Original Article

Absorbable suture for band tightening of scleral buckling in pseudophakic rhegmatogenous retinal detachment: a modified surgical technique and a 6-month follow-up

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ABSTRACT

Background: Rhegmatogenous retinal detachment (RRD) is a separation of the neurosensory retina from the retinal pigment epithelium as a result of liquid vitreous passing through a retinal break. Scleral buckling surgery (SB) is a conventional treatment for RRD. In SB, a silicon explant is used to indent the sclera, reduce vitreous traction, and close the retinal break, and an encircling band is used circumferentially, leading to myopia. This study aimed to evaluate the functional and biometric outcomes after SB with absorbable band-tightening sutures in patients with pseudophakic RRD.

Methods: In this prospective interventional study, we included pseudophakic eyes with RRD treated surgically with SB and a temporary encircling band using a 6-0 absorbable Vicryl suture to tighten the band, instead of conventional permanent suture tightening. Anterior chamber depth (ACD), axial length (AL), intraocular pressure (IOP), spherical equivalent refractive error (SER), and best-corrected distance visual acuity (BCDVA) were measured preoperatively and at 1 day, 2 weeks, 3 months, and 6 months postoperatively.

Results: We included 30 eyes of 30 patients with a mean (standard deviation [SD]) age of 66.1 (10.5) years who underwent SB with an absorbable band-tightening suture for pseudophakic RRD. Significant increases in AL and ACD were observed at 2 weeks after surgery, with a significant decline in values thereafter; however, at the 6-month follow-up, the values were significantly higher than those at baseline (all $P < 0.05$). Based on the Vicryl tension and its hydrolysis, mean (SD) SER at 2 weeks postoperatively was significantly more myopic than at baseline (-5.8 [1.6] D versus +1.3 [1.8] D). However, the mean (SD) SER decreased significantly throughout the 6-month follow-up (all $P < 0.05$), and it reached -1.8 (0.9) D, which was comparable with the mean baseline SER ($P = 0.140$). The participants experienced significant improvement in BCDVA throughout the follow-up period (all $P < 0.05$).

Conclusions: Using an absorbable suture to tighten the encircling band in patients with pseudophakic RRD can reduce postoperative myopia without adversely affecting the anatomical or functional outcomes. Future comparative studies with larger sample sizes and longer postoperative follow-up are needed to verify these findings.

KEYWORDS

rhegmatogenous retinal detachment, retinal detachment, absorbable, suture, Vicryl, scleral bucklings, eye axial length, myopia, anterior chamber

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INTRODUCTION

Rhegmatogenous retinal detachment (RRD) is the separation of the neurosensory retina from the retinal pigment epithelium as a result of liquid vitreous passing through a retinal break. Several studies have reported the incidence of RRD as 6.3 – 17.9 per 100,000 population per year [1, 2]. In studies with sample sizes greater than 300, the annual incidence has been reported as 10.5 cases per 100,000 population [1]. The incidence of RRD in pseudophakic eyes is four times that in phakic eyes [3].

Scleral buckling surgery (SB) has been used as conventional treatment of retinal detachment for decades [4-6]. In SB, silicone explants are used to indent the sclera in the area of the retinal break, reduce vitreous traction, and close the retinal break. Moreover, a circumferential encircling band is often used. The success rate of this operation ranges from 82.5% to 88.8% [7-9]. SB is performed using nonabsorbable polyester sutures. The encircling band is also permanently tightened using a non-absorbable polyester suture or silicone sleeve [10].

Among the complications of this operation is severe myopia resulting in profound vision loss, which is very annoying in pseudophakic patients [11]. When a Vicryl suture is absorbed [12], the traction of the bandage disappears because the bandage slips to its original position and has no indentation effect on the sclera. Based on this principle, to reduce postoperative myopia, we decided to modify the conventional SB procedure by using Vicryl for band tightening instead of the non-absorbable suture, so that the buckling effect of the band would be temporary.

Thus, this study attempted to determine whether encircling band-induced myopia can be eliminated if the band is tightened with Vicryl sutures in cases of pseudophakic RRD. We evaluated the anatomical, functional, and biometric outcomes of eyes with pseudophakic RRD treated with SB using absorbable band-tightening sutures.

