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Management of Hip Subluxation Using Hip Bracing in Fukuyama Congenital Muscular Dystrophy

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Background and Objective

◆ FCMD: severe muscle weakness + CNS involvement

◆High risk of **hip dislocation**

◆Surgery is challenging (cardiopulmonary risk)

◆Hip bracing effective in CP → **unknown in FCMD**

◆ **Aim:**
- **To evaluate whether hip bracing prevents hip displacement in FCMD**

Methods

◆ **n = 6 (nonambulatory FCMD)**

◆Inclusion Criteria
- Confirmed diagnosis of FCMD based on biallelic pathogenic variants in FKTN
- Age 1–15 years
- Nonambulatory status
- Reimer's migration percentage (MP) ≥ 10%
- Provision of informed consent

◆ Exclusion Criteria
- History of **hip surgery**

◆**Groups**
- Brace (n=3): 6 months
- Control (n=3): historical

◆ **Device**
- RS-Hip Brace (RSREHAB, Seongnam, South Korea)
- Structure:
  - Inner pants layer
  - External fabric strap system
- Previously reported to prevent **progression of coxa valga** in nonambulatory children with cerebral palsy

Figure 1. Hip brace used in this study: (a) anterior, (b) posterior, and (c) lateral views.

◆**Outcomes (baseline → 6 months)**
- MP (migration percentage)
- HSA (head-shaft angle)
- AI (acetabular index)

Results

◆mean age of the six participants: 10.83 ± 2.32 years

◆ , each group: one male and two females

Table 1. Demographic data and radiographic data

	Hip brace group (n=3)	Control group (n=3)	p-value
Age	9.33±1.15	12.33±2.31	1.00
Sex (M:F)	1:2	1:2	
Pre_MP (MA)	60.32±17.05	84.87±23.24	0.40
Pre_MP (LA)	44.48±20.82	42.83±41.34	0.70
Pre_MP (average)	52.40±17.32	63.85±29.18	0.70
Pre_HSA (MA)	165.41±10.97	170.80±7.36	0.70
Pre_HSA (LA)	157.41±14.37	167.06±7.00	0.70
Pre_HSA (average)	161.41±12.66	168.93±7.18	0.70
Pre_AI (MA)	10.82±1.92	13.32±3.59	0.40
Pre_AI (LA)	19.71±1.36	18.99±6.60	1.00
Pre_AI (average)	15.26±1.15	16.15±5.07	0.70
Pre_PO	2.44±1.10	5.41±7.49	1.00
Post_MP (MA)	56.41±16.52	90.64±16.22	0.10
Post_MP (LA)	45.57±20.69	66.10±27.18	0.40
Post_MP (average)	50.99±8.93	78.37±13.31	1.00
Post_HSA (MA)	162.72±6.22	167.31±11.28	0.70
Post_HSA (LA)	156.07±4.05	167.3±6.77	0.10
Post_HSA (average)	159.39±4.36	167.31±9.01	0.40
Post_AI (MA)	15.04±1.20	11.54±5.58	0.70
Post_AI (LA)	21.78±4.35	21.05±6.43	1.00
Post_AI (average)	18.41±2.08	16.29±4.73	0.70
Post_PO	4.77±1.85	6.17±4.59	1.00

MA, more affected; LA, less affected; AI, acetabular index; F, female; HSA, femoral head-shaft angle; M, male; MP, Reimer's migration percentage; PO, pelvic obliquity.

◆**Brace Group**
- MP: **52.4 → 51.0% (stabilized)**
- HSA: **161.4 → 159.4° (improved)**
- AI: minimal change

◆ **Control Group**
- MP: **63.9 → 78.4% (progression)**
- HSA / AI: no significant change

Table 2. Difference of Value of Hip X-ray

	Hip brace group (n=3)	Control group (n=3)	p-value
△MP (MA)	-3.91±26.68	5.77±7.17	0.70
△MP (LA)	1.09±27.48	23.27±36.77	0.40
△MP (average)	-1.41±25.67	14.52±21.74	0.40
△HSA (MA)	-2.69±16.94	-3.48±4.62	0.70
△HSA (LA)	-1.33±15.43	0.24±1.30	0.70
△HSA (average)	-2.01±16.11	-1.62±2.67	0.70
△AI (MA)	4.22±1.70	-1.78±8.76	0.70
△AI (LA)	2.07±3.55	2.05±8.23	1.00
△AI (average)	3.15±0.94	0.14±8.03	0.70
△PO	2.33±0.86	0.76±9.32	0.70

△ = (Value after 6 months of hip bracing) – (Baseline value)

MA, more affected; LA, less affected; AI, acetabular index; HSA, femoral head-shaft angle; MP, Reimer's migration percentage; PO, pelvic obliquity.

◆ **Key Finding:**
Brace → stabilization / Control → progression

Conclusion

◆**Hip bracing may slow or prevent hip displacement in FCMD**

◆**Small sample size → further large-scale studies needed**