Clip-Grafts for Aneurysm and Small Vessel Surgery*

Part 1: Repair of Segmental Defects with Clip-Grafts; Laboratory Studies and Clinical Correlations

Part 2: Clinical Application of Clip-Grafts to Aneurysms; Technical Considerations

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The introduction of the operating microscope to the field of neurosurgery has opened a new era. Intracranial neurovascular surgery on major vessels seems technically feasible. Yet the necessity for rapid work, the position of these vessels, the friable vessel wall, and uncontrolled bleeding make microsuture techniques most difficult.

The purpose of the clip-graft is to provide the neurosurgeon with a rapid non-suture technique for the repair of diseased major intracranial vessels. It is anticipated that there will be application to endarterectomies, embolectomies, aneurysms, and the repair of major vessels injured in tumor surgery.

The clip-graft utilizes a teflon or dacron graft attached to a circular spring metal clip. The stainless steel metal clip is merely the carrier for the graft and provides a non-suture method of application. This report resolves itself therefore to a study of these fabric grafts in the repair of segmental defects in small arteries of the sizes of the human internal carotid and middle cerebral. The previously reported concept of intraluminal pressure-sealing is utilized.

Materials and Methods

Arteriotomy. Defects in the carotid and femoral arteries of mongrel dogs were made by excising a wedge of vessel wall measuring approximately 5 mm in length and one-third of the circumference of the artery in width. The vessels ranged in diameter from 2.5 mm to 4.0 mm (Figs. 1 and 2).

Received for publication March 9, 1967.

* Supported by U. S. Public Health Grants NB-05651, NB-06826, and NB-06882. Presented at meeting of the American Association of Neurological Surgeons (Harvey Cushing Society), San Francisco, California, April 17, 1967.
fitted snugly around the vessel and compromised the lumen 0.5 to 0.75 mm bled only through the pores of the graft. This could be avoided by preclotting the graft. Those grafts which did not fit snugly bled from the ends. This was controlled by the application of gelfoam to the ends and slight pressure for 5 minutes. The gelfoam was then removed by saline irrigations. A properly applied tight-fitting preclotted graft did not bleed (Fig. 2 right).

**Histological Sections.** Endothelium bridging across platelets and fibrin was well-advanced by the end of the third day. This was complete by the seventh day. In no specimens was there evidence of endothelial break-down or necrosis of the supporting tissues to the endothelial lining of.