



臺北市立萬芳醫院 - 委託財團法人臺北醫學大學辦理
Taipei Municipal Wan Fang Hospital (Managed by Taipei Medical University)

住院期間提供早產兒多感官介入是否可促進神經動作的發展?

職能治療師 劉妍廷

112/02/15



堅持品質 共創價值

RESEARCH ARTICLE

Open Access

Effectiveness of interventions on early neurodevelopment of preterm infants: a systematic review and meta-analysis



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PICO

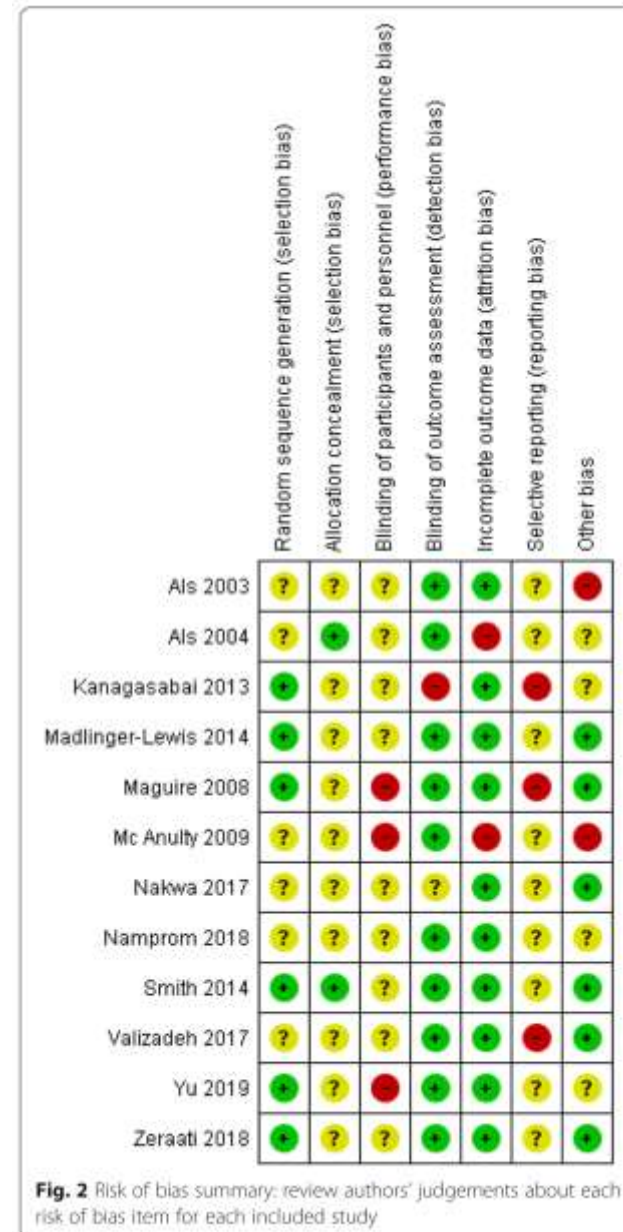
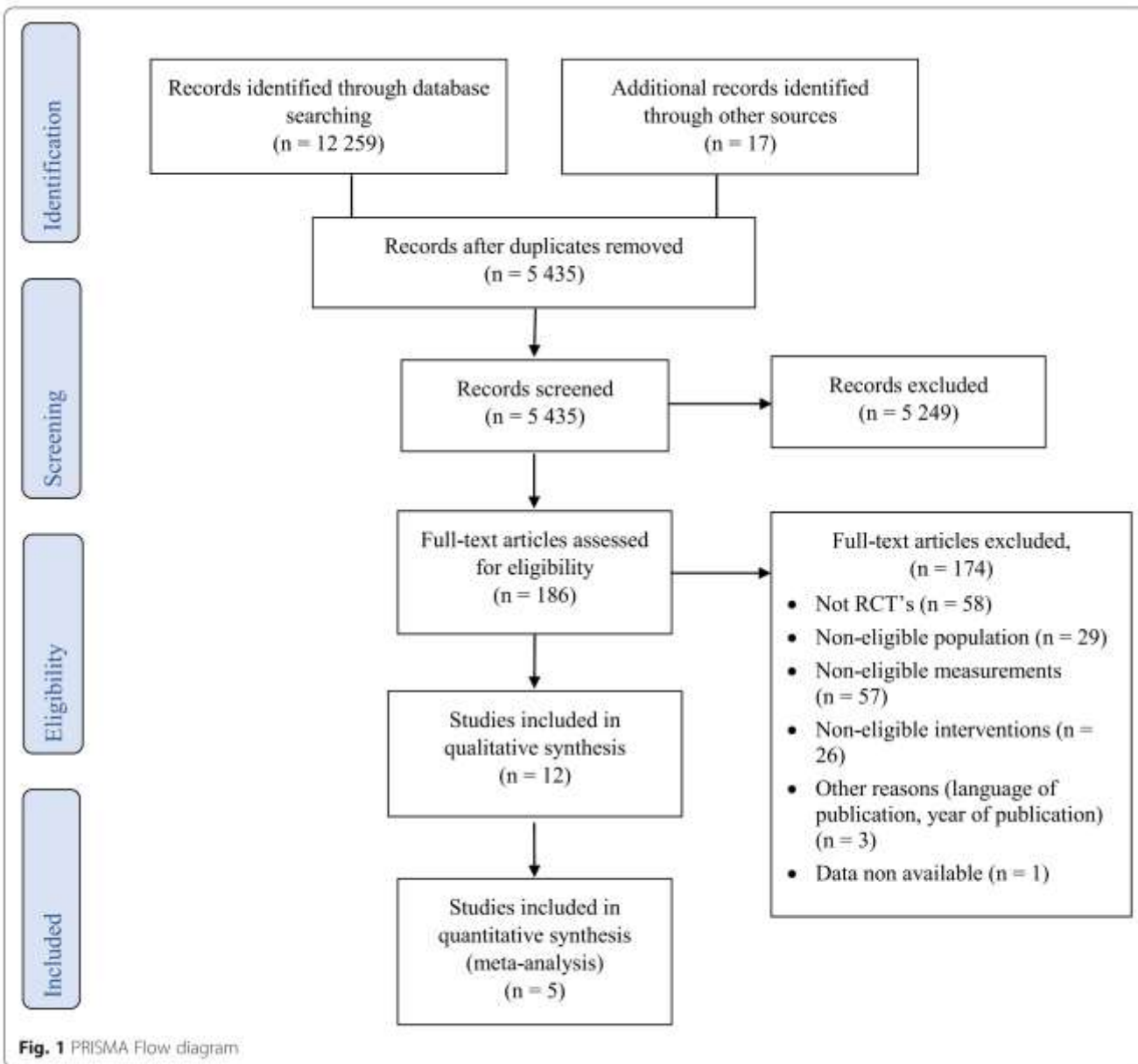
P	Preterm 24-36 ^{6/7} weeks of gestation.
I	All types of interventions in NICU hospitalization.
C	All types of comparator groups.
O	Preterm infants' neurodevelopmental scale



