

가

(National Instruments)

2004 4 5
2

(photo plethysmography: PPG)

5

5

30

10

(extinction coefficient)

Beer-Lambert

2 PPG (photoplethysmog-

raphy)

13

44

31

43.6 ± 12.2

11.4 ± 11.3

가

20

44

440

71

가 349

가

$44 \times 5 / = 220$

PPG

LED

PPG

2

202

LED 1 ms

500 us

64

138

NELLCOR (DS-100, Durasensor)

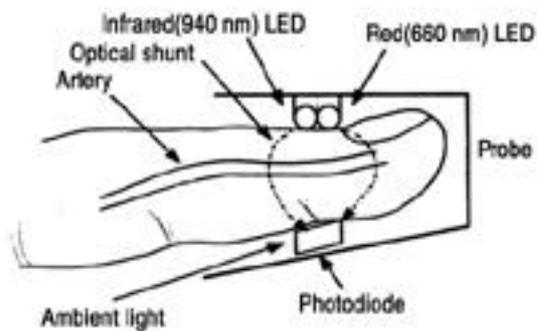
PPG

(Fig. 1).

660 940nm (DAQ-board; PCI-6020E, National Instrument)

12bit

PC



가

44 440
420

20

Fig. 1. Probe of PPG.

Table. 1, Fig. 2 . 71 , p=0.005 , 가
 349 . p=0.01 , 가
 SPSS 8.0(SPSS Inc.) 2-way ANOVA .
 p=0.000, p=0.026 가 가 가
 Table. 2
 Fig. 3 44 가 440
 20 420
 SPSS 8.0(SPSS Inc.) 2-way ANOVA 202
 64 138 ,
 p=0.000,

Table 1. Blood flow. n=420

	Blood flow of each finger					Sum
	1st	2nd	3rd	4th	5th	
Normal fingers (n=349)	1.7 ± 0.6 (n=77)	2.3 ± 0.8 (n=65)	2.5 ± 1.0 (n=65)	2.6 ± 0.9 (n=69)	2.0 ± 0.8 (n=73)	2.2 ± 0.9 (n=349)
Replanted fingers (n=71)	0.9 ± 0.6 (n=10)	1.4 ± 0.9 (n=15)	0.9 ± 0.5 (n=16)	1.1 ± 0.8 (n=17)	1.4 ± 1.0 (n=13)	1.1 ± 0.8 (n=71)

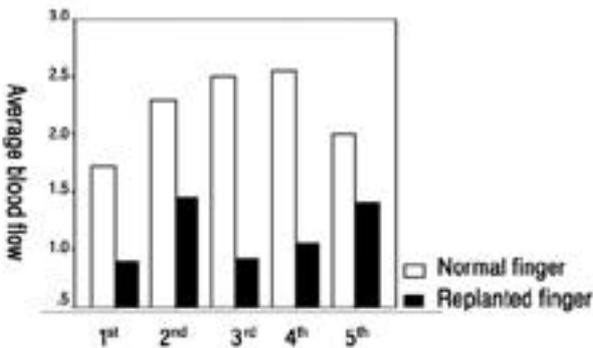


Fig. 2. Average blood flow of normal and replanted fingers.

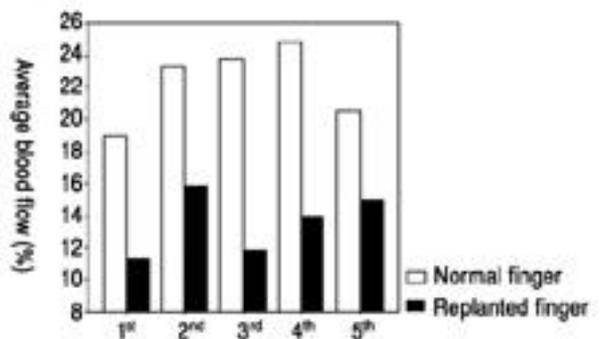


Fig. 3. Distribution of blood flow of each finger [%].

Table 2. Blood flow (%) n=420

	Blood flow of each finger					Sum
	1st	2nd	3rd	4th	5th	
Normal fingers (n=349)	18.9 ± 6.9 (n=77)	23.3 ± 5.3 (n=65)	23.8 ± 4.5 (n=65)	24.8 ± 5.4 (n=69)	20.5 ± 5.8 (n=73)	22.1 ± 6.1 (n=349)
Replanted fingers (n=71)	11.4 ± 7.2 (n=10)	15.8 ± 8.2 (n=15)	11.9 ± 5.7 (n=16)	14.0 ± 7.3 (n=17)	15.0 ± 4.4 (n=13)	13.7 ± 6.7 (n=71)

Table. 3

가

가 가

가
44

Table. 4

44

5

가

가

가

가

가

1

43

가

50%

(impedance plethysmography)

Raynaud's phenomenon, Buerger's

disease,

가

가 가

(non-invasive) 4

16-23

가

가 가

(PPG: photo-plethysmography)

가

Doppler

가

15

(angiogram)

Table 3. Comparison of blood flow ratio of normal and replanted fingers (n=202)

	Blood flow ratio of normal finger (n=138)	Blood flow ratio of replanted finger (n=64)
Average	1.04	0.53
SD	0.16	0.26
Maximum	1.50	1.00
Minimum	0.42	0.09
p=0.000		

Table 4. Individual comparison of blood flow ratio of normal and replanted fingers (n=43)

	Average of blood flow ratio of normal fingers (n=43)	Average of blood flow ratio of replanted fingers (n=43)	Average of blood flow ratio of replanted fingers
			Average of blood flow ratio of normal fingers
Average	1.04	0.51	0.50
SD	0.13	0.24	0.25
Maximum	1.32	0.93	1.06
Minimum	0.59	0.12	0.12

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