation to tone their arms doing percussion and vibration all day. Also, with no electrical beds for head down positioning beds were lifted onto shock blocks and the Stryker Frame was lifted to place a pin. This gave additional opportunity for arm strengthening.



Throughout the years, numerous breathing techniques and devices, such as inspiratory and expiratory muscle training, positive expiratory pressure, and high-frequency chest wall oscillation (the vest system) have evolved and the term “chest physical therapy” has been replaced by the more descriptive term “airway clearance.” Postural drainage with manual percussion and vibration remains indicated for patients who do not respond to or can’t participate with other techniques, or who cannot be mobilized. These techniques can also be applied prior to

mobilization to enhance the patient's tolerance of other physical therapy treatment interventions. In addition, caregivers are instructed in these techniques to continue treatment at home.



Therapy Vest



Acapella PEP device



Inspiratory Muscle Trainer

Early Mobility

Early mobilization therapy is a systematic approach to initiating physical activity and movement in critically ill patients in the intensive care unit (ICU). Traditionally, ICU patients are often kept sedated and immobilized to prevent complications and facilitate medical management. However, research over the past few decades has highlighted the detrimental effects of prolonged immobility, such as muscle weakness, ventilator-associated complications, and psychological distress. Early mobilization therapy aims to counteract these negative consequences by promoting early and progressive physical activity tailored to the patient's condition and capabilities. The significance of early mobilization for ICU patients cannot be overstated. Prolonged immobility in the ICU has been associated with a myriad of adverse outcomes, including muscle atrophy, weakness, ventilator associated pneumonia (VAP), pressure ulcers, and an increased risk of thromboembolic events. Moreover, immobility can exacerbate psychological distress, leading to anxiety, depression, and post-traumatic stress disorder (PTSD) in ICU survivors. By contrast, early mobilization has been shown to mitigate these risks, improve functional outcomes, shorten ICU and hospital lengths of stay, and enhance survivors' overall quality of life.

The historical perspective on ICU care and immobility delineates the progression of critical care medicine and nursing practices over time. In the 19th century, nurses delivered physical care in hospitals near nursing stations, marking the stages of intensive therapy. The advent of life-support devices for ventilation and renal function characterized early 20th-century intensive therapy. Over the past five decades, critical care has evolved into comprehensive monitoring and automated laboratory measurements guided by critical care physicians, nurse specialists, pharmacists, and respiratory therapists utilizing diverse life-support methodologies. During the 1990s, a significant paradigm shift unfolded in ICU critical care medicine toward managing more critically ill patients with conditions like acute respiratory distress syndrome. During this period, many breakthroughs occurred in sustaining patients on ventilators for extended durations

and exploring novel treatment modalities. However, practices involving deep sedation and paralysis were prevalent, resulting in prolonged immobility and potential long-term ramifications for patients. The ICU Liberation initiative by the Society of Critical Care Medicine focuses on decreasing pain, oversedation, delirium, immobility, and sleep disturbances in the ICU. Implementing strategies such as ventilator weaning protocols, maintaining light sedation levels, preventing delirium, initiating early mobilization, and fostering family engagement aims to enhance patient outcomes and reduce the risk of post-intensive care syndrome (PICS). In recent years, critical care nursing has witnessed advancements in multidisciplinary teams, protocol-driven care for weaning from mechanical ventilation and sedation, and early patient mobilization to prevent complications like VAP and deep vein thrombosis.

Over the past decade, the evolution of early mobilization therapy in the ICU has marked significant progress. Randomized trials have assessed the efficacy of early mobilization and rehabilitation in ICU settings, reduced the incidence of ICU acquired weakness (ICU-AW), and enhanced long term physical functioning and quality of life for patients. Despite the availability of supportive evidence and guidelines advocating for early mobilization, early mobility in ICUs varies throughout the US. Recent studies have optimized various strategies in ICU early mobilization and rehabilitation practices which include the establishment of multidisciplinary teams with assigned champions, the utilization of structured quality improvement methodologies, the identification of barriers and facilitators, the assessment of optimal timing, type, and dosage of interventions, the evaluation of outcomes and performance metrics, and the integration of mobility-related measures into clinical care to establish patient-centric goals and monitor progress. The effectiveness of early mobilization in the ICU has been corroborated by research demonstrating a reduction in the incidence of ICU-AW, enhancement of functional capacity, reduction in mechanical ventilation duration, improvement in patients' ability to stand, increased rates of ICU discharge, and overall improvement in patient outcomes. Emerging techniques such as electrical muscle stimulation, cycling, hydrotherapy, and devices like the Sara Combilizer have exhibited favorable outcomes and safety profiles in facilitating early mobilization.

