SUPPLEMENTARY METHODS

Laser Doppler imaging

Laser Doppler scanner settings were recorded and kept the same for each time point and for each animal. The laser Doppler scanner was mounted above a procedure table and both of the monkey's arms were positioned under the laser source. The scan area, which included the anterior surface of both arms, was defined using an integrated video camera. During the scan, the laser beam moved in a raster pattern over the surface of the skin at a rate of 4 mm/second, covering an area of 256×220 pixels and sampling at a depth of approximately 1 mm. Scattered light was photo-detected in the imager and then electronically and digitally processed to produce a color-coded map of tissue perfusion. Saved images were later analyzed to determine the average flux units in the injected and uninjected arms. A flux unit is an arbitrary unit that is proportional to the average speed of the blood cells and their concentration. To obtain the average flux units in the limbs, a region of interest was drawn that extended from just above the elbow to the finger tips and the average of all the flux units within that region was calculated. The same region of interest was drawn for both the injected and uninjected arms and the color scale was set from 0 to 1000 flux units for each image analyzed in this study. Areas of low perfusion and low flux units appeared blue while areas of high perfusion and high flux units appeared yellow or red. The perfusion ratio for each time point was calculated by taking the average flux units in the injected arm and dividing by the average flux units in the uninjected arm.

Nerve conduction studies and resting electromyography

For the NCS, both motor-nerve and sensory-nerve studies were performed. The motor-nerve responses were obtained by electrically stimulating at a nerve and then recording from a muscle that it innervates. Motor-nerve studies with the median nerve were performed by stimulating at the wrist and elbow and recording with surface electrodes over the abductor pollicis brevis (APB) muscle belly. Ulnar motor-nerve studies were performed by stimulating at the wrist, below the elbow, above the elbow, and at the axillary and recording with surface electrodes over the abductor digiti minimi (ADM) muscle belly. Sensory-nerve studies were performed by electrically stimulating a nerve and then recording directly from it or from one of its branches. Median nerve sensory studies were performed by stimulating at the wrist and elbow and recording with ring electrodes on the second digit. Ulnar sensory-nerve studies were performed by stimulating at the wrist and elbow and recording with ring electrodes on the fifth digit. For each nerve evaluation, the distance between the stimulation site and the recording site was determined by marking each site with a skin marker and measuring the distance with a tape measure. For nerves with two stimulation sites, the conduction velocity (m/sec) was calculated using the equation $V = d/tp - td$ where V is the velocity, d is the distance in millimeters between the two stimulation points, tp is the latency of the proximal stimulation point and td is the latency of the distal stimulation point. After completing the nerve conduction studies, needle EMGs were performed to evaluate resting muscle activity. The needle electrode was inserted through the skin into a select muscle and the electrical signal was allowed to stabilize. The electrical signal and the electrical sounds were observed during the needle insertion. Any spontaneous spikes, waves or fasciculations were recorded. The APB, ADM, dorsal interosseous, pronator teres, extensor digitorum communus, tricep, bicep, and deltoid muscles were all tested by needle EMG. Voluntary motor unit action potentials were not obtained because we were unable to evoke a reliable muscle contraction in an anesthetized animal.