CASE REPORT

Bidirectional Synergistic Vergence

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ABSTRACT

A 14-year-old boy presented with left ptosis and squint since his childhood. In primary position he had left hypotropia with ptosis (levator function 2mm). With elevation of the right eye, the left eye depresses and adducts; with depression of the right eye, the left eye elevates and abducts. Forced duction test revealed no restrictive pattern. The synergistic divergence described in the literature was unidirectional and wholly compatible with inferior rectus co-contraction. But this case is bidirectional, and the aberrant upward movement cannot be explained by rectus muscle co-contraction. The two vertical rectus muscles show reciprocal misinnervation, or this effect could be coming from co-contraction of one of the oblique muscles for the movement in one direction.

Keywords: Divergence, innervation, oblique muscle, oculomotor nerve, rectus muscle

EXPLANATORY TEXT

Vertical synergistic divergence is a rare form of congenital cranial dysinnervation disorders.¹ Diagnosis is mainly based on nine cardinal gazes and forced duction test. Presence of the inferior oblique muscle underaction may lead to misdiagnosis of Brown syndrome. However forced duction test reveals no restrictive pattern in vertical synergistic divergence.² Retraction, which is important for the differential diagnosis with vertical Duane retraction syndrome, is not expected at attempted gazes.³ Jaw winking phenomena may be associated. Surgical outcomes are not satisfactory for most patients.

However, the synergistic divergence described in the previous cases was unidirectional

and wholly compatible with inferior rectus co-contraction. But our case is bidirectional and the aberrant upward movement cannot be explained by rectus muscle co-contraction. Oblique muscle co-contraction would be evidenced by dynamic torsion, associated abducting horizontal movement, or the globe protruding slightly and widening the palpebral fissure during gaze into the specified position. In attempted upgaze, the left eye adducts and infraducts, suggesting co-contraction of the inferior rectus muscle. In attempted downgaze, the exotropia increases dramatically (Figure 1). This suggests that the inferior oblique could be producing the co-contraction, since co-contraction from the superior rectus muscles would adduct the eye.

FIGURE 1 Nine cardinal gazes of 14-year-old boy with bidirectional synergistic vergence. With elevation of the right eye, the left eye depresses and adducts (top figure, middle row); with depression of the right eye, the left eye elevates and abducts (bottom figure, middle row).

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

REFERENCES

- [1] Pandey PK, Dadeya S, Singh A, Vats P, Rath N, Dangta S. Misinnervation in the third nerve palsy: vertical synergistic divergence or consummate congenital bilateral asymmetrical Brown's syndrome with congenital ptosis? *Indian J Ophthalmol* 2010;58:555–556.
- [2] Jethani J. Misinnervation in third nerve palsy: vertical synergistic divergence. *Indian J Ophthalmol* 2009; 57:476–477.
- [3] Pandey PK, Vats P, Singh A, Rath N, Sharma A, Sood S. Vertical synergistic divergence: to be or not to be, that is the quintessential question. *Indian J Ophthalmol* 2013;61: 86–87.