METHODS

In this prospective interventional study, we recruited 30 eyes of 30 patients with pseudophakic RRD who underwent SB between January 2019 and January 2020. The study was approved by the Ahvaz Jundishapur University of Medical Sciences Ethics Committee (approval number: IR.AJUMS.REC.1397.490) and was conducted in compliance with the tenets of the Declaration of Helsinki. The study procedures were explained to all participants, and written informed consent was obtained from each.

We included patients with pseudophakic RRD, proliferative vitreoretinopathy (PVR) of no more than grade B, and who were scheduled for an SB procedure. We excluded patients with a history of ocular trauma, history of retinal surgery including pars plana vitrectomy, age less than 15 years, giant retinal tear, choroidal neovascularization, diabetic retinopathy, glaucoma, uveitis, macular hole, age-related macular degeneration, macular scar, and systemic disease or the use of drugs that affect wound healing.

All patients underwent conventional SB [10, 11], in which a 240 encircling scleral band is anchored to the sclera using non-absorbable 5-0 braided polyester mattress sutures and a circumferential or meridional segmental silicone tire beneath the band is anchored to the sclera at the area of the retinal break(s) and is tightened using non-absorbable 5-0 braided polyester mattress sutures. However, in contrast to the conventional procedure, the encircling band was tightened (band-tightening suture) with 6-0 absorbable Vicryl (6-0 Vicryl; Ethicon Inc., Somerville, NJ, USA). Subretinal fluid was drained using a 23-gauge needle for all eyes. A postoperative barrier laser (Ellex Medical Lasers, Adelaide, South Australia, Australia) was used around the retinal break(s) in all eyes.

On postoperative day 1, 0.1% betamethasone (Betasonate; Sina Daru Co., Tehran, Iran), homatropine 2% ophthalmic solution (Sina Daru Co., Tehran, Iran), and ciprofloxacin 0.3% (Ciplex, Sina Daru Co., Tehran, Iran) were prescribed four times per day for 3 – 4 weeks.

Patients were examined before surgery and at 1 day, 2 weeks, 3 months, and 6 months postoperatively. At each visit, examinations included best-corrected distance visual acuity (BCDVA) using an E chart and converted to logarithm of the minimum angle of resolution; cycloplegic refraction after instilling two drops of cyclopentolate 1% (Sina Daru), using streak retinoscopy (HSR II; Heine Optotechnik, Herrsching, Germany), and recording spherical equivalent refractive error (SER); axial length (AL) and anterior chamber depth (ACD) measurements using IOL Master 500 (Carl Zeiss Meditec, Jena, Germany); intraocular pressure (IOP) measurement using a contact Goldmann applanation tonometer (Haag-Streit, AT-900, Koeniz-Berne, Switzerland); and fundus examination using an ID-10 indirect binocular ophthalmoscope (Topcon, Tokyo, Japan).

IBM SPSS Statistics for Windows (version 26.0; IBM Corp., Armonk, NY, USA) was used for the statistical analysis. Quantitative variables are presented as means and standard deviations (SD), and qualitative variables are presented as frequencies and percentages. The Kolmogorov–Smirnov test was used to assess the normality

of distribution of the variables. If the quantitative variables had a normal distribution, Student's *t*-test or one-way analysis of variance (ANOVA) was used to compare the means of the variables. If the studied variables did not have a normal distribution, the non-parametric Mann-Whitney U test or Kruskal-Wallis test was used to compare the means of the variables. Statistical significance was set at $P < 0.05$.

RESULTS

Overall, we included 30 eyes of 30 patients with pseudophakic RRD who were treated with SB using 6-0 absorbable Vicryl band-tightening sutures. Table 1 presents the baseline characteristics of the study participants.

