

Lymphatic system response to severe lower limb trauma

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Disclosure of relevant financial interests

All authors have nothing to disclose

BACKGROUND & OBJECTIVE

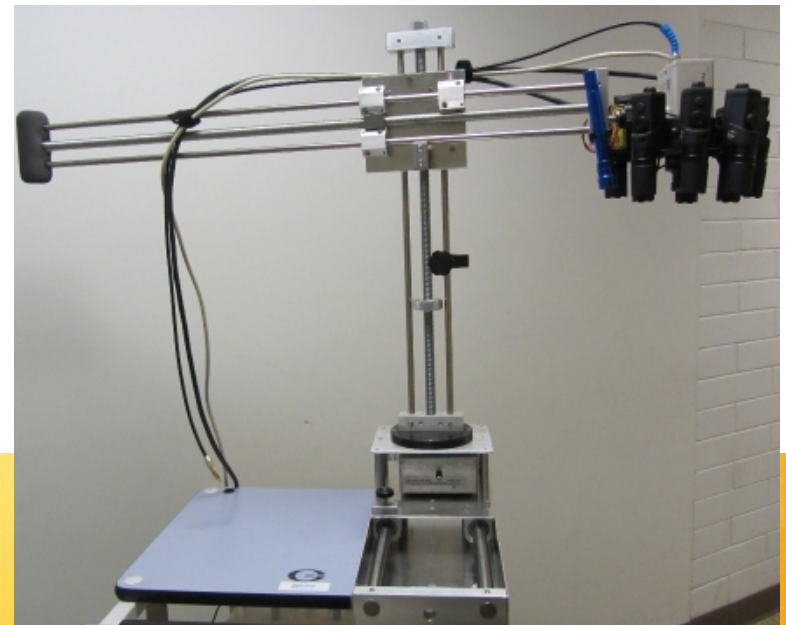
Severe compound lower limb trauma requiring complex soft tissue reconstruction may lead to lymphoedema of the distal extremity.

To demonstrate the lymphatic response after soft tissue reconstruction for **Gustilo IIIB** fractures of the lower limb.



LYMPHATIC IMAGING

- Indocyanine Green (ICG)
Pulsion® Medical Systems
- Fluorescence properties – less invasive imaging for superficial lymphatic system
- Intradermal injection, dorsal side foot [0.1mL-0.2mL]
- Near Infra-Red (NIR) imaging camera
- Custom made imaging camera with 780nm laser torches as excitation light



SUMMARY TABLE 20 PARTICIPANTS

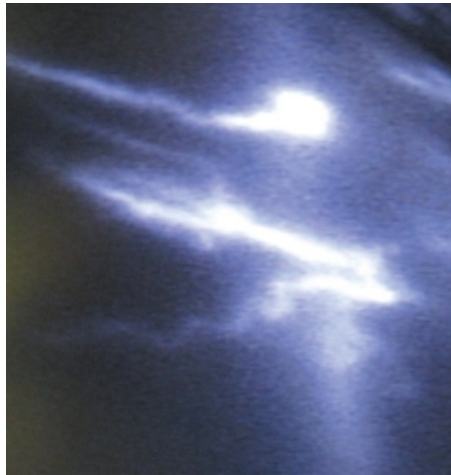
Age (mean \pm SD)	47.5 \pm 16.99
Male : Female (N)	17 : 3
BMI (mean \pm SD)	29.65 \pm 4.69
Leg affected (L:R)	10:10
Hospital stay (mean \pm SD)	26.8 \pm 19.99
Soft tissue infection N (%)	4 (20%)
Osteomyelitis N (%)	7 (35%)
Visible oedema N (%)	11 (55%)
Difference volume in L (mean \pm SD)	415.09 \pm 552.53

ICG IMAGING

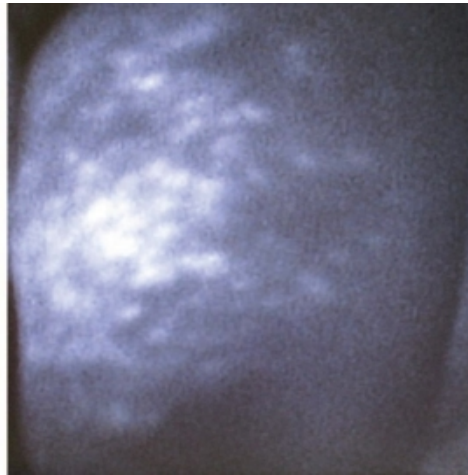
- Free muscle flap did not show functioning superficial lymphatic vessels.
- Scar tissue restricted continuation of lymphatic flow.
- There was a notable difference in lymphatic flow speed between affected and non affected leg.

