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Head Postural Changes in a Child with the Dominant Eye Affected by Superior Oblique Palsy: A Case Report

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Dear Editor,

Patients suffering superior oblique (SO) palsy usually adopt a head tilt contralateral to the affected eye to reduce the hypertropia. However, a paradoxical head tilt ipsilateral to the affected eye is seen in up to 3.4% of patients with SO palsy [1,2]. It is thought that patients with a paradoxical head tilt may prefer increasing image separation or using suppression to maintaining unstable binocular single vision [1–4]. Herein we reported a child with left SO palsy who changed the directions of head tilt when amblyopia developed in the right eye. Written informed consent for publication of the research details and clinical images was obtained from the patient's parents. To the best of our knowledge, this is the first report that found the moment developing a paradoxical head tilt in the unilateral SO palsy.

A 4-year-old boy without any trauma or medical history was referred for abnormal head posture. He was born full term with no perinatal history. He previously had a persistent head tilt to the right as shown in video taken at home and whole spine x-ray at the age of 3 years (Fig. 1A, 1B), while there were no abnormal musculoskeletal findings. However, he demonstrated a left head tilt of 15° at the presentation, which was eliminated by patching on the left eye (Fig. 1C, 1D). His best-corrected visual acuity was 20 / 50 in the right eye and 20 / 32 in the left eye with mild hyperopic astigmatism correction (+0.75 +1.25 × 90 for the right eye and +0.50 +0.75 × 90 for the left eye). In primary position, he had a left hypertropia of 6 prism diopters (PD), worsening in the right gaze and on the left head tilt. Versions were consistent with a left SO palsy. Fundus examination showed 8° extorsion in the right eye instead of the left eye, indicating that he preferred the left eye fixation (Fig. 1E, 1F). He started the amblyopia treatment with patching on the left eye. On the patching treatment, he showed a right face turn (Fig. 1G). However, he still showed a left paradoxical head tilt at the age of 5 years when achieving 20 / 20 in both eyes (Fig. 1H). During the 2 years follow-up, he had a left hypertropia of 6 to 8 PD in primary position, that measured 16 PD in the right gaze and orthotropic in the left gaze. The left hypertropia was 10 to 12 PD on the left head tilt and orthotropic on the right head tilt. Ocular motility of the left eye demonstrated +2 overelevation in adduction with –2 underdepression in adduction (Fig. 1I). Worth 4-dot testing revealed a right suppression at 5 m and on the left head tilt while a binocular fusion at 1/3 m. The coronal image of the orbit computed tomography showed symmetric SO muscles in both eyes. He underwent a left inferior oblique myectomy. Intraoperatively, the exaggerated forced ductions testing did not show laxity of the left SO tendon. A month after surgery, he showed improvement in the head position (Fig. 1J). Three months after surgery, he exhibited a mild left head tilt (<5°) with recurrence of amblyopia in the right eye, restarting the patching on the left eye.

Paradoxical head tilt in the setting of SO palsy may be attributed to the fixation preference for the affected eye particularly in children [3]. Our patient changed a right

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Fig. 1. Head postural changes in a child with left superior oblique (SO) palsy with altering the fixation preference. (A) Video capture image and (B) whole spine x-ray at age 3 years demonstrating a right head tilt. (C,D) Photographs taken at age 4 years, when he developed mild amblyopia in the right eye. (C) He showed a preference for tilting his head to the left. (D) Patching the left eye eliminated this head tilt. (E,F) Fundus photographs at age 4 years showing extorsion in the right eye, which suggests he prefers the left eye fixation. (G) Photograph of the patient showing a right face turn during amblyopia treatment. (H) Photograph and (I) nine-gaze photograph taken at age 5 years show that he still shows left SO palsy with a left head tilt. (J) Photograph that shows he has a normal head position a month after SO palsy surgery. The patient's parents provided written informed consent for publication of the clinical images.

head tilt to a left head tilt when the unaffected right eye developed mild amblyopia. It may be related to his fixation preference with the affected left eye supported by the fundus extorsion of right eye. The left head tilt allowed his fixating left eye to be in abduction and supraduction, farthest away from the field of action of the weak SO muscle. This position of the affected eye may result in the optimal stability through a balance between compensatory counter-rolling and anticompensatory torsional saccades [5]. In addition, he also showed a right suppression on the left head tilt. This is consistent with previous reports that patients in unilateral SO palsy with paradoxical head tilt experienced alternating suppression or diplopia with a head tilt toward the affected side, whereas unstable fusion with a usual compensatory head tilt [1,2,4]. Based on the two attributable factors, our patient may have more comfortable and clearer image in the fixating left eye with a paradoxical head tilt. Therefore, the head postures in childhood SO palsy can change with altering a fixation preference.

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