5. Cutaneous hemoglobin oxygenation of different free flap donor sites.

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Microsurgical skin flaps raised from various body regions show differences in vascular architecture, cutaneous capillary density, and skin perfusion. Therefore, it can be expected that oxygenation of the skin is different at the various free flap donor sites. To determine the cutaneous oxygen supply, intracapillary hemoglobin oxygenation was measured on the donor sites of the radial forearm flap, scapula, latissimus dorsi, rectus abdominis, anterolateral thigh, and osteocutaneous fibula flap on 50 healthy subjects (25 men and 25 women aged 20 to 40 years). Measurements were performed noninvasively with the Erlangen Microlightguide Spectrophotometer (EMPHO) on skin areas of 6 x 8 cm in each region under resting conditions. The hemoglobin oxygenation of the skin in all donor regions varied between a maximum of 43.94 to 58.94 percent in the scapula region and a minimum of 13.89 to 29.45 percent in the lateral calf. High oxygenation values were also found on the skin over the latissimus dorsi muscle (34.56 to 48.45 percent), followed by the distal volar forearm (29.78 to 40.30 percent), whereas paraumbilical skin and the donor sites of the lower extremities were less oxygenated. By using the Wilcoxon test, significant differences were found between all donor regions except for the anterolateral thigh and lateral calf ($p = 0.05$). There were no gender-specific differences. From these results, it is concluded that, on young healthy subjects, regional oxygen supply on different free flap donor sites varies significantly. This finding must be considered in the interpretation of intracutaneous or transcutaneous PO2 measurements for flap monitoring.
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