

Physiotherapy Contributions to Quality of Life Improvement in Endovascular Patients: Clinical Practice and Policy Perspectives

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ABSTRACT

In endovascular procedures have changed the way vascular care is done by offering minimally invasive options that cause less harm and faster healing. Success in the procedure does not, however, promise functional independence or better quality of life (QoL). To free the gap between the people related to physiotherapy and to improve circulation in vein, treatments of a pain and the swelling, of people physical and mental health. This paper discuss the, how physiotherapy can help to recover the endovascular surgery for the clinical and the patient point of view. The study also focuses the different exercise program that people must use in their daily life with using several platforms as tele-physiotherapy models, patient centric, group of people for physical exercise, reduce the complications. As the policies are need to update for the physiotherapy and it has to be a part of multimodal care pathways. By making sure that health policy and professional practice are in line, physiotherapy can turn endovascular healing into a whole process that is driven by better quality of life, fair access, and long-term clinical care.

KEYWORDS: Endovascular Rehabilitation; Physiotherapy; Quality of Life; Early Mobilization; Tele-Physiotherapy; Health Policy; Multidisciplinary Care; Vascular Recovery.

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INTRODUCTION

Endovascular procedures, which are less invasive than standard open surgeries, have changed the way vascular diseases are treated. Some procedures that are connected to shorter hospital stays, fewer sickness, and faster recovery are angioplasty, stenting, and endovascular aneurysm repair (EVAR). But these medicines can make it challenging for patients to go back to the quality of life they had before the condition since they might cause reduced mobility, discomfort, weariness, and diminished cardiovascular endurance. As the number of people with vascular diseases around the world keeps going up, the focus on healing needs to go beyond the success of the procedure and include full rehabilitation and long-term health. This helps patients get better and avoids problems like deep vein thrombosis, lymphoedema, and muscle deconditioning. Personalised aerobic and resistance training, early mobilisation protocols, and graded activity plans can make a big difference in improving vascular health, endurance, and mental and social outcomes [2]. Tele-physiotherapy and community-based rehabilitation frameworks have also made it easier for people to get care after surgery, especially those who live in rural or resource-limited areas.

Even though physiotherapy is becoming more and more recognised for its clinical value, it is still not always incorporated into normal endovascular care pathways. Many policy structures and reimbursement systems aren't clear about whether or not physiotherapy is included. This makes it harder for some people to get care and causes care to be delivered in pieces. It is very important to make sure that professional practice and health policy are in sync so that physiotherapy is seen not just as an extra service but as an important part of full vascular rehabilitation.

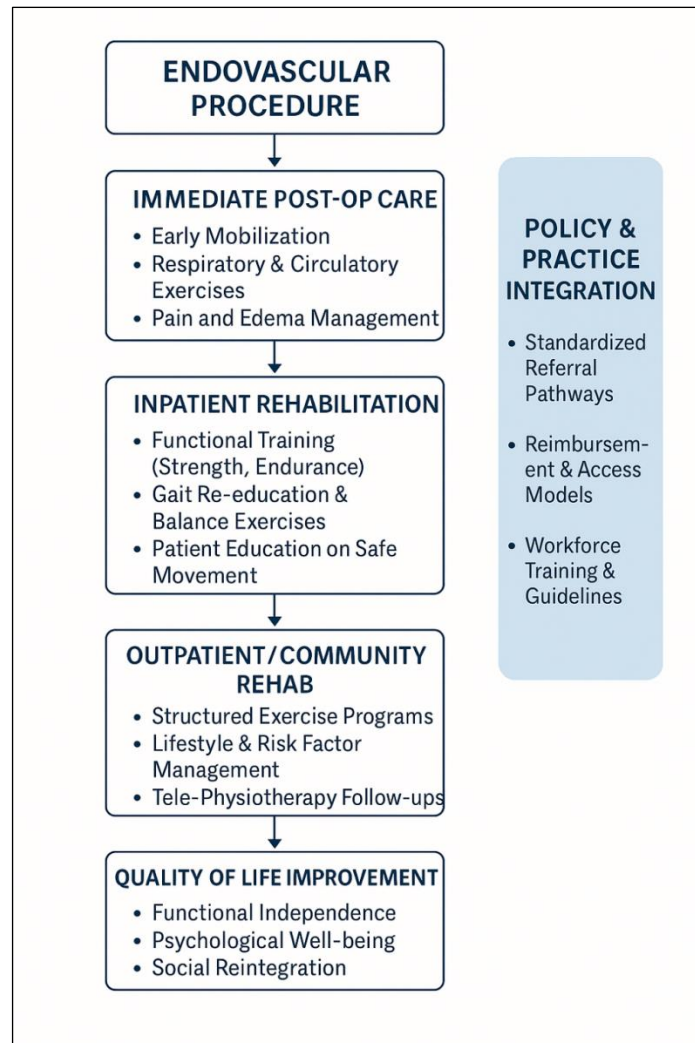


Figure 1. Integrated Physiotherapy Pathway for Endovascular Patients

This research examines the dual aspects of physiotherapy for endovascular patients: clinical practice and policy formulation. It speaks about how physiotherapy may be a component of vascular care models that involve more than one type of care and how it can help people live better and have more functional ability. It also talks about ways to measure the results of these adjustments.