Ventricular Assist Devices, Balloon Pumps, and ECMO

History of mechanical circulatory support

The development of mechanical circulatory support devices for end stage heart failure has been driven by the shortage of donor organs for heart transplantation. Collaborative efforts in the fields of surgery, medicine, and biomedical engineering, sponsored by both government and industry, have led to the invention of devices capable of providing reliable circulatory support. The population of patients with end-stage heart failure continues to grow exponentially and drives rapid growth in this area.

Historical timeline of mechanical circulatory support

1953: Gibbon developed cardiopulmonary bypass (CPB) in the clinical setting to treat pulmonary embolism.

1958: Akutsu and Kolff reported using the first experimental total artificial heart (TAH) implantation in a dog using a pneumatically driven device to support the animal for 90 minutes.

1962: The IABP was introduced experimentally by Mouloupoulos, et al (the first mechanical assist device) who used a latex balloon placed in the descending thoracic aorta that was inflated during diastole and deflated during systole to support circulation.

1963: Liotta, et al reported the first use of an implantable artificial ventricle in a human.

1964: Impetus was added to the development of mechanical cardiac assist devices when the NIH became actively involved in the development of mechanical cardiac assist devices with the formation of the Artificial Heart Program.

1967: Barnard performed the first human heart transplantation, which began a period during which heart transplantation programs were initiated at a number of centers.

1968: Kantrowitz, et al reported the first clinical use of the IABP in patients with cardiogenic shock.

1969: Cooley, et al reported the use of a TAH as a mechanical bridge to heart transplantation.

1970: The NIH established the National Heart, Lung, and Blood Institute (NHLBI) that sponsored a program to develop an LVAD that was used in a trial of postcardiotomy weaning. Work on LVADs continued with DeBakey reporting the successful support to discharge of 2 postcardiotomy patients assisted with extracorporeal pneumatic LVADs.

1978: The first use of an LVAD as a bridge to transplantation was reported by Norman, et al.

1984: Although devices were being used for temporary support, the first TAH intended for permanent support was implanted by DeVries, et al, and supported the patient for 112 days.

1984: The first successful bridge To transplant case using a VAD was reported by Portner, et al using the Novacor implantable electrical LVAD in a patient with ischemic end-stage heart disease.

With the advent of the immunosuppressive agent cyclosporine in the mid-1980s, heart transplantation experienced a renaissance.

1988-2021: Over 83,000 heart transplants were performed in the US. Among those patients, a ventricular assist device (VAD) was used in over 20,000 or approximately 25% of transplantations. Pediatric patients comprised 31% of total transplantations and approximately 9% of children required a VAD as a bridge to transplantation.

Mechanical ventricular assist devices (VAD) have evolved to the point in which they now provide a reliable means of supporting patients with heart failure as a bridge to transplantation. Recent advances in VAD technology have made it feasible to support patients at home on a long-term basis with assist devices while awaiting transplantation or as destination therapy. This strategy has proved greatly beneficial in terms of the patient's sense of well being as well as overall economic considerations in terms of supporting a patient at home instead of in the hospital.

The earliest VADs incorporated a diaphragm and unidirectional artificial valve to replicate the pulsatile cardiac cycle with a diastolic filling time and a systolic emptying of the devices to mimic the native heart. The first generation VADs were either pneumatically or electrically driven. Unfortunately these first devices had several disadvantages including large size, noise emission, infectious diseases, malfunctioning mechanical tears, or valve degradation.

