

Bone Mineral Density of Lumbar Spine in Children With Spastic Quadriplegia and Spastic Diplegia

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Abstract

In children with cerebral palsy, bone density is decreased by disturbance of bone remodelling due to lack of normal weight bearing and muscle contraction through physical activity. Loss of bone density cause fracture, delays treatment with immobilization, and leads to functional limitation. The purpose of this study was to investigate bone mineral density of lumbar spine in children with spastic quadriplegia and diplegia. Six spastic quadriplegia and 14 spastic diplegia were evaluated in this study. QDR 4500 X-ray densitometer was used to measure bone density at lumbar spine (L1 L4). Children with cerebral palsy showed lower bone density than that of normal children. Bone density in children with spastic quadriplegia and diplegia was $-1.812 \pm .962$, $-1.519 \pm .935$, respectively. However, there was no significant differences in bone density between children with spastic quadriplegia and diplegia. There was no significant difference in bone density relation to motor development level, height, and weight. Further study is needed to find the appropriate interventions for preventing loss of bone density in children with cerebral palsy.

Key Words: Spastic quadriplegia; Diplegia; Bone density; Lumbar spine; Motor level.

1988). (Henderson, 1997),
가 ,
가
(Hensinger 가
Jones, 1981), 가
가
가
(Henderson, 1997; Lee
(Cech Martin, 1995). Lyne, 1990; McIvor Samilson, 1966;
, 가 (Southard Tolman , 1975),
, 1991) 가
(Forbes, 1988; Lowrey, 1998).
가
가
가
(Stallings , 1993a),
(Krick Van Duyn MAS, 1984; Evers
, 1991; Stallings , 1993b), (,
, 1991; Hahn , 1975; Lidgren ,
1979; Morijiri , 1981),
, D (Jekovec-Vrhovsek
, 2000; Sherk , 1977),
(Abramson,
1948; KrØlner Toft, 1983)
(Henderson, Lin Greene, 1995).

1.

가

40%가

20

6 ,

14

(Mackinnon,

(Z-) , Z

4 10

-1.0 Z 가 1

6 Z

3.

SPSS/Win (version

10.0)

30 °

Z-

t-

Z-

2.

Z-

QDR 4500

(Dual-energy X-ray absorptiometry), (Hologic inc, Waltham, 1996)

X-

1.

35 mR

X-

가

가

(Southard , 1991).

가

=1', ' =2', ' =3', ' =4'

가

가

2.17 ± 1.47

3.07 ± .92

가

(p>.05),(1).

L1 L4

2.

1. Motor level in children with spastic quadriplegia and diplegia

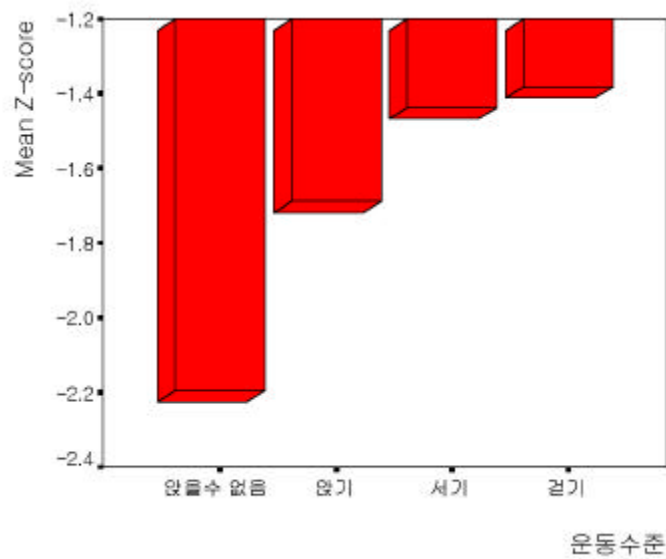
Type	Mean ± SD	t	p
Spastic quadriplegia	2.17 ± 1.47	1.686	.109
Spastic diplegia	3.07 ± .92		

2. Z-score of lumbar spine in children with spastic quadriplegia and diplegia

Type	Mean ± SD	t	p
Spastic quadriplegia	-1.812 ± .962	.636	.533
Spastic diplegia	-1.519 ± .935		

3. Z-score of lumbar spine according to motor level

	Sum of squares	df	Mean squares	F	p
Between groups	1.929	3	.643	.713	.558
Within groups	14.422	16	.91		
Total	16.350	19			



1. Z-score of lumbar spine with motor level

Z- (L1-L4) 3. Z- Z-
 Z- -1.812 ± .962 Z- Z-
 , -1.519 ± .935 , Z- 가 , Z-
 1 가 (p>.05),(3).
 가 Z- 20
 가 가 -1.607 .
 Z- ‘ ’ -1.381, ‘ ’
 -1.438, ‘ ’ -1.687, ‘ ’
 -2.195
 (p>.05),(2).

4. Correlation of Z-score of lumbar spine and height and weight

	Pearson correlation	p
Height Z-score of lumbar spine	.027	.910
Weight Z-score of lumbar spine	.045	.851

가 가
 가 2
 (1). (Lin Henserson,
 1996).
 4. Z- 가 가
 Z- ,
 가 .
 (Hensinger Jones,
 1982).
 (p>.05),(4).
 (Styer-Acevedo, 1994).
 가
 가 ,
 (Stallings , 1993a).
 20 30 35 40
 가
 , (osteoblast)
 , (osteoclast) 가,
 (negative bone
 balance)
 ,
 가 ,
 ,
 가
 가
 (Lin Henderson, 1996).

(disuse osteoporosis)

가 가

(Geiser, 1958; Gillespie, 1954; Kharmosh Saville, 1965; Landry Fleisch, 1964; Walton, 1954)

가

Geiser Trueta
 (1958)

Lin Henderson
 (1996) 가

6

14

가 가
 , 1995). Henderson(1995)

(L1 L4)

Z-

1

가

(- 1.519 ± .935)

(- 1.812)

가

± .962)가

가

Z-

가 2

가

Z- 가

(- 1.381),

(- 1.438),

(- 1.687),

(- 2.195)

가

가

. Borner

(1988)

2

Z-

가

가

가

가

가

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- 가
- 1991.
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