PATTERNS OF ICG LYMPHATIC IMAGING

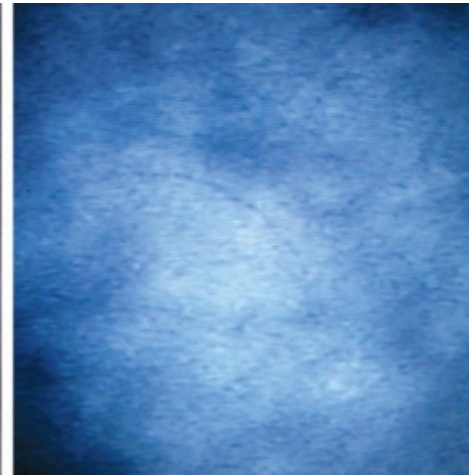
Mapping of the superficial lymphatic system with ICG:
“Splash & Stardust” pattern = Reduction in flow or dermal backflow
“Diffuse” pattern = Non-functioning system (lymphostasis)



SPLASH



STARDUST

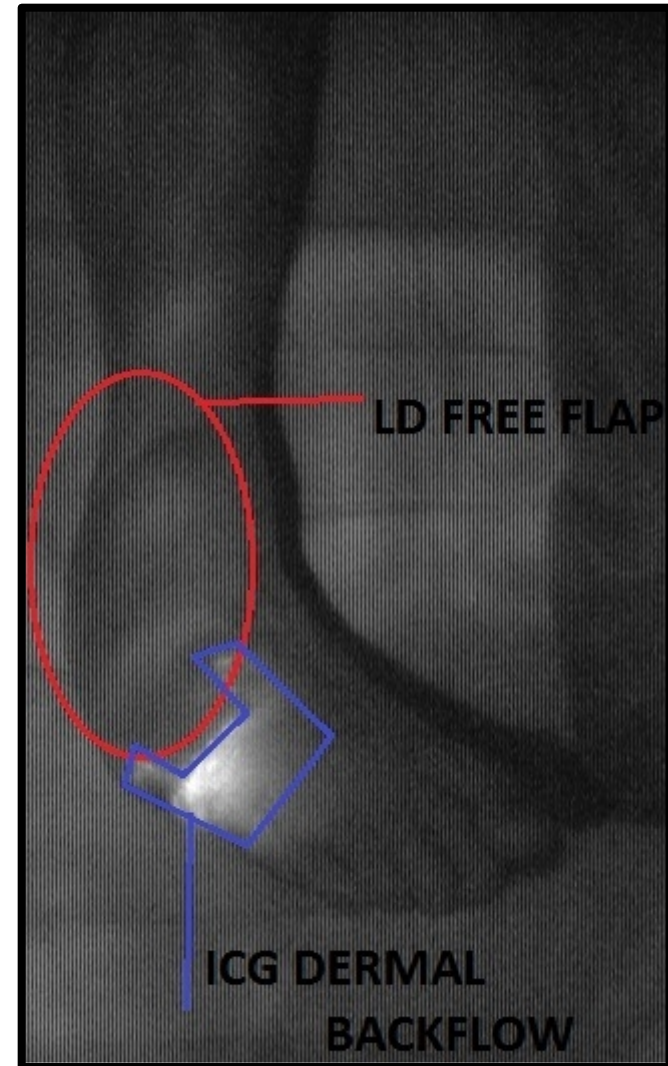
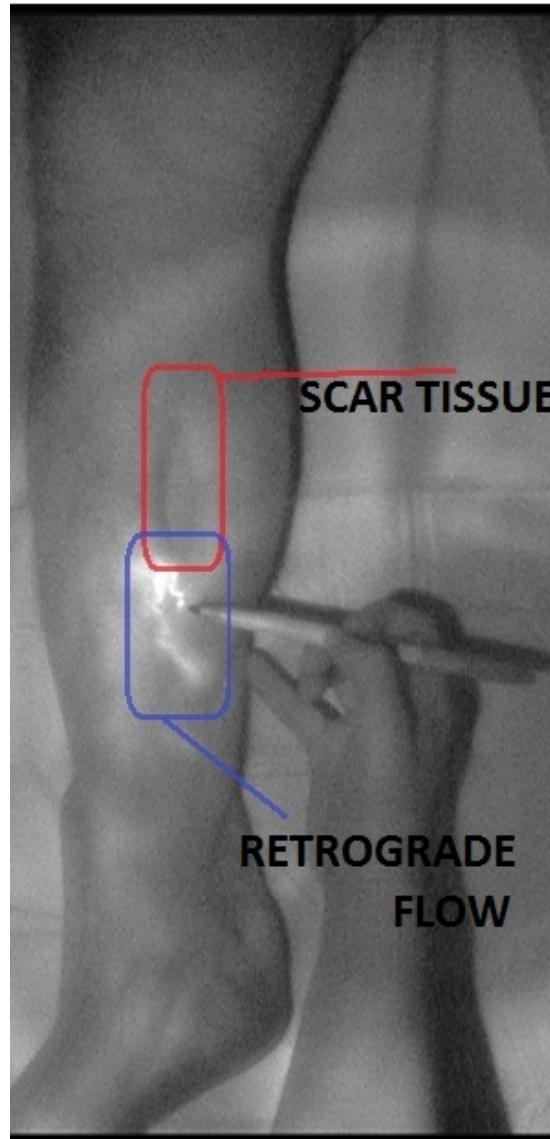


