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SURVIVAL OF A FREE FLAP AFTER 20 HOURS OF IMMEDIATE POST-OPERATIVE VENOUS OCCLUSION

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The survival of a free groin flap after 20 hours of immediate post-operative venous occlusion is presented. It is unknown just how long a free flap can tolerate vascular occlusion in the immediate post-operative period and still be salvaged. Experimental work suggests that as time without perfusion increases, a "no-reflow" phenomenon may appear. May *et al.* (1978) demonstrated a point of irreversibility following 12 hours of normothermic ischaemia of a free epigastric flap in the rabbit. Harashina *et al.* (1977) have shown that a lower abdominal rat flap will not survive venous occlusion exceeding 8 hours. Our clinical impression is that immediate venous occlusion can be tolerated for a longer period of time than arterial occlusion. The time limits for these unfortunate events have yet to be well defined.

CASE REPORT

A 21-year-old woman presented for reconstruction of her chin (Fig. 1). Since

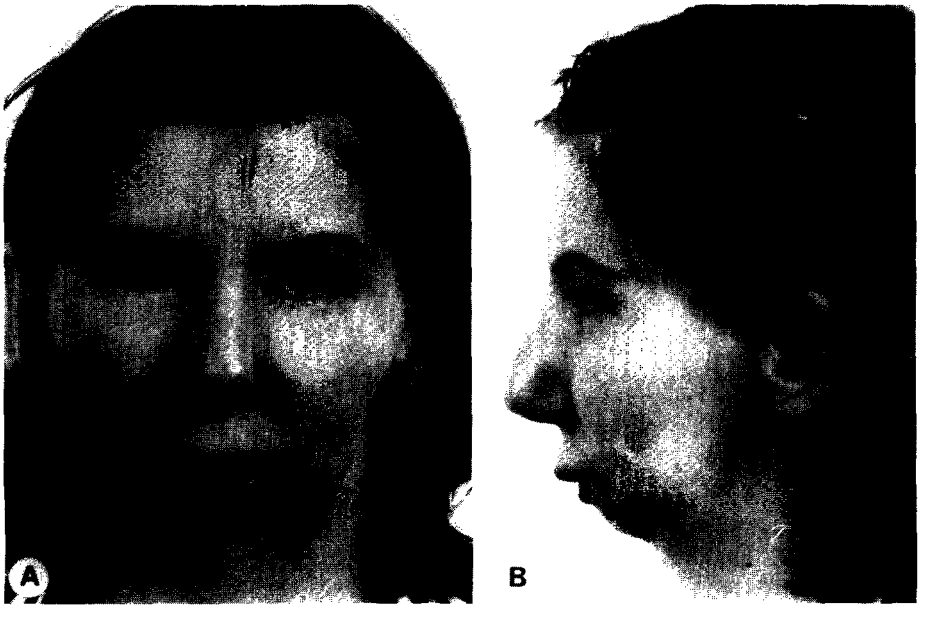

FIG. 1. A and B. Pre-operative appearance to show gross underdevelopment of the lower jaw and chin.

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infancy she had undergone 15 operative procedures to improve the appearance and function of a severe Pierre Robin deformity. She lived the life of a recluse. Articulation and deglutition remained difficult but her main complaint was her appearance. A decision was made to augment the lower third of her face with a free groin flap. It was felt unwise to upset the existing intraoral balance between severe microglossia and micrognathia. On April 12, 1978, a left free groin flap was elevated and transferred to her chin. The margins of this flap were de-epithelialised and subsequently positioned to increase bulk. The groin flap was devascularised at 1500 hr. On completion of the arterial anastomosis, shortly before 1700 hr, the right facial artery began to perfuse the flap. A single vein repair was finished one hour later. The anastomoses were patent although the venous outflow was questioned at the time. The flap was cool with satisfactory colour. By 0700 hr the next day, the distal third of the flap was profoundly blue: the proximal half showed slow capillary refill. A large haematoma was evacuated from under the distal end of the flap at 0730 hr. Preparation for her second anaesthetic started at 1300 hr. This intubation proved exceedingly difficult. The flap was a blotchy pink with blue black dominating the distal segment (Fig. 2). By 1400 hr the wound edges had been released, more

FIG. 2. Appearance of the distal end of the free flap just before re-exploration of the anastomosis.

haematoma evacuated and the anastomoses visualised. The artery was patent. The vein had clot extending on both sides of the anastomosis. The neck vein was found to terminate about 2 cm downstream from the anastomosis. This vein had never been capable of outflow. The vein anastomosis was resected and a 7·5 cm long clot removed from the flap vein (Fig. 3). This was followed by vigorous venous bleeding from the flap vein and the flap improved slightly in colour. The vein continued to drain well until a clamp was applied for the anastomosis. A search was made for a suitable recipient vein. The internal jugular vein was the only suitable vein. A 7 to 8 cm vein graft was anastomosed end to side to the right internal jugular and end to end to the flap vein. Good flow was immediately established. Over the ensuing days the flap underwent the colour changes of bruised tissue and survived completely (Fig. 4).

