crucial, we have used a large, soft-foam pillow (Zimfoam Cast Elevator; Zimmer Orthopedic Surgical Products, Warsaw, IN) to stabilize the leg in this elevated position. The operator manipulates both the transducer and the block needle while viewing the imaging screen across the operating table. After identifying the common peroneal and tibial components of the sciatic nerve, the needle is inserted on the lateral aspect of the leg at the indicated depth from the transducer. To maintain the needle within the plane of imaging, fine movements of the ultrasound transducer are required. Because the needle path is parallel to the active face of the transducer, the choice of block needle is not important to the success of the procedure. We use a V-shaped redirection of the block needle to place local anesthetic on both the anterior and the posterior sides of the nerves.

We believe that our lateral approach to popliteal nerve block with ultrasound imaging has several fundamental advantages over other techniques. First, the supine position is the most convenient if not the only positioning option in many patients. Second, because the ultrasound transducer is remote from the point of needle entry, no sterile cover is necessary. Third, the desired needle path is parallel to the active face of the transducer, which promotes optimal needle visibility. We have had good results with our lateral approach in approximately 30 patients.

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References

1. Hadzic A, Vloka JD. A comparison of the posterior versus lateral approaches to the block of the sciatic nerve in the popliteal fossa. *Anesthesiology* 1998;88:1480-1486.
2. Vloka JD, Hadzic A, April E, Thys DM. The division of the sciatic nerve in the popliteal fossa: Anatomical implications for popliteal nerve blockade. *Anesth Analg* 2001;92: 215-217.
3. Hullander M, Spillane W, Leivers D, Balsara Z. The use of Doppler ultrasound to assist with sciatic nerve blocks. *Reg Anesth* 1991;16:282-284.
4. Gray AT, Collins AB, Schafhalter-Zoppoth I. Sciatic nerve block in a child: A sonographic approach. *Anesth Analg* 2003;97:1300-1302.
5. Sites BD, Gallagher J, Sparks M. Ultrasound-guided popliteal block demonstrates an atypical motor response to nerve stimulation in 2 patients with diabetes mellitus. *Reg Anesth Pain Med* 2003;28:479-482.
6. Sinha A, Chan VW. Ultrasound imaging for popliteal sciatic nerve block. *Reg Anesth Pain Med* 2004;29:130-134.
7. Peer S, Kovacs P, Harpf C, Bodner G. High-resolution sonography of lower extremity peripheral nerves: Anatomic correlation and spectrum of disease. *J Ultrasound Med* 2002;21:315-322.

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Stimulating Catheter and Electrophysiologic Effect of the Flush Injectates: Exciting

To the Editor:

I remember having read Dr. Neal promising evolving and exciting discoveries related to continuous brachial plexus block.[1] Did he imagine for one moment that these would apply to continuous peripheral nerve blocks in general?

It is exciting to read the works of Salinas et al.[2] and Tsui et al.[3] Both are evidence-based works and, by chance, appear in the same issue of *Regional Anesthesia and Pain Medicine* because they address directly or indirectly the same controversial topic: the stimulating catheter. Allow me to express my gratitude and enthusiasm to both authors in one letter.

It is exciting to see that the findings obtained by Dr. Salinas using a remarkably rigorous scientific methodology confirmed the reality of unpredictable failure with nonstimulating catheters that is, in my observation, the major motive to use a stimulating one. The 15% failure rate was not statistically significant, yet could become so with more patients. The significantly more intense motor and sensory block that Dr. Salinas found with stimulating catheters verifies our clinical observation of a decrease in anesthetic dose.[4] Our current infusion rates range from 2 to 5 mL/h ropivacaine 0.2%, and we seldom use a bolus. However, beyond such a consideration, there are others related to many intrinsic measures the stimulating catheters offer to assess our practice and make it evolve. The work of Dr. Salinas is an example. His results with electrostimulation without injectate suggest the assessment of the bias that I may have introduced with normal saline.[4] This bias was investigated by other colleagues—it is exciting.

It is also very exciting to read the work of Tsui et al.,[3] which has revolutionized my practice. Their findings drew me out of a decade of misinterpretation associated with the disappearance of stimulation after injection of a few milliliters of anesthetic. They provided solid electric physical-based explanations to some aspects of neurostimulation that I had observed with stimulating catheters[4]; the necessity of delivering higher amperage to stimulate after normal saline was flushed to ease the placement, the absence of electrostimulation in three successful sciatic catheters, and the absence of electrostimulation that had led perhaps to many unnecessary catheter repositions. Currently, I am testing dextrose 5% in water for placement of stimulating catheters. It works extraordinarily well. Thank you very much for having done your work, Dr. Tsui.

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References

1. Neal JM, Hebl JR, Gerancher JC, Hogan QH. Brachial plexus anesthesia: Essentials of our current understanding. *Reg Anesth Pain Med* 2002;27:402-408.

