21 patients with IRDs (7 genetically confirmed, 11 clinically diagnosed, and 3 suspicious retinal dystrophies), 18 (86%) had abnormal photopic waveforms. Of the three normal photopic results, two were in the suspicious category, and one had a known rod-cone dystrophy. 20 patients presumed to have an IRD based on clinical findings completed dark adapted testing, and 100% had abnormal scotopic waveforms.
Discussion: Our results show that the RETeval handheld ERG is a practical and accurate tool for early diagnosis of pediatric IRD's, often avoiding the need for sedation and operating room time with conventional corneal electrode ERG testing.
Conclusions: To our knowledge, this is the first study investigating both scotopic and photopic responses obtained with the handheld RETeval ERG in a cohort of pediatric IRD patients. This device is especially useful in younger children and may allow for widespread use of ERG's outside the tertiary care setting.

037 Feasibility of eye patch assistant plus a microsensor to monitor objective adherence with patching. Jingyun Wang, Hongxin Xu, Reed M. Jost, Bryan De La Cruz, Sarah E. Morale, Eileen E. Birch
Introduction: A microsensor was suggested to monitor adherence with patching amblyopia treatment due to its advantages: small, waterproof, long-lasting battery. However, its application has been limited because of a number of practical challenges: (1) it is so small that it is hard to hold and is easily lost; (2) children or pets may swallow it due to its candylike appearance. To overcome these challenges, we designed a small device, the Eye Patch Assistant (EPA), to facilitate patching with a microsensor. This study reports pilot data for use of the EPA coupled with a microsensor to monitor patching adherence.
Methods: Thirteen adults (11 control, 2 amblyopic) and 20 children (6 control, 14 amblyopic) were enrolled. Participants were asked to wear an Ortopad eyepatch (patch) or an Ortopad eyepatch plus the EPA with a microsensor embedded (patch+EPA). Each adult completed both testing conditions for 2 hours each in random order and reported their wearing time (based on clock). Each child was randomized to either Patch or Patch+EPA for a short period of time (5-20 min). The sensor reading interval was set to 5 min. After each test condition, a questionnaire with 12 questions related to comfort was administered.
Results: In the adult group, self-reported time wearing patch+EPA (mean $\pm$ SD) was 119 $\pm$ 4 min, while the microsensor-reported 121 $\pm$ 6 min. In the child group, self-reported time wearing Patch+EPA was 9.4 $\pm$ 5.4 min, while the microsensor-reported 8.5 $\pm$ 5.3 min. There was no significant difference between self-reported and microsensor-reported patch-wear time (paired t test, $P = 0.5$).There was no significant in comfort scores ($P > 0.05$) for all questions.
Discussion: Objective adherence with patching can be monitored safely with a microsensor assisted with the EPA.
Conclusions: Within a predictable variability due to its 5 min sampling interval, a microsensor embedded in the EPA device provides a promising way to safely monitor adherence with patching in children.

038 Are piggyback IOLs recommendable for children? M. Edward Wilson, Rupal H. Trivedi
Introduction: The selective use of piggyback IOLs for young children has been reported since the mid-1990s but only in small numbers and without longer term follow-up. Surgeons currently have insufficient information about whether these techniques are recommendable.
Methods: An IRB-approved retrospective chart review was conducted of consecutive cases of piggyback IOL implantation in children at one institution.
Results: Fifty-one eyes of 40 children received piggyback IOL implantation, 42 eyes at the time of cataract surgery and 9 eyes as a later secondary procedure. Median age at cataract surgery and piggyback IOL placement were 0.51 and 0.73 years respectively. Four eyes (8%) underwent unplanned piggyback IOL removal (1 each for IOL tilt, pupillary capture, pupillary block, and pupillary membrane). Forty-four eyes had >5 years' follow-up (median, 12.42 years of follow-up); 35/44 eyes had the piggyback IOL explanted in a planned manner at a median of 3.24 years after implantation. 9 eyes have still not had the piggyback IOL explanted after a median 11.6 years of follow-up. 9 eyes have needed IOP-lowering topical medications, and 1 eye has been operated for glaucoma.
Discussion: Planned sulcus IOL explantation was uncomplicated in our series. While early-unplanned complications required IOL removal in 4 eyes, late complications were not noted and glaucoma developed at predictable rates for this population.
Conclusions: Piggyback IOL placement in young children (1 in the bag and 1 in the sulcus) appears to have an acceptable safety profile. It allows the surgeon to aim for emmetropia at surgery and manage increasing myopia over time rather than decreasing hyperopia.

039 Horizontal and vertical eye movements after horizontal and vertical recti were detached from eyes in patients with nystagmus. Dongsheng Yang, Ping Wang
Introduction: We usually believe that horizontal or vertical eye movements would be eliminated if horizontal or vertical recti were detached from the eye. However, we observed large horizontal or vertical eye movements after horizontal or vertical recti were detached from the eye. We will report the video-recorded eye movements.
Methods: The medial and lateral recti were surgically detached from insertions of the eyes during extra-ocular muscle (EOM) surgeries in 5 adult patients with infantile nystagmus syndrome. In another patient with acquired nystagmus, whose right superior rectus and inferior oblique were detached from her right eye, large (up to 20°) upword eye movements were also recorded. The amplitudes of the eye movements was estimated based on the distance of the movements.
Results: The amplitudes of the horizontal eye movements are about 25° $\pm$ 5° after the the medial and lateral recti were detached and amplitude of upward eye movements were about 20° after the superior rectus and inferior oblique were detached.
Discussion: Large horizontal and vertical eye movements were recorded after horizontal and vertical EOM were detached. It indicates that vertical recti may involve in horizontal eye movments and horizontal recti may involve in vertical eye movements.
Conclusions: Activity of vertical recti during the horizontal eye movements may need to be investigated, and vice versa for vertical eye movements.

040 Punctate hyperreflective vitreous opacities visualized by handheld spectral domain optical coherence tomography in premature infants screened for retinopathy of prematurity. Emily M. Zepeda, Thomas B. Gillette, Ayesha Shariff, Laura Grant, Leona Ding, Kristina Tarczy-Hornoch, Michelle T. Cabrera
Introduction: Vitreous changes in retinopathy of prematurity (ROP) are poorly understood. The goal of this study was to characterize