Pneumatic and Non-Pneumatic Compression Devices

DME.SW.109.A
v1.0.2025

Introduction

Pneumatic and non-pneumatic compression devices are addressed by this guideline.

Criteria

Pneumatic Compression Device Without Calibrated Gradient Pressure

A pneumatic compression device without calibrated gradient pressure (HCPCS E0650 or E0651) and related accessories are considered medically necessary when **any** of the following applies:

- The individual has chronic lymphedema with symptoms and **both** of the following:
  - The individual has **any** of the following:
    - There are dark and thick spots of skin on the extremities (hyperkeratosis, hyperplasia, hyperpigmentation).
    - The skin has lesions called papillomatosis cutis lymphostatica.
    - The limb is enlarged and disfigured due to swelling and thickening of the skin (elephantiasis).
    - There is a wound or weeping (lymphorrhea) of the skin due to congested lymph fluid.
    - Measurements taken over time show persistent lymphedema.
  - The individual has tried **all** of the following for at least four weeks, but the swelling has not gone down:
    - The individual used compression wraps or bandages on a daily basis.
    - The individual had regular exercise.
    - The individual had manual lymphatic drainage (MLD) if available.
    - The individual elevated the limb(s).
- The individual has swelling due to problems with their veins (chronic venous insufficiency) and there is documentation of the following:
  - Swelling and ulcers persist after six months of treatment that includes **all** of the following:

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- The individual used compression wraps or bandages on a daily basis.
- Wound care included removal of any damaged tissue, if needed, and applying dressings to help the wounds heal.
- The individual had regular exercise.
- Medications for medical conditions contributing to the swelling were considered and prescribed.
- The individual elevated the limb(s).

Pneumatic Compression Device with Calibrated Gradient Pressure

A pneumatic compression device with calibrated gradient pressure (HCPCS E0652) is medically necessary when **all** of the following are met:

- The individual has chronic lymphedema in a limb that extends to the head, neck, chest, trunk, and/or abdomen.
- The medical necessity criteria for a pneumatic compression device without calibrated gradient pressure as described above have been met.
- There is documentation of **all** of the following:
  - Daily treatment results from a four-week trial with a pneumatic compression device without calibrated gradient pressure (E0650 or E0651), including **all** of the following:
    - The E0650 or E0651 was used for several hours every day for at least four weeks after being fitted, taught, and watched over by a professional who knows how to use the device regularly and successfully.
    - Limb measurements were taken daily before and after several hours of treatment with E0650 or E0651. If there has been improvement in lymphedema, then the calibrated pump E0652 is not medically necessary.
    - The individual used compression wraps or bandages on a daily basis.
    - The individual had regular exercise.
    - The individual elevated the limb(s).
    - Limb measurements were taken daily before and after at least 30 minutes of manual lymphatic drainage (MLD). If there has been improvement in lymphedema, the calibrated pump E0652 is not medically necessary.
    - The individual's diet was evaluated and any necessary changes were implemented.
    - Medications for medical conditions contributing to the swelling were considered and prescribed.
    - Anemia or low blood protein levels were corrected, if possible.

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- Measured lymphedema in a limb that extends to the head, neck, chest, trunk, and/or abdomen has shown no improvement at the end of the four-week trial with E0650 or E0651.

Note:

If there is improvement of lymphedema, the trial of conservative therapy must be continued after the initial four weeks. Subsequent reassessment and measurements must occur at intervals at least one week apart on an ongoing basis. If no significant improvement has occurred in the most recent four-week period and the medical necessity criteria above are still met, a pneumatic compression device with calibrated gradient pressure (E0652) is considered medically necessary.

Non-Pneumatic Compression Devices

A non-pneumatic compression device (HCPCS E0680, E0681) and related appliances (HCPCS E0678, E0679, E0682) are considered medically necessary for an individual when criteria for a pneumatic compression device and related accessories have been met and there is documentation of **all** of the following:

- The individual is mobile.
- Your provider documents that a non-pneumatic compression device is preferred over a pneumatic compression device.
- Only one compression device is covered at a time.

Intermittent Limb Compression Device

A pneumatic compression device designed to stimulate blood flow in the deep veins of the lower extremities (HCPCS E0676) is medically necessary when **all** of the following apply:

- The pump (E0676) is requested as a preventive measure for an individual with limited mobility and at high risk of a blood clot forming in the deep veins of the limb (deep vein thrombosis).
- The individual or a caregiver can manage the device effectively.
- A comprehensive treatment plan for pneumatic compression has been established that includes education and training.

