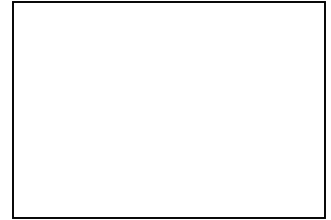




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POSITION STATEMENT OF THE NATIONAL LYMPHEDEMA NETWORK

By NLN Medical Advisory Committee; Approved by the NLN Board of Directors: 05/19/2004; Review Date: 05/19/2007

TOPIC: AIR TRAVEL

Air travel presents several considerations for individuals with lymphedema and for those at high risk for lymphedema. It is the position of the National Lymphedema Network that:

- Individuals with a **confirmed diagnosis** of lymphedema should wear some form of compression therapy (i.e., compression garment or compression bandages) while traveling by air.
- Individuals **at risk** for developing lymphedema should understand the risk factors associated with air travel and should make a decision to wear compression based on their individual risk factors.

Rationale for the Use of Compression

The cabin pressure that is experienced during flight in a plane is less than the atmospheric pressure one experiences while on the ground. The decreased pressure within the plane's cabin may give rise to increased swelling in a lymphedematous limb as interstitial pressures are physiologically altered. (1; 2) The colloid osmotic pressure of the blood plasma remains a constant force, however, changes in ultrafiltration and resorption occur when the external pressures exerted on the limb are changed. (3) The cabin pressure of the plane is decreased during flight, which results in a decrease in the interstitial pressure at the blood capillary level. This diminished pressure will result in a decrease in the fluid moved into the lymphatic system. The fluid will remain in the extracellular spaces and, therefore, an exacerbation of lymphedema may result.(4) The use of a compression garment and/or compression bandages will provide external pressure on the extremity to adequately support favorable resorption and decrease the potential for fluid accumulation in the tissue. A compression garment must be well fitted, and in many cases custom-made, to assure optimal fit and assure that the compression level is appropriate to manage the lymphedematous condition. (5)

The use of compression bandages may prevent an exacerbation of an already existing lymphedematous condition and is, therefore recommended for this population during air travel. In this instance, a known dysfunction of the lymphatic system exists and has manifested itself in the affected body region. Under these circumstances, the standard for

maintaining optimal lymphatic function dictates support equal to external compression afforded at the atmospheric pressure of sea level. (6) During flight, as cabin pressure decreases, compression bandages will effectively alter the interstitial tissue pressure, as well as enhance the muscle pump in the lymphedematous extremity. The beneficial outcomes are two-fold. First, resorption of fluid at the capillary level is enhanced due to the supportive nature of the bandages. Second, the bandages stimulate the lymphatic system, via the muscle pump, with resulting increased uptake of extracellular fluid. This level of compression may aid in preventing the exacerbation of an already-existing lymphedematous condition.

Definition of Individuals At-Risk for Lymphedema

People at risk for lymphedema are individuals who have NOT yet displayed signs and symptoms consistent with a diagnosis of lymphedema but have a known incapacity of their lymphatic system. This may include people who have undergone removal of lymph nodes. In addition, receiving radiation therapy also puts an individual at an increased risk for developing lymphedema. At-risk individuals have altered lymphatic function that may impede the body's ability to take up excess fluids that escape into the extracellular spaces. Further, it has been found that early sensory changes in an at-risk limb, including heaviness and swelling, may be associated with the presence of lymphedema.(7) These individuals should pay close attention to changes in their extremities, and may be at a higher risk of developing lymphedema from an incident such as an airline flight.

Recommendations abound for these individuals to avoid general activities that may cause swelling in the affected body region. People who are at risk should take precautions when flying due to the air pressure changes previously mentioned.

garment may benefit these individuals by applying an external, graded force to the limb and adequately accommodating the de-creased air pressure during flight.

Guidelines for Garment Fit

An upper extremity compression sleeve should fit snugly from the wrist to the axilla (arm pit). There should be no evidence of the sleeve material gathering at the inner elbow, or gapping at the forearm. Upon wear of the garment, there should be no sign of redness at the top or bottom bands of the sleeve. If a silicone border is selected, no discoloration or skin irritation along the border should occur. There should be no symptoms of numbness or tingling in the hand or fingers with wear of the sleeve. A compression glove or gauntlet hand piece should always accompany a compression sleeve to ensure that no distal swelling occurs with wearing the sleeve.

A lower extremity compression garment should fit snugly from the foot to the top of the garment. If a knee-high stocking is selected, the fit of the garment should end just below the bend of the knee to assure comfort and adequate circulation. A thigh-high stocking may be utilized and should fit up to the groin. Any stocking should be well fitted with no gapping and/or gathering of the material behind the knee.