CLINICAL CONTEXT

Endovascular operations are the best way to treat PAD, aneurysms, and venous insufficiencies. These minimally invasive therapies restore blood flow, stabilise artery walls, and prevent major vascular events. The procedure is likely to work, but it will take a long time to recuperate. Patients may have problems moving due to muscular weakness, poor endurance, and nervousness. If they don't have planned rehabilitation [3], these issues might worsen their QoL.

These psychological issues may make it harder for patients to enter rehabilitation programs, slowing their recovery. We need a holistic strategy that considers mental and physical health [4]. Physiotherapists educate and coach patients to help them understand their disease, observe safe activity limitations, and participate in their recovery.

From a systems point of view, there are still differences in how physiotherapy is integrated into vascular care paths. Referrals to rehabilitation are often delayed or not used enough in clinical situations because healthcare teams don't follow standard procedures or aren't aware of them. However, there is more and more proof that starting physiotherapy right away after an endovascular procedure improves functional outcomes, lowers the need for hospital readmissions, and makes patients happier.

The practical setting makes the important role of physiotherapy in the link between medical treatment and functional recovery stand out. It is important to recognise these benefits and include physiotherapy in regular post-endovascular care in order to improve patient outcomes and quality of life in general.

PHYSIOTHERAPY CONTRIBUTIONS

Physiotherapy is a key part of helping people who have had endovascular treatments regain their function and improve their quality of life. It helps with all stages of care, from getting people out of the hospital quickly to long-term therapy in the community, and it works on both the physical and mental aspects of healing. [5][6].

Early Mobilization and Circulatory Support: During the first few days after surgery, it's very important to stay mobile to avoid problems like deep vein thrombosis (DVT), pulmonary congestion, and muscle loss. Physiotherapists use gradual mobilisation routines, which start with deep breathing, bed exercises, and ankle pumps, to improve oxygenation, encourage vein return, and keep joints flexible. Once a patient is medically stable, they are allowed to do light activities and walk with supervision. This protects their blood vessels and reduces haemodynamic stress.

Exercise Prescription and Functional Training: Post-endovascular rehabilitation is based on personalised training plans. Walking or riding a bike are examples of aerobic exercises that improve cardiovascular endurance and peripheral circulation. Resistance training, on the other hand, builds muscle strength and improves your ability to control your posture. To find the best mix between effectiveness and safety, physiotherapists change the level of intensity of exercise based on the ankle-brachial index (ABI), the patient's perception of exertion, and the patient's other health problems. Reevaluation on a regular basis makes sure that growth is in line with vascular healing and tolerance.

Pain, Edema, and Wound Management: Pain and swollen limbs often make it hard for patients to participate in therapy. To ease pain and lower swelling, physiotherapists use manual techniques, limb elevation, compression therapy (when needed), and gentle range-of-motion movements.

Tele-Physiotherapy and Home-Based Rehabilitation: With the rise of digital health, tele-physiotherapy is a useful way to provide care outside of hospitals. Patients can stick to their treatment plans with the help of virtual consultations, remote tracking, and exercise programs that work with apps, especially in rural areas or places with few resources. These models make long-term vascular health management easier to get to, more consistent, and more self-empowering.

Psychosocial Empowerment and Education: Physiotherapy also helps with the mental parts of getting better. Patients gain confidence and independence by learning about safe activities, making changes to their lifestyle, and self-monitoring. Promoting active involvement increases motivation, lowers the fear of re-injury, and supports long-lasting changes in behaviour.