Postoperatively, fundus examination with indirect ophthalmoscopy showed peripheral band indentation at the 1-day and 2-week visits that disappeared at the 3- and 6-month examinations. Of the 30 eyes, 26 (87%) had retinal reattachment up to 6 months after the first operation, and 4 eyes (13%) developed retinal detachment during the 2 months after surgery and underwent standard pars plana vitrectomy. After pars plana vitrectomy, 3 eyes had retinal reattachment, but one did not recover, and the retina was re-detached. The reason for retinal re-detachment after SB

Table 1. Baseline characteristics of the study participants

Parameters	Values
Age (y), Mean ± SD, Median (Range)	66.1 ± 10.5, 67 (45 to 78)
Sex (Male / Female), n (%)	24 (80) / 6 (20)
Laterality (OD / OS), n (%)	12 (40) / 18 (60)
Time since RRD diagnosis (days), Mean ± SD, Median (Range)	4.1 ± 2.1, 5.0 (3 to 10)
Time since cataract surgery (y), Mean ± SD, Median (Range)	5.2 ± 2.4, 5.4 (1 to 10)

Abbreviations: y, years; SD, standard deviation; n, number; %, percentage; OD, right eye; OS, left eye; RRD, rhegmatogenous retinal detachment.

Table 2. Comparison of pre- and postoperative ocular parameters in study participants

Variable	Follow-up points			
	Pre-op	**2-week post-op**	**3-month post-op**	**6-month post-op**
ACD (mm), Mean ±SD **Median (Range)**	0.3 ± 3.5 3.6 (3.3 to 4.1)	4.7 ± 0.4 4.1 (3.7 to 5.2)	4.4 ± 0.4 4.4 (3.8 to 5.4)	4.1 ± 0.3 4.2 (3.8 to 4.8)
P_0	-	**0.001**	**0.001**	**0.001**
Significance between periods	-	P_1 **= 0.036,** P_2 **= 0.025,** P_3 = 0.080		
AL (mm), Mean ± SD **Median (Range)**	23.3 ± 0.5 23.2 (22.7 to 24.2)	25.2 ± 0.8 25.2 (24.2 to 26.6)	24.8 ± 0.7 24.7 (23.7 to 26.0)	24.3 ± 0.7 24.2 (23.1 to 25.8)
P_0	-	**< 0.001**	**0.001**	**0.003**
Significance between periods	-	P_1 **= 0.001,** P_2 **= 0. 001,** P_3 **= 0.001**		
IOP (mmHg), Mean ± SD **Median (Range)**	11.5 ± 2.3 12 (7 to 15)	13.9 ± 1.9 13.5 (11 to 18)	12.8 ± 1.2 12.5 (10 to 15)	1.1 ± 12.5 12.4 (10 to 14)
P_0	-	**0.003**	**0.044**	0.154
Significance between periods	-	P_1 **= 0.007,** P_2 **= 0.007,** P_3 **= 0.025**		
SER (D), Mean ± SD **Median (Range)**	+ 1.3 ± 1.8 -1.5 (+ 1.8 to - 3.8)	- 5.8 ± 1.6 - 5.7 (- 4.0 to - 7.0)	- 4.3 ± 1.0 - 4.2 (- 2.5 to - 6.3)	- 1.8 ± 0.9 - 1.9 (+ 0.3 to - 3.5)
P_0	-	**0.002**	**0.002**	0.140
Significance between periods	-	P_1 **= 0.010,** P_2 **= 0.001,** P_3 **= 0.002**		
BCDVA (logMAR), Mean ± SD **Median (Range)**	2.1 ± 0.1 2.1 (1.8 to 2.2)	1.2 ± 0.4 1.4 (1.0 to 1.9)	0.9 ± 0.4 0.8 (0.5 to 1.9)	0.2 ± 0.8 (0.4 to 1.0)
P_0	-	**0.007**	**0.001**	**0.001**
Significance between periods	-	P_1 **= 0.007,** P_2 **= 0.002,** P_3 **= 0.027**		

Abbreviations: Pre-op, preoperative; post-op, postoperative; ACD, anterior chamber depth; mm, millimeter; SD, standard deviation; AL, axial length; IOP, intraocular pressure; mmHg, millimeter of mercury; SER, spherical equivalent refractive error; D, diopter; BCDVA, best-corrected distance visual acuity; logMAR, logarithm of the minimum angle of resolution. *P*-values < 0.05 are shown in bold. P_0, *P*-value for comparison between baseline and each postoperative measurement; P_1, *P*-value between 2-week and 3-month postoperative measurements; P_2, *P*-value between 2-week and 6-month postoperative measurements; P_3, *P*-value between 3- and 6-month postoperative measurements; SER was reported for patients with macula on.

was missed retinal break(s) with insufficient buckling support or PVR. No buckle or band complications, such as buckle extrusion, were observed during the study period.

