De operatieve procedure is beschreven in 'atlas of vascular surgery' van Ouriel en Rutherford; Saunders 1998 (niet meer in de handel):

CHAPTER 25

Carotid Endarterectomy

Carotid endarterectomy is the most frequently performed peripheral vascular surgical procedure in many practices. A decline in the number of carotid endarterectomies occurred during the late 1980s and early 1990s as a result of claimed improvements in medical therapy, such as antiplatelet agents and control of risk factors. This relative trend was reversed after the publication of several randomized trials comparing surgical with medical therapy for carotid disease, repudiating the effectiveness of medical therapy for severe carotid stenoses.

OPERATIVE PROCEDURE

The neck is hyperextended with the chin turned away from the operative side (Fig. 184). A longitudinal incision is made along the anterior border of the sternocleidomastoid muscle. Some surgeons prefer a curvilinear incision running in a skin crease obliquely down and toward the midline, but we appreciate the ease with which the longitudinal incision may be extended proximally and distally when unsuspected common or distal internal carotid disease must be addressed.

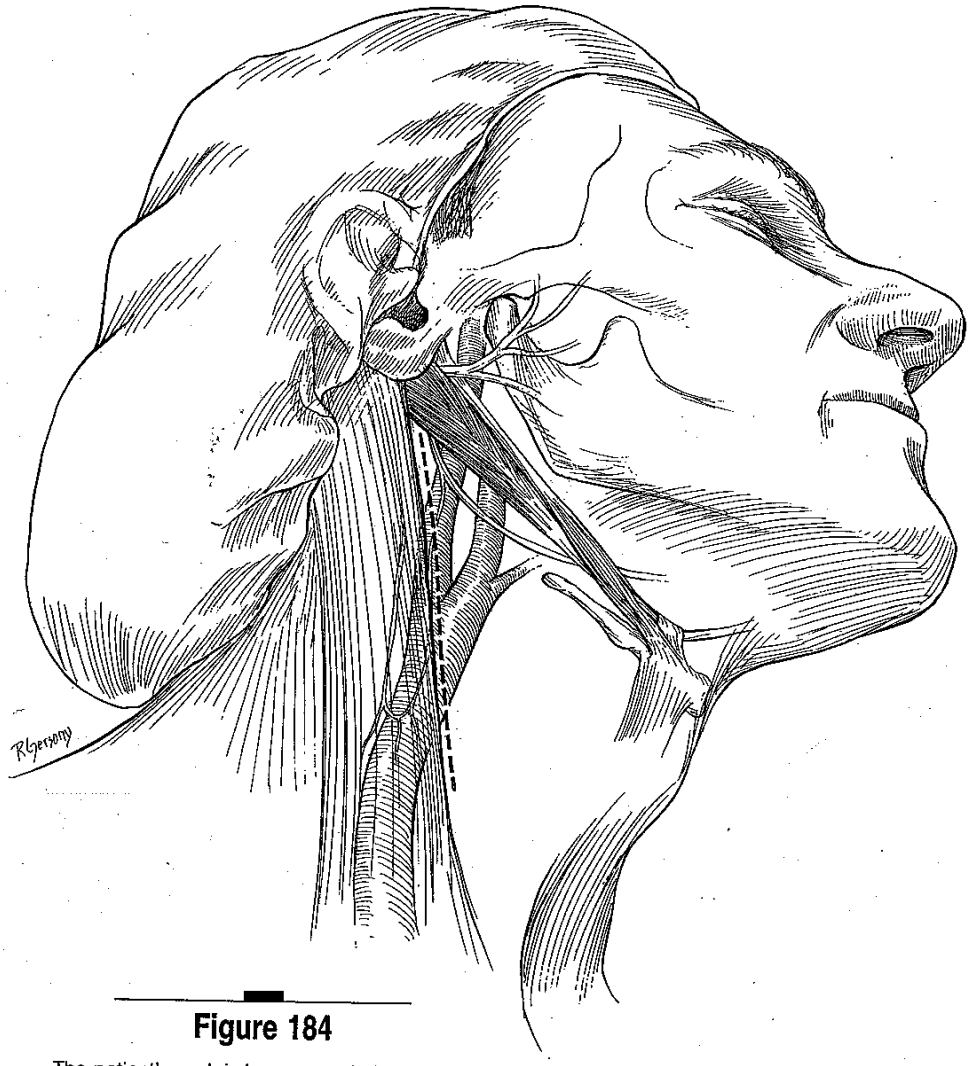

Figure 184

The patient's neck is hyperextended and turned away from the operative field in preparation for a carotid endarterectomy. The incision runs parallel to the anterior border of the sternocleidomastoid muscle, along its upper two thirds.

