소아재활

발표일시 및 장소 : 10 월 19 일(토) 10:40-10:50 Room D(5F)

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Clinical application of customized neck orthosis in children with torticollis

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Objective

Torticollis is characterized by lateral head tilt and chin rotation toward the side opposite the tilt. The aim of this study was to investigate the effect of customized neck orthosis with negative sensory feedback for the treatment of torticollis that has not been responsive to conservative or surgical treatment.

Method

Thirteen children with torticollis participated in this study. The patients diagnosed as torticollis including muscular origin, ocular origin, and postural abnormality were included. The patients with intellectual disability and under 3 years old of age were excluded. The ipsilateral aspect of the orthosis is designed higher to provide support between the clavicle and mandibular angle and is made to be adjustable in height. A rough surface using Velcro was attached to the site of contact with the mandibular angle at the tilted head side, which makes the patient uncomfortable, inducing them to tilt head toward the opposite side as negative sensory feedback (Fig. 1). All patients have applied neck orthosis for 2 hour per day and 5 days per week. The neck orthosis was applied alone during the first 3 months for adaptation and then the rough surface was provided. The patients were educated with neck exercise to avoid contact the neck orthosis and rough surface for the active stretching exercise of ipsilateral neck muscle and strengthening exercise of contralateral neck muscle. Clinical outcomes were evaluated with the angle of inclination of the head.

Results

Four out of thirteen children were dropped out due to poor cooperation or follow-up loss. Total 9 patients (5 boys and 4 girls) participated in the study. Demographic data are shown in Table 1. Three patients were the postoperative state of ocular torticollis, 2 patients were the postoperative state of congenital muscular torticollis and 4 patients were positional torticollis. Significant improvement was revealed in the angle of torticollis after neck orthosis applied (p=0.000) (Fig. 2). Degree of neck angle correction, which represents the treatment effect, were significantly higher in the patients with higher initial neck angle and female gender (p=0.024 and 0.007, respectively) (Table 2). Age of starting treatment, treatment duration and side of the lesion did not affect the treatment effect. Among 9 patients, only 1 patient reported skin lesion as a minor complication. They did not report any major complications. After treatment, patients and their family were satisfied with corrected head posture with neck orthosis

Conclusion

This study provides evidence of clinical applicability of customized neck orthosis with negative sensory feedback. It may be an effective treatment option for refractory torticollis after surgical treatment or torticollis with the postural problem.

Figure 1. (A) Customized neck collar. Arrow indicates Velcro attached to the site of contact with mandibular angle at the tilted head side that provides negative feedback. (B) Application of customized neck collar to the patient with torticollis.

Table 1. Demographics and analyzed data of the subjects

Variables	Values
Age (months)	56.78±18.80
Gender	
Male	5 (55.6%)
Female	4 (44.4%)
Side of the lesion (Right : Left)	
Right	3 (33.3%)
Left	6 (66.7%)
Diagnosis	
Positional torticollis	4 (44.4%)
Postoperative state of ocular torticollis	3 (33.3%)
Postoperative state ofcongenital muscular torticollis	2 (22.3%)
Initial neck angle (°)	17.78±5.07
Treatment duration (months)	8.33±4.03
Neck angle at follow-up (°)	5.33±3.67
Improvement in neck angle (°)	12.44±5.00

Table 2. Effect of properties on treatment effect

Variables		Improve in neck angle
Age of starting treatment (months)	rho	0.404
	p-value	0.281
Initial neck angle (°)	rho	0.734
	p-value	0.024*
Treatment duration (months)	rho	0.140
	p-value	0.718
Gender	*p-value*	0.007*
Side of the lesion	*p-value*	0.332

Asterisk (*) means statistically significant