

RETINOPATHY of PREMATURITY

Transscleral Retinal Photocoagulation (TSRPC)

<p>ROP-TS1 Transscleral versus Transpupillary Diode Laser Photocoagulation for Stage 3+ Retinopathy of Prematurity Seiberth V, Vardarli I, Knorz MC, Liesenhoff H. Presentation. D.O.G. Meeting Heidelberg. Mannheim/Heidelberg September 1995. German J Ophthalmol 1(Suppl):127, 1995</p> <p><i>Also listed as ROP-LI25.</i></p>	<p>Twenty eyes of 10 infants (gestational age 24-27 weeks, mean 25.7 ± 0.9 weeks; birth weight 480-908 g. mean 777 ± 175 g) with ROP stage 3+ were treated with diode infrared laser photocoagulation. One eye of each infant was treated transsclerally while the fellow eye had transpupillary coagulation using the laser indirect ophthalmoscope. Follow-up ranged from 2 to 14 months (mean 7.5 ± 2.3 months.) In 10 (100%) eyes treated transpupillary and in 9 (90%) eyes treated transsclerally, ROP regressed after a single or a second laser treatment and the outcome was a flat, attached retina. One eye (10%) with zone I disease failed after transscleral laser treatment and ROP progressed to stage 4 A with a retinal fold and partially attached retina, although additional retinal detachment surgery with an encircling band was performed. There were no adverse side effects as a result of retinal/preretinal bleeding in the ridge in five eyes (25%). Conclusion: Transscleral diode laser coagulation for treatment of ROP stage 3+ proved to be as effective and safe as transpupillary diode laser photocoagulation.</p>
<p>ROP-TS2 Transscleral versus Transpupillary Diode Laser Photocoagulation for Threshold Retinopathy of Prematurity Sieberth V, Vardarli I, Jendritza W, Knorz MC, Liesenhoff H. University Eye Clinic, Klinikum Mannheim, Germany [ARVO Abstract]. Invest Ophthalmol Vis Sci. 37(3): S695. Abstract nr 3176, 1996</p> <p><i>Also listed as ROP-LI31.</i></p>	<p>The 810 nm diode laser wavelength makes lens-sparing transscleral coagulation of the retina possible, and to evaluate the efficacy and safety of transscleral diode laser coagulation for threshold ROP, the authors performed a controlled clinical study. Forty eyes of 20 preterm infants (gestational age 24-29 weeks, mean 26.8 ± 1.6 weeks; birth weight 540-1200 g. mean 859 ± 163 g) with threshold ROP were treated with diode laser photocoagulation. One eye of each infant was treated transsclerally while the fellow eye had transpupillary coagulation using the laser indirect ophthalmoscope. Follow-up ranged from 4 to 22 months (mean 10.5 ± 6.3 months). Main outcome measure was the regression of acute ROP and the incidence of adverse treatment effects. In 20 (100%) eyes treated transpupillary and in 19 (95%) eyes treated transsclerally ROP regressed after a single or a second laser treatment and the outcome was a flat, attached retina. One eye (5%) with zone I disease failed after transscleral laser treatment and ROP progressed to stage 4B with a partially attached retina, although retinal detachment surgery with an encircling band was performed. No adverse side effects as a result of diode laser treatment were noted except for a small amount of retinal/preretinal bleeding in the ridge in 9 (45%) transsclerally and in 5 (25%) transpupillary coagulated eyes. There were no adverse side effects (e.g. bleeding, cataract formation) in the anterior segments of the eyes. Conclusion: The results suggest that transscleral 810 nm diode laser coagulation for treatment of threshold ROP is as effective and safe as transpupillary diode laser photocoagulation.</p>

