Lymphedema: A Review and Case Profiles
October 2004

Lymphedema of the extremities remains a therapeutic challenge. As a result many different treatments have been devised but none have been routinely effective.

Two types of lymphedema occur, primary and secondary. Primary lymphedema is rare, the result of a congenital abnormality of the lymphatic system. Secondary lymphedema, the most common form, may be acute or chronic. It results from obstruction or interruption of the lymphatic channels. Fluids and proteins, transudate from cells or exudate from both lymphatic and vascular channels collects in the superficial connective tissues and fails to be absorbed by the lymphatic system. Duration varies from weeks to years.

The acute form generally follows trauma and is easily resolved by conventional methods. The chronic version is a more vexing problem, only minimally improved by existing technologies with rapid recurrence when therapy ceases. Chronic lymphedema most frequently occurs post-mastectomy or subsequent to a variety of other surgical procedures that involve resection of the lymph channels and nodes. It can also be a complication secondary to congestive heart failure, chronic liver disease, thrombophlebitis, systemic infections and gravitational dependency. In its late stages it is characterized by firm induration with accompanying cyanosis as arterial compression occurs.

**Lymphedema Etiology**

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<th>Acute</th>
<th>Chronic</th>
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<tr>
<td>• Trauma</td>
<td>• Thrombophlebitis</td>
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<td>• Surgery</td>
<td>• Congestive Cardiac Failure</td>
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<td>• Burns</td>
<td>• Immobilization</td>
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<td>• Dependency</td>
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<td>• Post Radiation</td>
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<td>• Renal Failure</td>
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<td>• Hepatic Disease</td>
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<td>• Systemic Infection</td>
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<td>• Developmental</td>
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Conventional Therapies
1. Elevation of extremity above level of heart
2. Variety of compression techniques
   - Pumps
   - Bandages
   - Fitted garments
   - Massage
   - Compression

It should be noted that there is no effective drug therapy available. Diuretics are frequently utilized but not recommended for long term use. The above listed conventional therapies do not provide long term solutions. Outcomes are usually limited at best and require prolonged periods of treatment without permanent relief or cure.

Case Profile #1
80 year old male.

Duration
3 to 4 years. Progressive in nature.

Etiology
Post harvesting long saphenous vein (coronary bypass procedure)
Gravitational dependency
Recurrent congestive heart failure

Findings
Initially affected extremity circumference mid-calf 6 cm greater than opposite side
Firm non-pitting induration
Moderate cyanosis
Poor venous filling
No palpable arterial pulse distal to femoral pulse

Treatment
Ten one-hour sessions over a four week period utilizing the BioFlex Low Intensity Laser Therapy System. Treatment was applied over the sympathetic nervous system and locally.

Outcome
Objective
Mid-calf circumference same as opposite side
Resolution of cyanosis and induration
Restoration of venous filling and peripheral arterial pulses
Normal skin temperature

Subjective
Absence of sensation of heaviness, chronic aching
Activity level restored to normal
No regression or recurrence four months post-cessation of treatment.
Case Profile #1. Lymphedema Prior to and Following Treatment with LILT.

Initial

Final

After 10 Treatments

- Cyanosis and induration gone
- Good venous filling
- Mid-calf diameter same as left
**Case Profile #2**
58 year old female

**Duration**
Liver transplant in 1986 precipitated by hepatitis and hepatic failure

**Diagnosis**
Chronic lymphedema of left lower extremity with accompanying cellulitis

**Etiology**
Thrombophlebitis of deep veins
Anti-rejection medications
Hypoalbuminemia
Gravitational dependency

**Findings**
Initially right leg mid-calf circumference – 35 cm
Left leg mid-calf circumference – 43 cm

**Treatment**
Nine one-hour sessions over three weeks using BioFlex Low Intensity Laser Therapy System in circumferential manner.

**Outcome**
Left leg mid-calf circumference – 38 cm
Cellulitis 90% resolved without antibiotics
(Note - At this time patient moved away and is continuing treatment at another facility using the BioFlex System.)
Case Profile #2. Lymphedema Prior to and Following Treatment with LILT.

Initial

Intermediate

After 9 treatments
(mid calf diameter reduced 6 cm)
(Patient relocated and continued treatment at another clinic)
Discussion

Large surface treatment arrays are applied in circumferential fashion to the affected areas. Often in these situations arterial circulation is compromised; in order to relieve this and enhance reduction of the edema, Low Intensity Laser Therapy may also be applied to the appropriate dermatomes of the spinal column, resulting in a sympathectomy-type effect. We utilize this technique in the treatment of edema in both the upper and lower extremities. This accelerates resolution of the pathology and its ensuing complications.

Conclusion

Low intensity laser therapy is effective in the treatment of both acute and chronic lymphedema. Notwithstanding duration of the condition in our experience response is rapid with total elimination of the problem in less than four weeks.

The Bio-Flex Low Intensity Laser Therapy System is therefore recommended as the therapy of choice in treating lymphedema.