Table 2 shows ACD, AL, IOP, SER, and BCDVA values at baseline and each follow-up visit. One day after surgery, the mean ACD was deeper than at baseline and was significantly deeper even 2 weeks after surgery. Yet, the 3-month measurement revealed a significant decrease, and at 6 months the ACD was shallower but still significantly deeper than at baseline (all $P < 0.05$) (Table 2). One day after surgery, the mean AL was longer than at baseline and was significantly longer even at two weeks after surgery; yet, despite a decreasing trend up to 6 months, the mean AL was still significantly longer than at baseline (all $P < 0.05$) (Table 2). One day after surgery, the mean IOP was significantly higher than at baseline ($P = 0.001$); however, it decreased significantly at 2 weeks, 3 months, and 6 months (all $P < 0.05$) and reached its lowest postoperative level at 6 months, which was comparable with the mean baseline IOP ($P > 0.05$) (Table 2). Two weeks after surgery, the mean SER was significantly more myopic than at baseline; however, it decreased significantly thereafter (all $P < 0.05$), and at 6 months, it was slightly higher but not significantly different from the mean baseline SER ($P > 0.05$) (Table 2). Postoperative BCDVA improved significantly from the baseline to each time point of follow-up, and this continued until the end of the follow-up period (all $P < 0.05$) (Table 2).

DISCUSSION

In the present study, instead of using a nonabsorbable polyester suture to tighten the band, we used a 6-0 absorbable Vicryl suture. Postoperatively, as the Vicryl was absorbed, the connection between the two ends of the band was cut, leading to the loss of tension and indentation of the band and a reduction in AL and SER. We found a significant improvement in the postoperative functional and biometric eye parameters. An increase in AL, SER, and ACD was observed 2 weeks after surgery, with a decreasing trend afterward, and at 6 months the mean AL, SER, and ACD values were slightly higher than the preoperative measurements.

An encircling band is usually implanted in eyes with pseudophakic RRD that undergo SB, reducing the probability of re-detachment requiring a secondary procedure [13]. Scleral indentation from the segmental silicone tire and the band at the equator of the globe increases the length of the anterior-posterior axis of the eyeball and causes myopia [14-17]. In our study, the significant increases in the mean AL, SER, and ACD in the first 2 weeks after surgery corresponded to the two-week period of maximum Vicryl tension [18]. Thereafter, decreasing AL, SER, and ACD and achievement of approximately their preoperative measurements at the 6-month postoperative examination are consistent with the lysis and absorption of the Vicryl suture [19]. The degree of myopia was higher 2 weeks after surgery, but it then began to decrease so that at 6 months the degree of myopia was mild with a mean (SD) SER of -1.8 (0.9) D, which was still more myopic than the baseline SER, although the difference was not statistically significant.

In our study, the limited increase in mean AL, SER, and ACD at 6 months after surgery could be attributed to the segmental buckle, which is implanted with non-absorbable sutures and increases the anterior-posterior length of the eye to some extent, as reported by Aldhafeeri et al. [20].

In a similar study, Yu et al. [21] used absorbable sutures for encircling band-tightening sutures and evaluated their effects on AL, ACD, and refractive error. They compared their results with those of a control group in which the band tightening was permanent. The results showed that AL and myopia in the study and control groups increased significantly at the 1-week postoperative examination. However, after the first week, AL and myopia decreased at the 3- and 6-month postoperative examinations, and this decrease was statistically significant in the case group, but not in the control group. ACD was significantly deeper in both the case and control groups at the 1-week postoperative examination; however, at 6 months, ACD returned to the preoperative value in the case group but not in the control group [21]. Our results were similar to those of their study.

