4. Intracapillary haemoglobin oxygenation and interstitial pO2 in venous flaps: an experimental study in rats.

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In order to be able to objectively evaluate capillary perfusion of venous flaps, we created arterialised venous flaps, venous flow-through flaps, and unilateral pedicled venous island flaps in the epigastric vascular system of Wistar rats and determined their oxygen supply with two different methods. Interstitial pO2 was polarographically measured with a probe placed intracutaneously in the center of the 4 x 2.5 cm flaps and continuously recorded on a connected computer. Moreover, we also noninvasively determined the oxygenation of the intracapillary haemoglobin with a micro-lightguide spectrophotometer. The statistical evaluation showed comparable results for both measurement methods: Arterialised venous flaps had a better oxygen supply with a pO2 of 16 mmHg and an Hb oxygenation of 23% than the other types of venous flaps, but they have a poorer oxygen supply than conventionally perfused flaps (pO2: 24 mmHg, Hb oxygenation: 30%). Venous flow-through flaps (pO2: 9 mmHg, Hb oxygenation: 17%) and unilateral pedicled venous island flaps had a significant better oxygen supply than skin flaps without any vascular connection. The results show that the capillary system in all types of venous flaps is reached by some of the inflowing oxygenated haemoglobin over the entire flap surface to different degrees.

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