NEW USES OF TANTALUM IN NERVE SUTURE, CONTROL OF NEUROMA FORMATION, AND PREVENTION OF REGENERATION AFTER THORACIC SYMPATHECTOMY.

ILLUSTRATION OF TECHNICAL PROCEDURES*

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TANTALUM is a metal that causes practically no irritation on the part of human tissues. It has the added advantages of easy processing into plates, thin sheets, or wire at the factory, and of convenient sterilization, drilling, shaping, or cutting in the operating room. For use in operations on the nerves it is available† in thin sheets (0.001 and 0.002"), in annealed rolls (approximately 0.00075") of convenient size for wrapping a nerve suture or an area of neurolysis, and in thinner foil (0.00025"). The latter has turned out to be too thin, having such a tendency to crumple and fragment that it has had to be discarded. For the past two years, before they were made available for commercial use, these products were extensively used and tested by the neurosurgical specialists in both the Army and Navy Medical Corps.

This paper presents adaptations of these new tantalum products which have proven to be of value in the operative treatment of severed peripheral nerves, painful neuromas, and in thoracic sympathectomy. These procedures can best be described by a series of simple sketches and reproductions of x-rays, with accompanying brief comments in the text.

NERVE SUTURE

Current statements to the contrary, even the finest silk sets up a definite amount of fibrosis when used as epineurial sutures, and occasionally may produce a severe reaction. Under the most favourable circumstances a thin capsule of connective tissue is clearly visible to the naked eye around each silk knot, and in occasional instances the strands may be pushed apart by a dense mass of fibroblasts, as illustrated in Fig. 1.

Granted that the surgeon has good eyesight, 0.003" tantalum wire swedged onto fine atraumatic needles is the ideal material for suturing severed nerves. Finer than any other available stitch and also definitely less irritant to tissue, it is easy to tie and there is no tendency of the first half

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† These products can now be obtained for limited civilian use from the Ethicon Suture Laboratories of Johnson & Johnson at New Brunswick, N. J.
hitch of a square knot to slip. For this reason a slight but perceptible degree of trauma is avoided every time a suture is tied. The fact that this fine wire breaks when put under unnecessary tension is an added safeguard. A further unique advantage is tantalum's relatively high opacity to x-rays, so that each delicate knot remains as a clear marker of the position and state of the line of anastomosis.

Colonel R. Glen Spurling, formerly in charge of neurosurgery at the Walter Reed General Hospital in Washington, and Lt. Colonel Barnes

Woodhall, his successor, first experimented with covering the line of a nerve suture with tantalum foil 0.00025" in thickness. It was soon discovered that foil tended to break up because of its extreme thinness and it was therefore discarded, although the early results were promising. Woodhall and other neurosurgical specialists in both the Army and Navy then utilized annealed sleeves of sheet tantalum 0.00075" in thickness, which were prepared for us by Professor Paul Weiss of the University of Chicago. Still more recently these annealed rolls of sheet tantalum have come into commercial production. Under proper circumstances, this method of protecting the area of nerve

![Figure 1](image-url)