CINAHL, MEDLINE, Pubmed, EMBASE, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials , Web of Science

- Review Manager (RevMan) 5.1 software
- Random effect model with a 95% confidence interval
- Studies with heterogeneity [PRISMA] with a 95% CI
- Heterogeneity : Chi-squared test with a significance level of 0.1, I^2 using the classification.
- Grading of Recommendations Assessment, Development and Evaluation (GRADE) guidelines





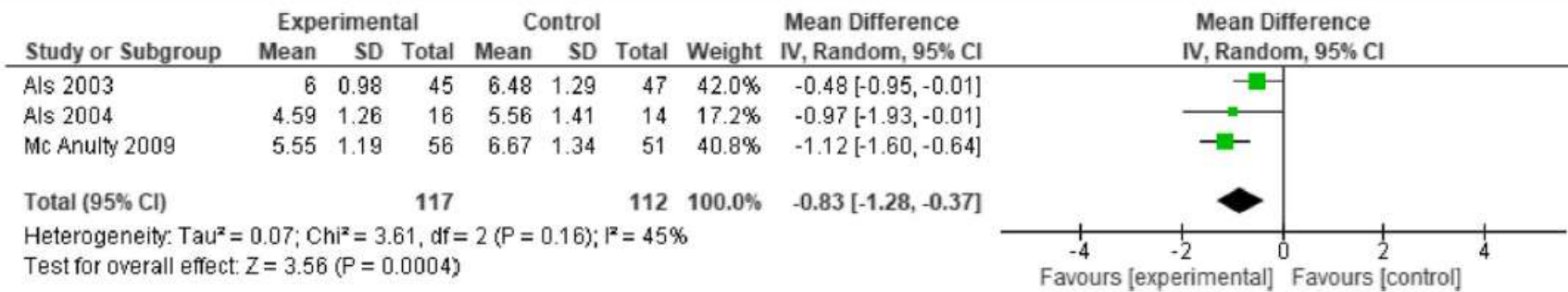


Fig. 3 NIDCAP vs. Standard care for the neurobehavioral development (autonomic system - APIB)

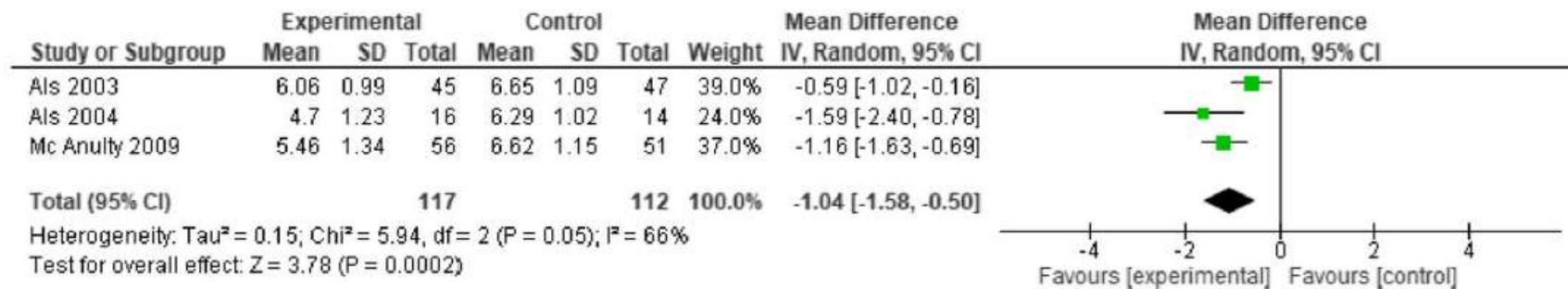


Fig. 4 NIDCAP vs. Standard care for the neurobehavioral development (motor system - APIB)

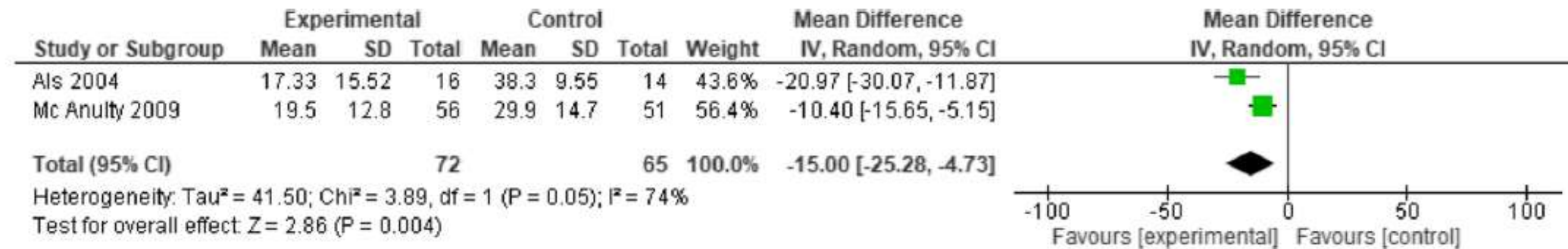


Fig. 5 NIDCAP vs. Standard care for neurological development (Prechtl)