Albanese et al. [22] found significant differences in AL, ACD, and SER in phakic eyes treated with SB for primary macula-on RRD compared with fellow phakic eyes at a mean (SD) follow-up duration of 50.9 (21.9) months. Operated eyes experienced -1.35 (0.57) D myopic shift, 0.83 (0.23) mm increase in mean (SD) AL, and 0.09 (0.18) mm shallowing in mean (SD) ACD at the last follow-up. We found a decreasing trend in ocular biometry parameters from the 2-week postoperative visit until the end of the follow-up period in pseudophakic eyes with RRD using an absorbable suture to tighten the encircling band. Although ACD was still significantly deeper and AL was longer at the final follow-up visit than at baseline, despite having a myopic shift, SER revealed no significant difference from baseline values in our participants. In contrast, Albanese et al. [22] found a significant myopic shift at the last follow-up in operated eyes compared to baseline refraction. Despite the differences in the phakic status of the included eyes and the study design, using an absorbable suture to tighten the encircling band resulted in the reduced significance of the myopic shift in our study. However,

future studies comparing biometric changes in eyes using a surgical technique similar to ours and comparing the changes in the contralateral unoperated eye could provide robust conclusions concerning the advantages of this modified surgical technique.

Comparing different suture materials, Muller et al. [23] recorded stable stiffness values for non-absorbable sutures (Ethibond) over a 2-month test period and found no significant differences between the measurement points. Vicryl exhibited an increasing hysteresis with ongoing degradation. Wilde et al. [24] followed eyes that underwent combined pars plana vitrectomy and SB using a 5-0 Ethibond suture for the repair of RRD. AL measurements in the 33 included eyes revealed a significant increase in mean (SD) AL from 25.39 (1.27) mm preoperatively to 26.54 (1.16) mm postoperatively, with mean (SD) change in AL of 1.15 (0.67) mm over a mean postoperative follow-up period of more than 15 months [24]. Despite several differences between their study and ours, using absorbable Vicryl sutures to tighten the band instead of conventional permanent tightening revealed a significant decrease in AL from the baseline to each time point following the 2-week postoperative visit, and the final mean AL at the 6-month postoperative visit was 0.98 mm longer than the mean baseline value, with a significant improvement in functional and refractive outcomes. However, further comparative longitudinal studies are needed to confirm the advantages of absorbable sutures for band tightening on the long-term refractive and biometric outcomes of SB in pseudophakic eyes with RRD.

In our study, four patients developed postoperative retinal re-detachment that was treated with pars plana deep vitrectomy. Although our sample size was small, the anatomical success rate after the first operation was 87%, which is comparable with the results of other studies including those of Hong et al. (90.5%), Wang et al. (88.8%), Sharma et al. (83.5%), Haritoglou et al. (73.9%), and Ahmadieh et al. (72.2%) [7, 25-28].

To our knowledge, the present study is the first to use an absorbable band-tightening suture for pseudophakic RRD with promising results. However, it is limited by a small sample size, lack of inclusion of all types of RRD, and absence of a control group or comparison with the contralateral unoperated eyes. We recommend future studies using absorbable band-tightening sutures for pseudophakic RRD treated with an encircling band and pars plana vitrectomy, comparing the outcomes with a those of a control group, and with a longer follow-up period. Perhaps studies assessing patients' satisfaction with functional outcomes could provide real-world evidence to support this surgical approach as a widespread practice.

CONCLUSIONS

Using a 6-0 absorbable Vicryl suture to tighten the encircling band can reduce postoperative myopic shift without adversely affecting anatomical or functional outcomes. Furthermore, this surgical modification did not increase the risk of postoperative complications. Future comparative studies with larger sample sizes and longer postoperative follow-up are needed to verify our preliminary results.

ETHICAL DECLARATIONS

Ethical approval: The study was approved by the Ahvaz Jundishapur University of Medical Sciences Ethics Committee (approval number: IR.AJUMS.REC.1397.490) and was conducted in compliance with the tenets of the Declaration of Helsinki. The study procedures were explained to all participants, and written informed consent was obtained from each.
Conflict of interest: None.

