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Assessing mechanical allodynia in the rat paw with a new electronic algometer.

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Von Frey filaments used for testing mechanical thresholds are mechanically unstable and their use is difficult to standardize. We have therefore constructed a hand-held electronic pressure algometer. The pressure algometer is connected to a computerized data collection system, allowing on-line display of the applied force as well as the application rate. Data stored on the computer can be replayed and further analyzed. Using this apparatus, we have measured the pressure-induced withdrawal thresholds in rats with surgically induced neuropathy. The probe, with a circular tip of 1.0 mm diameter, was applied manually with a pressure increasing by approximately 0.05 N/s. Presurgical thresholds were normally distributed with a mean of 0.415 N, showing no significant difference between paws. During 2 weeks after surgery, the thresholds of the operated side were significantly reduced (range, 0.209-0.318 N), while the thresholds of the non-operated side remained at higher values (range, 0.432-0.491 N). Thresholds of control rats without surgery were in the 0.380-0.520 N range, with no significant difference between paws. In an additional experiment it was shown that interobserver reliability was high, both between withdrawal threshold values obtained and between rates of application used. In conclusion, the electronic algometer allows standardization of testing, detailed documentation of each experiment and provides an objective and accurate method for measuring the reactions of test animals to mechanical stimuli.