

TOPIC: AIR TRAVEL

Air travel presents several considerations for individuals with lymphedema and for those at 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 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 air flight is less than the atmospheric pressure on the ground. During flight, cabin pressure decreases from sea level to the low air pressure found at between 6,000 and 8,000 feet above sea level. The decreased pressure within the plane's cabin may give rise to increased swelling in a lymphedematous limb as tissue pressures are physiologically altered.^{1; 2} Changes in fluid production in the tissues occur when the external pressures exerted on the limb are changed.³ Diminished pressure in the airplane cabin will result in a decrease in the fluid moved in to the lymphatic system. The fluid will remain in the extracellular spaces and an exacerbation of lymphedema may result.⁴ The use of the compression garments will provide external pressure on the extremity to adequately support favorable resorption and decrease the potential for fluid accumulation in the tissue.⁵ The use of compression may prevent worsening of pre-existing lymphedema and is recommended for those with lymphedema during air travel.⁶ Compression bandages will potentially increase the interstitial tissue pressure and 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 compression. Second, the garment or bandages stimulate the lymphatic system, via the muscle pump, and uptake of extracellular fluid increases, helping to prevent an exacerbation of lymphedema.

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 insufficiency of their lymphatic system. This includes people who have undergone removal of lymph nodes or radiation therapy, which increases the 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 tissues. Individuals at risk should pay close attention to changes in sensations of their extremities, such as heaviness, fullness or aching that may signal the onset of lymphedema from an airline flight.

People who are at risk for lymphedema should take precautions when flying and should consider compression to the affected limb. A medical compression garment should be recommended and sized by a health care practitioner who is experienced in garment fitting.

Other Considerations for Air Travel

In addition to alterations in air pressure, several other factors may contribute to an exacerbation of lymphedema during travel. Air travel is sedentary in nature, which causes blood and lymphatic circulation to slow. This may precipitate an exacerbation of swelling as fluid pools in a dependent extremity. All individuals traveling by plane are

advised to move their limbs frequently to help prevent swelling. Standing and moving around the cabin frequently will encourage improved uptake of extracellular fluid and help prevent further accumulation of fluid in the tissues.

Lifting and carrying heavy luggage may cause stress on muscles in an involved or high-risk limb, increasing the risk of swelling. Bags with shoulder straps can cut across lymphatics in an upper extremity increasing the risk to an affected arm. Using roller bags or having assistance with bags is strongly encouraged.

Another factor influencing fluid dynamics in an extremity is dehydration during travel.⁸ Ambient air in the passenger cabin of a plane is dry and may increase the potential for dehydration. Without adequate fluid intake the blood capillary pressures may alter. Dehydration of the lymphedematous limb may increase protein concentration in the tissues resulting in increased ultrafiltration of fluid from the blood into the extracellular spaces and potentially contributing further to swelling in the affected limb.

Based on the risks described above, the National Lymphedema Network offers the following guidelines for air travel:

For Individuals With A Confirmed Lymphedema Diagnosis

Regarding Compression Garments, persons with lymphedema should:

- Obtain a well-fitted compression garment for air travel.
- Obtain the garment well in advance of the trip and wear it several times to ensure proper fit and comfort.
- For most upper extremity lymphedema conditions compression of at least 20-30 mmHg is recommended.
- For most lower extremity lymphedema conditions, compression of at least 30-40mmHg is recommended.
- A hand piece, either a glove or a gauntlet should be worn with the compression sleeve.
- Place the garment on before take-off.
- Leave garment on for 1-3 hours after deplaning to allow tissue pressures to equilibrate.

Regarding Compression Bandages

During air travel, certain individuals may require the added compression afforded by bandaging. These persons should:

- Be trained by a lymphedema specialist in appropriate bandaging techniques.
- 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 at Risk for Lymphedema

Each person must make an individual choice based on 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 an individual choose to obtain a compression garment, follow the recommendations as above.

For All Individuals Traveling

Regarding seat Assignment, Airport Regulations and Airline Choice:

- Persons with lower extremity lymphedema should consider a seat with increased leg room, such as a bulk-head or first class seat if possible.
- A note from your physician regarding your lymphedema may help answer security questions related to your bandages or compression garments.

- Newer jetliners such as Air Bus, A380 or Boeing Dreamliners are able to maintain higher cabin pressure with more humidified air, and may improve comfort.

Regarding Activity

- Avoid carrying heavy bags or using shoulder straps on the affected arm.
- Use roller bags or obtain assistance for carrying, lifting and transporting luggage.
- Wear loose fitting, non-constricting clothing.
- Move about the cabin frequently if possible to enhance contribution of the “muscle pump”.
- Throughout your trip, try to avoid excessive activities of the type that tend to exacerbate your swelling, take frequent breaks for rest and elevation, and get adequate sleep.

Regarding Dietary and Medical Concerns for Individuals with Lymphedema and Those At Risk

- Ensure adequate fluid intake during flight and throughout your trip.
- Maintain healthy eating habits, minimizing alcohol, caffeine and salty foods.
- Consider bringing antibiotics with you, especially when travelling outside the U.S. or if you have a history of cellulitis in the affected limb.
- Wear a LYMPHEDEMA ALERT Bracelet (upper extremity) and/or necklace (lower extremity).

Note: The aforementioned recommendations are to serve as guidelines and cannot guarantee the prevention of Lymphedema in those at-risk, or worsening of Lymphedema in those with swelling. Each person's medical status may affect their response to air travel. Consultation with a physician and/or a Lymphedema therapist prior to travel may be beneficial.

REFERENCES

1. Cottrell JJ. Altitude exposures during aircraft flight. Flying higher. Chest 1988; 93(1) : 81-84
2. Casley-Smith JR, Caseley-Smith JR. Lymphedema initiated by aircraft flights. Aviat Space Environ Med 1996; 67(1) : 52-56.
3. Witte CL, Witte MH. On the causation of edema: a lymphologic perspective. Perspect Biol Med 1997; 41(1) : 86-97
4. Aukland K, Reed RK. Interstitial-lymphatic mechanisms in the control of extracellular fluid volume. Physiol Rev 1993; 73 (1) : 1-78
5. Hampton S. Elvarex compression garments in the management of lymphoedema. Br J Nurs 2003; 12 (15) : 925-929.
6. Brennan MJ, Miller LT. Overview of treatment options and review of the current role and use of compression garments, intermittent pumps, and exercise in the management of Lymphedema. Cancer 1988; 83(12 Suppl American) :2821-2827.
7. Armer JM, Radina ME, Porock D, Culbertson SD. Predicting breast cancer-related Lymphedema using self-reported symptoms. Nurs Res 2003; 52(6): 370-379.
8. Greenleaf JE. Problem: thirst, drinking behavior, and involuntary dehydration. Med Sci Sports Exerc 1992; 24(6): 645-656
9. Compression Prophylaxis may increase the potential for flight-associated lymphoedema after breast cancer treatment. The Breast 2002; 11(1): 66-7