Any medical compression garment should be recommended and sized by a health care practitioner who is experienced in garment fitting. Special instructions should be reviewed for wear and care of the garment according to the manufacturer's guidelines. Lymphedema compression garments will maintain their advertised compression for up to six months with frequent wear. Garments worn less frequently may potentially last longer. Garments older than six months should be assessed for adequate compression and fit.

Other Considerations for Air Travel

In addition to the alteration in air pressure, several other factors may contribute to an exacerbation of lymphedema during travel. Air travel is sedentary in nature, normally causing blood and lymphatic circulation to slow. This may precipitate an exacerbation of swelling as the fluid pools in the extremity. Further, lifting and carrying luggage, an activity endemic to travel, may cause undue stress on muscles in an involved or high-risk limb, thereby increasing the risk of swelling.

Another factor influencing fluid dynamics in an extremity may be attributed to dehydration during travel.(8) Ambient air in the passenger cabin of a plane is dry and may lend itself to dehydrating the body. If adequate water intake is not achieved, the blood capillary pressures face further alteration. Due to the protein-rich nature of the extracellular fluid, dehydrating the lymphedematous limb may result in an increase in ultrafiltration of fluid from the blood into the extracellular spaces. This is due to the hydrophilic nature of the protein molecules and thus, their propensity to attract and retain water, potentially propagating further swelling in the affected limb.

The sedentary nature of prolonged air travel may further encourage fluid pooling in static limbs. All individuals traveling by plane are advised to move their arms and legs frequently to prevent swelling from occurring. Standing and moving around the cabin once every 30-60 minutes will encourage improved uptake of extracellular fluid and prevent further accumulation of fluid in the tissues.

As a result of the above outlined risks, the National Lymphedema Network offers the following guidelines for air travel:

For Individuals With A Confirmed Lymphedema Diagnosis

Regarding Compression Garments:

- Be measured for and obtain a well-fitted compression garment for air travel
- Obtain compression of at least 20-30 mmHg for most upper extremity lymphedema conditions. A hand piece, either a glove or a gauntlet is absolutely necessary and should be worn with the compression sleeve
- Obtain compression of at least 30-40 mmHg for most lower extremity lymphedema conditions

- Obtain any new garments well in advance of the trip to assure adequate fit and be sure to wear the garment in advance of travel to identify any adverse effects that may occur

Regarding Compression Bandages:

Certain individuals may require for air travel the added compression afforded through bandaging.

- Be trained by a lymphedema specialist in appropriate techniques for safely applying compression bandages
- Apply the compression bandages before flying
- Leave the bandages on until you reach your final destination
- While away from home, continue your regular schedule of garment and bandage wear

For Individuals Who Are At-Risk For Lymphedema

Each patient must make an individual choice based on the constellation of risk factors associated with their own medical history. The NLN recommends that at-risk individuals make an informed decision in conjunction with their health care provider. If the patient chooses to obtain a compression garment, the following recommendations are made:

Regarding Compression:

- Be measured for and obtain a well-fitted compression garment for air travel
- Obtain compression of no greater than 20-30 mmHg for upper extremity support. A hand piece, either a glove or a gauntlet, is absolutely necessary and should be worn with the compression sleeve
- Obtain compression of no greater than 30-40 mmHg for lower extremity support
- Obtain the garment in advance of the trip to assure adequate fit and be sure to wear the garment for one full day well in advance of travel to identify any adverse effects that may occur
- Place the garment on before leaving home on the day of travel
- Leave the garment on until your final destination has been reached

For All Individuals Traveling:

Regarding Seat Assignment and Airport Regulations:

- Consider a seat with adequate leg room (for lower extremity patients)
- Consider obtaining a note from your physician regarding your lymphedema, in case of security questions related to your bandages or compression garment

Regarding Activity:

- Obtain assistance for carrying, lifting and transporting luggage
- Wear loose fitting, non-constricting clothing
- Get up every 30 to 60 minutes and walk up and down the aisle of the plane
- Once at your destination and throughout your trip, try not to exceed your normal level of activity and get adequate rest

Regarding Diet and Medical Concerns for Individuals with Lymphedema and Those At-Risk:

- Increase water intake
- Maintain healthy eating habits
- Obtain a prescription for antibiotics and directions for use from your physician to have in case an infection occurs while you are away. When traveling out of the country, have the prescription filled prior to leaving

- Wear a LYMPHEDEMA ALERT Bracelet (upper or lower extremity) and/or necklace (lower extremity)

Note: The aforementioned recommendations are to serve as guidelines, and as such, cannot guarantee the prevention of lymphedema in those at-risk, or the prevention of the progression of lymphedema. Each person's medical status may also affect the outcome following air travel. Consultation with a physician and/or a lymphedema therapist prior to travel may be indicated.

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