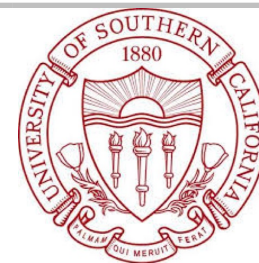


# Pedicled Temporoparietal Fascial Flap Use in Combined Revascularization to Prevent Adult Moyamoya Disease Ischemic Complications

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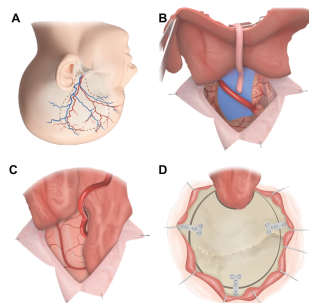
## Introduction

Moyamoya disease (MMD) is a progressive, idiopathic cerebrovascular occlusive disease associated with devastating ischemic and hemorrhagic complications. Although various revascularization techniques including direct, indirect and combined microvascular bypasses have been described, there is still an ongoing controversy regarding the most effective revascularization approach. [1-3] Direct superficial temporal artery – middle cerebral artery (STA-MCA) bypass is a widely used technique in adult MMD revascularization. [2,3,5] The incorporation of indirect revascularization through pedicled temporoparietal fascia flap (TPFF) offers supplemented neovascularization and hemodynamic support to ischemic brain regions. [2,4] We here present a novel combined revascularization approach for adult MMD utilizing the TPFF.

## Methods

The technique of combined direct STA-MCA bypass and indirect pedicled TPFF revascularization for adult MMD is described (Figs. 1-2) along with a case presentation (Figs. 3-4).

Figure 1

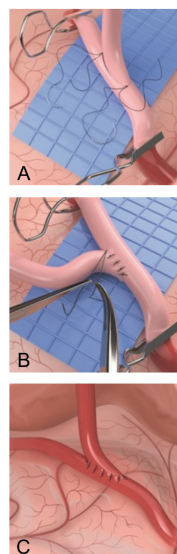


The technical steps of pedicled TPFF surgical planning and implementation in combined revascularization. A - Outline of the TPFF. B - Exposure of the donor and recipient vessel after “butterflying” the distal half of the flap. C - TPFF “butterfly wing” release and intradural positioning. D - Repositioning of the craniectomized bone flap.

## Results

The described method of combined bypass for treatment of adult MMD utilizes highly vascular galeal flap with preserved STA and vein within the pedicle in combination with direct extracranial-intracranial bypass. This revascularization model does not require flap inversion and eliminates use of temporalis muscle offering better cosmetic and functional results. This approach has been successfully implemented for adult MMD treatment at our facility since May, 2016.

Figure 2



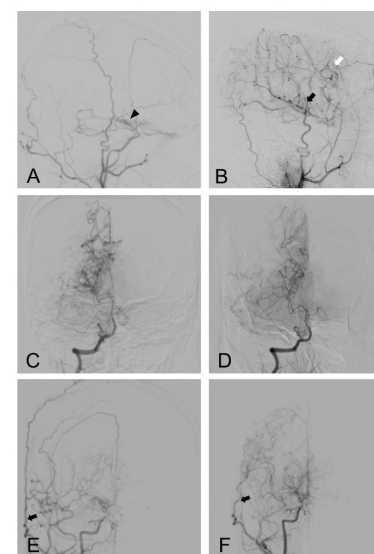
End-to-side microvascular anastomosis. A - Anchor suture placement. B - Interrupted permanent suture placement. C - Completed anastomosis.

Figure 4



Cosmetic outcome after STA – MCA and pedicled TPFF combined bypass. A well healed wound with minimal alopecia is located behind the patient's hairline (Left) which can be completely covered by hair (Right).

Figure 3



Pre-operative and 15-month follow-up angiograms. A - Pre-operative ICA and ECA injection demonstrating moyamoya vasculature at ICA terminus (arrowhead). B - Follow-up ECA injection demonstrating STA to MCA anastomosis (black arrow). Neovascularization from TPFF results in a hazy appearance (white arrow). C - Pre-operative VA injection demonstrating moyamoya vessels at the basilar terminus and PCA territory. D - Follow-up VA injection showing reduction of moyamoya vasculature. E - ECA injection showing a robust STA (black arrow). F - Follow-up ECA injection showing robust flow in the STA passing intracranially (black arrow) and evidence of neovascularization.

## Conclusions

The technique of combined revascularization presented here has not previously been described. The perceived benefit over current revascularization strategies is the extent of coverage using a local, well perfused vascular flap with preserved venous outflow that can result in acceptable cosmetic outcomes.

## Learning Objectives

1) Describe the benefits of pedicled TPFF use in combined revascularization for adult MMD; 2) Understand the surgical technique peculiarities of the pedicled TPFF harvest and microvascular anastomosis.

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