<p>ROP-TS3 Transscleral vs. Transpupillary Diode Laser Photocoagulation for the Treatment of Threshold Retinopathy of Prematurity Seiberth V, Linderkamp O, Vardarli I. Arch Ophthalmol 115:1270-1275, 1997</p> <p><i>Also listed as ROP-LI40.</i></p>	<p>To evaluate the efficacy and safety of transscleral diode laser photocoagulation for acute proliferative ROP, the authors performed a controlled clinical study in 25 preterm infants with threshold ROP in both eyes: One eye of each infant was treated transsclerally with the OcuLight and DioPexy Probe and the fellow eye was treated transpupillary using the OcuLight and laser indirect ophthalmoscope.</p> <p><u>Treatment Parameters</u></p> <table border="1"> <thead> <tr> <th></th> <th>Transsclerally</th> <th>Transpupillary</th> </tr> </thead> <tbody> <tr> <td>Spot size</td> <td>1000 µm</td> <td>480 µm</td> </tr> <tr> <td>Power</td> <td>250 - 600 mW</td> <td>160 - 450 mW</td> </tr> <tr> <td>Duration</td> <td>200 - 600 ms</td> <td>200 ms</td> </tr> <tr> <td>Number of Burns</td> <td>153 - 877</td> <td>329 - 2078</td> </tr> </tbody> </table> <p>Follow-up ranged from 2 to 22 months. After transpupillary coagulation, ROP regressed in all 25 of the eyes; after transscleral coagulation, ROP regressed in 24 of the 25 eyes. Transscleral diode laser coagulation is as effective in the treatment of threshold ROP as transpupillary diode laser photocoagulation.</p>		Transsclerally	Transpupillary	Spot size	1000 µm	480 µm	Power	250 - 600 mW	160 - 450 mW	Duration	200 - 600 ms	200 ms	Number of Burns	153 - 877	329 - 2078
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<p>ROP-TS4 Follow-Up After Transscleral Diode Laser Photocoagulation For Retinopathy of Prematurity Stage 3+ Akkoyun I,¹ Seiberth V,^{1,2} Jendritza W,¹ Vögele C,¹ Liesenhoff H.¹ ¹University Eye Clinic, Klinikum Mannheim, Germany; ²Department of Ophthalmology, Marienhospital Osnabrueck, Germany [ARVO Abstract]. Invest Ophthalmol Vis Sci. 39(4): S819. Abstract nr 3792, 1998</p> <p><i>Also listed as ROP-LI41.</i></p>	<p>To evaluate the safety of transscleral diode laser treatment for ROP stage 3+, the authors prospectively examined 30 eyes of 30 very low birth weight infants (gestational age 23 to 31 weeks, mean ± SD 26.6 ± 1.8; birth weight 510-1200, 855 ± 170) quarterly after regression of acute ROP. Examinations included assessment of anterior segment, fundus, vision, refractive error and biometry. Follow-up ranged from 10 to 48 months (29.6 ± 11.2). Control group consisted of the 30 fellow eyes treated transpupillary using the laser indirect ophthalmoscope. In 29 of 30 eyes (97%) of transscleral and all (100%) transpupillary treated eyes, the outcome was a flat and attached retina. There were no anterior segment abnormalities (e.g., iris burns, synechiae, cataract) in all eyes of both groups. Visual acuity, refractive error and biometry showed no significant differences between the transpupillary and transscleral treated eyes. These results indicate that transscleral diode laser photocoagulation can safely be used for the treatment of ROP stage 3+.</p>															
<p>ROP-TS5 Refractive Error after Transscleral Diode Laser Photocoagulation for Threshold Retinopathy of Prematurity Woldt C,¹ Seiberth V,¹ Akkoyun I,² Hügger P.² ¹Department of Ophthalmology, Marienhospital Osnabrueck, Johannisfreiheit 2-4, D-49074 Osnabrueck, Germany; ²University Eye Clinic, Theodor-Kutzer-Ufer, D-68135 Mannheim, Germany [ARVO Abstract]. Invest Ophthalmol Vis Sci. 40(4): S477. Abstract nr 2515, 1999</p>	<p>Refractive error was measured prospectively in 16 eyes of 16 preterm infants (gestational age 24 to 31 weeks, mean ± SD 26.9 ± 1.9; birth weight 540 to 1200 g, mean ± SD 849 ± 174) treated at random with transscleral diode laser photocoagulation for threshold ROP. Controls were the 16 fellow eyes treated transpupillary. Mean refractive error was not significantly different in the second year after coagulation in transsclerally (-3.5 ± 5.4 D) or transpupillary (-3.0 ± 5.1 D) coagulated eyes (p=0.8). However, the transsclerally coagulated eyes showed slightly more myopia than the transpupillary coagulated fellow eyes, though the difference was not statistically significant (p=0.08).</p>															