Outcome



Outcome

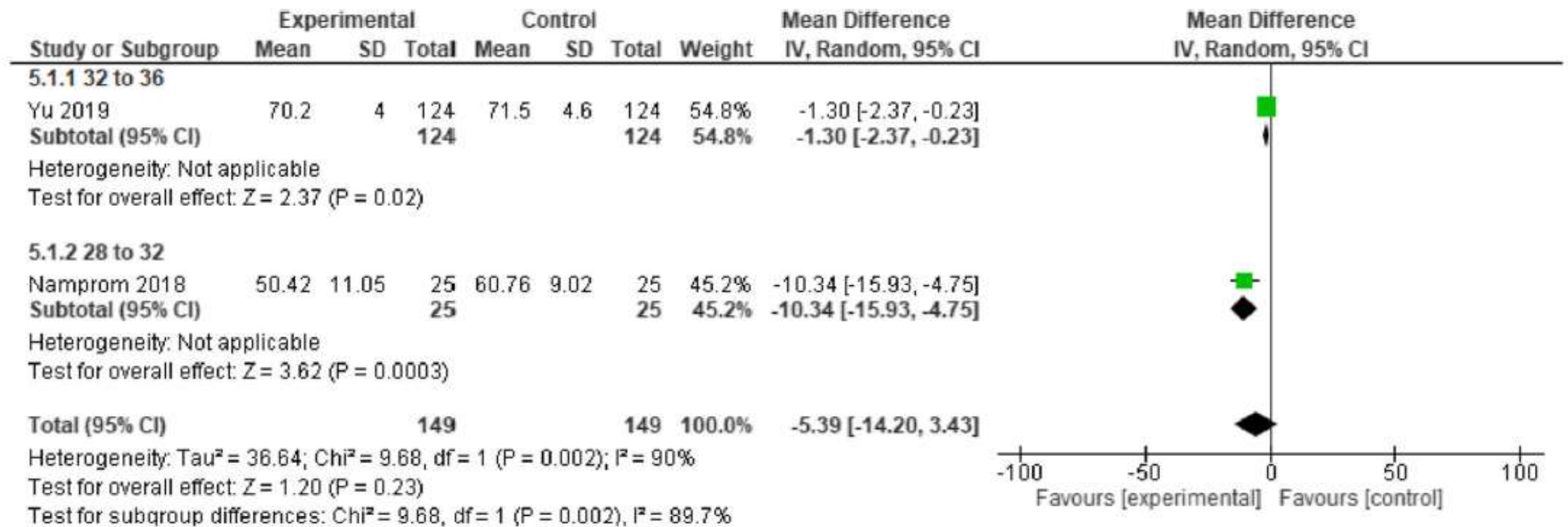


Fig. 6 Parental participation programs vs. Standard care for neurobehavioral development (NNE)

A Randomized-Controlled Trial Pilot Study Examining the Neurodevelopmental Effects of a 5-Week M Technique Intervention on Very Preterm Infants

Joan R. Smith, PhD, RN, NNP-BC; Jacqueline McGrath, PhD, RN;
Marco Brotto, PhD, RN; Terrie Inder, MD, MBChB

E : 10 , C : 10
GA 26-30 wk
BW 630-1250g

TABLE 1. Infant Characteristics at Birth^{a,c}

Infant Characteristics	M Technique Group			Control Group			Significance 2-Tailed ^b
	Mean	SE	Range	Mean	SE	Range	
Birth weight, g	970	71	630-1190	932	56	630-1250	.72
Gestational age, wk	26.7	0.44	26-29	26.6	0.35	26-29	.78
Apgar score 1 min	3.9	0.9	1-8	4.2	0.8	1-8	.69
Apgar score 5 min	5.1	0.70	2-8	5.7	0.6	4-9	.66
CRIB II score	5.1	1.4	1-13	3.6	1.3	1-12	.30
Gender ^c	Frequency (%)			Frequency (%)			
Male	4 (44.4)			6 (66.7)			
Female	5 (55.6)			3 (33.3)			
Race ^c							
Black	4 (44.4)			4 (44.4)			
White	5 (55.6)			5 (55.6)			

Abbreviation: CRIB, clinical risk index for babies; SE, standard error of mean.

^aInfant characteristics between the M Technique and control groups were comparable.

^bMann-Whitney U test.

^cDescriptive statistics of infant gender and race between the M Technique and control groups.

E : NICU care + **7mins M Techniques**
(tactile & proprioceptive)
C : Standard NICU care
6 times/wk, 5 weeks

(Smith, et al.,2014)



Outcome

Pre- & Post-

1.NICU Neurobehavioral Scale(NNNS)

2.Growth velocity

TABLE 3. Comparison of the Study Cohort Neonatal Intensive Care Unit Network Neurobehavioral Scale Summary Scores at Term Equivalent

Summary Score	M Technique Group, Mean* (SE)	Control Group, Mean* (SE)	Significance 2-Tailed ^b
Attention	3.32 (0.25)	3.63 (0.49)	.83
Handling	0.61 (0.33)	0.70 (0.06)	.25
Quality of movement	3.14 (0.22)	3.96 (0.37)	.08
Regulation	4.33 (0.24)	4.05 (0.54)	.96
Nonoptimal reflexes	7.44 (0.84)	7.33 (0.41)	.89
Asymmetric reflexes	2.89 (0.48)	2.33 (0.53)	.36
Stress abstinence	0.37 (0.02)	0.31 (0.03)	.17
Arousal	3.78 (0.32)	3.06 (0.26)	.11
Hypertonicity	1.00 (0.33)	1.33 (0.47)	.71
Hypotonicity	1.00 (0.29)	0.56 (0.24)	.26
Excitability	4.89 (0.82)	3.78 (0.81)	.37
Lethargy	5.78 (1.19)	8.78 (0.88)	.10

*Descriptive statistics.

^bMann-Whitney U test.

TABLE 4. Infant Weights Between the 2 Groups at 30 Weeks' Postmenstrual Age (PMA) (Day 1 of Study) and 35 weeks' PMA (Completion of Study)^a

Timepoints	M Technique Group, Mean ^b (SE/Range)	Control Group, Mean ^b (SE/ Range)	Significance 2-Tailed ^c
Weight at 30 wk PMA, g	1171.67 (68.35/790-1470)	1158.33 (46.44/910-1320)	.79
Weight at 35 wk PMA, g	2335.00 (125.11/1780-3010)	2107.44 (65.08/1830-2362)	.17

^aDifference in weight 1163.33 949.11 0.005 from 30 weeks to (64.67/990-1540) (42.53/760-1202) 35 weeks' postmenstrual age.

