

# **Microvascular Porcine Model for the Optimization of Composite Tissue AutoTransplantation**

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## **Introduction:**

Devastating extremity injuries are prevalent on the modern battlefield. Improved body armor, rapid evacuation times and advanced critical care yield survivability in the face of catastrophic limb trauma. The number and complexity of these injuries requires novel methods for salvage and reconstruction. This model is designed to assess the solution H<sub>2</sub>S for its ability to optimize tissue stability and viability during composite tissue transplantation and thus expand reconstruction applications.

## **Methods:**

A donor gracilis myocutaneous flap with its associated Mathes type II arteriovenous axis is procured from 70-90kg Yorkshire swine. Utilizing the right external carotid artery and internal jugular vein as the recipient axis, microvascular anastomosis is performed. Control group 1 undergoes immediate microvascular anastomosis with resultant 1 hour ischemic period with interim perfusion with heparinized saline. Control group 2 undergoes delayed anastomosis with 3 hour ischemic period and interim perfusion with heparinized saline. These are compared with experimental group 1 which undergoes interim perfusion with H<sub>2</sub>S for 1 hour and experimental group 2 which undergoes interim perfusion with H<sub>2</sub>S for 3 hours. Markers of ischemia-reperfusion injury are evaluated following anastomosis and on POD#1, 2, 7 and 14.

## **Results:**

This porcine microvascular model has been validated and control animals accomplished. The standard degree of ischemia-reperfusion injury has been established in the controls with laboratory and histologic analysis. Experimental groups are now underway.

## **Conclusions:**

We have established and validated a novel porcine model for microvascular composite tissue transplantation. This model will be utilized to assess the effects of H<sub>2</sub>S on tissue stability and viability, and optimize conditions for transplantation and for the eventual induction of immunotolerance to composite tissue allotransplants.