ORAL PRESENTATION 4-2

소아재활
발표일시 및 장소 : **10 월 27 일(토) 14:00-14:10 Room E(5F)**

OP4-2-1

The Scoliosis Curve Flexibility in Patients with Duchenne Muscular Dystrophy

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Objective
Non-ambulant Duchenne muscular dystrophy (DMD) patients frequently develop scoliosis. Management of scoliosis is crucial because it affects pulmonary function. Moreover, it extends the curve distally to cause pelvic obliquity. This Results in pain and limit of activity of daily living. Surgery has been a treatment of choice for scoliosis in the pre-steroid era. However, with the use of steroid, life expectancy and curve progression have been greatly improved. Hence, Use of orthosis should be considered. Spinal orthosis attempts to correct scoliosis by flattening the curve with pressure, which means that spine should be flexible. Thus, flexibility of the curve could be a significant influencing factor for the effectiveness of braces. The aim of this study was to investigate the extent and changes of Cobb angle, pelvic obliquity, and curve flexibility after loss of walking ability and correlations between them.

Methods
The medical records and whole spine x-rays of sitting and supine positions of 273 DMD boys visited the division of Pediatric Rehabilitation between March, 2017 and February, 2018 were retrospectively reviewed, and finally, 50 boys were extracted with at least 3 years of consecutive follow ups(Figure 1). Cobb angle and pelvic obliquity were measured (Table 1-1, 1-2). Flexibilities were measured by the change in curve angles with and without the gravitational force, which is the difference between Cobb angles in sitting and supine position in this study. Flexibilities of those who had scoliosis at the first year follow up (12 boys) were analyzed by repeated measure ANOVA (Figure 2). To evaluate the relationships among each index, Pearson correlation test was performed.

Results
The features of flexibility and pelvic obliquity were manifested by the time points after the loss of ambulation (Table 1-1, 1-2). It is notable that flexibility gradually decreased each year, from 86.21±4.96, 60.70±6.45, and to 49.10±9.99. Among 50 boys, 31 boys had scoliosis. Almost every patient with scoliosis, except 2 boys, went through the sequential

course of 1)no scoliosis, 2)full flexibility, when scoliosis is only measurable at sitting position, and 3)partial flexibility when scoliosis was also detectable at the supine position. Cobb angle in sitting position had significant correlation with pelvic obliquity both in sitting and supine position ($r=0.722$ and $r = 0.650$, $p < 0.05$). Cobb angle in supine also had significant correlation with pelvic obliquity in each position. ($r=0.806$ and $r = 0.786$, $p < 0.05$).

Conclusion

It is important for physicians to acknowledge of the course of scoliosis after the loss of ambulation, to detect the curve as soon as possible, as there is a time period of scoliosis with flexibility where orthotic intervention would be effective.

Table 1-1. Cobb angle of the subjects

	Number of boys	Cobb angle in sitting position (°)	Cobb angle in supine position (°)	Flexibility of scoliosis (%)
Time 1	31	22.43±2.76	8.22±2.97	86.21±4.96
Time 2	24	27.15±3.24	13.73±3.55	60.70±6.45
Time 3	12	34.40±4.40	22.23±6.34	49.10±9.99

Table 1-2. Pelvic obliquity of the subjects

	Number of boys	Pelvic obliquity in sitting position (°)	Pelvic obliquity in supine position (°)	Flexiblity of Pelvic obliquity (%)
Time 1	18	8.60±1.00	2.54±0.81	71.90±9.17
Time 2	10	11.37±1.06	6.92±1.46	42.43±10.74
Time 3	4	18.43±7.28	12.58±5.83	32.45±12.67

Values are presented as mean standard deviation.

Time 1 represent the time when scoliosis was first detected after loss of walking ability

Time 2 represent the time 1 year after the detection of scoliosis

Time 3 represent the time 2 year after the detection of scoliosis

Figure 1. Participant inclusion process

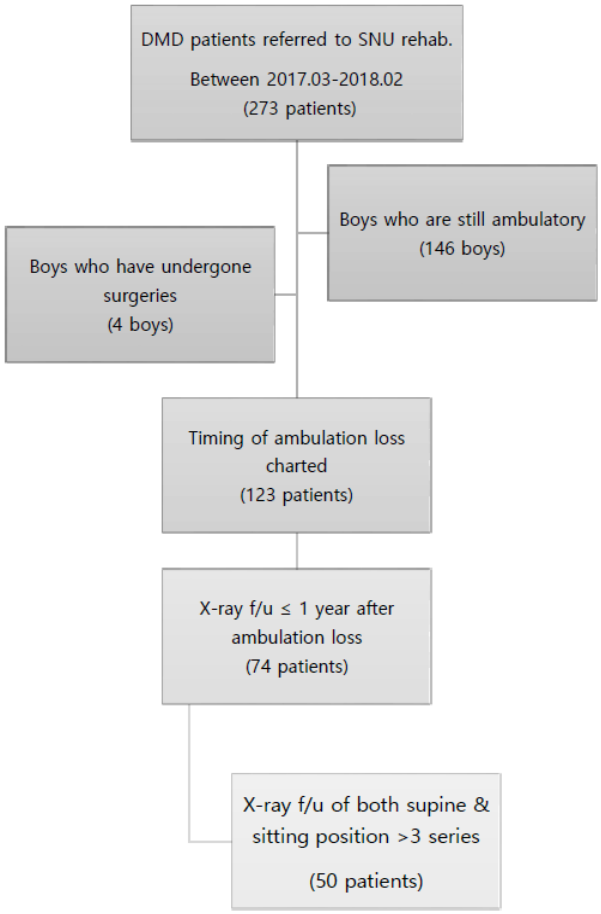

Figure 2. Flexibilities of patients who had scoliosis at the first year follow up.