Pneumatic Compression Device, High Pressure, Rapid Inflation/Deflation

A pneumatic compression device for the treatment of peripheral arterial disease (PAD) (HCPCS E0675) is medically necessary when there is documentation of **all** of the following:

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- The degree of limited blood flow in the arteries of the limbs is life-threatening.
- It is not possible to do a procedure that would bring more blood flow to the area.
- The individual or a caregiver can manage the device effectively.
- A comprehensive treatment plan for pneumatic compression has been established that includes education and training.

There are no problems or safety concerns for the devices noted above that may include, but are not limited to the following:

- New blood clot in one of the large, deep veins in the limb (deep vein thrombosis).
- New blood clot that is stopping the lungs from getting blood (pulmonary embolism).
- Fluid buildup in the lungs (pulmonary edema).
- Infection or cancer in the area that needs to be treated.
- Limited heart function characterized by New York Heart Association (NYHA) Class III or IV heart failure.
- Untreated wounds or other skin problems that can get worse when compressed.
- Limb deformity or shape that cannot be accommodated by compression sleeves
- IPC is contraindicated in individuals on bed rest or immobilized without venous thromboembolism (VTE) prophylaxis for ≥72 hours after stroke onset due to the risk of dislodging a newly formed clot.

Additional Information

- Compression device related accessories are considered medically necessary only when the appropriate related base compression meets medical necessity criteria.

Not Covered

- A pneumatic compression device with calibrated gradient pressure (E0652) is not medically necessary for swelling that is confined to the limbs.
- Use of both a non-pneumatic compression device and a pneumatic compression device is not medically necessary.

Definitions

Edema is a non-specific term for the accumulation of fluid in tissues. There are numerous causes for edema (e.g. congestive heart failure, post-surgery, congenital abnormalities, etc.).

Lymph contains protein and cell debris, and can cause swelling of the tissues when the lymphatic system has been damaged.

Lymphedema is defined as accumulation of fluid and fibroadipose tissues due to disruption of lymphatic flow. If left untreated, lymphedema can cause chronic

inflammation, infection, and hardening of the skin, resulting in further lymph vessel damage. Lymphedema can be classified as either primary or secondary.

Primary lymphedema is typically a hereditary condition in which an individual exhibits an inherent flaw in the structural development of the lymphatic system. Some examples include:

- Congenital lymphedema due to lymphatic aplasia or hypoplasia.
- Milroy's disease, an autosomal dominant familial form of congenital lymphedema.
- Lymphedema praecox.
- Lymphedema tarda.

Secondary lymphedema is more common than primary lymphedema, and is the result of ineffective lymphatic drainage causing decreased lymph transport due to an extrinsic cause. It is most commonly caused by cancer-related treatment, including surgery (especially lymph node dissection, such as for breast cancer) or radiation therapy (especially axillary or inguinal), lymphatic obstruction by tumor, trauma, or other form of lymphatic overload.

The International Society of Lymphology uses the following criteria to diagnose and classify lymphedema:

- **Stage 0 (or Ia) lymphedema** is a subclinical or latent condition where swelling is not yet evident despite impaired lymph transport, subtle alterations in tissue fluid/composition, and changes in subjective symptoms. Most individuals are asymptomatic, but some report a feeling of heaviness in the limb.
- **Stage I lymphedema** represents an early accumulation of fluid relatively high in protein content. Pitting may occur. An increase in various types of proliferating cells may also be seen. Stage I corresponds to a mild grade of lymphedema above.
- **Stage II lymphedema** involves more changes in solid structures; limb elevation alone rarely reduces tissue swelling; and pitting is manifest. Later in Stage II, the limb may not pit as excess subcutaneous fat and fibrosis develop. Stage II corresponds roughly to a moderate grade of lymphedema above.
- **Stage III lymphedema** encompasses lymphostatic elephantiasis where pitting can be absent and trophic skin changes such as acanthosis, alterations in skin character and thickness, further deposition of fat and fibrosis, and warty overgrowths have developed. Stage III corresponds to a severe grade of lymphedema above.

Chronic venous insufficiency (CVI) is caused by abnormalities in the walls or valves of the veins in the lower extremities, or by a previous deep vein thrombosis (DVT). Blood flow becomes obstructed or there is a backflow of blood that can lead to skin changes, edema, and ulcers. Signs of CVI include hyperpigmentation, stasis dermatitis, chronic edema, and venous ulcers.

