

Dynamic changes in countertraction intensity of the peripheral nerve repaired with the adhesion of fibrin glue.

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Abstract:

Background: At present, the repair by means of suture is still commonly used to repair the peripheral nerve injury and rupture, while the adhesion of the fibrin glue repairing peripheral nerve injury has been considered as a new topic of study. Objective: To study the countertraction intensity of peripheral nerve and its dynamic changes after repaired with the adhesion of fibrin glue. Design: A randomized controlled experimental study. Setting and materials: The study was completed in the Laboratory of Biodynamics, Department of Orthopaedics, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology. The healthy adult male Wistar rats weighing 250-300 g were selected for the experiment. Interventions: Totally 96 Wistar rats were completely randomized into the suture group and the adhesion group. Their sciatic nerves were cut, and the incisions were well lined. The fibrin glue was adopted in the adhesion group, while 11-0 suture, was adopted in the suture group. On the very day and 3, 7, 14, 21, 28 days after the operation, 8 rats were respectively taken each from the suture group and the adhesion group. The free sciatic nerves of them were detected immediately by the biodynamic test. Main outcome measures: The peak load and the power consumption were measured when the nerves ruptured and the nerve stress-strain curve was described. Results: In normal countertraction intensity curve of the nerve, the elastic peculiarity can be manifested. Between the suture group and the adhesion group, there were no notable significances of the maximal countertraction intensity and power consumption on the very day and 14, 21, 28 days after the operation ($P > 0.05$). While 3 days after the operation, the maximal countertraction intensity of the two groups was (1.35 ± 0.27) , (1.97 ± 0.23) N/mm²

respectively, the power consumption was (0.028 ± 0.007) , (0.040 ± 0.003) J/mm² respectively. Seven days after the operation, the maximal countertraction intensity was (1.93 ± 0.26) , (2.74 ± 0.30) N/mm² respectively, the power consumption was (0.047 ± 0.009) , (0.063 ± 0.007) J/mm² respectively. The differences both had the notable significance ($P < 0.05$). Conclusion: The fibrin glue has enough countertraction intensity and can gratify the need of such nerve repairs.