2. Salinas FV, Neal JM, Sueda LA, Kopacz DJ, Liu SS. Prospective comparison of continuous femoral nerve block with nonstimulating catheter placement versus stimulating catheter-guided perineural placement in volunteers. *Reg Anesth Pain Med* 2004;29:212-220.
3. Tsui BCH, Wagner A, Finucane B. Electrophysiologic effect of injectates on peripheral nerve stimulation. *Reg Anesth Pain Med* 2004;29:189-193.
4. Pham Dang C, Kick O, Collet T, Gouin F, Pinaud M. Continuous peripheral nerve blocks with stimulating catheters. *Reg Anesth Pain Med* 2003;28:83-88.

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Tremor of the Forearm During Performance of Axillary Brachial Plexus Block

To the Editor:

We are not aware of reports of severe tremor during the performance of brachial plexus block. Recently, we encountered a patient who had transient, severe uncontrollable tremor of his forearm during performance of an axillary brachial plexus block.

A 60-year-old, 83-kg man had right ulnar neuropathy caused by cubital tunnel syndrome. His heart rate was 69 beats/min; blood pressure, 161/97 mm Hg; respirations, 16/mm; and oxygen saturation by pulse oxymetry 98% breathing room air. After attaching monitors and supplemental oxygen 2 L/min by nasal cannula, we abducted the patient's arm to 90°. After antiseptic cleaning of the axilla, we proceeded with performance of an axillary block by a transarterial approach. After advancing the needle posterior to the artery and careful aspiration, we started injection of 1.5% mepivacaine hydrochloride. The patient immediately had coarse tremor of the right forearm. Thinking that the patient was moving his forearm, we asked the patient not to move but the patient replied that he could not control the movement. We retested for intravascular injection, which was negative. We completed the block by injecting 50 mL 1.5% mepivacaine. The tremor stopped spontaneously in 3 minutes after the start of the local anesthetic injection. When the surgeons exposed the ulnar nerve, they found a small amount of blood in the ulnar nerve sheath. The rest of the patient's course during and after surgery was uneventful.

Peripheral nerve entrapment, like peripheral neuropathy, can be associated with tremor. Little et al.[1] reported a patient with ulnar nerve entrapment manifesting tremor at rest. The tremor involved the muscles supplied by ulnar nerve, and it disappeared on voluntary movement. The exact mechanism for the tremor is not clear. Stretching the nerve or tapping the nerve at the area of entrapment can precipitate the tremor. There may be a central mechanism for the tremor as it is stopped by a proximal nerve block. A stretch reflex when the arm is supinated and abducted can be contributory. A partial decrease in sensory input from entrapment results in synaptic excitability in the afferent fibers that are still functioning. Impulse discharges from the focally demyelinated fibers at the entrapment site with orthodromic conduction to the spinal cord may produce hyperactive stretch reflex resulting in tremor. Axillary brachial plexus block was found to be an acceptable method of anesthesia[2] for surgical correction of ulnar nerve entrapment.

Although the mechanism is not known, supination and abduction of the arm in our patient or introduction of the needle into the axillary sheath could have precipitated the tremor, which was abolished by the axillary block.

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References

1. Little JW, Burchiel K, Nutter P. Tremor and peripheral nerve entrapment. *J Neurosurg* 1986;64:145-147.
2. Hebl JR, Horlocker TT, Sorenson EJ, Schroeder DR. Regional anesthesia does not increase the risk of postoperative neuropathy in patients undergoing ulnar nerve transposition. *Anesth Analg* 2001;93:1606-1611.

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These Go to Eleven

To the Editor:

A change in our hospital's global supply contract recently forced us to change manufacturers of our custom combined spinal epidural trays. On carefully evaluating an epidural catheter new to us, we were surprised to find that the double mark we had always believed to be placed 10 cm from the tip as an industry standard was, in fact, at 11. Furthermore, all the catheters from this particular manufacturer were consistently marked at eleven. We were further surprised to learn that the catheter we had been using for 2 years likewise had its markings placed off from 5, 10, and 15 cm measurements.

Epidural catheter markings are generally considered important to guide placement. Inserting catheters too far has been found to result in complications, and not far enough has been found to result in failure.[1-2] Mismarked individual catheters have been described in the past,[3-5] while consistent differences between manufacturers in tensile strength and flexibility have been noted.[6] We now describe our finding of consistent differences in the marking and side orifices of epidural catheters produced by leading manufacturers. Table 1 lists the very consistent differences we found in multiple catheters (3-6) we measured from each manufacturer. Figure 1 is an image of the 2 most disparate catheters side by side. When a Portex catheter (Smith's Medical, Keene, NH), rather than a B-D catheter (Becton Dickinson, Franklin Lakes NJ), is placed, the proximal orifice of the catheter is situated almost a centimeter and a half shallower in the epidural space. The resultant difference in depth of the proximal orfice