

NURSING PROCEDURE MANUAL

ALP[®]

Venous Thromboembolism Prevention System

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ALP® DESCRIPTION AND OPERATING PRINCIPLE

ALP® (Alternating Leg Pressure) is a non-invasive prophylactic system for reducing the incidence of thromboembolism. The application of external intermittent pneumatic compression on the foot and legs has two effects:

1. Increases venous blood flow velocity, thereby reducing stasis.
2. Enhances fibrinolytic activity to reduce the risk of early clot formation.

The ALP® System consists of a pump and a pair of calf or thigh length or foot, single patient use garments. The pump provides intermittent cycles of compressed air, which alternately inflate the single-chambered garments. The compression, when applied properly to the patient, increases venous blood flow velocity and stimulates fibrinolysis.

The pump operates on a 60-second automatically timed cycled consisting of approximately 12 seconds of inflation followed by approximately 48 seconds of deflation.

The ALP® 501 System may be used on patients at risk of developing deep vein thrombosis and in conjunction with systemic interventions for the high risk patient.

ALP® PRECAUTIONS & COMPLICATIONS

- A. The pump connections should be checked to make sure they are securely locked and that the garment has been properly applied with the garment tubing located **at the ankle**.
- B. If the patient experiences leg pain or tingling numbness, **remove garment immediately**.
- C. If the calf, thigh, or foot compression is discontinued for a **substantial length of time** in a patient considered at risk of developing venous complication, perform a visual assessment for deep venous thrombosis before resuming compression therapy.

ALP® CONTRAINDICATIONS

- A. Pulmonary edema.
- B. Congestive heart failure.
- C. Any ischemic vascular disease such as severe arteriosclerosis.
- D. Phlebitis or any known or suspected deep vein thrombosis.
- E. Any localized condition the placement of the garment would interfere with such as untreated, infected wounds, gangrene, recent skin grafts or dermatitis.
- F. The physician should review the patient's medical status and use this device in accordance with his/her best understanding of the patient's needs and current condition.

ALP® INDICATIONS

- A. Pre, Intra and Post phases of Surgery
- B. Patients pre-disposed of DVT Risk Factor (see DVT Risk Factor Assessment Worksheet)
- C. Periods of prolonged immobility
- D. Paralyzed Limbs
- E. When the use of an anticoagulant therapy is contraindicated
- F. As an adjunct modality with other methods of DVT prophylaxis (e.g., Heparin, LMWH, Warfarin, Dextran) for the high risk patient

DVT RISK FACTOR ASSESSMENT FOR SURGICAL PATIENTS

Name _____ Age _____ Sex _____

Diagnosis _____ Admission: Elective or Emergency

Type of surgery _____

Please check all pertinent factors (Each risk factor has value of 1 unless otherwise noted.)

<input type="checkbox"/> Age 41 to 60 years <input type="checkbox"/> Age 60 to 70 years (2 factors) <input type="checkbox"/> Age over 70 years (3 factors) <input type="checkbox"/> Anticipated bed confinement (> 72 hours) <input type="checkbox"/> History of DVT/PE (3 factors) <input type="checkbox"/> Varicose Veins <input type="checkbox"/> Obesity (> 20% of ideal body weight) <input type="checkbox"/> Previous immobilization (> 72 hours) <input type="checkbox"/> Prolonged immobilization <input type="checkbox"/> MI (current) <input type="checkbox"/> CHF (current) <input type="checkbox"/> Stroke (current) 2 factors <input type="checkbox"/> Crystalloid infusion (> 5 liters/24 hours) <input type="checkbox"/> Severe COPD <input type="checkbox"/> Trauma (2 factors)	<input type="checkbox"/> Pelvic surgery or total joint replacement (2 factors) <input type="checkbox"/> Surgery > 30 minutes <input type="checkbox"/> Confining travel, flight/ auto (> 4 hours within week of admission) <input type="checkbox"/> History of pelvic or long bone fracture <input type="checkbox"/> Leg edema, ulcers, stasis <input type="checkbox"/> Malignancy <input type="checkbox"/> Pregnancy or postpartum (<1 month) <input type="checkbox"/> Inflammatory bowel disease <input type="checkbox"/> Severe infection <input type="checkbox"/> Estrogen therapy <input type="checkbox"/> Hypercoagulable states Congenital _____ Acquired _____ <input type="checkbox"/> Planned operation over 2 years <input type="checkbox"/> Other _____
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TOTAL RISK FACTORS _____

Recommended modalities for each Risk Group

LOW RISK	MODERATE RISK	HIGH RISK
(1 factor) anti-embolism stockings plus early ambulation, or *ALP® (IPC)	(2-4 Factors) *ALP® (IPC) or low dose heparin	(More than 4 factors) *ALP® (IPC) plus selected pharmaceutical (low dose heparin, LMWH, Warfarin)

**IPC (Intermittent Pneumatic Compression)

Please check the modality(s) chosen from the list below and sign/date

<input type="checkbox"/> LMWH <input type="checkbox"/> Heparin (regimen: _____) <input type="checkbox"/> Warfarin (regimen: _____)	<input type="checkbox"/> Other <input type="checkbox"/> No Prophylaxis <input type="checkbox"/> Suspected DVT, perform duplex ultrasonography <input type="checkbox"/> Pre-op consult
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Contradiction to anticoagulants: YES or NO (Circle one)

If yes, explain: _____

Physician's Signature: _____ Date _____

ALP® GARMENT APPLICATION & PUMP OPERATION

1. Plug the ALP® pump into a suitable 110 VAC electrical outlet. **DO NOT TURN THE PUMP ON AT THIS TIME.**
2. Connect the tubing set to the two outlets on the pump ensuring that a click is heard from the Delrin snap lock connectors.