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Venous thromboembolism (VTE) refers to a blood clot that starts in a vein. Deep vein thrombosis (DVT) and pulmonary embolism (PE) are two manifestations of VTE. VTE has significant morbidity and mortality for individuals in the community and in the hospital.

Deep vein thrombosis (DVT) occurs when a thrombus develops within the deep veins, most commonly in the lower extremities.

Pulmonary Embolism (PE) occurs when there is a disruption to the flow of blood in the pulmonary artery or its branches by a thrombus that originated somewhere else in the vasculature. PE usually occurs when a part of a thrombus formed by DVT breaks off and enters the pulmonary circulation. Very rarely, PE can occur from the embolization of other materials into the pulmonary circulation such as air, fat, or tumor cells.

Pulmonary Edema is defined as an abnormal accumulation of extravascular fluid in the lung parenchyma. Pulmonary edema can cause diminished gas exchange at the alveolar level, which can lead to respiratory failure.

Heart Failure (HF) is a common clinical syndrome with symptoms caused by impaired ability of one or both ventricles to pump at a normal pressure due to a structural or functional cardiac disorder. It is characterized by specific symptoms, such as dyspnea and fatigue, and signs, such as fluid retention.

The **New York Heart Association (NYHA)** has established a functional **classification system for heart failure** based on the timing of symptom onset for an individual.

- **Class I** heart failure is characterized by symptom onset with strenuous activity.
- **Class II** heart failure is characterized by symptom onset with an ordinary level of activity.
- **Class III** heart failure is defined as symptom onset with minimal activity, and is further broken down into:
  - **Class IIIa**, in which an individual has no shortness of breath at rest, or
  - **Class IIIb**, in which an individual has recent onset of shortness of breath at rest.
- **Class IV** heart failure is characterized by symptom onset at rest.

Peripheral artery disease (PAD) is a circulatory problem in which narrowed arteries reduce blood flow to limbs, resulting in compromised blood flow to the distal tissue and failure to keep up with oxygen demands.

Chronic limb threatening ischemia (CLTI) is a clinical syndrome defined by the presence of PAD in combination with rest pain, gangrene, or a lower limb ulceration for greater than two weeks duration. Revascularization of the extremities aims to repair the flow of blood into and out of the limbs.

Revascularization procedures can be done in a more traditional surgical manner (e.g., common femoral endarterectomy, femoral-popliteal bypass), or via an endovascular

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route (e.g., stenting, percutaneous transluminal angioplasty (PTA), atherectomy). Hybrid revascularization combines endovascular procedures with surgical revascularization to treat both inflow and outflow conditions at the same time.

A **non-segmented pneumatic compressor (E0650)** is a device that has a single outflow port on the compressor.

A **segmented pneumatic compressor without calibrated gradient pressure (E0651)** has multiple outflow ports that lead to different segments of the sleeve or compression garment that is worn by the individual.

A **calibrated segmented pneumatic compressor (E0652)** has at least three outflow ports that can be manually set to deliver different individually determined pressures in each segment of the sleeve or compression garment.

A **non-pneumatic compression device (E0680 and E0681)** uses active compression with a shape-memory alloy activated by a controller. These devices do not require the individual to be stationary during treatment.

Intermittent pneumatic compression (IPC) devices are compression devices that generate short bursts of high pressure waves, followed by low pressure intervals.

- An **intermittent pneumatic compression (IPC) device (E0675)** delivers high pressure and rapid inflation/deflation cycles for the treatment of arterial insufficiencies, including peripheral artery disease.
- An **intermittent limb compression (ILC) device (E0676)** is a pneumatic compression device used for the prevention of deep vein thrombosis (DVT) that delivers pressure and inflation/deflation cycles for the prevention of DVT.

Evidence Discussion

Medical background

The United States Food and Drug Administration (FDA) considers pneumatic and non-pneumatic compression devices to be Class II devices. As such, they are considered to be of moderate to high risk, and they are required to complete the 510(k) clearance process. The 510(k) clearance process requires manufacturers to notify the FDA of the safety and effectiveness of a device prior to marketing it. Manufacturers of pneumatic compression devices available in the United States include Tactile Medical®, Bio Compression Systems, Inc., Mego Afek AC Ltd., Medline® Industries, LP, and DJO Global®, Inc.