Table 1. Physiotherapy Contributions in Endovascular Rehabilitation

Physiotherapy Domain	Key Interventions	Objectives	Expected Outcomes
Early Mobilization	• Bed mobility exercises• Ankle pumps• Assisted ambulation	Prevent complications like DVT and pulmonary embolism; stimulate circulation; improve confidence	Enhanced venous return, reduced immobility-related risks, faster functional recovery
Respiratory & Circulatory Support	• Deep breathing• Incentive spirometry• Diaphragmatic breathing	Improve oxygenation, reduce pulmonary complications, and support vascular health	Improved respiratory function, reduced atelectasis, enhanced endurance
Functional & Exercise Training	• Aerobic exercise (walking, cycling)• Resistance training (graded loads)• Balance and gait training	Restore strength, endurance, and coordination; enhance mobility	Improved cardiovascular fitness, stability, and independence
Pain & Edema Management	• Limb elevation• Compression (as appropriate)• Gentle ROM exercises• Cryotherapy / manual techniques	Reduce swelling, control discomfort, improve joint movement	Decreased edema, lower pain intensity, better participation in rehab
Patient Education & Counseling	• Education on safe movement• Lifestyle modification• Self-monitoring techniques	Empower patients to self-manage; reduce fear and anxiety; promote adherence	Increased self-efficacy, reduced anxiety, better compliance
Tele-Physiotherapy / Home-Based Care	• Virtual sessions• App-based exercise monitoring• Remote progress tracking	Extend care beyond hospital; ensure continuity in rural or resource-limited areas	Improved access, sustained engagement, long-term adherence
Psychosocial Support	• Motivation and reassurance• Goal setting• Psychosocial engagement	Address fear, anxiety, and depression; enhance motivation	Improved mental well-being, patient satisfaction, social reintegration

Physiotherapy basically turns endovascular recovery from a purely medical process into a complete rehabilitation trip that improves not only physical ability but also independence, resilience, and quality of life as a whole.

QUALITY OF LIFE IMPROVEMENT

Quality of life, or QoL, is a broad term that includes things like physical health, mental health, social involvement, and general happiness with one's life. For people who have endovascular procedures, recovery is more than just making sure the vessels stay open and the procedure goes well. It's also about being able to return to useful daily activities, regain independence, and keep up their mental and social health [7]. Physiotherapy is a key part of this process because it turns clinical recovery into real gains in daily life.

Physical Function and Independence: Structured mobility training, gait re-education, and endurance-building habits help people feel less tired, keep them from losing their fitness, and get them back to work or leisure activities faster. Patients feel more

in control of their bodies and routines after this physical empowerment, which is closely linked to better quality of life.

Psychological and Emotional Well-Being: Endovascular patients often deal with stress, fear of moving, and not knowing what the future holds for them. Physiotherapy lessons on a regular basis create a structured setting where progress can be seen and measured, which reduces fear and increases hope. Physiotherapists also help patients feel better about their own abilities, which is an important factor in mental health [8]. Psychosocial involvement is an important part of rehabilitation because it builds trust, motivation, and a sense of accomplishment. This helps fight depression and feelings of isolation.

Social Participation and Community Reintegration: As a person's mobility and energy get better, they can get back to doing things with their family and friends, as well as hobbies that they were unable to do before because of vascular disease. This reunion not only makes social bonds stronger, but it also makes people more emotionally strong and happy with their lives.

Outcome Measurement and Evidence of Change: Physiotherapists use validated tools like the Short Form Health Survey (SF-36), the EuroQoL EQ-5D, and the VascuQoL questionnaire to directly measure these improvements in quality of life. The Six-Minute Walk Test (6MWT), the Timed Up and Go (TUG), and the Ankle-Brachial Index (ABI) are all complementary functional tests that give us measurable information about how our bodies are recovering. Including these patient-reported outcome measures (PROMs) and functional tests in rehabilitation makes sure that the treatments stay focused on the goals and are supported by proof. [9].

Physiotherapy is more than just a way to heal; it improves the quality of life. It changes post-endovascular care into a complete model of recovery based on the patient's living experience by addressing the interconnected areas of physical, mental, and social well-being.

POLICY AND PRACTICE PERSPECTIVES

It is well known that physiotherapy is helpful for endovascular rehabilitation, but it is still hard to get it included in official healthcare systems around the world. Clinicians must collaborate and acquire political and institutional support to make physiotherapy a major part of vascular treatment [10]. Policy gaps must be filled, and professionals must operate within health system goals. This makes therapy services easier, better, and longer-lasting.

Integration into Multidisciplinary Care Pathways: It would make sure that connections are created rapidly, that rehabilitation programs are organised, and that there is clear communication between fields [11]. Adding exercise to early discharge plans also helps keep treatment going and lowers the number of times individuals have to go back to the hospital.

Training, Competency, and Scope of Practice: Physiotherapists need vascular therapy skills. Legislation can arrange certification, continual education, and clinical criteria like haemodynamics and vascular load tolerance to make things safer. Allowing physiotherapists to make evidence-based decisions keeps interventions for complex vascular profiles safe and effective [12].

Moving from episodic rehabilitation to an organised, system-supported model is needed for physiotherapy to move forward in policy and practice. This kind of integration not only improves the results for each patient, but it also makes the vascular healthcare ecosystem stronger and more efficient.