<p>ROP-TS6 Transscleral Diode Laser in the Treatment of Retinopathy of Prematurity Davis AR, Jackson H, Trew D, McHugh JDA, Aclimandos WA. Eye 13;571-576, 1999</p>	<p>Transscleral diode laser (TSDL) treatment with the IRIS Medical infrared (810 nm) OcuLight photocoagulator and DioPexy Probe was performed in 14 eyes of 8 babies with threshold ROP (stage III+).</p> <p><u>Treatment Parameters</u> All treatment was transconjunctival. The desired visible endpoint was a greyish-white retinal lesion.</p> <p>Anesthesia: The authors' preferred method is general anesthesia. Duration: 2 – 3 seconds Power: 500 to 750 mW</p> <p>All 14 eyes showed regression of plus disease at 1 week after treatment. Twelve eyes began to show signs of regression of abnormal neovascularization at 2 weeks. At last follow-up, 11 eyes (79%) showed a favorable outcome. Three (21%) eyes developed traction retinal detachments. Minimal chemosis and lid edema were observed in all patients. The degree of conjunctival edema was minimal and resolved in 24 hours in all cases. Conclusion: TSDL photocoagulation is an effective and technically straightforward alternative to cryotherapy in the treatment of ROP. The combination of transscleral and indirect laser may prove to be the ideal regimen for treatment of ROP, particularly in babies with extensive disease in zone 1 or those who need re-treatment.</p>
<p>ROP-TS7 Transscleral Diode Laser Photocoagulation in Acute Retinopathy of Prematurity Seiberth V, Woldt C, Linderkamp O. Klin Monatsbl Augenheilkd 215;241-246, 1999</p> <p>Article – German Abstract - English</p>	<p>In a controlled clinical study, 60 eyes of 30 very low birth weight infants with threshold ROP were treated with diode laser photocoagulation. One eye of each infant was coagulated transsclerally while the fellow eye had transpupillary coagulation using the LIO. Follow-up ranged from 2 to 38 months. Results: In 29 (97%) out of 30 eyes treated transsclerally and in 30 (100%) out of 30 eyes treated transpupillary, the outcome was a flat, attached retina. Three eyes had a second laser treatment and 2 eyes had additional retinal detachment surgery. One eye (3%) with zone 1 disease failed after transscleral laser treatment and additional retinal detachment surgery with partially detached retina (stage 4B). No adverse side effects as a result of laser treatment were noted except for a small amount of retinal/preretinal bleeding in the ridge and a vitreous bleeding. There were no adverse side effects in the anterior segments of the eyes. Conclusion: Transscleral diode laser coagulation for treatment of threshold ROP proved to be as effective as transpupillary diode laser photocoagulation. Only minor side effects were noticed. Transscleral diode laser photocoagulation is an advantageous treatment method in eyes with preexisting risk of cataract formation in transpupillary treatment.</p>

<p>ROP-TS8 Laser Therapy for Retinopathy of Prematurity Banach MJ, Berinstein DM Curr Opin Ophthalmol 12:164-170, 2001</p> <p><i>Also listed as ROP-LI55.</i></p>	<p>In this review, the most recent advances of ROP and its accurate diagnosis are discussed. All current aspects of laser photocoagulation are discussed, including the indications for treatment, equipment, anesthesia, treatment techniques, complications, postoperative care, and structural outcomes. Systemic parameters that may affect ocular outcomes are also addressed. Some highlights:</p> <p><u>Laser Treatment Technique</u> Laser treatment should be instituted within 72 hours of the diagnosis of threshold disease. The authors use the 810 nm OcuLight laser with an indirect delivery system to apply laser treatment to avascular retina immediately anterior to the ridge of extraretinal fibrovascular proliferation and extending to the ora serrata for 360° in all cases. A moderately intense, gray-white burn is the desired target intensity. Laser settings to achieve the desired lesion intensity vary, but often range from a power of 150 mW to 400 mW and duration of 0.2 to 0.3 seconds. The mean number of burns have ranged from 410 to 1556 in these reports, but this can vary considerably depending on the posterior extent of the ridge and the resultant spot size.