

PRONATOR QUADRATUS MUSCLE FLAP FOR THE TREATMENT OF NEUROMA IN CONTINUITY AT THE WRIST

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The pronator quadratus can be prelevated as an island flap and used for coverage of neuromas at the wrist level. We have applied it with success in 4 patients.

Keywords : neuroma ; muscle flap ; hand ; wrist

Mots-clés : névrome ; lambeau musculaire ; main ; poignet

INTRODUCTION

Treatment for neuroma in continuity is a challenging problem in the wrist and hand. The aims are relief of pain and preservation of distal nerve function. The diagnosis is usually obvious with an area of local tenderness, a Tinel sign and in some cases some loss of sensibility distal to the injured site. Treatments range from neurolysis, nerve resection, transposition of the nerve, coverage of the neuroma with healthy (bulky) tissue to more experimental techniques (i.e. implantation of electrodes). A few papers (2, 3) report the use of local muscle flaps in the palm of the hand for the coverage of neuromas. In 1984, Dellon and McKinnon (1) described the pronator quadratus muscle flap as a possible flap for coverage of tissue defects and neuromas at the wrist level. Despite the fact that nerve injury is frequent around the wrist we are not aware of other reports regarding this flap.

PATIENTS AND METHODS

Patients

We operated 4 patients. There were 2 men and 2 women, with ages ranging from 17 to 63 years. All were operated by the same surgeon (LDS) and evaluated by an independent surgeon (WDN). All were signi-

ficantly disabled due to local tenderness and burning irradiating pain caused by a neuroma of the superficial branch of the radial nerve (3 patients) or palmer branch of the median nerve (1 patient).

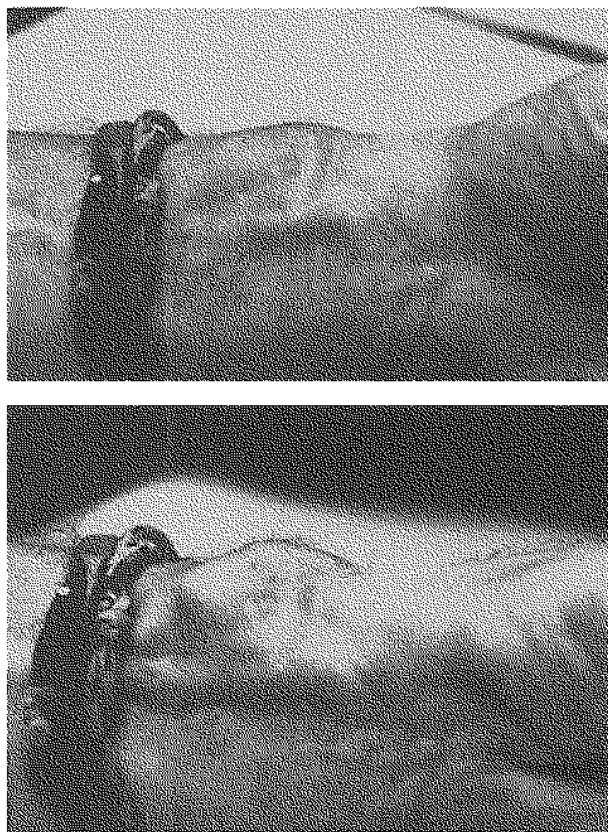


Fig. 1. — Aspect of the flap (patient 2) at rest (a) and with resisted pronation (b).

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Operative technique

We followed carefully the technical description of Dellon and McKinnon (1) (fig. 2). The wrist is approached by a longitudinal palmar incision, starting at the wrist crease up to 15 cm proximally. The radial insertion of the pronator quadratus is approached between the tendons of the flexor pollicis longus and the flexor digitorum profundus ; this insertion is freed from the radius as is the distal edge of the muscle. The distal branches of the anterior interosseous artery are coagulated carefully. The muscle belly can now be elevated. The ulnar origin is approached between the flexor digitorum profundus and the flexor carpi ulnaris. This insertion is also divided. Now the neurovascular bundle is dissected proximally. Perforating branches through the interosseous membrane are ligated. The muscle can now be elevated as an island flap and brought superficially to cover the median nerve and the palmar branch of the median nerve. If the radial nerve has to be covered a second incision is necessary ; the muscle is tunneled subcutaneously to cover the radial nerve endings. The muscle is sutured to the local fascia. Immediate mobilisation is allowed postoperatively.