^bDescriptive statistics.

^cMann-Whitney U test.

TABLE 2. Descriptive-Categorical Variables of Participants at 30 Weeks' Postmenstrual Age (Day 1 of Study)^a

Infant Characteristics	M Technique Group Frequency (%)	Control Group Frequency (%)
Assisted ventilation		
NC	0 (0.0)	1 (11.1)
HHNC	4 (44.4)	3 (33.3)
CPAP	2 (22.2)	1 (11.1)
SiPAP	3 (33.3)	3 (33.3)
Vent	0 (0.0)	1 (11.1)
Supplemental oxygen		
Yes	8 (88.9)	6 (66.7)
No	1 (11.1)	3 (33.3)
Patient room design		
Single	5 (55.6)	6 (66.7)
Open bay	4 (44.4)	3 (33.3)
Caffeine		
Yes	9 (100.0)	9 (100.0)
No	0 (0.0)	0 (0.0)

Abbreviations: CPAP, continuous positive airway pressure; HHNC, High Humidity Nasal Cannula; NC, nasal cannula; SiPAP, bi-level continuous positive airway pressure; vent, ventilator.

^aStatistical differences were not calculated because of categorical data.

Summary

NNNS

Exp gr. = C gr.

Growth velocity

Exp gr. > C gr.

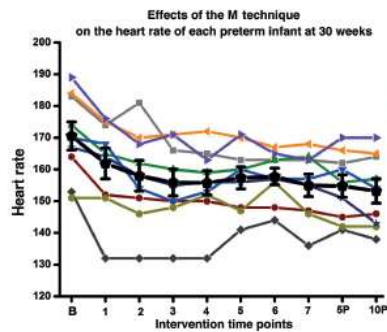


Outcome

Exp Gr. (before, during, after, 30wk, 32wk, 34wk)

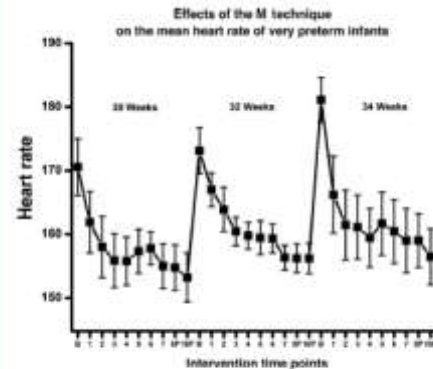
1. Physiologic parameters
2. Infant behavioral states

FIGURE 2.



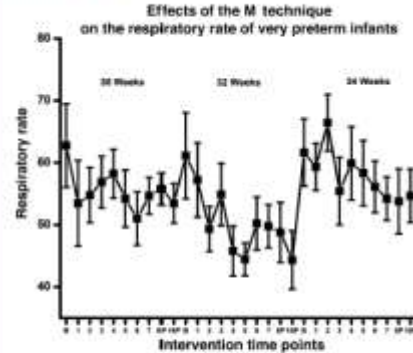
Line graph showing experimental subjects' heart rate (HR) from baseline to 10 minutes postintervention at 30 weeks' postmenstrual age. The black line indicates the group mean heart rate and standard error (SE) over time and clearly depicts the reduction of HR over time.

FIGURE 3.



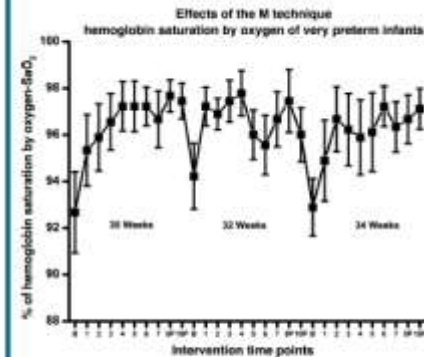
Line graph shows the mean heart rate (HR $\pm$ SE) for experimental subjects from baseline to 10 minutes postintervention at 30, 32, and 34 weeks' postmenstrual age (PMA) making evident the decrease in mean HR over time at each PMA studied.

FIGURE 4.



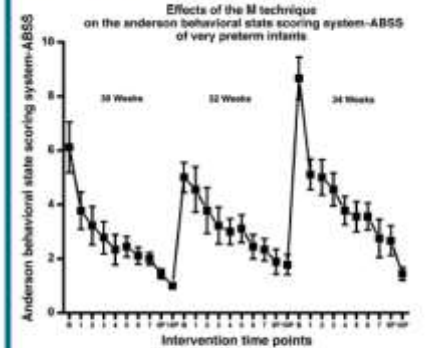
Line graph showing the mean respiratory rate (RR $\pm$ SE) for experimental subjects from baseline to 10 minutes postintervention at 30, 32, and 34 weeks' postmenstrual age (PMA) making evident the decrease in mean RR over time at each PMA studied.

FIGURE 5.



Line graph showing the mean hemoglobin oxygen saturation percentage (SaO₂ $\pm$ SE) for experimental subjects from baseline to 10 minutes postintervention at 30, 32, and 34 weeks' postmenstrual age (PMA) making evident the increase in mean SaO₂ over time at each PMA studied.

FIGURE 6.



Line graph showing the mean Anderson Behavioral State Scoring System (ABSS $\pm$ SE) for experimental subjects from baseline to 10 minutes postintervention at 30, 32, and 34 weeks' postmenstrual age (PMA) clearly illustrates the reduction in mean ABSS over time at each PMA studied.

