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, 1980), 가
(, 1996).
(McCain, 1992)
(Anderson, 1991), 가 (, 1994),
(母兒 相互作用) (White- Traut
Nelson, 1988) 가 .
(Harrison, 1985; Mueller,
1996),
가 (, 1997; Clark, Cordero,
Gross & Manos, 1989).
, ,
(McCain, 1992; Rice, 1977)
(Field et al, 1986), (, 1977) 가 ,
,1997), 가 (, 1982)
(Booth, Johnson-Crowley & Barnard, 1985) (, 1985).
(Lee, 1991; White-
Traut & Goldman, 1988)
가 (Leib, Benfield
Guidubaldi, 1980), (Scafidi, Field,
Schanberg Kuhn, 1990) ,
(Rice, 1979), (Leib

* 1998 가
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Table 1. Homogeneity test for general characteristics of subjects in sensory stimulation and control group

General characteristics		Sensory stimulation group	Control group	X 2 or t	P
Gender	Boy	8	9	0.02	0.90
	Girl	3	3		
Weight(kg)		3.20±0.24	3.30±0.33	0.76	0.46
Height(cm)		50.9±1.21	50.8±0.73	0.28	0.78
Head circumference (cm)		34.8±1.46	35.0±0.92	0.43	0.67
Chest circumference (cm)		33.2±1.27	33.3±1.49	0.22	0.83
Behavioral development		107.0±6.54	106.6±5.96	0.14	0.89
Behavioral state		5.1±1.82	4.7±2.93	0.33	0.75
Heart rate (beats/min)		126.0±4.65	126.3±5.71	0.15	0.88
Birth weight (kg)		3.08±0.21	3.15±0.34	0.60	0.55
Birth height (cm)		49.0±1.43	49.8±1.34	1.54	0.14
Birth head circumference(cm)		33.9±1.38	34.5±0.83	1.34	0.20
Birth chest circumference(cm)		32.4±1.22	32.2±0.93	0.32	0.75
Gestational age(wks)		39.7±0.67	39.8±0.58	0.50	0.62
Mother's age(yrs)		23.2±7.59	21.6±5.48	0.54	0.60

Each value represents mean ±SD

1) Booth (1985)

1. ,

2 ().

23 가

11 (:8, :3) , 1

12 (:9 :3) ,

가 10

6 84

2) ,

1 가

2. (1)

: (Tanita 1380, Japan)

10g

6 (, Korea)

mm

2 4

mm

14

mm . 가 9- 12 「 , 」 Anderson (1990)

(2) (1964) “ (4) (Hico Co,

” 2 31 Japan) 1 .

0 , 0.5 3) SAS

(developmental X2 test t-test

quotient: DQ)

$$DQ = \frac{\text{---}}{\text{---}} \times 100$$
 (repeated measures ANOVA) Bonferroni

(130- 144), (115- 129), X2 test

(100- 114), (85- 99), (70- 84) 가 .

(1964) paired t-test , unpaired t-test

(3) Anderson(1990)

(ABSS:Anderson Behavioral State Scale)

ABSS 가

(1) (2), 1.

(3), (4),

(5), (6), 1)

(7), (8),

(9), (10), (11), 2 3.21±0.24kg 3.30

(12) 12 ±0.33kg , 1

1 1 3 가 .

1 2 2 4 6

가 8 가가

1-5 가 0.10kg, 0.20kg, 0.28kg, 0.39kg, 0.50kg

「 」 , 6-8 「 」 , 6 가

Table 2- 1. Changes of body weight(kg) in sensory stimulation and control group

Group	Age (week)							Source	F	P
	2	3	4	5	6	7	8			
Sensory stimulation	3.21±0.24	3.45±0.24	3.70±0.26	3.95±0.29	4.23±0.26	4.50±0.29	4.77±0.30	Group week	4.46	0.0469
Control	3.30±0.33	3.45±0.37	3.60±0.37	3.75±0.39	3.95±0.36	4.11±0.37	4.27±0.39	G*W	18.52	0.0001