DIFFUSE

Yamamoto *et al* (2011) The Earliest Finding of Indocyanine Green Lymphography in Asymptomatic Limbs of Lower Extremity Lymphedema Patients Secondary to Cancer Treatment: The Modified Dermal Backflow Stage and Concept of Subclinical Lymphedema. DOI: 10.1097/PRS.0b013e3182268da8

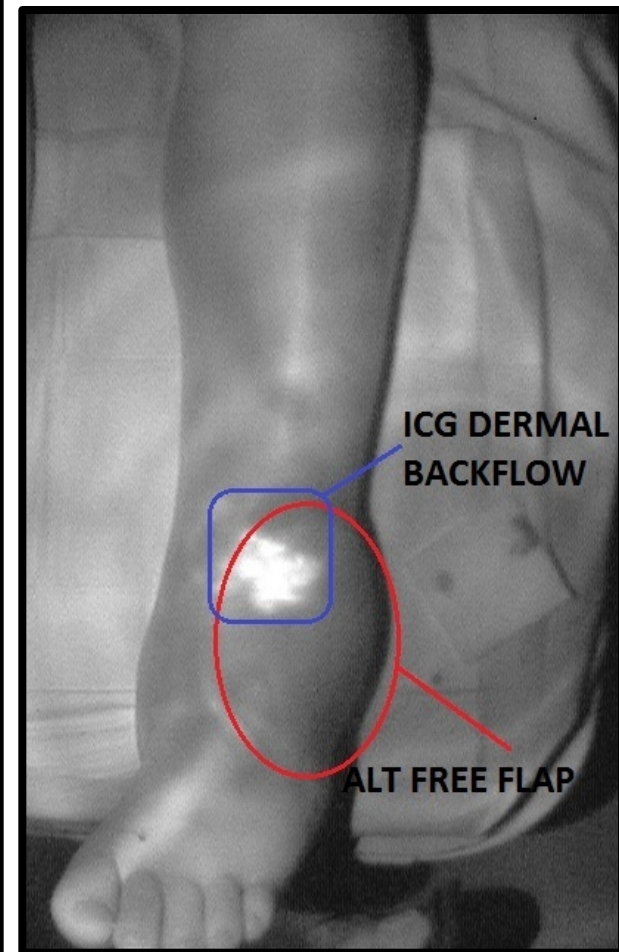
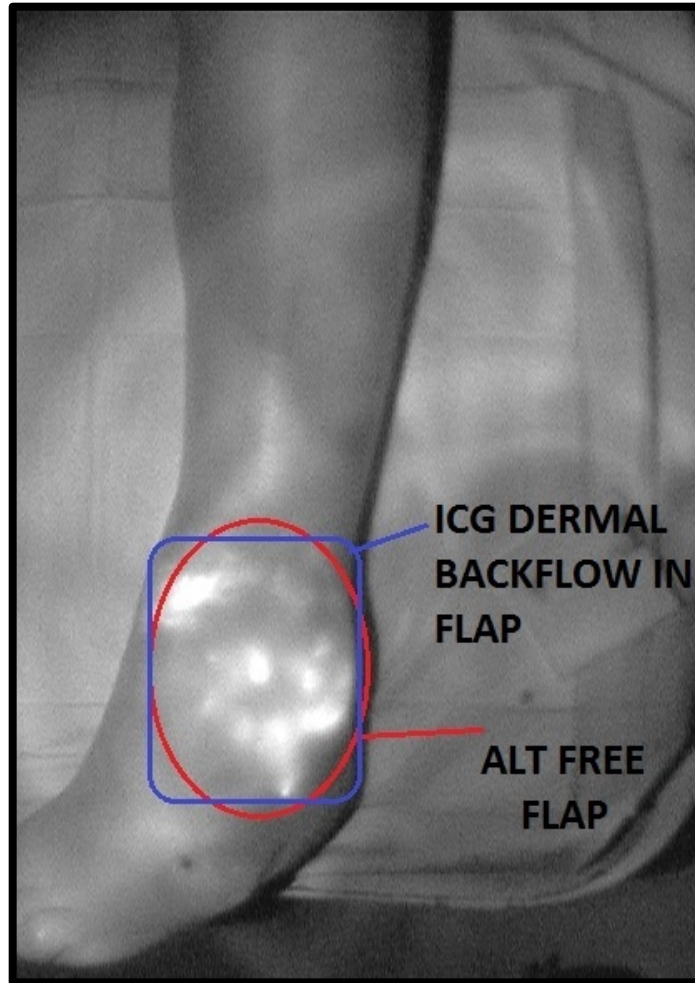
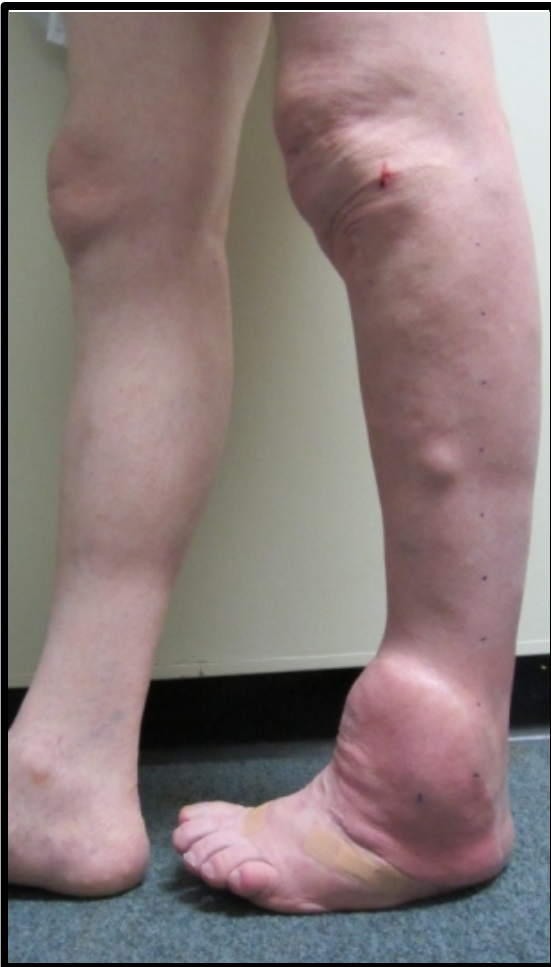
ICG LYMPHATIC IMAGING

Male – MVA 2009 – LD free flap and multiple grafts-oedema



ICG LYMPHATIC IMAGING

Male – MVA 2010 – ALT free flap - oedema



CONCLUSION

- Extensive soft tissue loss is a risk for lymphoedema
- We have demonstrated objective changes in the lymphatic system following Gustilo 3b trauma
- ICG imaging is a less invasive lymphatic imaging technique
- Early recognition and early intervention will prevent progression of lymphoedema