HR ↓

RR ↓

SaO₂ ↑

ABSS ↓

M techniques



Physiologic & behavioral

Neurodevelopmental
Effects(26-30wks)



ORIGINAL ARTICLE

Effect of Multi-sensory Stimulation on Neuromuscular Development of Premature Infants: A Randomized Clinical Trial

How to Cite This Article: Zeraati H, Nasimi F, Rezaeian A, Shahinfar J, Ghorban Zade M. Effect of Multi-sensory Stimulation on Neuromuscular Development of Premature Infants: A Randomized Clinical Trial. Iran J Child Neurol. Summer 2018; 12(3):32-39

E : 40 , C : 40
GA 32-36 wk
BW 1200-1500g

Table 1. Baseline characteristics of participants with mean and standard deviation

Demographics	Intervention group		Control group		t-test
	Mean	SD	Mean	SD	
Gestational Age (wk)	32.1	2.0	32.8	1.8	$P=0.58$
Weight (g)	1400.1	250.4	1441.4	261.8	$P=0.23$
Length (cm)	38.2	2.5	39.0	2.7	$P=0.32$
Head circumference	28.0	1.5	28.6	1.3	$P=0.66$
Apgar score 1 min	6.4	2.7	6.1	2.5	$P=0.51$
Apgar score 5 min	8.8	1.7	8.6	2.2	$P=0.59$
Length of NICU stay (d)	21.3	3.9	22.1	4.2	$P=0.37$

E : NICU care + 12mins
multisensory stimulation
(Auditory, Tactile, Visual, Vestibular)
C : Ward's care
5 times/wk until discharge

(Zeraati et al.,2018)



Outcome

Neuromuscular Maturity	Intervention group		Control group		t-test
	Mean	SD	Mean	SD	
Before Intervention	15.2	2.2	14.8	2.5	$P=0.43$
After intervention	23.7	1.9	18.1	2.4	$P=0.001$
The results of variance analysis with repeated measurements		Between-groups intervention		$P=0.001$	
		Between-groups Control		$P=0.04$	
		Comparison of two groups		$P=0.001$	

Neuromuscular Maturity	Intervention group		Control group		Mann Whitney U test
	Mean	SD	Mean	SD	
Posture	3.03	0.7	2.03	0.5	$P<0.005$
Square Window	3.2	0.4	3.03	0.8	$P=0.334$
Arm Recoil	3.2	0.7	2.4	0.6	$P<0.005$
Popliteal angle	3.9	0.7	2.9	0.9	$P<0.005$
Scarf sign	3.1	0.6	3.0	0.7	$P=0.641$
Heel to ear	3.3	0.5	2.5	0.8	$P<0.005$
Total	20.7	1.6	15.9	1.5	$P<0.005$

Summary

New Ballard Score

Exp gr. > C gr.

Multisensory benefit↑
(32-36wks)



Effects of Basic Developmental Care on Neonatal Morbidity, Neuromotor Development, and Growth Term Age of Infants Who Were Born at <32 Weeks

Celeste M. Maguire, MS^a, Sylvia Veen, MD, PhD^a, Arwen J. Sprij, MD^b, Saskia Le Cessie, PhD^c, Jan M. Wit, MD, PhD^a, Frans J. Walther, MD, PhD^a, on behalf of the Leiden Developmental Care Project

E : 91 , C : 88
GA 25-31 wk
BW 538-2155g

TABLE 1 Maternal Medical and Parental Demographic Background Variables

Variable	DC	Control
Obstetric history, <i>N</i>	91	88
Preexisting disease (diabetes, renal, hypertension, other), <i>n/N</i> (%)	8/82 (9.8)	11/82 (13.4)
Pregnancy induction, <i>n/N</i> (%)	13/86 (15.1)	12/84 (14.3)
Diseases during pregnancy, <i>n/N</i> (%)		
Diabetes mellitus gravidarum	4/87 (4.6)	5/84 (6.0)
(Preeclampsia or HELLP syndrome)	19/87 (21.8)	13/84 (15.5)
Medication during pregnancy, <i>n/N</i> (%)		
Antihypertensives	12/91 (13.2)	14/84 (16.7)
Antibiotics	35/91 (38.5)	34/84 (40.5)
Tocolytics	46/91 (50.5)	48/84 (57.1)
Other	8/91 (8.8)	7/84 (8.3)
Antenatal glucocorticoids, <i>n/N</i> (%)		
1 dose	17/90 (18.9)	28/88 (31.8)
1 course (2 doses)	47/90 (52.2)	41/88 (46.6)
Mode of delivery, <i>n/N</i> (%)		
Vaginal	51/91 (56.0)	47/88 (53.4)
Cesarean section	40/91 (44.0)	41/88 (46.6)
PROM >24 h, <i>n/N</i> (%)	16/91 (17.6)	22/88 (25.0)
Primipara, <i>n/N</i> (%)	26/91 (28.5)	73/86 (84.9)
Parental demographic background		
Maternal age, <i>N</i>	89	85
Mean (SD), y	30.1 (5.4)	30.4 (5.1)
Paternal age, <i>N</i>	70	69
Mean (SD), y	34.3 (5.3)	35.0 (5.7)
Mother white, <i>n/N</i> (%)	59/90 (65.6)	62/87 (71.3)
Father white, <i>n/N</i> (%)	63/90 (70.0)	65/87 (74.7)
Mother's education level, <i>n/N</i> (%) ^a		
Low	36/78 (46.2)	24/73 (32.9)
Intermediate	26/78 (33.3)	33/73 (45.2)
High	16/78 (20.5)	16/73 (21.9)
Father's education level, <i>n/N</i> (%) ^a		
Low	30/78 (38.5)	21/73 (28.8)
Intermediate	30/78 (38.5)	29/73 (39.7)
High	18/78 (23.0)	23/73 (31.5)