</p> <p>Complications: Laser photocoagulation using the indirect delivery system has potential immediate ocular complications that include inadvertent macular burns, and both vitreous and choroidal hemorrhage. Thermal injuries to the cornea, iris, and lens can also occur. Cataracts are well described following indirect laser treatment for ROP.</p> <p>Postoperative care: Immediately after laser treatment, steroid drops or ointment may be applied. Follow-up examinations are performed weekly until the regression of plus disease and fibrovascular proliferation occurs, then every 2 to 4 weeks until 3 months of age (corrected).</p> <p><u>Transscleral Retinal Photocoagulation</u> Transscleral diode lasers are also available for treating ROP. The transscleral probe is applied to the external surface of the sclera and has a diode aiming beam that allows the targeted retina to be visualized using an indirect ophthalmoscope. To achieve a grayish, white burn, the authors used powers between 500 and 750 mW and a pulse duration of 2 to 3 seconds. Advantages of transscleral treatment when compared with transpupillary treatment include the reduced risk of thermal injury to the iris and lens, and the ability to treat through media opacities such as vitreous hemorrhage and miotic pupils. Disadvantages include the technical difficulty in treating zone 1 disease just anterior to the ridge without conjunctival incisions. Although the vast majority of infants can be safely treated with transpupillary laser applications, transscleral diode laser may play a role in select cases.</p>
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<p>ROP-TS9 Functional and Refractive Outcome of Laser Photocoagulation for Retinopathy of Prematurity G.Kieselbach, A.Ramharter, Baldissera I, Kralinger MT. Ophthalmology, Univ of Innsbruck, Innsbruck, Austria. Invest Ophthalmol Vis Sci. 45:ARVO E-Abstract 4039, 2004</p> <p><i>Also listed as ROP-LI68.</i></p>	<p>The authors examined 19 consecutive patients who had undergone photocoagulation for ROP between 1997 and 2002. A total of 37 eyes received either 810 nm transscleral or transpupillary laser treatment. Data consisted of grade of ROP pre-and postoperatively, birth-weight, perioperative and postoperative complications and refraction. Based on indirect ophthalmoscopy, independent observers graded the extent of ROP and determined the postoperative refraction by retinoscopy. Results: 97.3 % of all eyes responded to laser treatment with regression of ROP. Only 1/37 eyes progressed to stage 4B despite photocoagulation and therefore an encircling procedure was performed. After further progression the eye had to have a vitrectomy. Perioperative complications included hemorrhages in 21.6% that resorbed spontaneously and cataract formation in 1 eye (2.7%). Postoperative refractive errors at a mean age of 25±16 months were evaluated. The mean spherical equivalent was +1.0±3.5D. Only 13.6% of the refracted eyes were myopic. Conclusions: Photocoagulation for ROP resulted in regression of threshold ROP. In addition, the analyses of the refractive outcomes demonstrated a predominance of hypermetropia. Whether laser therapy is beneficial in avoiding myopic shift in preterm infants, must be evaluated by a prospective study.</p>
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