

Anterior segment optical coherence tomography for identifying muscle status in strabismus surgery

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Dear Sir,

Anterior segment optical coherence tomography (AS-OCT) finds very few indications in the domain of strabismus surgery. Current applications remain restricted to determining limbus-muscle insertion distance and anterior segment changes after strabismus surgery. We discuss two cases of operated strabismus surgery where AS-OCT imaging helped in identifying the operated eye and/or extra ocular muscles (EOM) and thus proved instrumental in planning and management.

Case 1 A 45 years old orthotropic male presented with post traumatic left eye rhegmatogenous retinal detachment. He had history of strabismus surgery in the left eye in childhood for exotropia. He was planned for left eye vitreoretinal surgery with encirclage but in the absence of previous records, planning the encirclage was difficult. AS-OCT scans (Visante OCT, Carl Zeiss, Germany) were ordered to identify the EOMs where both the right and left medial rectus (MR) were found to be inserted normally. The right MR had a smooth contour (Figure 1) while left MR appeared bulky and irregular (Figure 2). At similar distance of 8.85 mm from the root of the iris, right MR measured 0.42 mm in thickness (Figure 1) while left MR measured 0.60 mm (Figure 2). The right lateral rectus (LR) appeared normal (Figure 3) while the left LR could not be identified even on maximal left

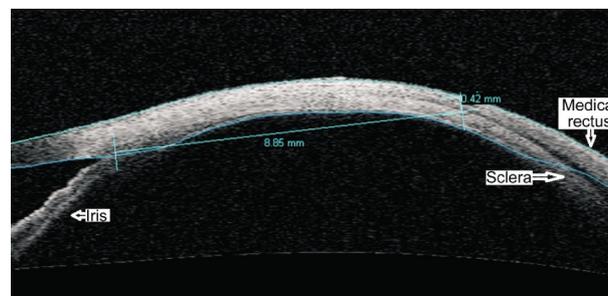


Figure 1 AS-OCT image of the right eye showing normally inserted medial rectus with smooth contour The muscle measures 0.42 mm in thickness at 8.85 mm from the root of the iris.

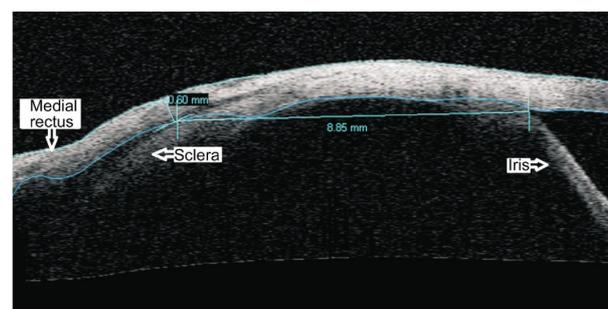


Figure 2 AS-OCT image of the left eye showing normally inserted medial rectus The muscle is bulky with irregular contour and measures 0.60 mm in thickness at 8.85 mm from the root of the iris.

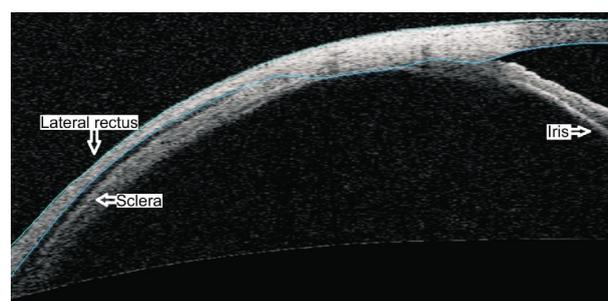


Figure 3 AS-OCT image of the right eye showing a normally inserted lateral rectus with smooth contour.

adduction. Instead shallow choroidal detachment was identified in the left eye (Figure 4). Hence previous surgery was presumed to be resection of left MR and supramaximal recession of left LR. During the vitreoretinal surgery, peritomy was extended temporally for placing the encirclage and the LR was localized at 17 mm from the limbus while MR was normal.

Case 2 A 23 years old girl presented with 30 degree exotropia in the right eye. Her father gave history of surgery

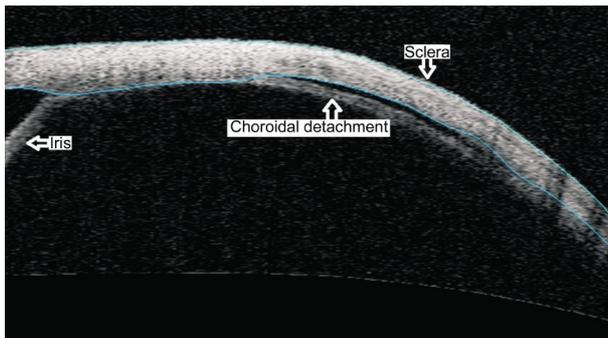


Figure 4 AS-OCT image of the left eye showing choroidal detachment Note that the lateral rectus cannot be identified even on maximal adduction.

in early childhood for strabismus but could not definitely identify the type of strabismus in childhood or the eye operated. No records or photographs were available and bilateral bulbar conjunctiva appeared free of scarring. With a presumptive diagnosis of consecutive right eye exotropia, AS-OCT imaging was performed to identify EOMs. The images revealed MR of both the eyes to be inserted normally but left MR was bulky in comparison to right MR. The right LR was normally inserted and had a smooth contour. The left LR however could not be identified even on maximal left adduction. Previous strabismus surgery was again concluded as left eye LR supramaximal recession and MR resection and the diagnoses was thus changed to residual exotropia. She was posted for right eye surgery where intra operative findings matched the AS-OCT findings in the right eye. AS-OCT imaging is non invasive, repeatable and highly reproducible for determining EOM insertion distance from limbus^[1]. We used the temporal 15 degree gaze for MR and nasal 30 degree gaze for LR for identifying the muscles in horizontal cross sections as suggested before^[2]. Inability to localize the LR in maximal adduction was presumed to be due to supramaximal recession in both the cases (as proven in case 1 during retinal surgery). Bulky and irregular contour of MR in both the cases was presumed to be due to resection

procedure. By identifying the operated eye (in case 2) and the operated muscles in both the cases, AS-OCT was thus helpful in their management and even changed our diagnoses in case 2.

AS-OCT scanning appears consistent for the horizontal recti muscles, as in our case, but the retro-equatorially inserted oblique muscles are difficult to scan. Although we can quantitatively comment on recession of the EOMs, the same cannot be done for resection procedure and is highly subjective. For the same reason we measured thickness of the MR in case 1 at similar distance in both the eyes and could demonstrate higher thickness in the operated eye (Figures 1, 2). AS-OCT has also been used to study anterior segment changes after strabismus surgery^[3-4].

To conclude, AS-OCT is quick and effective in identifying the operated muscles in cases of "forgotten squint surgery". EOM recession surgeries can be objectively identified by the same.

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