TABLE 2 Infant Medical Background Variables

Variable	DC	Control
Gestational age, wk, <i>N</i>	91	88
Mean (SD)	29.3 (1.8)	28.9 (1.9)
Range	25.0–31.9	25.0–31.9
Birth weight, g, <i>N</i>	91	88
Mean (SD)	1216 (358)	1196 (354)
Range	538–2155	640–2080
Length, cm, <i>N</i>	79	79
Mean (SD)	37 (4.0)	37 (3.8)
Range	25.0–46.0	28.5–45.0
Head circumference, cm, <i>N</i>	86	86
Mean (SD)	26.7 (2.4)	26.5 (2.3)
Range	22.0–33.6	22.0–31.6
Male gender, <i>n/N</i> (%)	49/91 (53.8)	58/88 (65.9)
SGA percentile <10 and ≥3, <i>n/N</i> (%)	8/91 (8.8)	8/88 (9.1)
SGA percentile <3, <i>n/N</i> (%)	8/91 (8.8)	6/88 (6.8)
Twin, <i>n/N</i> (%)	26/91 (28.6)	18/88 (20.5)
Inborn, <i>n/N</i> (%)	56/91 (61.5)	53/87 (60.9)
Apgar scores at 5 min		
Mean (SD)	8.1 (1.8)	8.1 (1.4)
Median (range)	9 (2–10)	8 (3–10)
CRIB score, <i>N</i>	91	87
Median (range)	2 (0–20)	3 (0–12)
RDS, <i>n/N</i> (%)		
Grade 1	15/91 (16.5)	15/87 (17.2)
Grade 2	16/91 (17.6)	17/87 (19.5)
Grade 3	19/91 (20.9)	14/87 (16.1)
Grade 4	9/91 (9.9)	17/87 (19.5)
Surfactant, <i>n/N</i> (%)	41/91 (45.1)	50/88 (56.8)
Hyperbilirubinemia, <i>n/N</i> (%)	82/91 (90.1)	81/88 (92.0)

E : NICU care + environment
adjustment + positioning
Positioning(nest)
Environment (light , sound)
C : NICU care



Outcome

Outcome Measures

Parameter	DC (n = 91)	Control (n = 88)	P
Days of hospitalization			
Mean (SD)	37.2 (29.1)	36.4 (28.1)	.86
Median (range)	31 (6–142)	30 (5–165)	
Days intensive care			
Mean (SD)	15.9 (13.7)	16.7 (15.3)	.74
Median (range)	12 (0–53)	11 (0–60)	
No. of infants requiring respiratory support, n/N (%)	86/91 (94.5)	79/88 (89.8)	.28
Days of mechanical ventilation			
Mean (SD)	6.1 (7.3)	6.9 (7.1)	.45
Median (range)	3.5 (0–39)	4.0 (0–29)	
Days of CPAP			
Mean (SD)	8.6 (9.6)	10.1 (10.5)	.34
Median (range)	4.5 (0–35)	6.0 (0–39)	
Total days ventilatory support			
Mean (SD)	14.6 (13.6)	17.0 (15.1)	.30
Median (range)	10.0 (1–52)	12.0 (1–59)	
Growth parameters at term age, N	72	70	
Age, mean (SD), wk	40.8 (1.2)	40.7 (1.5)	.72
Weight, mean (SD), kg	3.12 (0.64)	3.15 (0.50)	.76
Head circumference, mean (SD), cm ^a	35.6 (1.8)	35.5 (1.6)	.81
Length, mean (SD), cm	48.6 (3.3)	48.6 (2.3)	.95
Daily weight gain, mean (SD), g	23.7 (4.9)	23.6 (4.8)	.95
Weekly head-circumference growth, mean (SD), cm ^a	0.78 (0.13)	0.75 (0.14)	.38
Weekly growth in length, mean (SD), cm	1.00 (0.23)	0.97 (0.20)	.34
Neurologic outcome at term (Prechtl), n/N (%)			
Normal	42/76 (55.3)	43/72 (59.7)	.46
Mildly abnormal	30/76 (39.5)	27/72 (37.5)	
Definitely abnormal	4/76 (5.2)	2/72 (2.8)	

TABLE 4 Comparison of Data of Secondary Outcome Measures

Parameter	DC (n = 91)	Control (n = 88)	P
In-hospital mortality, n/N (%)	12/91 (13.2)	8/88 (9.1)	.40
Early neonatal death	3/91 (3.3)	2/88 (2.3)	
Late neonatal death	9/91 (9.9)	6/88 (6.8)	
Total days of supplemental oxygen			
Mean (SD)	12.0 (17.7)	14.9 (20.5)	.31
Median (range)	5 (0–93)	4.5 (0–90)	
Oxygen requirement at >28 d of life, n/N (%)	15/78 (19.2) ^a	22/75 (29.3) ^a	.15
BPD (oxygen dependent at >36 wk GA), n/N (%)	6/78 (7.7)	10/75 (13.3)	.30
Postnatal corticosteroids, d, n/N (%)			
7–10	2/91 (2.2)	1/88 (1.1)	.08
15–20	1/91 (1.1)	8/88 (9.1)	
>20	1/91 (1.1)	1/88 (1.1)	
IVH, n/N (%)			
Grades 1–2	19/91 (20.9)	28/88 (31.8)	.12
Grade 3 and periventricular echodensity	11/91 (12.1)	5/88 (5.7)	
Posthemorrhagic ventricular dilation, n/N (%)	4/91 (4.4)	2/88 (2.3)	.68
NEC, n/N (%)	6/91 (6.6)	4/87 (4.6)	.75
Sepsis, n/N (%)	40/91 (44.0)	32/87 (36.8)	.36
Meningitis, n/N (%)	5/91 (5.5)	5/88 (5.7)	.99
PDA (indomethacin and/or surgery), n/N (%)	19/91 (20.9)	23/88 (26.1)	.48
Dopamine/dobutamine, n/N (%)	32/91 (35.2)	25/87 (28.7)	.42
ROP, n/N (%)	3/70 (4.3)	5/70 (7.1)	.19
PVL at term age follow-up, n/N (%)			
Grade 1	3/71 (4.2)	6/67 (9.0)	.53
Grade 2	3/71 (4.2)	3/67 (4.5)	
Grade 3	0/71 (0.0)	0/67 (0.0)	
Grade 4	0/71 (0.0)	0/67 (0.0)	
Physical therapy required at term	14/76 (18.4)	9/74 (12.2)	.49

Summary

Basic developmental
care
No effect
on short term
physical &
neurologic outcomes
(25–31wks)



The effects of alternative positioning on preterm infants in the neonatal intensive care unit: A randomized clinical trial

Laura Madlinger-Lewis^a, Lauren Reynolds^b, Cori Zarem^a, Tara Crapnell^a, Terrie Inder^{c,d,e}, Roberta Pineda^{a,c,*}