Carotid Endarterectomy

The subcutaneous fat and platysma muscle are divided with electrocautery, ligating and dividing branches of the external jugular system running immediately beneath the platysmal layer. Dissection is continued in the plane around the anterior border of the sternocleidomastoid muscle. Lateral retraction of the muscle and continued medial dissection exposes the internal jugular vein. Its large facial tributary is ligated and divided along with a higher tributary running just superficial to the hypoglossal nerve. Division of these branches of the internal jugular vein allows the vein to be mobilized laterally, exposing the carotid bifurcation and the vagus nerve (Fig. 185).

The hypoglossal nerve is visualized as it crosses the internal and external carotid arteries; it is tethered inferiorly by a small artery running from the occipital artery to the sternocleidomastoid muscle. The ansa cervicalis also pulls the hypoglossal nerve inferiorly, and division of the ansa and the artery to the sternocleidomastoid muscle allows the hypoglossal nerve to be released medially as the first step in exposing the high internal carotid artery. The posterior belly of the digastric muscle may also be divided to obtain an additional 1 to 2 cm of distal exposure. Using these techniques, we have needed to subluxate the mandible only infrequently to gain high enough exposure.

After adequate heparinization, the external carotid artery is controlled with a vessel loop, and the superior thyroid artery is temporarily clipped. The internal carotid artery is occluded with a *gentle* bulldog clamp (e.g., Gregory) or surrounded with a vessel loop if an intraluminal shunt will be used. The proximal common carotid artery is controlled with a vessel loop and a vascular clamp.