Each values represents mean ±SD

0.26 ± 0.04kg,	0.16 ± 0.04kg	0.92cm	,	1	3
				35.2 ± 1.37cm	35.4 ±
		0.81cm	0.2cm		
2	1	3	2	4	
가	2	가	,	3	5
4	6	8	가	6	8
	(F=18.52, P=0.0001),			0.2cm	0.3cm
가	(F=4.46, P=0.0469)(2- 1).	0.4cm			0.3cm
2)		6		가	
		0.5±0.15cm,		0.4±0.12cm	
		2			
0.73cm	50.9 ± 1.21cm	50.8 ±	가	(F=3.15, P=0.0065),	
6	8	가		(2- 3).	
	0.3cm, 0.5cm, 0.6cm, 0.8cm,				
0.9cm, 1.0cm	6	가	4)		
	0.9 ± 0.11cm,	0.7 ±			
0.14cm					2
					가
가	(F=4.18, P=0.0007),	8	가		6
	(2- 2).	0.1cm, 0.2cm, 0.2cm, 0.3cm, 0.5cm, 0.7cm			
3)		6	가		
		2	0.5±0.09cm,	0.4±0.16cm	
	34.8 ± 1.46cm	35.0 ±			

Table 2-2. Changes of height (cm) in sensory stimulation and control group

Group	Age (week)							Source	F	P
	2	3	4	5	6	7	8			
Sensory stimulation	509 ±1.21	518 ±1.06	527 ±1.14	535 ±1.11	544 ±1.10	55.2 ±1.11	56.1 ±1.14	Group week	1.94 482.61	0.1779 0.0001
Control	508 ±0.73	515 ±0.87	522 ±0.94	529 ±1.04	53.6 ±1.09	54.3 ±1.06	55.1 ±1.22	G*W	4.18	0.0007

Each values represents mean ± SD

Table 2-3. Changes of head circumference(cm) in sensory stimulation and control group

Group	Age (week)							Source	F	P
	2	3	4	5	6	7	8			
Sensory stimulation	34.8 ±1.46	35.2 ±1.37	35.8 ±1.18	36.3 ±0.97	36.8 ±1.02	37.2 ±1.06	37.6 ±0.82	Group week	0.07 191.76	0.7939 0.0001
Control	35.0 ±0.92	35.4 ±0.81	35.8 ±0.89	36.1 ±0.77	36.5 ±0.76	36.9 ±0.71	37.2 ±0.70	G*W	3.15	0.0065

Each values represents mean ± SD

Table 2-4. Changes of chest circumference(cm) in sensory stimulation and control group

Group	Age (week)							Source	F	P
	2	3	4	5	6	7	8			
Sensory stimulation	33.2	33.6	34.1	34.6	35.2	35.8	36.4	Group week G*W	0.25	0.6246
	±1.27	±1.23	±1.32	±1.27	±1.26	±1.04	±0.93		186.82	0.0001
Control	33.2	33.5	33.9	34.4	34.9	35.3	35.7		2.87	0.0119
	±1.49	±1.48	±1.47	±1.34	±1.28	±1.25	±1.18			
Each values represents mean ± SD										

가 2 가

(F=2.87, P=0.0119), 2 4 6

(2-4). 8 가 (F=12.50, P=0.0001), 가 (F=4.99, P=0.0365) (3).

2. (115- 129),

(100- 114), (85- 99), ,

2 107.0 ± 6.54 2 4

106.6 ± 5.96 2 가 ,

4 110.2 ± 6.34 4 6

107.7 ± 5.99 2.5 6 , 2 ,

8 4.9 , 7.9 5 , 10

가 (P=0.05).

6 가 6 8

3.9 , 14 가

(P=0.022) (4).

