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Ideas and Innovations

A new technique to anastomose vessels with great discrepancy in diameter

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SUMMARY. **Free flap transfer often involves anastomosing vessels with different diameters. A new technique to anastomose vessels with considerable discrepancy in diameter, which has been used reliably for thirteen years in clinical practice, is described. Scanning electron microscopy shows that the anastomotic area is very smooth and heals well.**

Anastomosing vessels with different diameters is a basic technique for microsurgeons. With the increase of vessel size discrepancy, the patency rate of end-to-end anastomosis is decreased.[1] If the discrepancy of the two vessels is not great it can be overcome by mechanical dilatation of the small vessel end or by cutting the end obliquely. Greater discrepancy may be solved by techniques which either narrow the larger vessel[2] or widen the smaller vessel.[3] These techniques

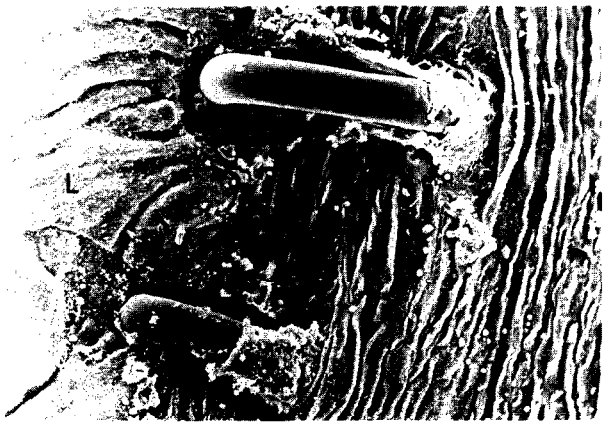

Fig. 1

Figure 1—The intima surface at the anastomotic site of a fifteen minutes specimen. The intima of the cut edges of the small vessel (S) stuck on the endothelial sheet of the large vessel (L) closely. There is no deposition of thrombotic material (SEM, ×250).

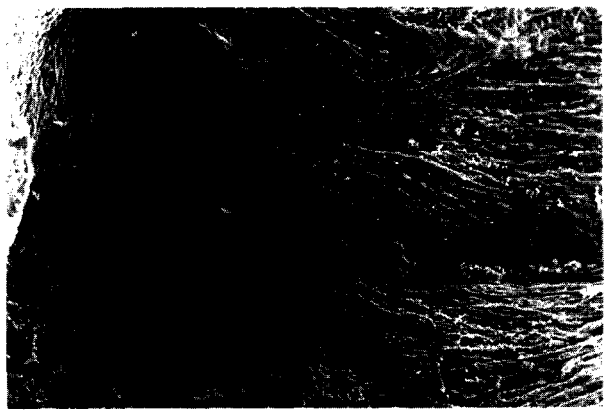

Fig. 2

Figure 2—The anastomotic site of a two weeks specimen. The reendothelialisation of the anastomotic site is completed (SEM, ×130).

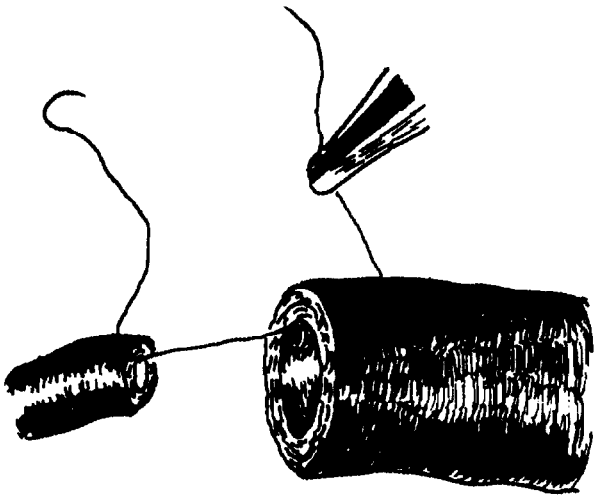

Fig. 3

Figure 3—The placing of the first stitch.

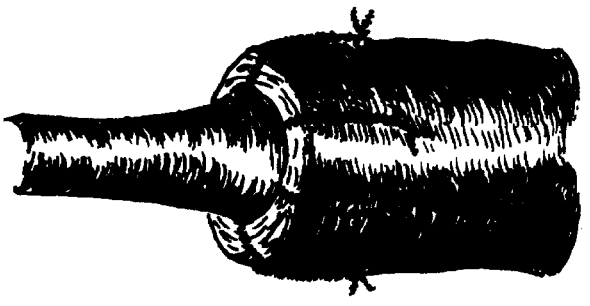

Fig. 4

Figure 4—The sutured anastomosis.

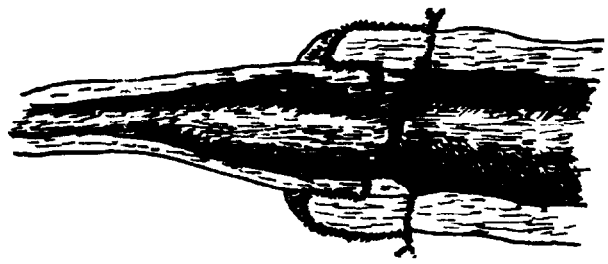

Fig. 5

Figure 5—The anastomotic site showing the small vessel inserted into the large one.

are complex and the anastomotic area produced is not smooth. To overcome these problems, we have used the 'unequal bite' suturing technique for thirteen years in clinical practice to perform end-to-end anastomosis of vessels with great discrepancy in diameter. Scanning electron microscopy showed that the anastomotic area produced by this technique is smooth and heals well (Figs 1, 2).

Suturing Method

The first stitch is placed in the middle of the posterior walls. The second and third sutures are placed such that the three stitches are 120 degrees apart. Another three sutures are added between these. All sutures are passed through the larger vessel wall at a point that is slightly more than twice the thickness of its wall from the stump end and passed through the smaller vessel wall at a point slightly narrower than twice the thickness of its wall from the end. The smaller vessel wall is always thinner than the larger vessel wall, thus the needle bite in the larger vessel is three to four times wider than on the smaller vessel (Fig. 3). When the sutures are tied, the end of the smaller vessel is invaginated into the lumen of the larger one. This makes a smooth anastomotic area (Figs 4, 5).

Discussion

The 'unequal bite' technique has developed from the same principles as the 'equal' end-to-end anastomosis technique, but it demands more accuracy when placing the stitches. In our clinical practice, six stitches are used for the anastomosis of a 1 mm vessel and a 3 mm vessel. If the larger vessel approaches 4 mm in size, eight or nine stitches may be needed.

In this technique, when flow is re-established, the end of the small vessel expands and the walls of the two vessel ends are nicely apposed. Blood flows well and thrombotic substances are few. The unequal bite suturing technique is a valuable development of the basic end-to-end anastomosis technique. It is reliable and gives freedom to the microsurgeon to perform end-to-end anastomosis successfully anywhere, even in difficult conditions.

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