

## EXPERIMENTAL AND CLINICAL APPLICATION OF FIBRIN GLUE IN MICROVASCULAR ANASTOMOSES: 10 YEARS OF EXPERIENCE.

**Introduction:** several studies with fibrin glue application in microvascular anastomoses have reported its benefits on suture reduction and anastomosis decreased time. In spite of that, clinical experience has been limited.

**Methods:** two experimental studies were conducted comparing the conventional suture technique with the fibrin glue assisted technique in terms of number of sutures, anastomosis time, patency rate, bleeding and histopathological findings. In the first study (2003), we performed end-to-end anastomoses in the femoral and carotid arteries of rats. In the second study (2008), the experimental model consisted of a free groin flap transfer to the anterior cervical region in rabbits. The flap's circulation was restored by means of an end-to-side anastomosis between the femoral and carotid arteries, and an end-to-end anastomosis between the femoral and external jugular veins. In the clinical study (2009), 20 cases of free flaps were divided into two groups, according to the anastomosis technique: conventional group (n= 7 patients) and fibrin glue group (n= 13 patients).

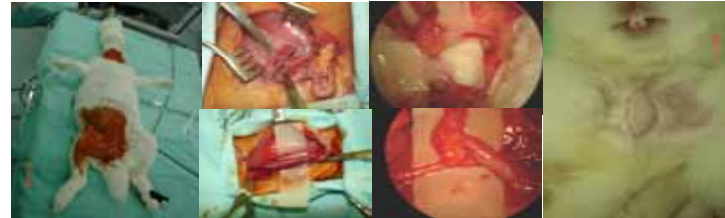
**Results:** in both experimental studies, the application of fibrin glue reduced the number of sutures (30 to 50% of suture reduction) and the time required to complete the anastomoses (2 to 6 minutes less). The anastomotic bleeding was also significantly reduced. The patency rates and the flaps' survival rate were not adversely affected by the fibrin glue application and were kept around 90%. The histopathological findings revealed a non-significant increase in the inflammatory process around the anastomoses in rabbits, but not in rats. In the clinical study, the fibrin glue cut by half the number of sutures and the time required to complete the anastomoses. The ischemic time of the flaps was reduced by almost 13 minutes (non-significant). The survival rate of the flaps were similar in both groups: 84.6% (11/13) in the fibrin glue group and 85.7% (6/7) in the conventional group.

**Discussion:** Since our first experience with fibrin glue in microvascular anastomoses, we became very enthusiastic about its possible clinical applications. We accomplished more 34 cases of free flaps with a cumulated success rate of 91%. We recently had our first six cases of digit replantations using fibrin glue with similar positive results (83% of survival rate). In the few cases that we had to re-explore the anastomoses, the fibrin glue was not an issue. It was easily removed from the vessel and did not interfere with the re-exploration. Although we tried to demonstrate the usefulness of fibrin glue in our studies through objective measurable parameters such as number of sutures, anastomosis time and anastomosis bleeding, the major benefit of fibrin glue application is subjective. It makes the microvascular surgery easier to perform because we can complete the anastomoses with less sutures and with a wider interval between the suture knots, improving the visualization of the lumen.

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a: animal positioning and preparing. b: inguinal flap dissected and pedicled at the femoral vessels. c: carotid artery and external jugular vein prepared at the anterior cervical region. d: anastomoses with fibrin glue (end-to-side anastomosis between the femoral and carotid arteries, and an end-to-end anastomosis between the femoral and external jugular veins). e: re-exploration of the anastomoses after two weeks. f: inguinal flap after two weeks.



Large bone defect of the humerus (after an osteosarcoma resection) treated with a free vascularized fibular graft. The anastomoses were performed at the brachial vessels with fibrin glue application

Severe crushing injury of the hand with multiple digit amputation and extense soft-tissue defect covered with ALT. The anastomoses were performed at the radial artery and cephalic vein with fibrin glue application.