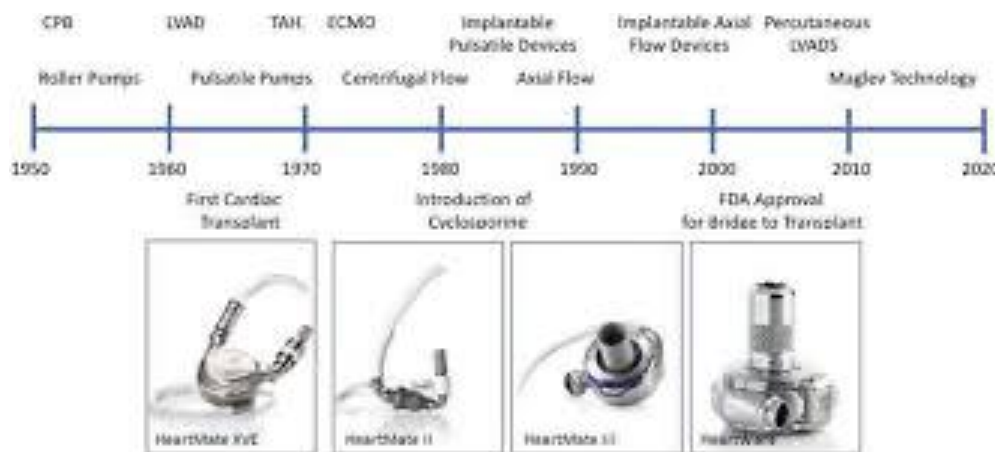


Photo of an early generation LVAD (left) and its control panel (right).

In 2025, there are devices from 3 manufacturers that are approved by the United States Food and Drug Administration (FDA) for cardiac support as a bridge to transplantation: the Novacor implantable LVAD, the HeartMate implantable LVAD (Thermo Cardiosystems, Inc., Woburn, MA), and the Thoratec extracorporeal VAD (Thoratec Laboratories Corp, Berkeley, CA), which can be used to assist the left and/or right ventricle.

Aside from long-term support as a bridge to transplantation, mechanical VADs have also found an important role in the treatment of patients with postcardiotomy cardiogenic shock and acute heart failure expected to resolve, as in the case of viral myocarditis.

Although VADs have been successful in the support of adult patients, pediatric patients and smaller adult patients have had fewer options in terms of available devices because of limitations of device minimal flows, device size, and fit issues. New pump designs are on the horizon that will address these issues.



Timeline of mechanical devices in the cardiac patient.

The history of the Impella heart pump began with the development of its predecessor, the [Hemopump](#), in the 1980s, and the Impella was first used in humans in 1999. The device was invented in Germany and first approved for clinical use in Europe in 2005, followed by U.S. FDA approval in 2008 for the Impella 2.5 model.

Key milestones in ECMO history

1950s: The foundation for ECMO was laid with the first successful use of a heart-lung bypass machine for open-heart surgery, providing short-term support.

1960s: The development of the membrane oxygenator, which separates gas from blood using a semi-permeable membrane, made longer-term support more feasible.

1971: The first successful use of an extracorporeal bypass circuit for a patient with acute respiratory failure was reported.

1975: Dr. Robert Bartlett successfully treated the first newborn, named Esperanza, with meconium aspiration syndrome using ECMO.

1980s: The use of ECMO expanded to the pediatric population and became a standard treatment for neonatal respiratory failure by 1986. The Extracorporeal Life Support Organization (ELSO) was founded in 1989 to collect data and improve best practices.

2009: The H1N1 influenza pandemic spurred new research and highlighted the clinical success of ECMO for adults with severe respiratory failure, supported by trials like the CAESAR trial. This period also saw the formal organization of adult ECMO programs at some centers, such as at Legacy Emanuel Medical Center.

2020: Covid led to further widespread use and awareness of ECMO and the need for additional involvement by PT with early mobility.

Featured Members

Ann Fick, PT



Biography

Dr. Ann Fick is the Director of Clinical Education and a Full Professor at Maryville University in St. Louis, MO. She earned her bachelor's degree in physical therapy from Saint Louis University, an advanced master's degree from Texas Woman's University in Houston, and a transitional Doctor of Physical Therapy from the Massachusetts General Hospital Institute of Health Professions in Boston.