E : Alternative positioning
(Dandle Roo)
2 hrs/day, 3 times/wk

	Traditional Positioning	Alternative Positioning	<i>p</i> value ^f
	Mean (SD) or <i>n</i> (%)	Mean (SD) or <i>n</i> (%)	
<u>Baseline Factors</u>			
Gestational Age at Birth (Weeks) ^a	29.4 (2.8)	28.0 (2.5)	0.02*
Race (African American)	25 (56.8%)	30 (62.5%)	0.67
Sex (Male)	17 (38.6%)	22 (45.8%)	0.53
Single Parent Household	36 (81.8%)	38 (79.2%)	0.8
<u>Acquired Factors</u>			
Necrotizing Enterocolitis	3 (6.8%)	4 (8.3%)	0.9
Confirmed Sepsis	12 (27.3%)	14 (29.2%)	0.9
Brain Injury	10 (22.7%)	7 (14.6%)	0.4
Time Out of Positioning >2 Hours Per Day ^a	8 (18.2%)	20 (41.7%)	0.02*



C : Traditional positioning
(blanket & cloth rolls)

(Madlinger-Lewis et al.,2014)

	Traditional (n=44)	Alternative (n=48)	Mean Difference (95% CI)	Adjusted Mean Difference (95% CI)
Mean ± SD	Mean ± SD			
<u>NNNS</u>				
Orientation	3.76±1.19	3.53±1.01	0.23 (-.026, 0.71)	0.16 (-0.36, 0.67)
Tolerance of Handling	0.65±0.13	0.71±0.14	-0.06 (-0.12, 0.00)	-0.04 (-0.10, 0.02)
Quality of Movement	3.03±0.77	3.11±0.71	-0.08 (-0.38, 0.23)	-0.04 (-0.37, 0.28)
Self Regulation	4.36±0.84	3.92±0.88	0.44 (0.08, 0.79)*	0.30 (-0.06, 0.67)
Sub-Optimal Reflexes	6.59±2.51	7.52±2.16	-.93 (-1.90, 0.04)	-0.53 (-1.45, 0.39)
Stress	0.39±0.09	0.40±0.13	-0.01 (-0.06, 0.04)	0.00 (-0.05, 0.05)
Arousal	3.69±0.95	3.77±1.02	-0.09 (-0.50, 0.32)	-0.14 (-0.57, 0.28)
Hypertonia	1.55±1.27	1.71±1.29	-0.16 (-0.69, 0.37)	-0.06 (-0.61, 0.49)
Hypotonia	1.07±0.97	1.13±1.23	-0.06 (-0.52, 0.41)	0.08 (-0.41, 0.56)
Asymmetry	1.13±1.23	2.56±1.90	0.57 (-0.26, 1.41)	0.90 (0.04, 1.75)*
Excitability	5.34±2.47	6.33±2.99	-0.99 (-2.13, 0.15)	-0.95 (-2.16, 0.26)
Lethargy	7.50±3.13	7.38±2.96	0.13 (-1.14, 1.39)	0.39 (-0.89, 1.68)
<u>Medical</u>				
PMA at Discharge (Weeks)	39.11±4.55	39.14±3.86	-0.03 (-1.77, 1.72)	1.32 (-0.24, 2.88)
Days of Ventilation	39.14±3.86	9.23±17.62	-1.57 (-8.65, 5.51)	4.28(-1.55, 10.10)
Total O2 Days	34.00±43.49	49.88±53.19	-15.88 (-36.11, 4.36)	6.20(-6.15, 18.54)
Days to Full Oral Feeds	50.55±28.22	61.63±33.20	-11.08 (-24.20, 2.24)	0.94 (-5.30, 7.17)
Length of Stay (Weeks)	9.32±6.37	10.69±5.67	-1.37 (-3.86, 1.13)	1.11 (-1.43, 3.65)

Summary

Appropriate
positioning

Increase

Symmetrical
movement & response
(28-32wks)

Effects of Early Intervention on Visual Function in Preterm Infants: A Randomized Controlled Trial

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E : 27 , C : 30
GA 25⁺⁰-29⁺⁶ wk
BW 800-1200g

Demographic feature	Early Intervention (n = 27)	Standard Care (n = 30)
Gestational age at birth (weeks), mean (SD)	28.4 (0.9)	27.8 (1.3)
Birth Weight (g), mean (SD)	1,032 (249)	1,092 (312)
Male, n (%)	13 (48)	16 (53)
Singleton, n (%)	15 (56)	18 (60)
CRIB II score, mean (SD)	7.7 (1.7)	8.1 (2.3)
Apgar score at 1', median (range)	7 (4–9)	6 (2–8)
Apgar score at 5', median (range)	8 (7–10)	8 (5–9)
Cesarean Section, n (%)	25 (93)	26 (87)
Days of Mechanical Ventilation, mean (SD)	3.9 (7.5)	4.3 (6.3)
Days of NCPAP, mean (SD)	25.7 (13.7)	25.6 (14.0)
Days of High Flow Nasocannula, mean (SD)	15 (26.5)	7.2 (15.3)
Small for Gestational Age, n (%)	6 (22)	4 (13)
Sepsis, n (%)	11 (41)	11 (37)
Severe Bronchopulmonary Dysplasia, n (%)	8 (30)	5 (17)
GMH-IVH grade 1–2, n (%)	3 (11)	4 (13)
Retinopathy of prematurity <3, n (%)	1 (4)	6 (20)
Medical Necrotizing Enterocolitis, n (%)	0 (0)	1 (3)
Days of Hospitalization, mean (SD)	76 (24.0)	82.4 (35.1)
Length of stay in the incubator (days), mean (SD)	50.22 (15.5)	50.87 (19.9)
Gestational Age at Discharge, mean (SD)	39.2 (3.5)	39.6 (4.1)
Maternal Age, mean (SD)	33.9 (3.9)	33.8 (6.2)
SES, mean (SD)	50.7 (9.7)	44.8 (13.9)
Gestational Age at visual assessment, mean (SD)	40.7 (1.0)	41 (1.1)

Early Intervention Multisensory integration

(visual interaction & infant massage)

Birth 3wks infant massage (2 times/day until TEA)
34wk GA visual interaction(once/day until TEA)

