Synchronous Microsurgical Anastomosis Technique

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Introduction

- **Microsurgical Techniques**

- Without Devices

(Continuous Horizontal Mattress, Vertical Mattress, Interrupted…etc)

- With Devices

(Fibrin glue, Laser assisted, Coupler …etc.)

- Assisted Techniques

(Assisting suspension,Triangulating continuous Suture…etc.)

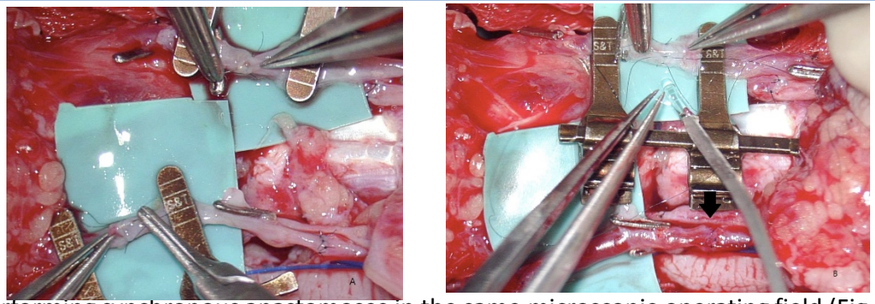
- **Synchronous Technique**

- 2 Operators did the anastomosis at the same time

Methods

- Retrospective review of 16 cases (30 digits)
- 8 cases in each group
- Micro-anastomosis included artery, vein and nerve
- Suture technique used : Simple interrupted sutures + continuous interrupted suture skills
- Reviewed:
  - Total anastomosis time
  - Total operation time
  - Ischemia time
  - Hospital stay (Days)
  - Survival rate of finger

Figure 1,2 – Synchronous anastomosis Technique



Performing synchronous anastomoses in the same microscopic operating field (Fig.1)
One of the surgeons completed the anastomosis (black arrow). assistance can be provided to the other operating surgeon (Fig. 2)

Table 1 : The anastomosis time for synchronous anastomosis technique and corresponding control groups

Patient and Replantation digits number	Anastomosis required	Synchronous anastomosis *Anastomosis Sequence	Anastomosis Time per digit (Mins)	Total anastomosis time (Mins)	Survival	Conventional : Anastomosis one by one Anastomosis sequence	Anastomosis Time per digit (Mins)	Total anastomosis time (Mins)	Survival	Time Saving (Mins)	Time Saving (%)
1 digit (Case 1 vs 9)	2A,2N	A/A + N/N	37	37	yes	N+N+A+A	66	66	yes	29	44%
1 digit (Case 2 vs 10)	1A,1V,2N	N/N +A/Vo	40	40	yes	N+N+A+V	69	69	yes	29	42%
1 digit (Case 3 vs 11)	1A,1V,2N	A/2N+V	56	56	yes	N+N+A+V	65	65	yes	9	14%
2 digits (Case 4 vs 12)	2A,2V,4N	A/2N+N/N+A /Vo+V	44	88	yes	N+N+A+Vo+ N+N+A+V	73	145	yes	57	39%
2 digits (Case 5 vs 13)	2A,2V,4N	N/N+A/Vo +A/2N+V	45	89	yes	N+N+A+N+N +A+V+V	73	145	1 digit failure due to artery occlusion	56	39%
2 digits (Case 6 vs 14)	2A,2V,4N	A/2N+N/N+A /Vo+V	49	97	1 digit total loss due to vein thrombosis	N+N+A+Vo+ N+N+A+V	70	140	yes	43	31%
3 digits (Case 7 vs 15)	3A,3V,6N	A/2N+N/N+A /Vo+A/2N+V +V	47	146	1 digit failure due to persistent artery	N+N+A+N+N A+N+N+A+V +V+V	68	204	yes	58	28%
3 digits (Case 8 vs 16)	3A,3V,6N**	GA/2N+AG/ Vo+A/2N+N/ N+A/Vo+V	47	142	yes	N+N+GA+AG +N+N+A+N+ N+A+V+V+V	76	229	1 digit partial loss due to vein thrombosis	87	38%
Average :Mean(SD)		*45.6 (SD 5.8)		Survival rate	87%		*69.9 (SD 3.7)	Survival rate	87%	**46 (SD 23.5)	34.3%

A: artery, V: vein, N: nerve, Vo: Volar Vein, G: graft
*1st Operator's anastomosis/2nd operator's anastomosis, sequence presented as: 1st synchronous-anastomosis+2nd synchronous-anastomosis+…4th synchronous-anastomosis. **1 Artery need vein graft
*P<0.001 Mann-Whitney U Test comparison between synchronous and conventional group
** P =0.01 Kruskal–Wallis test followed by post hoc Mann–Whitney multiple comparisons and Bonferroni and Holm correction. Significant difference between 1 digit vs 2 digits replantation and 1 digit vs 3 digits replantation

Results

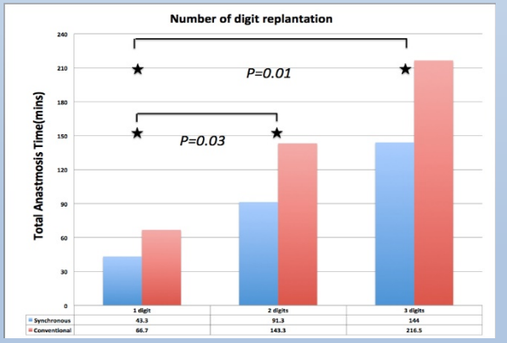
- Average anastomosis time per Digit (*P < 0.001)

- 45.6 ± 5.8 min (Synchronous group)
- 69.9 ± 3.7 min (Conventional group)

- Survival Rate : Both 87%
- Average of Time Saving (*P < 0.01)

- 46 ± 23.5 minutes (34.3%)

Figure 3 – Reduction of time consumption and number of replantation



Conclusions

- Synchronous Microsurgical technique is very practical for complex cases
- Synchronous microsurgical technique benefits in selected Clinical and Financial situations for patients and also surgeons