Her clinical background includes working as a full-time clinician (and PRN as a faculty member), with leadership roles primarily in intensive care units at major teaching hospitals. Many of her patients were post-operative with varying cardiovascular and pulmonary conditions, although she has also treated patients of all ages in acute care and inpatient rehabilitation settings, including in Kansas City, MO.

Her research on comparing pulse oximetry types/probe placement during patient activity and physical therapy following abdominal surgery and stem cell transplantation has been presented via poster and platform presentations. Her published work includes studies on physical therapy in patients receiving Levophed (Norepinephrine), after LVAD implantation, and following transcatheter aortic valve replacement. She is currently investigating mobility levels and discharge outcomes in patients after Impella device implantation.

Dr. Fick was honored with the APTA Lucy Blair Service Award in 2022, the APTA CVP Merit Award in 2015, and delivered the Linda Crane Lecture in 2023.

When did you first get involved in the Cardiopulmonary Section/Academy of CVP?

I first became involved in the academy while presenting a research poster at the 1987 APTA Combined Sections Meeting titled "Exercise Response in Heart Transplant Patients." To fulfill my master's degree requirements, I conducted two research studies. A pilot study explored heart

rate responses in three patients following heterotopic heart transplantation (where the native heart remains and a donor heart is implanted in the right chest). These patients demonstrated the expected innervated response of the native diseased heart and the denervated response of the transplanted heart, simultaneously in the same individual. I then compared the vital signs of heart transplant recipients to those of healthy individuals.

While research initially drew me to the academy, my involvement deepened through writing questions for the specialty exam and serving as Treasurer. The commitment of academy members across the country compelled me to remain involved.

Who were some of your mentors?

There are so many mentors I'm grateful for. As a student, my favorite course was Cardiopulmonary, taught by Ethel Frese, who later mentored me as Treasurer of the Academy. When I moved to St. Louis, Tammy Burlis hired me, and soon I found myself working full-time in the cardiothoracic surgical ICU alongside Heidi Tymkew, while also guest lecturing to Tammy's students at Washington University.

Ellen Hillegass gave me the confidence to take the CVP Specialty Exam after I attended her course. Later, she invited me to contribute a chapter to her textbook. I now collaborate with her, Ashley Parish, and Naomi Bauer as part of the Oxygen Task Force.

I've also been mentored by countless colleagues in service roles, from fellow faculty and Acute Care Practice Committee members to the Education Academy board. Their support and partnership have been invaluable.

What are your proudest achievements?

As a clinician, my proudest moments have come from helping patients regain their mobility and sharing the outcomes of research questions that originated in my day-to-day clinical experiences.

Being honored with the Linda Crane Lectureship was a deeply humbling moment. Linda's lasting impact on our profession makes this recognition especially meaningful to me.

What is your advice to someone trying to stay updated in the field, and what worked for you?

Get involved, please. Whether as a clinical instructor, academy volunteer, clinical leader, or patient advocate, these experiences give insight into patient needs and allow you to contribute to the profession and community in meaningful ways.

I hadn't initially planned on an academic career, but these roles prepared me for one I now thoroughly enjoy. Staying involved has connected me with inspiring therapists and enriched my clinical and personal growth. Also, don't hesitate to explore other academies that align with your interests because cross-collaboration fosters growth.

What is the most important issue for the CVP Academy to address in the future?

Our academy is filled with members who possess deep CVP knowledge and diverse skills (e.g., clinical, research, teaching, leadership, and advocacy). My experience suggests that some of this talent has yet to be nurtured.

We need to create intentional opportunities for mentorship and engagement, so these voices are heard and empowered. Leveraging the strengths of our members will help the academy continue to evolve and thrive.