FOR ONE GARMENT USE: If a leg is involved in the surgical procedure and only one garment is to be used, simply leave the unused air outlet free – disconnect the tubing from the pump that will not have a garment attached.

3. Remove the pair of Calf, Thigh or Foot garments from the sealed bag. The Calf, Thigh and Foot garments are **UNIVERSAL** and may be used on either limb.
4. Follow the “**INSTRUCTIONS FOR USE**” for the specific garment that is printed in its sealed garment bag.
5. When applying the **CALF GARMENTS**, unfold the calf garments and position the panel labeled “**THIS SECTION BEHIND CALF**” behind the belly of the calf muscle. The end of the calf garment where the tubing is located should be placed at the ankle. Snugly wrap the calf garment around the patient’s calf making sure the inflatable bladder is directly behind the patient’s calf. Secure the three Velcro fasteners around the calf section. The garment should fit securely but not tightly around the calf.
6. When applying the **THIGH Garments**, unfold the thigh garments and position the panel labeled “**THIS SECTION BEHIND THE KNEE**” behind the patient’s knee (popliteal fossa). The end of the thigh garment where the tubing is located should be placed at the ankle. Snugly wrap the thigh garment around the patient’s calf and thigh making sure the inflatable bladder is directly behind the patient’s calf section first. Secure the three Velcro fasteners around the calf section first then securely wrap the two Velcro fasteners around the thigh section. The garment should fit securely but not tightly around all parts of the patient’s leg.
7. When applying the **FOOT GARMENTS**, unfold the garments and position the octagonal bladder under the arch of the foot. The open end where the tubing is to be attached should point in the same direction as the toes. Snugly wrap the foot garment around the top of the foot making sure the inflatable bladder is directly underneath the patient’s arch. Secure the Velcro fastener tab around the top of the foot. Securely wrap the remaining strap “heel strap” around the back of the heel and attach on the top of the foot.
8. Repeat for the other leg or foot. **IT IS IMPORTANT THAT BOTH GARMENTS BE APPLIED SNUGLY TO THE LEGS OR FEET.**
9. Connect the pump’s black snap-lock connection tubing to the garments by pushing them firmly together until they click. (To remove them, press the button on the female end of connector while simultaneously pulling on the male end).
10. Adjust the pressure regulator dial to a pressure setting of 40 mm Hg unless otherwise ordered by a physician. (the pressure range of the pump is 40-60mmhg, recommended pressure setting is 40mmhg)
11. Turn the pump on by pressing the green **ON/OFF** switch. The pumps **ON/OFF** switch will illuminate.
12. If the patient is ambulatory, turn the pump off and disconnect the tubing from the garments. By securing the garment tubing underneath the last Velcro fastener of the ankle region, the patient may ambulate with the garments in place. Once the patient returns to the chair or bed, connect the tubing to the garments and turn the pump on.

NOTE: The pump’s black snap-lock connection tubing is REUSABLE - DO NOT DISCARD

ALP® OPERATION CHECKLIST

1. After a short delay (maximum of 30 seconds), one of the garments will rapidly inflate. The other garment will inflate 30 seconds later.
2. Check the garments alternately inflate and deflate (12 seconds inflation/48 seconds deflation).
3. If the audible / visual pressure alarm activates, refer to the Alarm Trouble Shooting section provided with the pump. The garments should inflate within 1 minute of starting the pump. The garments will alternately inflate, each garment inflating within 30 seconds of the other. If this does not occur, make certain the pump is plugged into a viable 110 VAC outlet and the **ON / OFF** switch is turned **ON**.
4. Make certain all snap lock connectors are securely locked in.
5. The pressure alarm, which is audible and visual, will function under situations of low pressure, continued pressure, when a garment fails to inflate or deflate, and a malfunctioning pump.
6. When there is a problem with one garment, there will be an intermittent audible and visual alarm. The alarm will function only during that garment cycle. Items that need to be checked include pump and garment connection, bladder leaks, kinked tubing and confirmation of the proper garment application.

PRESSURE ADJUSTMENT

The pressure control is on the front of the pump and ranges from 40-60 mm Hg. The pressure exerted by the Calf, Thigh and Foot Garments can be adjusted by turning this knob. Turning the knob clockwise increases the pressure; counter clockwise decreases the pressure. **The recommended pressure setting is 40 mm Hg.**

ALP[®] ALARM TROUBLESHOOTING

The ALP[®] 501 pump is fitted with an audible and visual alarm. When a problem occurs, the audible alarm sounds and the red light illuminates.

Alarm	Fault	Corrective Action
Intermittent beep and red light.	Low pressure or continued pressure.	Ensure all tubing is connected at the pump and garments and the tubing is not kinked. Try the pump again. If this result is unsuccessful, turn off the pump and disconnect the garments. Refer pump to the service department and obtain new pump.

**** If you have checked for all possible alarm faults and the pump continues to alarm or is not functioning, please take the pump out of service and send it your Biomed department for further analysis.**

ALP[®] 501 PUMP CLEANING

DO NOT SPRAY ANY DISINFECTANT SOLUTION DIRECTLY ON THE PUMP. The exterior casing of the ALP[®] 501 pump is made of ABS plastic and should always be cleaned by using a soft, damp cloth with a mild detergent. Hypocarbonate and phenolic based cleaning solutions should **NEVER** be used since they cause this plastic to deteriorate. The ALP[®] pump may be disinfected using a hyperchlorite solution (1000ppm).