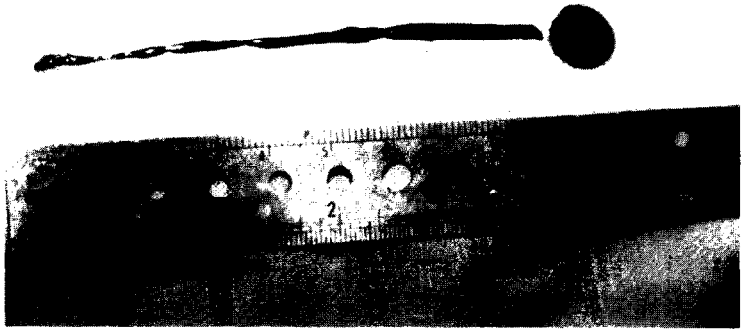

FIG. 3. A 7·5 cm long blood clot removed from the flap vein at the time of re-exploration.

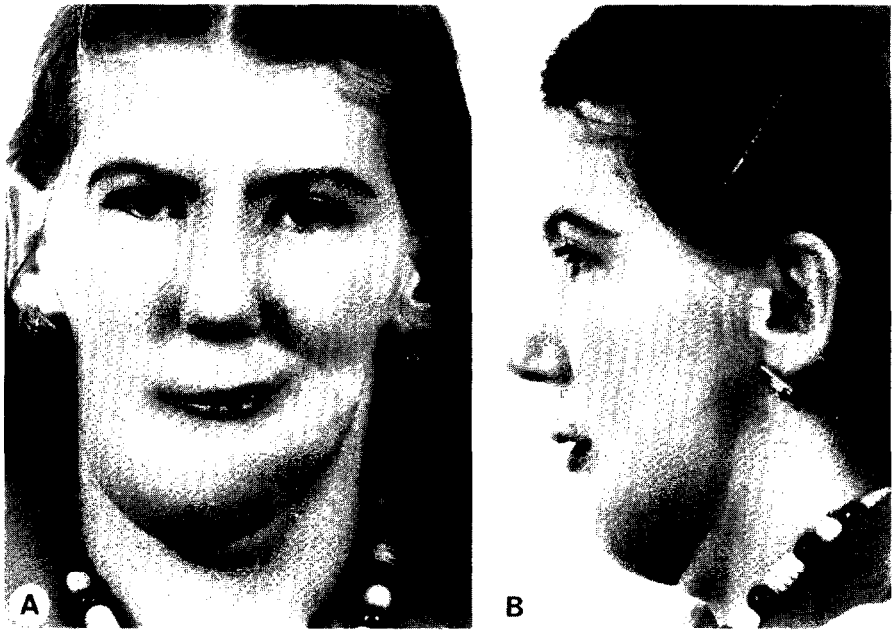

FIG. 4. A and B. Appearance 6 months post-operatively. Symmetry could be improved by reducing the right side of flap.

DISCUSSION

This free groin flap survived 20 hours without venous outflow. It may have been protected by its ability to ooze creating a >300 cc haematoma. A 7 to 8 cm vein graft with an end to side anastomosis to the internal jugular vein established good venous drainage. This is certainly a longer vein graft than the maximum of 5 cm recommended by the experience of Goodstein and Buncke (1979).

SUMMARY

A case report illustrating survival of a free flap after 20 hours of immediate post-operative venous occlusion is presented. This represents the most dramatic salvage of a free flap in the authors' experience. It suggests that the late diagnosis of venous obstruction may not preclude satisfactory re-exploration and repair of a thrombosed vein. Nevertheless, it is the authors' opinion that the shorter the interval of venous obstruction the more satisfactory will be revision of the anastomosis.

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REFERENCES

GOODSTEIN, W. A. and BUNCKE, H. J. (1979). Patterns of vascular anastomoses vs. success of free groin flap transfers. *Plastic and Reconstructive Surgery*, **64,** 37.

HARASHINA, T., SAWADA, Y. and WATANABE, S. (1977). The relationship between venous occlusion time in island flaps and flap survival. *Plastic and Reconstructive Surgery*, **60,** 92.

MAY, J. W., JR., CHAIT, L. A., O'BRIEN, B. McC. and HURLEY, J. V. (1978). The no-reflow phenomenon in experimental free flaps. *Plastic and Reconstructive Surgery*, **61,** 256.