Kate Grimes, PT, CCS



Biography

Kate Grimes, PT, DPT, CCS graduated from Columbia University in 1972 with a BS in Physical Therapy. She first worked in Boston in general rehab and then moved to Colorado for 5 years where she pursued orthopedics, focusing on surgical and sports medicine. She then attended graduate school at Medical College Virginia (MCV) with interest in eccentric muscle strengthening, connective tissue, and wound healing. She later enrolled in an internship at the University of Wisconsin—Lacrosse. This is when Kate was introduced to cardiology through the ACSM cardiac rehab workshop and became a certified exercise technician. She then returned to graduate school and switched her interest from ortho to cardiac. Under the guidance of her advisor, Roberta Newton, PhD, and in the company of a new graduate student, Meryl Cohen, PT, they took cardiology courses part of the MCV medical school curriculum. Kate's thesis, titled "The Influence of Exercise Modality on Heart Rate and Blood Pressure on Different Exercise Modalities" introduced her to research, and in the process of data collection, she performed 150 exercise tests on 30 subjects, which required the collection of expired gases with Douglas bags. After briefly serving as a unit secretary in the coronary care unit at Cape Cod Hospital and a brief return to sports medicine, Kate returned to Boston and began her first job in cardiology at The New England Deaconess Hospital (now part of the Beth Israel system) in 1981.

She found her passion working with all the surgical and medical cardiac inpatients. Cardiac PT was not very popular with the rehab staff due to undefined roles, but Kate found she was welcomed into the group, was given lots of independence, and worked closely with the cardiologists, cardiothoracic surgeons, and nurses. Kate spread interest of the cardiac population in her small department. Her colleague from graduate school, Meryl Cohen, was working at Mass General Hospital (MGH) at the time, and they would discuss ideas with one another. After a few years in inpatients, Kate trained and explored outpatient cardiac rehab at MGH. She had the opportunity to work for Colleen Kigin, the head of the MGH PT department and embraced

Colleen's vision of a strong cardiopulmonary presence in both the inpatient and outpatient areas. The overall welcoming atmosphere, established foundations, and clinical opportunities of the PT department at MGH sharpened Kate's skills as a provider.

She then had the opportunity to work at a community hospital, Newton-Wellesley Hospital (NWH), to design and launch their first outpatient cardiac rehab department in 1986. Kate continued to work there for the next 39 years until her retirement in August 2025. Kate was proud of the strong multidisciplinary team of nurses, PTs, dietitians, behavioral health providers, and cardiologists in the program at NWH. Everyone in the department constantly learned from one another. Kate recalls welcoming 3 patients on the first day in 1986 and now the program completes over 140 two-hour treatments per week. Kate was essential in preparing her program as one of the first to achieve AACVPR program certification and to maintain that status since. Over the decades, Kate helped her cardiac rehab program at NWH adapt and overcome numerous challenges in healthcare (financial, administrative, covid, and staffing). She established physical therapy as a strong and respected component of the program with multiple PTs with their CCS working alongside her.

From 1995 to 2007, Kate taught at the MGH Institute of Health Professions and was part of their team that developed their entry-level MS and DPT programs. To create and teach the cardiopulmonary curricula was an invaluable opportunity, honor, and welcomed challenge for Kate.

When did you first get involved in the Cardiopulmonary Section/Academy of CVP?

I first became familiar with the CVP section when I prepped for the CCS board certification exam. I also got involved whenever I attended CSM and national/local meetings.

Who were some of your mentors?

Academic: my colleagues at the MGH Institute of Health Professions, Cyndy Zadai, Mary Bourgeois, BA Harris, Marianne Beninato, Mary Knab, Leslie Portney, Aimee Klein, Terry Michel, Mary Knab, and Lin Steiner.

Clinical: Meryl Cohen, Colleen Kigin, Ellen Hillegas, the writings of Joanne Watchie, Larry Cahalin, and Scott Irwin. Joel Rubenstein, MD was the first medical director and cardiologist of the NWH cardiac rehab department and was an unselfish teacher and supporter. Ann Brown, RN was the nurse manager at NWH cardiac rehab and was an exemplar for patient focused care and forever changed how I interacted with my patients. My many colleagues who unselfishly shared their time and knowledge, and of course, the ultimate teacher and mentor, the patients.

What are your proudest achievements?

