

Background

Third cranial nerve (CN III) palsy following traumatic brain injury presents a significant surgical challenge, particularly when combined with multiple other oculomotor nerve palsies. However, aberrant CN III regeneration can result in muscle synkinesis patterns which paradoxically provide surgical opportunities not seen in typical CN III palsies.

Purpose

To demonstrate the surgical utility of synkinesis arising from aberrant CN III regeneration in managing post-traumatic ptosis to restore functional eyelid position.

Case

A 16-year-old female was referred after a severe road traffic accident in August 2023. She had right CN III paresis with aberrant regeneration, plus right CN IV and CN VI paresis, causing right ptosis, limited ocular movements, and a right RAPD, though she retained good central binocular vision. Notably, the right upper eyelid retracted to a normal eyelid position when the patient gazed to the left (inverse Duane's sign). Her main concern was the droopy right eyelid in primary gaze. Preoperative yoked prism testing confirmed functionally useful synkinesis, and surgery based on Kestenbaum principles was used to shift the resting gaze position to the right, improving eyelid position in primary gaze without direct lid surgery. This achieved combined correction of strabismus and ptosis in a single procedure by exploiting aberrant CN III regeneration.



Conclusions

- 1) Preoperative assessment using yoked prisms can accurately guide surgical planning.
- 2) Fixation duress surgery offers a better alternative to traditional lid surgery by avoiding the well-documented complications of direct lid surgery including lagophthalmos, exposure keratopathy, and poor corneal protection from diminished Bell's reflex.
- 3) Identification of opportunities where synkinesis might be used to correct ptosis in the primary position reduces the added morbidity of direct lid surgery.

Pre-op

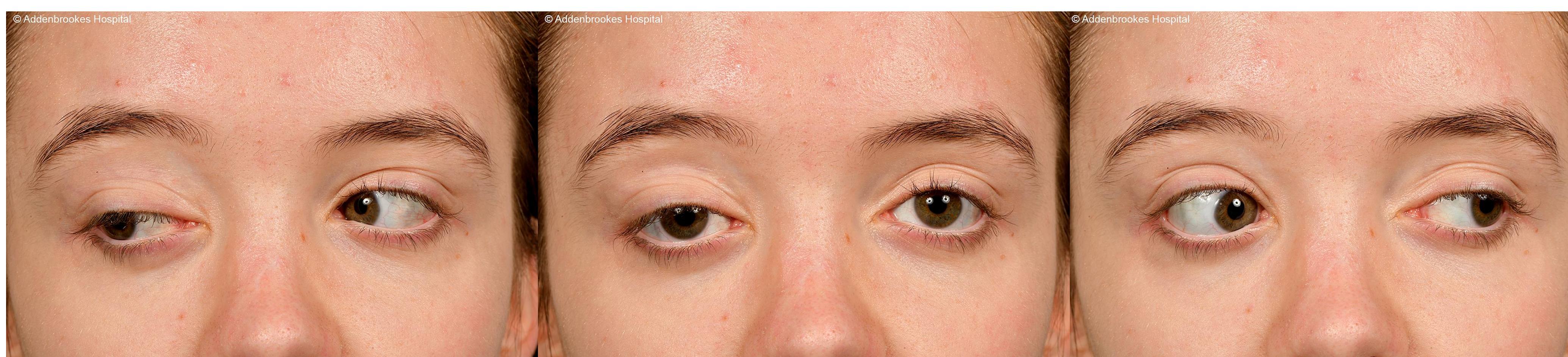


Yoked prism pre-op image showing improved right eyelid position in left gaze



Right ptosis in primary gaze

Post-op



Improved right eyelid position in primary gaze