DISCUSSION

Adding physiotherapy to care after endovascular surgery changes the way people think about healing and quality of life in the field of vascular health. In the past, clinical measures like vessel patency, procedural success, and complication rates were used to judge the success of endovascular interventions. It's becoming more and more clear that early mobilisation, structured exercise, and patient education can make a big difference in improving physical performance and lowering the risk of secondary complications. In clinical practice, however, physiotherapy is often not recommended enough or is delayed because referral systems are not unified, there are not enough physiotherapists, or there are not any standard protocols in place. This discrepancy between what the data says and what is actually done shows how important it is to have formal institutional pathways and policy requirements that include physiotherapy in endovascular care. It is very important for people from different fields to work together so that rehabilitation plans can start as soon as a patient is admitted and continue smoothly into the community.

When it comes to the patient, physiotherapy gives them both physical and mental comfort. Guided rehabilitation helps people feel more confident, less afraid of moving around, and more able to be involved in their own healing. Modern health policy objectives stress self-management, patient engagement, and preventive care, which is in line with this participatory model. Digital rehabilitation tools, like tele-physiotherapy platforms and remote tracking apps, can also make it easier for people to get help, keep it up, and stick with their treatment plan, especially in rural areas or places with few resources. These new ideas are in line with the world health system goals of being easy to get to, affordable, and able to grow. Even with these improvements, there are still problems. Physiotherapy isn't always a good fit for normal vascular pathways because of differences in how services are delivered, how they are paid for, and how aware healthcare teams are of them.

Table 2. Policy and Practice Perspectives in Physiotherapy for Endovascular Rehabilitation

Policy/Practice Domain	Key Focus Areas	Strategic Actions / Interventions	Intended Outcomes
Multidisciplinary Care Integration	Team-based collaboration between vascular surgeons, physicians, and physiotherapists	• Include physiotherapy in standardized care pathways • Ensure early referral and discharge planning • Promote interprofessional communication	Seamless care transition, improved recovery timelines, reduced readmissions
Standardized Clinical Protocols	Evidence-based physiotherapy guidelines for vascular rehabilitation	• Develop structured rehab protocols • Define safety parameters (e.g., hemodynamic monitoring) • Establish care milestones for each recovery stage	Uniformity in care delivery, enhanced safety, predictable patient outcomes
Training & Competency Development	Specialized skills and education for physiotherapists in vascular care	• Introduce certification programs • Conduct continuing professional education (CPE) • Foster clinical research and audit culture	Skilled workforce, improved clinical decision-making, enhanced patient confidence
Reimbursement & Coverage Models	Financial inclusion of physiotherapy services	• Integrate physiotherapy sessions in insurance packages • Define tele-rehabilitation billing codes • Advocate for cost-effectiveness evidence	Improved access, affordability, and equitable rehabilitation services
Equity & Access	Inclusion of underserved, rural, and remote populations	• Develop tele-physiotherapy frameworks • Establish community-based rehabilitation units • Promote outreach and home-visit programs	Increased accessibility, reduced healthcare disparities, community-level impact
Preventive Health Alignment	Integration with public health and NCD prevention strategies	• Embed physiotherapy in NCD policies • Promote exercise-based preventive programs • Support awareness campaigns	Enhanced vascular health literacy, reduced recurrence, long-term health promotion
Governance & Quality Assurance	Accountability and performance monitoring	• Implement audits and quality indicators • Establish outcome registries • Evaluate service delivery through PROMs and KPIs	Continuous quality improvement, transparency, policy feedback loop

Physiotherapy is not just an extra, it is a key part of getting the best results after arterial surgery. By improving its role through clinical control, health policy alignment, and technology integration, it can make sure that patients have full, fair, and high-quality recovery paths.

CONCLUSION AND FUTURE SCOPE

For patients having endovascular procedures, physiotherapy is an important part of their overall care. It helps them recover in more ways than one, including regaining their functional independence, emotional health, and quality of life. Physiotherapy helps people get back to normal as soon as possible by educating them about their condition and creating personalised exercise plans. It is an important link between medical treatment and complete recovery. Even so, there are still problems with the system that need to be fixed. For example, referral practices aren't always constant, policies aren't always followed, and access varies between healthcare settings. To get rid of these problems, clinicians, policymakers, and payers need to work together to create standard procedures, improve collaboration across disciplines, and make sure that everyone gets the same level of care. From a policy point of view, adding physiotherapy to official post-endovascular care plans can make the healthcare system work much better. Healthcare systems can make sure that physiotherapy is seen as an important part of recovery, not just an extra thing, by incorporating rehabilitation services into national vascular health strategies, making sure that reimbursement models are in line with patient-centered outcomes, and encouraging training in vascular rehabilitation for the workforce.

In the future, innovation and collaboration will be key to endovascular rehabilitation. New models like tele-physiotherapy, personalised exercise plans powered by AI, and wearable tech for remote tracking look like they could make it easier for more people to get help and keep it up, especially in places with few resources. Cost-effectiveness, long-term quality of life outcomes, and interdisciplinary implementation frameworks research will play a big role in shaping policy lobbying and evidence-based practice.

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