Being able to contribute to the program development of the cardiac rehab at Newton-Wellesley Hospital and working with a strong interdisciplinary team.

Being able to contribute to the development of the MGH IHP entry level curriculum.

Proud moments: patients coming back and telling their story and how much the program meant to them.

Seeing students blossom into true professionals and working with them as colleagues.

What is your advice to someone trying to stay updated in the field, and what worked for you?

We are physical therapists first. Don't stay just in a cardiopulmonary bubble. With our cardiopulmonary background we have a good understanding of exercise pathophysiology and

need to continue to share and collaborate with our fellow non-CVP therapists to enhance each other's practice and for the enrichment of the patient. Seek educational resources beyond what PT offers (e.g. attend cardiology meetings; primary medicine conferences, medical journals). As we expand our understanding of medicine and deepen our grasp of the current medical/surgical issues we can identify and contribute the expertise of physical therapy into medical practice for the betterment of our patients. Likewise, by improving our understanding of health and medicine, we may be able to anticipate and intervene on movement disorders that may not yet be identified by the medical/surgical community.

What is the most important issue for the CVP Academy to address in the future?

Integration of CVP system into all aspects of patient care as a forethought, not afterthought.

Reimbursement.

Research: especially integrated with other disciplines.

Anne Swisher, PT, PhD, FAPTA



Biography

Dr. Anne Swisher PT, PhD, FAPTA began her PT career in 1988, graduating from West Virginia University with a baccalaureate degree. She accepted her first job at UNC Hospitals, a large academic medical center, where she was fortunate to be mentored by Anne Mejia-Downs, a relationship that has lasted nearly 40 years. Her experience at UNC inspired a love for helping the sickest of the sick patients—critical care, heart and lung transplants—recover to independence. It was at UNC where she was also given her first opportunity to teach and assist in research, which led to a future academic career back home at WVU. With both a masters and PhD in exercise physiology, she was inspired to teach, research, and provide clinical care that explored the role of physical activity/exercise as medicine to manage and prevent chronic conditions (such as CF, PICS, and various cancers, as well as opioid addiction prevention). In her clinical practice, she has been fully imbedded as the movement expert in high-functioning interprofessional teams. This allows her to teach others about what PT can offer, while simultaneously learning from colleagues about emerging conditions and treatments and their effects.

Dr. Swisher sees herself first as a clinical scientist. In that role, she has performed many studies, obtained substantial grant funding, and been widely published. Due to her work in CF and other populations, she has been twice awarded Fulbright scholarships to support teaching and research in both Australia and Ireland. She served as the Editor-in-Chief of the *Cardiopulmonary Physical Therapy Journal* for 7 years. Her work related to PT and exercise for persons with CF led her to co-found exercise working groups within the North American and European Cystic Fibrosis

organizations. Additionally, she has presented her work at these societies' conferences and the World Physiotherapy meetings throughout North America and Europe. She co-founded the PT mentoring program within the Cystic Fibrosis Foundation, and provided input on many guidelines from this organization. As a co-author of *CF 101 for the Physical Therapist*, a landmark evidence-based, scope of practice document, she has taught many PTs to utilize all their expertise and work effectively in an interprofessional clinic.

Dr. Swisher was a cardiovascular & pulmonary clinical specialist for 20 years and served on the Specialty Council for several years, spearheading the revalidation project during her term. She brought her expertise to PT students and others during 31 years of full-time teaching. She has served on West Virginia University's Division of Physical Therapy as Director of Clinical Education, Director of Scholarship, and most-recently as Director of Post-Professional Education, where she has led the development of both Oncologic and Cardiovascular & Pulmonary Residencies. Many alumni have been inspired to pursue clinical practice in CVP PT by Dr. Swisher's teaching and after many years as the only CCS in the state, she mentored 2 PTs to achieve this recognition.

For her service to the Academy and the APTA, she was made a Catherine Worthingham Fellow of the APTA in 2016 and was invited to deliver the Linda Crane Memorial Lecture in 2020. She continues to mentor students and faculty to carry forward her passion for improving the lives of persons with, or at risk for, diseases and disabilities through physical activity and exercise.