In May 2021, Koya Medical, Inc. announced it received FDA 510(k) clearance for the Dayspring system, a non-pneumatic compression device for the treatment of lymphedema and venous diseases that impact lymphatic flow in lower extremities. In June 2020, Koya received FDA clearance for Dayspring for upper extremities.

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Literature review

Compression devices for the treatment of lymphedema:

- A 2020 systematic review of the guidelines for lymphedema (O'Donnell et al.) identified four clinical practice guidelines, one of which was based on a contemporary systematic review. The authors identified a single randomized trial (Fife et al., 2012) which demonstrated that advanced pneumatic compression devices (PCDs) were superior to basic PCDs in reducing limb volume in breast cancer related lymphedema. In this trial, 36 participants were randomized to an advanced PCD or standard PCD used for home treatment one hour per day for 12 weeks. The advanced PCD-treated group experienced an average of 29% reduction in edema compared to a 16% increase in the standard PCD group. The authors of the systematic review concluded that there are a limited number of clinical practice guidelines with a low quality of evidence; thus, additional high-quality studies are needed.
- Ridner et al. (2021) conducted a randomized controlled trial to determine the safety and feasibility of advanced PCDs in individuals with head and neck cancer. Forty-nine individuals with head and neck cancer-related lymphedema were randomized to lymphedema self-management plus an advanced PCD versus self-management alone for a duration of eight weeks. The use of an advanced PCD was associated with significant improvement in perceived ability to control lymphedema and visible external swelling. No device-related serious adverse events were reported. The authors concluded the advanced PCD appeared to be a safe and well tolerated treatment of secondary lymphedema in individuals with head and neck cancer.
- Szuba et al. (2002) performed a randomized trial to evaluate the efficacy of intermittent pneumatic compression (IPC) in the treatment of individuals with breast carcinoma-associated lymphedema. Twenty-seven individuals who had not been previously treated for lymphedema following treatment for breast cancer were randomized to complete decongestive therapy (CDT) alone or with adjunctive IPC (30 minutes daily for 10 days). CDT is a multidisciplinary approach to the treatment of lymphedema including manual lymphatic drainage, compressive wrapping of the limb, and decongestive exercises. Combined therapy was associated with a significantly greater reduction in limb volume during initial treatment (approximately 45% versus 26% with complete decongestive therapy alone). An additional randomization of the trial evaluated the efficacy of maintenance IPC therapy added to complete decongestive therapy in 11 individuals with unilateral breast cancer-associated lymphedema who had previously been treated with a program of complete decongestive therapy. At six to 12 months, a significant reduction in mean limb volume was found for combined therapy compared with an increased limb volume with complete decongestive therapy alone. In both studies, IPC was tolerated well without detectable adverse effects on skin elasticity or joint range of motion. The

authors opined that that the use of IPC can be used effectively in the therapeutic approach to individuals with breast carcinoma-associated lymphedema.

Compression devices for the treatment of chronic venous insufficiency:

- A review article by Comerota A.J. (2011) evaluated the effectiveness of intermittent pneumatic compression (IPC) to treat venous leg ulcers (VLUs). The author noted that IPC may promote healing of VLUs through active compression of the limb, and thus produce physiologic changes, including increased venous return, reduced leg edema, improved arterial perfusion, and endothelial effects. In addition, the author reviewed seven clinical studies including single-chamber or sequential IPC that demonstrated IPC improved ulcer healing when added to routine care. In conclusion, the author opined that application of IPC in combination with sustained graduated compression improved overall healing and accelerated the rate of healing in the management of VLUs.
- A Cochrane review (Nelson et al., 2014) examined whether intermittent pneumatic compression (IPC) increased the healing of venous leg ulcers (VLUs). The systematic review included nine randomized controlled trials (RCTs) (498 participants) that compared the effects of IPC with control (sham IPC or no IPC) or made comparisons between IPC treatment regimens in venous ulcer management. Notably, one trial including 80 participants found improved ulcer healing with IPC compared to compression bandages alone (62% versus 28%; p=0.002). In addition, two trials comparing IPC plus compression bandages with compression bandages alone found increased ulcer healing with IPC plus compression bandages. In summary, the authors concluded that IPC may increase healing compared with no compression bandages or when added to treatment with compression bandages.