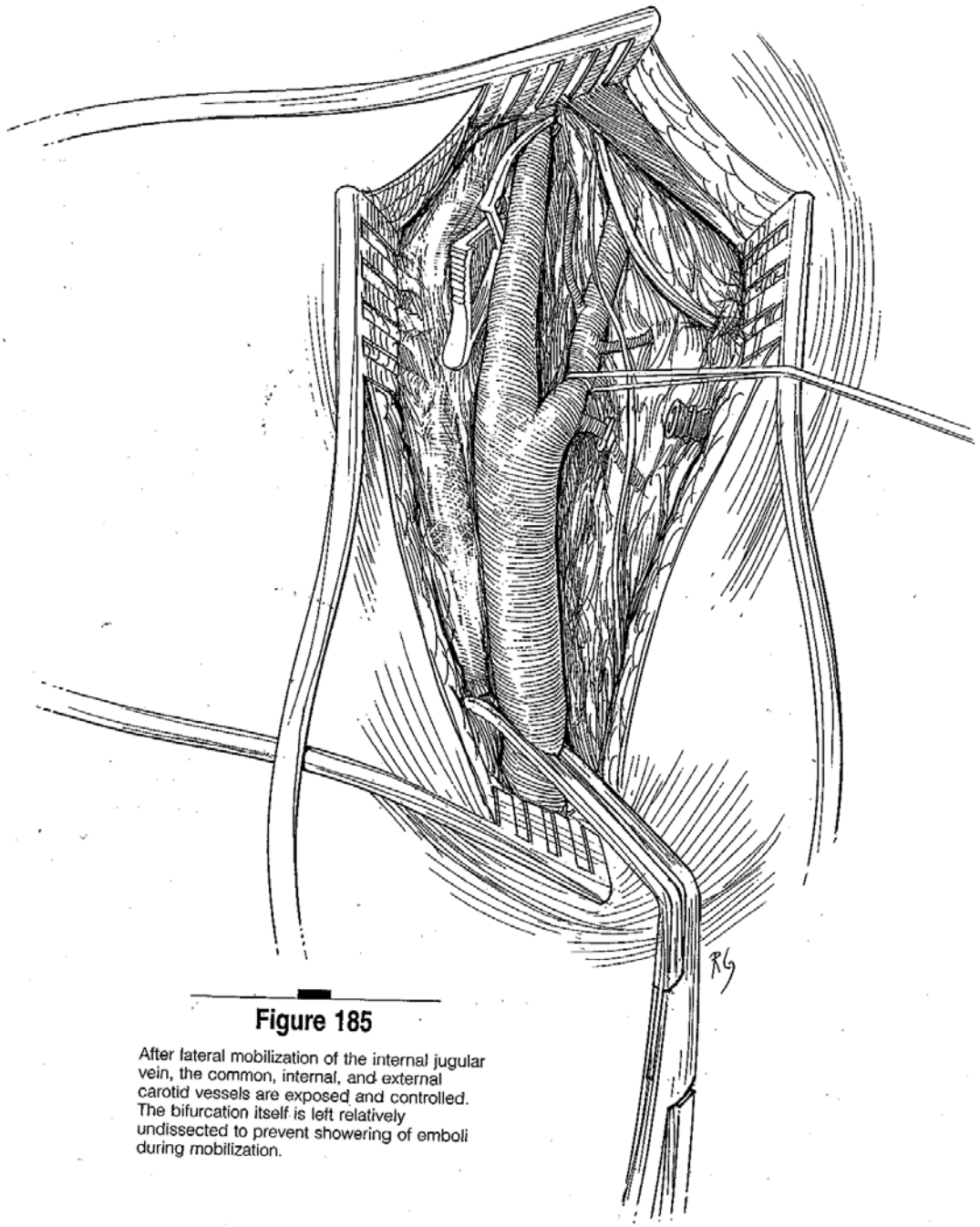

Figure 185

After lateral mobilization of the internal jugular vein, the common, internal, and external carotid vessels are exposed and controlled. The bifurcation itself is left relatively undissected to prevent showering of emboli during mobilization.

If desired, carotid stump pressures can be obtained at this time by inserting a "transduced" 23-gauge needle into the common carotid artery and momentarily releasing the internal carotid artery clamp. The absence of flow converts the internal carotid artery into a "manometer," reflecting the pressure at the circle of Willis. We have used a threshold mean stump pressure of 40 mm Hg to guide the need for shunting. If intraoperative electroencephalography is used instead, the tracing is observed for slowing, a sign that is usually manifested within 30 seconds of cross-clamping.

The carotid arteriotomy is begun on the common carotid artery, just proximal to palpable disease. The arteriotomy is continued distally, skirting the external carotid orifice, to end on healthy internal carotid vessel. When deemed necessary, the surgeon places a shunt at this time, inserting the internal carotid end first and allowing backbleeding to evacuate air from the tube before inserting the common carotid end.

The endarterectomy is begun at the site of the heaviest plaque formation, because the plane is most easily developed at this point. A spatula is inserted beneath the plaque, developing the natural plane of separation between the plaque and the residual outer media and adventitia at the site of the external elastic lamella. The proximal end of the plaque is divided with the Potts scissors or with a No. 15 blade over the spatula, and the endarterectomy is carried distally with longitudinal motions of the spatula to elevate the plaque off the residual arterial wall (Fig. 186). The external carotid artery loop is briefly released to allow an eversion endarterectomy of this vessel.