Table 3. Changes of behavioral developmental score in sensory stimulation and control group

Group	Age (week)				Source	F	P
	2	4	6	8			
Sensory stimulation	107.0±6.54	110.2±6.34	114.6±5.73	118.7±6.32	Group Week	4.99 57.91	0.0365 0.0001
Control	106.6±5.96	107.7±5.99	109.7±5.18	110.8±4.50	G*W	12.50	0.0001
Each values represents mean ±SD							

Table 4. Developmental status in sensory stimulation(S) and control group(C) at each age

Age(week)		2		4		6 *		8 *	
Developmental status		S	C	S	C	S	C	S	C
		No.	No.	No.	No.	No.	No.	No.	No.
High	(115- 129)	2	1	3	2	6	2	8	3
Average	(100- 114)	8	10	7	9	5	10	3	9
Low	(85- 99)	1	1	1	1	-	-	-	-

* P < 0.05 ; sensory stimulation group vs control group

128.4 ± 4.17 122.3 ± 3.31
(P=0.0014) (6).

(Field, 1995).

1993).

,1997).

6 가
6
1 2.54cm
2

4 가
 , 가 260g
 160g 가
 . Field(1986), Scar-Salapetek (1973),
 Rice(1977), McCain (1992), Anderson (1990)

가
2
가

Rice(1977), McCain (1992), Anderson (1990)

Each values represents mean \pm SD

** P< 0.001 ; before vs after sensory stimulation

가 가 (12) , ,
 (,1996). , 2

가가 1. 가 2
 (Field,1995). , ,

가 가 .
 가 가 2 가
 가 , 4 가

가 가
 가 가 3. 가
 가 (1996) 「 」 가
 「 」 「 」

가 (, 1983), Ludington 4.
 (1991)

가 가
 가 2 가
 가 가

(Field
 , 1986; Scafidi , 1990).

(1997). _____

 (1996). _____

가 (1985). _____

(1994). _____
 Lingual Lipase . 가
 _____ , 47(2), 1027 - 1037.

(1964). _____
 _____ , 5(1), 195- 233.

(1982). _____ 가

2 23 (11)
 (1984). _____

- , (1983).
- _____
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-Abstract-

Key concept : Sensory stimulation, Growth, Behavioral development, Infant

Effects of A Sensory Stimulation Program on Growth and Behavioral Development of Infants

*Kim Jeong Sun**

This study was designed to investigate the effects of a sensory stimulation program on the growth (weight, height, head circumference, and chest circumference), behavioral development, behavioral states, and the heart rate of the infants. A total of 23 infants of 2 weeks old were divided into sensory stimulation group (11 infants) and control group (12 infants).

The infants of sensory stimulation group had received sensory stimulation for 6 weeks.

Sensory stimulation program was composed of tactile and kinesthetic stimulation. We assessed growth, behavioral state and heart rate every week and behavioral development every 2 weeks. The results were as follows:

1. Body weight in sensory stimulation group, from two weeks after the sensory stimulation program, was significantly increased more than control group, but there was no significant difference in height, head circumference, and chest

circumference between the two groups.

2. Behavioral developmental score of sensory stimulation group was significantly higher than that of control group from two weeks after the sensory stimulation program. Developmental states of sensory stimulation group showed more 'high average developmental state' than the control group from 4 weeks after sensory stimulation program.
3. Behavioral states of sensory stimulation group after the sensory stimulation program, the 'sleeping state' was significantly increased more than control group. The 'awakening state' and the state of fuss or crying were significantly less than those of the control group.
4. The heart rate of the sensory stimulation group after the sensory stimulation was significantly lower than the control group.

These results indicate that the sensory stimulation program decreases heart rate and improves the sleeping state to be effective on promoting the growth and development of the infants.

In view of these experiments, we suggest sensory stimulation program might be considered as a nursing intervention for growth and development of the infants not only in clinical settings but also at homes and in the communities.

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