Compression devices for the prevention of venous thromboembolism (VTE):

- Dennis et al. (2013) conducted a multicenter randomized trial (CLOTS trial) to assess the effectiveness of intermittent pneumatic compression (IPC) for the reduction of deep vein thrombosis (DVT) in immobile individuals who had an acute stroke (ischemic or hemorrhagic). The study enrolled 2,876 participants who were admitted to the hospital within three days of acute stroke and who were immobile on the day of admission. The participants received treatment with thigh-length IPC or no IPC. At 30 days, there was a significant reduction in the rate of DVT in the femoral or popliteal veins (i.e., proximal DVT) for the IPC group compared with the no IPC group. In addition, the IPC group had significantly lower rates of symptomatic DVT (proximal or calf veins) and any DVT (symptomatic or asymptomatic, proximal or calf). In the subgroup of 322 participants with hemorrhagic stroke, IPC was associated with reduced risk of proximal DVT at 30 days. No major adverse events were associated with IPC treatment, but the IPC group had a significantly higher rate of skin breaks (3.1% versus 1.4%). Approximately one-third of participants in both groups received either anticoagulant prophylaxis or therapeutic anticoagulation. The

authors concluded that IPC is an effective method of reducing the risk of DVT and potentially improving survival in individuals who are immobile after stroke.

- A Cochrane meta-analysis (Kakkos et al., 2016) assessed the efficacy of combined intermittent pneumatic leg compression and pharmacological prophylaxis versus single modalities for the prevention of venous thromboembolism (VTE). The study included 22 trials with 9,137 participants (including 15 randomized trials). The review found moderate-quality evidence that combining IPC and pharmacologic prophylaxis decreased the incidence of VTE in hospitalized patients when compared with IPC alone or pharmacologic prophylaxis alone. However, the review did not address the use of pneumatic compression devices in the outpatient setting or following ambulatory surgical procedures.
- Ho and Tan (2013) conducted a meta-analysis of randomized controlled trials to assess the efficacy of combined intermittent pneumatic compression (IPC) of the legs and pharmacological prophylaxis versus IPC alone for the prevention of venous thromboembolism (VTE) in hospitalized individuals. A total of 16,164 hospitalized individuals from 70 trials met the inclusion criteria and were included in the meta-analysis. The study found that IPC plus pharmacologic prophylaxis provided an additive benefit for VTE prevention compared with IPC alone. Thus, the authors strongly recommended the use of IPC of the lower limbs as part of a multimodality approach to prevent VTE in hospitalized individuals.

Compression devices for the treatment of peripheral arterial disease (PAD):

- Alvarez et al. (2015) conducted a randomized, prospective study to evaluate the efficacy of high-pressure, intermittent pneumatic compression (HPIPC) in the treatment of symptomatic peripheral arterial disease (PAD) or critical limb ischemia (CLI). Eighteen participants received treatment with HPIPC for 60 minutes twice daily for 16 weeks, and 16 individuals received standard care (exercise regimen of walking for 20 minutes twice daily). The primary endpoint was peak walking time, defined as time to maximally tolerated claudication pain. The authors concluded that the HPIPC device significantly improved peak walking time and secondary endpoints including reduced resting pain, and improved healing rates, physical function, and bodily pain. The authors noted that HPIPC should be offered to individuals who are not candidates for endovascular or surgical procedures.
- Moran et al. (2015) conducted a systematic review to examine the evidence of the use of intermittent pneumatic compression (IPC) to aid wound healing and limb salvage in individuals with critical limb ischemia who are not candidates for revascularization. The authors identified two controlled before-and-after (CBA) studies and six case series. The two CBA studies involving IPC reported improved outcomes (e.g., limb salvage, wound healing, claudication distances, and quality of life scores). No difference in all-cause mortality was found. Complications included pain associated with compression, skin abrasion, and contact rash. The authors noted that all included studies had a high risk of bias. In conclusion, the authors

reported limited available evidence to support the use of IPC in critical limb ischemia; and moreover, additional well-designed studies are warranted.

- A 2020 review performed by Rabe and colleagues provided recommendations on the risks and contraindications of medical compression therapy. Sixty-two publications reporting medical compression therapy adverse events were reviewed. The most frequently reported non-severe medical compression therapy-associated adverse events included skin irritation, discomfort, and pain. In addition, very rare but severe adverse events, including soft tissue and nerve injury were identified. The authors opined that severe medical compression therapy-associated adverse events are very rarely encountered if compression is used correctly and contraindications are considered.