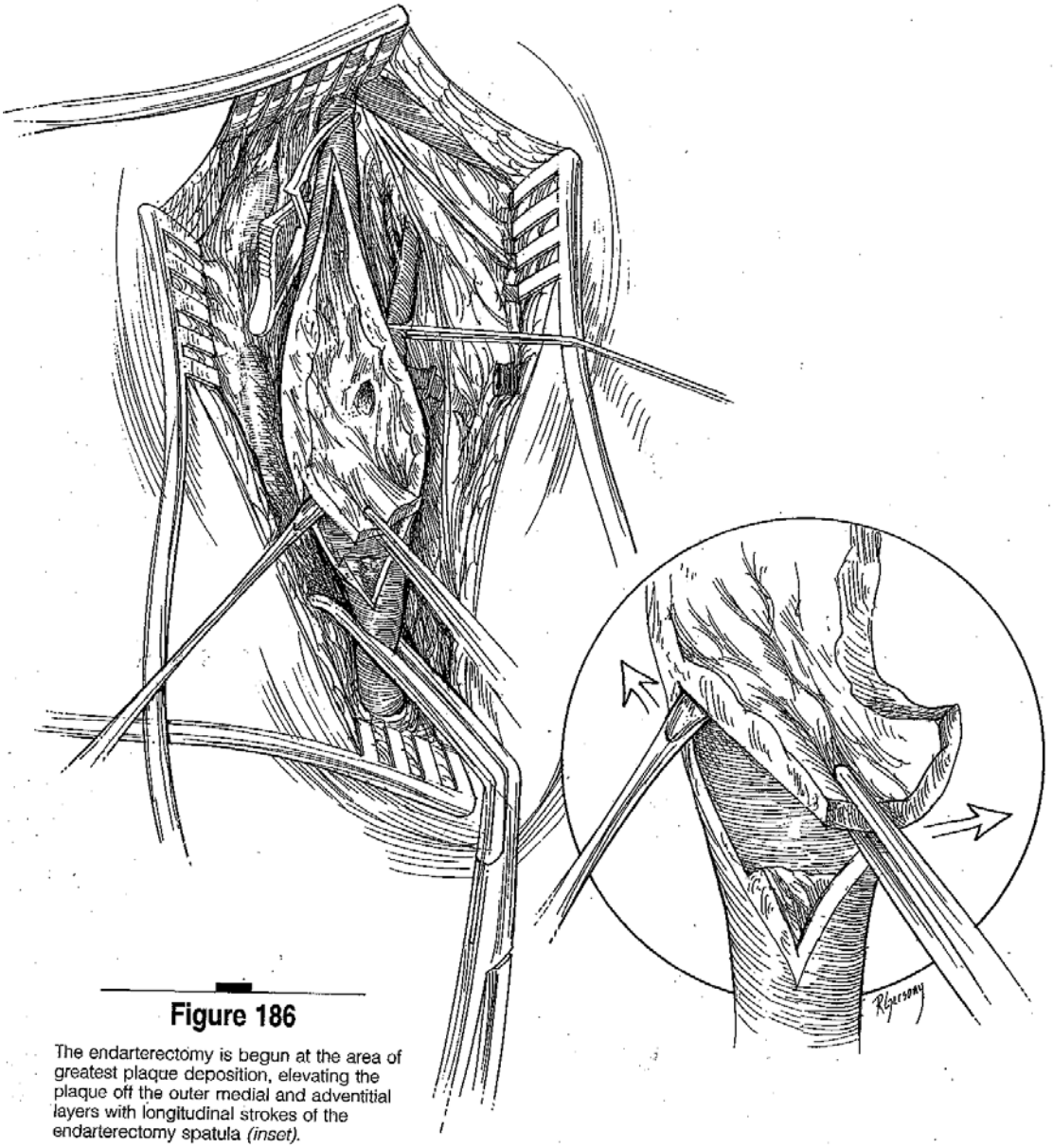

Figure 186

The endarterectomy is begun at the area of greatest plaque deposition, elevating the plaque off the outer medial and adventitial layers with longitudinal strokes of the endarterectomy spatula *(inset)*.

The plaque is elevated off the internal carotid artery, while the surgeon pays particular attention to the transition zone where the plaque becomes thinner and localized to the intimal layer. The media is normal at this point and is adherent to the adventitia. A transverse line between the reddish adventitia and the white medial layers is readily visualized. Often, the plaque separates cleanly with traction alone; otherwise, lateral traction on the plaque, sometimes assisted by making a nick with fine Potts or iris scissors, allows the plaque to peel away and leave a second transition zone from the adherent media to the thin, translucent intima (Fig. 187). The endarterectomized surface is cleared of residual circular medial fibers, removing them with a fine forceps and heparinized saline irrigation.