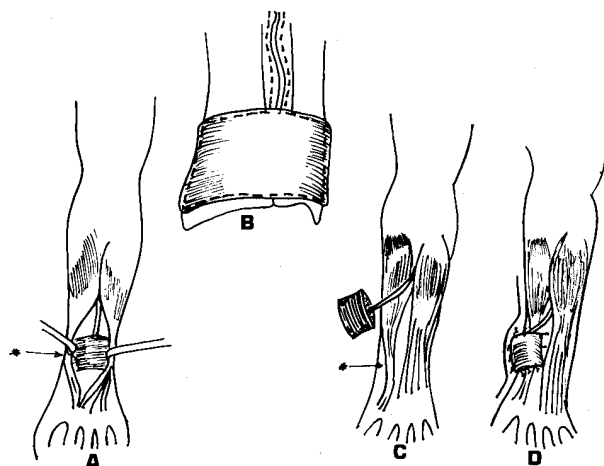


Fig. 2. — Schematic presentation of the operative technique.

RESULTS

All patients were reviewed ; the follow-up period ranged from 7 to 22 months postoperatively. The results are summarized in table 1. The pain was very important preoperatively, and disappeared completely in 3, and decreased steadily in the other

patient. All patients were greatly satisfied. The Tinel sign disappeared in 3 patients. The restricted mobility observed in 2 patients preoperatively, improved somewhat. The grip strength was within normal values for the sex and age. Pronation and supination were normal in all patients, without complaints regarding rotational force.

DISCUSSION

Injury to cutaneous nerves can jeopardize hand function due to pain. The local tenderness and the irradiating burning pain, with hypersensitivity of the overlying dermatome are the most striking features. Complete anesthesia is rarely seen. Most of these lesions are postsurgical and are perhaps the most important reason for dissatisfaction of the patient at the final evaluation. Treatment modalities are numerous, indicating that none is so good that it can be considered as the gold standard. Most surgical procedures are designed to protect the injured or scarred nerve by transposition of the nerve into healthy tissue or by covering it with (bulky) tissue. When the nerve is clearly cut and a well individualized neuroma can be isolated, transposition of the neuroma is preferred. However usually the nerves are fixed in diffuse fibrous scar tissue and in order to prevent further nerve injury we prefer a coverage of

Table I. — Summarized data of the patients

patients											
patient	neuroma	follow-up (months)	preop Tinel	postop Tinel	preop pain	postop pain	preop ROM (flex/ext)	postop ROM (flex/ext)	preop grip (kg)	postop grip (kg)	satisfaction
F 22	rsr	22	+	+	+	-	80/80	80/80	na	18	E
M 28	rsr	12	+	-	+	-	80/80	80/80	46	54	E
M 36	rsr	21	+	-	+	min	60/60	90/80	na	50	G
F 63	rpm	7	+	-	+	-	48/44	65/60	na	25	E

rsr = ramus superficialis n. radialis
 rpm = ramus palmaris n. medianus
 E = excellent ; Good = good, min = minimal
 na = not available

this scarred zone. The flap probably acts as a cushion, since similar pain relief was obtained by all patients by applicating preoperatively a silicone padding over the painful neuroma.

Muscle is an attractive tissue since it is bulky, well vascularized and available in virtually all sites, without causing important functional loss. In the wrist area the pronator quadratus fulfills all these criteria. The disadvantage is the limited excursion distally.

LITERATURE

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SAMENVATTING

L. DE SMET, W. DE NAYER, B. VAN DE MEULEBROUCKE, G. FABRY. M. Pronator Quadratus flap in de behandeling van neuromata in de pols.

De M. Pronator Quadratus kan als eilandflap worden gepreleveerd en gebruikt om neuromata t.h.v. de pols te bedekken. De techniek wordt beschreven en met succes toegepast bij 4 patiënten.

RÉSUMÉ

L. DE SMET, W. DE NAYER, B. VAN DE MEULEBROUCKE, G. FABRY. Le lambeau du carré pronateur dans le traitement des névromes au niveau du poignet.

Le carré pronateur peut être soulevé en îlot et utilisé pour la couverture d'un névrome au niveau du poignet. La technique est décrite; elle a été appliquée avec succès chez 4 patients.