Standard care
Kangaroo Mother Care (KMC)+
Nesting



Outcome

		Early Intervention (n = 27)	Standard Care (n = 30)	P-value
Spontaneous ocular motility	Mainly conjugated	26 (96.3%)	21 (70%)	0.013 ^a
	Occasional strabismus/occasional or lateral nystagmus	1 (3.7%)	9 (30%)	
	Intermittent strabismus/nystagmus	0 (0%)	0 (0%)	
	Continuous strabismus/nystagmus	0 (0%)	0 (0%)	
Ocular movements with target	Mainly conjugated	23 (85.2%)	16 (53.3%)	0.012 ^a
	Occasional strabismus/occasional or lateral nystagmus	4 (14.8%)	14 (46.7%)	
	Intermittent strabismus/nystagmus	0 (0%)	0 (0%)	
	Continuous strabismus/nystagmus	0 (0%)	0 (0%)	
Fixation	Stable (> 3 s)	27 (100%)	30 (100%)	n.a.
	Unstable (<3 s)	0 (0%)	0 (0%)	
	Absent	0 (0%)	0 (0%)	
Tracking—Horizontal	Complete	27 (100%)	30 (100%)	n.a.
	Incomplete	0 (0%)	0 (0%)	
	Brief	0 (0%)	0 (0%)	
	Absent	0 (0%)	0 (0%)	
Tracking—Vertical	Complete	27 (100%)	29 (96.7%)	1 ^a
	Incomplete	0 (0%)	1 (3.33%)	
	Brief	0 (0%)	0 (0%)	
	Absent	0 (0%)	0 (0%)	
Tracking—Arc	Complete	27 (100%)	24 (80%)	0.025 ^a
	Incomplete	0 (0%)	6 (20%)	
	Brief	0 (0%)	0 (0%)	
	Absent	0 (0%)	0 (0%)	
Tracking colored stimulus	Present	27 (100%)	30 (100%)	n.a.
	Absent	0 (0%)	0 (0%)	
Stripes discrimination	7–8 cards	21 (77.8%)	10 (33.3%)	0.001 ^a
	5–6 cards	6 (22.2%)	15 (50%)	
	3–4 cards	0 (0%)	5 (16.7%)	
	< 3 cards	0 (0%)	0 (0%)	
Attention at distance	≥ 70 cm	20 (74.1%)	6 (20%)	< 0.001 ^a
	51–60 cm	6 (22.2%)	17 (56.7%)	
	30–50 cm	1 (3.7%)	7 (23.3%)	
	<30 cm	0 (0%)	0 (0%)	

Summary

El + multisensory
integration



visual function ↑
in preterm infants



E : 22 , C : 29
GA <32 wk
BW <1500g

RESEARCH ARTICLE Open Access

Early combined rehabilitation intervention to improve the short-term prognosis of premature infants

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Table 1 Demographic data comparison (Mean ± SD^a)

Group	Cases	Sex (Cases)		Birth wei (g)
		Man	Male	
The intervention group	22	11	11	1348.18 ±
The control group	29	13	16	1338.45 ±
F/χ ² -value		0.134		0.027
P-value		0.714 ^b		0.87 ^b



Early Intervention group 20-25mins
Visual & auditory intervention
Respiratory intervention
Neuromotor intervention
Oral motor intervention
Control group
Standard care
Once/day , until discharge

Outcome

Table 2 Comparison of clinical treatment indicators (Mean $\pm$ SD, day)

Group	Invasive ventilation time	Noninvasive ventilation time	duration of oxygen supplementation	duration of indwelling gastric tube use	Days for hospitalization
Intervention group	3.63 $\pm$ 8.60	13.60 $\pm$ 9.08	22.84 $\pm$ 13.78	23.13 $\pm$ 12.84	39.18 $\pm$ 10.32
control group	5.55 $\pm$ 9.98	21.47 $\pm$ 12.98	31.98 $\pm$ 15.97	33.45 $\pm$ 15.48	47.45 $\pm$ 16.11
F-value	0.534	5.881	4.596	6.596	4.406
P-value	0.469 ^d	0.019 ^a	0.037 ^a	0.015 ^b	0.041 ^c

Table 3 Comparison of the incidence of common complications in preterm infants (case (%))

Group	ROP	BPD	NEC	intracranial haemorrhage
The intervention group	2 (9)	5 (23)	1 (4.5)	1 (4.5)
The control group	10 (34)	16 (55)	8 (27.6)	5 (17.2)
χ^2 -value	3.183	8.065	4.062	0.912
P-value	0.048 ^a	0.005 ^b	0.025 ^c	0.34 ^d

Table 4 Comparison of NBNA scores

Group	scores > 37	scores = 35–36	scores < 35	T-value	P-value
The intervention group	21	1	0	17.66	0.000 ^b
The control group	23	5	1		



Table 5 Comparison of Sliverman scores

Group	start time	first week	second week	third week	F-value	P-value
The intervention group	4.32 ± 1.91	2.36 ± 1.36	2.09 ± 1.15	1.41 ± 0.73	89.071	0.000 ^d
The control group	5.17 ± 1.67	4.41 ± 1.78	3.48 ± 1.70	2.66 ± 1.91		
F-value	2.887	20.109	10.888	8.359	2.609	0.037 ^c
P-value	0.096 ^a	0.000 ^b	0.000 ^b	0.006 ^b		

Table 6 Comparison of the neuromuscular scores in the Ballard scores analysis

Group	start time	first week	second week	third week	F-value	P-value
The intervention group	17.23 ± 3.18	18.73 ± 1.72	20.00 ± 1.72	21.41 ± 1.87	30.571	0.000 ^d
The control group	16.10 ± 2.43	16.24 ± 2.31	16.48 ± 2.20	17.97 ± 2.24		
F-value	2.056	17.896	34.446	38.446	2.817	0.049 ^c
P-value	0.158 ^a	0.000 ^b	0.000 ^b	0.000 ^b		

Summary

Early Intervention + premature infants
short term clinical outcomes ↑



住院期間提供早
產兒多感官介入
是否可促進神經
動作的發展？

同意

不確定

不同意

煩請各位同仁將舉牌結果打在留言處，謝謝！