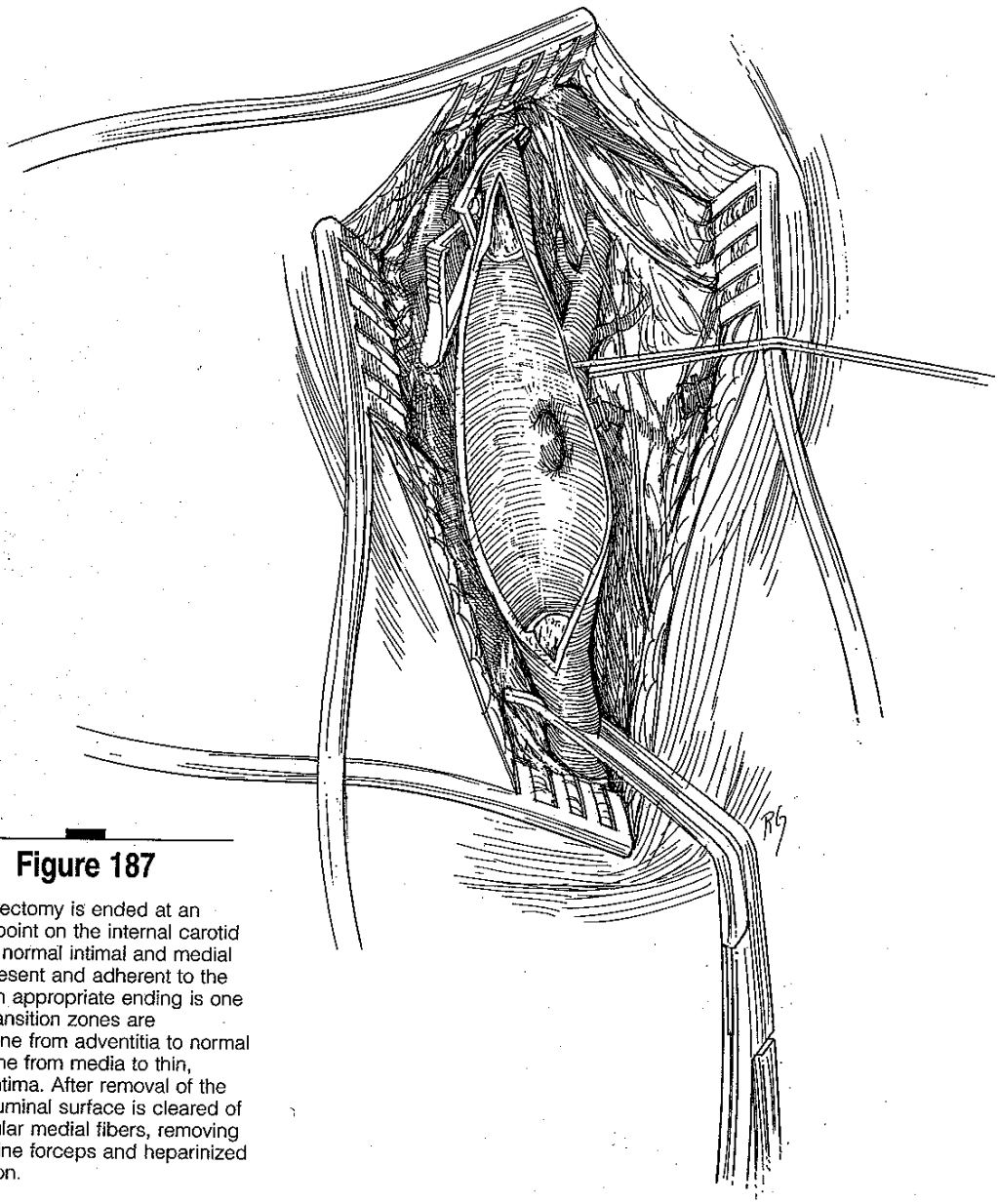

Figure 187

The endarterectomy is ended at an appropriate point on the internal carotid artery where normal intimal and medial layers are present and adherent to the adventitia. An appropriate ending is one where two transition zones are produced—one from adventitia to normal media and one from media to thin, translucent intima. After removal of the plaque, the luminal surface is cleared of residual circular medial fibers, removing them with a fine forceps and heparinized saline irrigation.

The arteriotomy is closed primarily or with a patch (Fig. 188). It has been our practice to patch all but the largest internal carotid arteries with a single, running 6-0 polypropylene suture and fashioned, precut coated polyester material. Some surgeons have used saphenous vein patches, and others have used everted, doubled external jugular vein. The patch is intended to restore the appropriate luminal dimension without enlarging it significantly.