Non-pneumatic compression devices:

- In an open-label, pilot study including 40 individuals with breast cancer-related lymphedema, Rockson and colleagues examined the quality of life (QOL) and limb volume maintenance efficacy of a novel wearable compression device (the Dayspring® System). After 28 days of use, participants had a statistically significant (18%) improvement in overall QOL as measured by the Lymphedema Quality-of-Life Questionnaire compared with baseline. Individual QOL domains and limb volume improved with therapy. Adherence was 98% over the course of the study. The authors concluded that the findings of this study suggested the Dayspring wearable compression device was safe and effective, and improved QOL as well as limb volume. However, it was unclear from the study whether the 18% QOL improvement was comparable to the average QOL gain observed in multiple prior pneumatic device studies, and whether it would be sustained over time.
- In a 2022 randomized, cross-over study, Rockson and colleagues examined the safety and effectiveness of a non-pneumatic compression device for the treatment of lymphedema versus an advanced pneumatic compression device in 50 women with unilateral breast cancer-related lymphedema. When compared with the pneumatic compression device, the non-pneumatic compression device was associated with greater mean reduction in limb edema volume and significantly greater mean improvements in QOL scores, greater adherence, and greater satisfaction with the device. No adverse events were reported. The authors concluded that these findings suggested that the non-pneumatic compression device is superior to the pneumatic compression device in reducing the edema volume in individuals with lymphedema, and produced improved outcomes for volume reduction and symptom relief. However, the authors noted that future studies are needed to examine the effects of early intervention and to determine long-term adherence to the use of the device to prevent the progression of lymphedema.

Professional organizations/societies:

- In 2020, the International Society of Lymphology updated the Consensus Document from the most recent 1995 document for the evaluation and management of peripheral lymphedema, and noted that intermittent pneumatic compression devices simulate manual massage, improve area of limb coverage, are easier to use, and may increase individual compliance, particularly for those who cannot complete both phases of complete decongestive therapy. Moreover, a 2022 consensus statement published by the American Venous Forum, American Vein and Lymphatic Society, and the Society for Vascular Medicine (Lurie et al.) recommended sequential pneumatic compression as an adjuvant of a multidisciplinary therapeutic treatment including manual lymphatic drainage, compression, and skin care in the maintenance phase of more advanced lymphedema treatment.
- In 2021, the American Head and Neck Society (Goyal et al.) noted that in head and neck cancer, secondary lymphedema occurs after disruption of lymphatics due to either tumor burden or cancer treatment (surgery, radiation, and/or chemotherapy). Presentation can be external (face and neck) or internal (tongue, pharynx, and larynx). Symptoms may include pain, cosmetic deformity, neck and shoulder dysfunction, visual disturbance, dysphonia, dysphagia, and difficulty breathing. The reported incidence of lymphedema varies and is likely related to cancer site, stage, and severity/combination of treatment, with reported rates ranging between 12% and 90%.
- An American College of Chest Physicians (ACCP) guideline (Gould et al., 2012) found only indirect evidence from mainly postoperative patients, showing that intermittent pneumatic compression (IPC) was associated with a reduction in deep vein thrombosis (DVT) of approximately 50% compared with no treatment. Thus, for individuals undergoing nonorthopedic surgery and at low risk of venous thromboembolism (VTE), the authors suggested IPC over no prophylaxis (Grade 2C). Another ACCP evidence-based clinical practice guideline (Falck-Ytter et al., 2012) titled "Prevention of VTE in Orthopedic Surgery Patients: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed." noted that an intermittent pneumatic compression device for thromboprophylaxis is attractive because of its possible effectiveness and low risk of increased bleeding events. However, suboptimal compliance with the use of an intermittent pneumatic compression device while in the hospital and the inability to continue this treatment at home for most individuals may limit their use. Newer battery-powered intermittent pneumatic compression devices that monitor compliance might be successfully used after discharge.
- Evidence-based guidelines published in 2011 from the American Academy of Orthopedic Surgeons (AAOS) titled, "Preventing Venous Thromboembolic Disease in Patients Undergoing Elective Hip and Knee Arthroplasty," reported moderate evidence to suggest that pharmacological agents and/or mechanical compression devices reduce deep vein thrombosis (DVT) rates in patients undergoing elective knee or hip arthroplasty. However, the authors noted that published evidence does not establish whether these prophylactic strategies affect rates of all-cause mortality,

fatal pulmonary embolism (PE), symptomatic PE, or symptomatic DVT in individuals undergoing elective hip or knee arthroplasty.