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REFERENCES

1. Mitry D, Charteris DG, Fleck BW, Campbell H, Singh J. The epidemiology of rhegmatogenous retinal detachment: geographical variation and clinical associations. Br J Ophthalmol. 2010;94(6):678-84. doi: 10.1136/bjo.2009.157727 pmid: 19515646
2. Li JQ, Welchowski T, Schmid M, Holz FG, Finger RP. Incidence of Rhegmatogenous Retinal Detachment in Europe - A Systematic Review and Meta-Analysis. Ophthalmologica. 2019;242(2):81-86. doi: 10.1159/000499489 pmid: 31230058

3. Bjerrum SS, Mikkelsen KL, La Cour M. Risk of pseudophakic retinal detachment in 202,226 patients using the fellow nonoperated eye as reference. Ophthalmology. 2013;120(12):2573-2579. doi: 10.1016/j.ophtha.2013.07.045 pmid: 24021894
4. Heimann H, Bartz-Schmidt KU, Bornfeld N, Weiss C, Hilgers RD, Foerster MH; Scleral Buckling versus Primary Vitrectomy in Rhegmatogenous Retinal Detachment Study Group. Scleral buckling versus primary vitrectomy in rhegmatogenous retinal detachment: a prospective randomized multicenter clinical study. Ophthalmology. 2007;114(12):2142-54. doi: 10.1016/j.ophtha.2007.09.013 pmid: 18054633
5. SPR Study group. View 2: the case for primary vitrectomy. Br J Ophthalmol. 2003;87(6):784-7. doi: 10.1136/bjo.87.6.784 pmid: 12770983
6. Brazitikos PD, Androudi S, Christen WG, Stangos NT. Primary pars plana vitrectomy versus scleral buckle surgery for the treatment of pseudophakic retinal detachment: a randomized clinical trial. Retina. 2005;25(8):957-64. doi: 10.1097/00006982-200512000-00001 pmid: 16340523
7. Haritoglou C, Brandlhuber U, Kampik A, Priglinger SG. Anatomic success of scleral buckling for rhegmatogenous retinal detachment--a retrospective study of 524 cases. Ophthalmologica. 2010;224(5):312-8. doi: 10.1159/000298752 pmid: 20332656
8. Afrashi F, Akkin C, Egrilmez S, Erakgun T, Mentes J. Anatomic outcome of scleral buckling surgery in primary rhegmatogenous retinal detachment. Int Ophthalmol. 2005;26(3):77-81. doi: 10.1007/s10792-006-9004-y pmid: 16957875
9. Wang A, Snead MP. Scleral buckling-a brief historical overview and current indications. Graefes Arch Clin Exp Ophthalmol. 2020;258(3):467-478. doi: 10.1007/s00417-019-04562-1 pmid: 31828426
10. Fallico M, Alosi P, Reibaldi M, Longo A, Bonfiglio V, Avitabile T, et al. Scleral Buckling: A Review of Clinical Aspects and Current Concepts. J Clin Med. 2022;11(2):314. doi: 10.3390/jcm11020314 pmid: 35054009
11. Ibrahim TM, Shaarawy AS, El Rayes EN, Bessa AS. Comparative study between conventional scleral and suprachoroidal buckling in management of primary rhegmatogenous retinal detachment. The Egyptian Journal of Cataract and Refractive Surgery. 2018;24(2):58-64. doi: 10.4103/JCRS.JCRS_6_18
12. Talbot AW, Meadows AE, Tyers AG, Shah-Desai S. Use of 7/0 Vicryl (coated polyglactin 910) and 7/0 Vicryl-rapide (irradiated polyglactin 910) in skin closure in ophthalmic plastic surgery. Orbit. 2002;21(1):1-8. doi: 10.1076/orbi.21.1.1.2604 pmid: 12029576
13. Figueroa MS, Corte MD, Sbordone S, Romano A, Alvarez MT, Villalba SJ, et al. Scleral buckling technique without retinopexy for treatment of rhegmatogeneous: a pilot study. Retina. 2002;22(3):288-93. doi: 10.1097/00006982-200206000-00006 pmid: 12055461
14. Huang C, Zhang T, Liu J, Ji Q, Tan R. Changes in axial length, central cornea thickness, and anterior chamber depth after rhegmatogenous retinal detachment repair. BMC Ophthalmol. 2016;16:121. doi: 10.1186/s12886-016-0296-z pmid: 27457086