When did you first get involved in the Cardiopulmonary Section/Academy of CVP?

While I attended my first Combined Sections Meeting in PT school, it was in the early 1990s that I found the CVP Section. Thanks to leaders who weren't afraid to ask newcomers to volunteer, I was asked to help with the research committee, and SACE, once I was a clinical specialist. These roles grew into serving on the Specialty Council and as Editor-in-Chief of the journal. Serving on the Section/Academy board as I represented these areas, and developing the journal gave me an outlet for my passion for CVP PT and helped me to meet many amazing people.

Who were some of your mentors?

I was lucky to serve under 4 Presidents (Steve Tepper, Dianne Jewell, Dan Malone, and Ethel Freese), who taught me about leadership. Anne Mejia-Downs got me involved in the CF Foundation and opened up a whole world (literally, internationally) of ways to impact the care for persons with CF across the lifespan. The amazingly creative Mary Massery showed me how to integrate musculoskeletal and neurologic aspects of PT into the management of people with CVP conditions. Rachel Yeater, my PhD chairperson, taught me how to be a strong female scientist. Mary Beth Mandich, PT, PhD, my program chairperson, taught me how to recognize and develop talent in young faculty.

What are your proudest achievements?

Over 30 plus years of clinical practice, I have been privileged to help people with a variety of challenges across the spectrum of acuity, from the extremely sick (people requiring ECMO for COVID) to elite athletes (collegiate high diver after stem cell transplant). I've worked in teams managing the care of persons with CF, lung cancer, breast cancer, and hematologic cancers. I've even been involved in designing exercise programs and education for persons at risk for opioid addiction and poor mental health. I love learning about medical conditions and figuring out how

exercise can prevent, modify and alleviate impacts on physical and mental health of affected people.

This wide-ranging interest and experience has led to opportunities to meet people and work together with physios all over the world. Seeing how each culture and health system addresses the common challenges has greatly enriched my life and outlook.

I've been honored to represent the Academy at the APTA Movement Summit, advise on the development of several Clinical Practice Guidelines, and participate in strategic planning. Guiding the Journal to being international in scope and indexed in major scientific databases has been very rewarding. Receiving the Academy's merit award, Linda Crane Lectureship and Fellowship, has been humbling.

However, what makes me most proud is to see the successes of people I have mentored—students from undergraduate to PhD levels, faculty colleagues, and clinical partners—grow into their full potential and advance the profession and specialty beyond what I could imagine.

What is your advice to someone trying to stay updated in the field, and what worked for you?

I think the best thing anyone can do is to always be curious. Learn about new trends—technology, medical and surgical advances, societal issues—then use your “PT lens” to see how they would impact components of movement (strength, endurance, flexibility, motor control, motivation) for human beings. Use your expertise in movement to maximize the benefits and minimize the adverse effects.

Read widely and find educational opportunities outside the CVP area. See what you can learn from in-services, grand rounds, journal articles, and conferences that you can use to improve your CVP care. Find interprofessional organizations, such as AACVPR, ACSM, CF Foundation, and many others, where you can learn from others and also teach them about what PT can bring to the team. The broader your vision, knowledge and skills, the more likely you can help any person who comes your way.

Get involved in an organization, task or project. Don't be afraid to say “yes” (or at least “I'll try”) when asked to do something. If you're 75% excited and 25% scared, that is where growth will happen. You'll meet amazing people and change the way you think.

What is the most important issue for the CVP Academy to address in the future?

Healthcare globally is in a crisis, compounded by lifestyle habits that lead to increases in CVP related diseases. There is no shortage of need for experts in our area. However, we need to think beyond the hospital setting to have the greatest impact. Getting involved in raising standards of PT care related to CVP and exercise should happen in all care settings (home care, long-term care, community wellness), not just after a patient has an event. There are many great organizations working on wellness and health promotion who do not know what a CVP PT can bring—reach out to form partnerships in improving the health of society. Make sure that CVP issues are fundamental to new practice models such as Primary Care PT and cash-based practice. Together with partners from other disciplines and members of communities, we can make a big impact for the future.