- The AHA/ACC (American Heart Association/American College of Cardiology) Guideline on the Management of Patients with Lower Extremity Peripheral Artery Disease (Gerhard-Herman et al., 2016) offered a weak recommendation that intermittent pneumatic compression should be considered for individuals with peripheral artery disease and critical limb ischemia, based on moderate quality evidence. They indicated that intermittent pneumatic compression (arterial pump) devices may be considered to augment wound healing and/or ameliorate severe ischemic rest pain. The rating further indicated that the usefulness of the device is unclear, but may be considered reasonable.
- Three global vascular surgical societies (the European Society for Vascular Surgery, the Society for Vascular Surgery, and the World Federation of Vascular Societies) joined efforts to publish the Global Vascular Guidelines on the Management of Chronic Limb-Threatening Ischemia (Conte et al., 2019). The authors opined on the management of chronic limb-threatening ischemia (CLTI). These guidelines included a conditional recommendation which stated that intermittent pneumatic compression therapy be considered in carefully selected individuals with peripheral artery disease and CLTI in whom revascularization is not possible.
- The Society for Vascular Surgery® the American Venous Forum Clinical Practice Guideline, "Management of venous leg ulcers" (O'Donnell et al., 2014) reported limited evidence to suggest that the addition of intermittent pneumatic compression (IPC) to compression therapy (compression bandages) offers benefit; however, individuals most likely to benefit are those who cannot tolerate, do not have access to compression therapy, or those who have failed to respond to compression therapy alone. Thus, the authors suggested use of intermittent pneumatic compression when other compression options are not available, cannot be used, or have failed to aid in venous leg ulcer healing after prolonged compression therapy.

Codes addressed in this guideline

The inclusion of any code in this table does not imply that the code is under management or requires prior authorization. Refer to the applicable health plan for management details. Prior authorization of a code listed in this table is not a guarantee of payment. The Certificate of Coverage or Evidence of Coverage policy outlines the terms and conditions of the member's health insurance policy.

HCPCS Code	Description
E0650	Pneumatic compressor, non-segmental home model

HCPCS Code	Description
E0651	Pneumatic compressor, segmental home model without calibrated gradient pressure
E0652	Pneumatic compressor, segmental home model with calibrated gradient pressure
E0655	Non-segmental pneumatic appliance for use with pneumatic compressor, half arm
E0656	Segmental pneumatic appliance for use with pneumatic compressor, trunk
E0657	Segmental pneumatic appliance for use with pneumatic compressor, chest
E0660	Non-segmental pneumatic appliance for use with pneumatic compressor, full leg
E0665	Non-segmental pneumatic appliance for use with pneumatic compressor, full arm
E0666	Non-segmental pneumatic appliance for use with pneumatic compressor, half leg
E0667	Segmental pneumatic appliance for use with pneumatic compressor, full leg
E0668	Segmental pneumatic appliance for use with pneumatic compressor, full arm
E0669	Segmental pneumatic appliance for use with pneumatic compressor, half leg
E0670	Segmental pneumatic appliance for use with pneumatic compressor, integrated, 2 full legs and trunk
E0671	Segmental gradient pressure pneumatic appliance, full leg
E0672	Segmental gradient pressure pneumatic appliance, full arm
E0673	Segmental gradient pressure pneumatic appliance, half leg
E0675	Pneumatic compression device, high pressure, rapid inflation/ deflation cycle, for arterial insufficiency (unilateral or bilateral system)
E0676	Intermittent limb compression device (includes all accessories), not otherwise specified
E0678	Non-pneumatic sequential compression garment, full leg

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HCPCS Code	Description
E0679	Non-pneumatic sequential compression garment, half leg
E0680	Non-pneumatic compression controller with sequential calibrated gradient pressure
E0681	Non-pneumatic compression controller without calibrated gradient pressure
E0682	Non-pneumatic sequential compression garment, full arm

Codes and Related Accessories

HCPCS Code	Description
E0650	E0655, E0660, E0665, E0666, E0671, E0672, E0673
E0651	E0667, E0668, E0669
E0652	E0656, E0657, E0667, E0668, E0669, E0670
E0676	The single HCPCS code is inclusive of the device and any components or accessories
E0675	E0667, E0668, E0669

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