If a shunt has been employed, it is removed before placement of the last few sutures. Air and debris are flushed out of the bifurcation before release of the distal clamp; the internal carotid clamp is released last.

The technical result is assessed with Doppler ultrasonography, a duplex ultrasound probe, or arteriography. Protamine sulfate reversal of the heparin effects and wound drainage are used at the surgeon's discretion. If desired, a drain is placed through a stab wound low in the neck. The drain may be removed after the heparin has worn off, usually within 6 hours. The platysma is closed with a running absorbable suture, and the skin is closed with a subcuticular stitch. Postoperative carotid surveillance is performed with duplex ultrasonography before discharge and at 6-month intervals for the first 2 postoperative years.

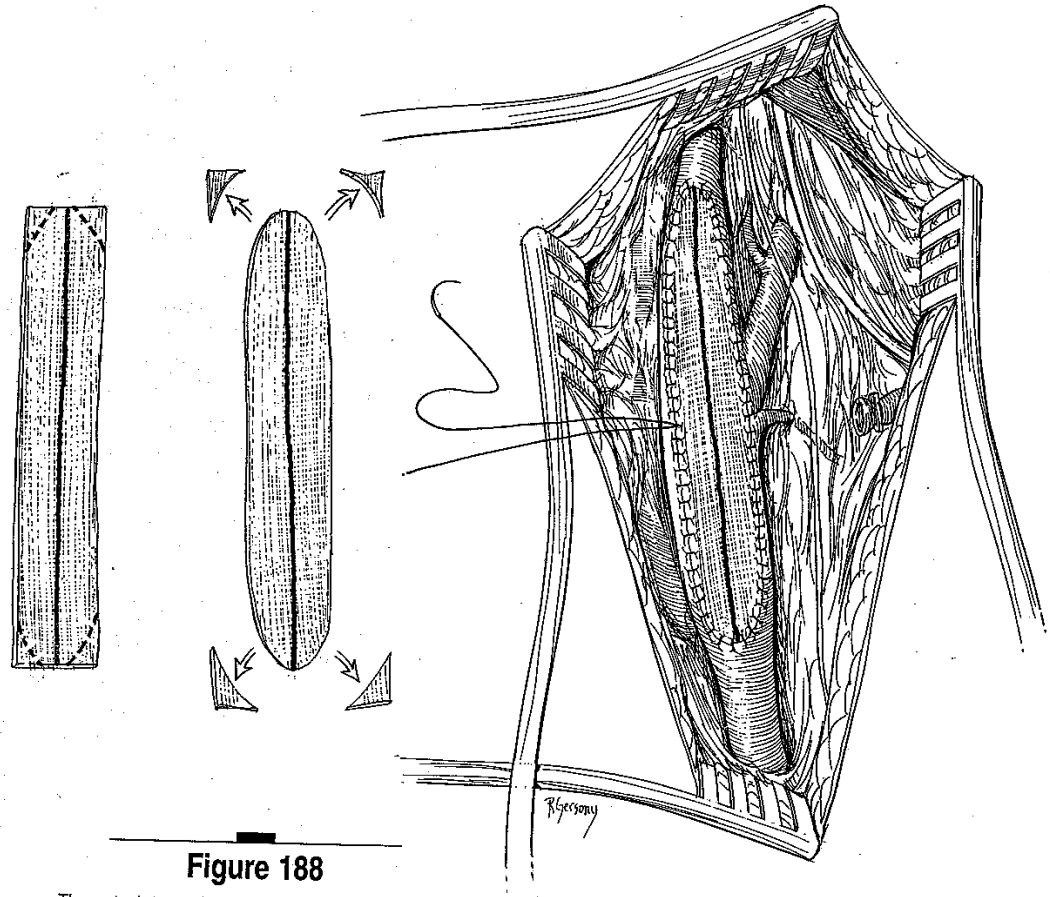

Figure 188

The arteriotomy is closed primarily or with a patch. Polyester carotid patch material may be precut or may require fashioning of the ends to achieve an appropriate shape.