15. Zhu ZC, Ke GJ, Wen YC, Wu ZY. Effects of scleral encircling surgery on vitreous cavity length and diopter. Int J Ophthalmol. 2016;9(4):572-4. doi: 10.18240/ijo.2016.04.16 pmid: 27162731
16. Chronopoulos A, Schutz JS, Varga Z, Souteyrand G, Thumann G. Complications of encircling bands-prevention and management. J Clin Exp Ophthalmol. 2015;6(440):1-5. doi: 10.4172/2155-9570.1000440
17. Lee DH, Han JW, Kim SS, Byeon SH, Koh HJ, Lee SC, et al. Long-term Effect of Scleral Encircling on Axial Elongation. Am J Ophthalmol. 2018;189:139-145. doi: 10.1016/j.ajo.2018.03.001 pmid: 29526704
18. Pillai CK, Sharma CP. Review paper: absorbable polymeric surgical sutures: chemistry, production, properties, biodegradability, and performance. J Biomater Appl. 2010;25(4):291-366. doi: 10.1177/0885328210384890 pmid: 20971780
19. Melega MV, Dos Reis R, Lira RPC, de Oliveira DF, Arieta CEL, Alves M. Comparison Between Nylon and Polyglactin Sutures in Pediatric Cataract Surgery: A Randomized Controlled Clinical Trial. Front Med (Lausanne). 2021;8:700793. doi: 10.3389/fmed.2021.700793 pmid: 34513873
20. Aldhafeeri R, Smolinski P, Friberg TR. The effect of segmental scleral buckling on the power and symmetry of the cornea, corneal thickness, the axial length, and the total power of the eye: A biomechanical model. Investigative Ophthalmology & Visual Science. 2017;58(8):4171-. Link
21. Yu XL, Liang XL, Ding XY, Hu J, Li JQ, Zhu XB, et al. Releasable encircling band for primary rhegmatogenous retinal detachment. Ophthalmology. 2014;121(12):2504-5. doi: 10.1016/j.ophtha.2014.07.028 pmid: 25172199
22. Albanese GM, Cerini A, Visioli G, Marenco M, Gharbiya M. Long-term ocular biometric variations after scleral buckling surgery in macula-on rhegmatogenous retinal detachment. BMC Ophthalmol. 2021;21(1):172. doi: 10.1186/s12886-021-01928-0 pmid: 33838640
23. Müller DA, Snedeker JG, Meyer DC. Two-month longitudinal study of mechanical properties of absorbable sutures used in orthopedic surgery. J Orthop Surg Res. 2016;11(1):111. doi: 10.1186/s13018-016-0451-5 pmid: 27729082
24. Wilde C, Awad M, Orr G, Kumudhan D, Saker S, Zaman A. Incidence of Clinically Significant Aniseikonia Following Encircling Scleral Buckle Surgery: An Evaluation of Refractive and Axial Length Changes Requiring Intervention. Vision (Basel). 2021;5(1):7. doi: 10.3390/vision5010007 pmid: 33546116
25. Hong IH, Jeon GS, Han JR. Comparison of Scleral Buckling and Vitrectomy Using Wide Angle Viewing System for Rhegmatogenous Retinal Detachment. Semin Ophthalmol. 2020;35(5-6):307-312. doi: 10.1080/08820538.2020.1842468 pmid: 33164647
26. Wang A, Snead MP. Scleral buckling-a brief historical overview and current indications. Graefes Arch Clin Exp Ophthalmol. 2020;258(3):467-478. doi: 10.1007/s00417-019-04562-1 pmid: 31828426
27. Sharma RK, Akkawi MT, Shehadeh MM, Aghbar AA, Qaddumi J. Anatomical and Visual Outcomes of Scleral Buckling Surgery in Rhegmatogenous Retinal Detachment. Middle East Afr J Ophthalmol. 2020;27(2):100-104. doi: 10.4103/meajo.MEAJO_94_18 pmid: 32874042
28. Ahmadieh H, Moradian S, Faghihi H, Parvaresh MM, Ghanbari H, Mehryar M, et al; Pseudophakic and Aphakic Retinal Detachment (PARD) Study Group. Anatomic and visual outcomes of scleral buckling versus primary vitrectomy in pseudophakic and aphakic retinal detachment: six-month follow-up results of a single operation--report no. 1. Ophthalmology. 2005;112(8):1421-9. doi: 10.1016/j.ophtha.2005.02.018 pmid: 15961159