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A new method to solve anophthalmic contracted socket in embedding orbital implant in 114 cases

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结膜旷置法治疗Ⅱ期义眼台植入时结膜囊缩窄的疗效观察

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摘要

目的:观察新的结膜旷置法行Ⅱ期义眼台植入,同时处理结膜囊缩窄的治疗效果。

方法:2008-01/2014-07 期间,我院收治的 114 例 114 眼眼球摘除术后眼窝内陷、结膜囊缩窄患者,在行Ⅱ期义眼台植入后同时处理结膜囊,从筋膜表面充分分离结膜至穹隆处,将预先制作的透明薄壳眼模置入结膜囊,使结膜瓣后退形成上、下穹窿,同时眼睑闭合时无明显张力。取出透明眼膜,并评估结膜缺损面积(即筋膜暴露面积),根据缺损区垂直径长度分为 4 组,Ⅰ组:缺损长 0~5mm;Ⅱ组:缺损长 6~10mm;Ⅲ组:缺损长 11~15mm;Ⅳ组:缺损长≥16mm。对所有病例采用旷置球结膜中央缺损区的方法,在上下结膜瓣后退的位置将结膜间断缝合于筋膜上,在义眼台的前部出现筋膜暴露区。如下穹窿浅,联合行下穹窿成形术;如眼睑闭合张力较大或结膜瘢痕较重,考虑术后结膜挛缩严重的患者联合行睑缘缝合术。结膜囊内涂抗生素眼膏后置入合适的眼模。

结果:所有患者暴露的筋膜区域于术后逐渐缩小并被结膜覆盖。平均于术后 1mo 内旷置的结膜区被新生的结膜覆盖完全。结膜缺损区垂直径<5mm 均能在 2wk 内完全移行覆盖,结膜囊形成良好,无需再次手术处理。结膜缺损区垂直径 6~10mm 能在 3wk 之内填补覆盖完全,少数患者结膜囊会有少量的收缩,但不影响配戴义眼片。结膜缺损区垂直径 11~15mm 能在 4wk 内移行生长覆盖完全,但结膜囊会轻度收缩,可配戴磨小的义眼片,部分术前结膜瘢痕较严重的患者需再次行结膜囊成形术。结膜缺损区垂直径≥16mm 也能在 6wk 以内完全覆盖整个筋膜暴露区域,结膜囊会有较明显收缩,需再次行结膜囊成形联合睑缘缝合术,3mo 后拆除睑缘缝线后能够配戴义眼片。有 2 例出现义眼台暴露,行义眼台暴露修补联合结膜囊成形术,术后结膜囊成形好。

结论:新的结膜旷置法能够很好地处理Ⅱ期义眼台植入时轻到中度结膜囊缩窄,无需任何移植物,患者损伤轻,减少多次手术。对于处理重度结膜囊狭窄,再手术风险较大,尚需进一步临床观察。

关键词:无眼球;结膜囊收缩;义眼台

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Abstract

• AIM: To perform a new method for orbital implant and contracted socket through one time and its results.

• METHODS: Totally 114 patients 114 eyes, from January 2008 to June 2014, with contracted socket participated in this study. We incised the bulbar conjunctiva horizontally and excised scar tissue, then implanted the hydroxyapatite in the four extraocular muscles and tightly sutured the Tenon' capsule. After that, we put the superior and inferior conjunctival petals backwards and sutured them to the Tenon's capsule. All the patients were divided into four groups according to the vertical diameter length of the conjunctival defect area: Group Ⅰ: ≤5mm; Group Ⅱ: 6-10mm; Group Ⅲ: 11-15mm; and Group Ⅳ: ≥16mm. These patients were followed up for 6mo to 3y to observe the conjunctival sac shaping and growth of conjunctiva.

• RESULTS: There were 64 cases in Group Ⅰ, 31 cases in Group Ⅱ, 16 cases in Group Ⅲ and 3 cases in Group Ⅳ. All patients' conjunctival defect was covered by new conjunctiva and scar tissue 4 to 6wk after surgeries. Ten cases had contracted socket; 2 cases had orbital implant exposure, requiring reoperation. Of the 114 cases, 8 had contracted socket and could use a smaller conformer, 106 could use a normal size conformer.

• CONCLUSION: When the conjunctival defect was ≤ 15mm, this new method can address the orbital implant and contracted socket at the same time. While it was ≥ 16mm, flap transplantation is necessary.

• KEYWORDS: anophthalmia; contracted socket; orbital implant

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INTRODUCTION

Because of the limitation of medical conditions, some patients underwent enucleation failed to implant the orbital implant in time. In the II stage, most of these patients may have conjunctival sac narrowing. The sunken eye is the most serious eye malformation after an orbital enucleation. The conventional approach to handle this defect is to implant an artificial ocular prosthesis, which can achieve the cosmetic effect of a real eye. Due to the serious trauma, chemical or thermal burns, or other causes, the conjunctiva is damaged and conjunctival sac narrowing occurs. In these situations, the conformer cannot be implanted immediately after the orbital operation; conjunctival sac coarctation surgery may be necessary as a first stage operation. The sunken eye deformity with conjunctival sac narrowing is a very serious issue when orbital implants are being used.

Soparkar[1] in 1998 expanded orbital volume by grafting dermal fat to sunken eye sockets, contracted socket, and implanted orbital exposure. In recent years, some researchers performed conjunctival sac skin grafting 3-6mo prior to orbital implants surgery in the treatment of conjunctival sac narrowing after enucleation; or performed orbital implantation 3-6mo prior to conjunctival sac skin grafting[2]. Staged procedures increase the number of surgeries and duration of treatment. Repeated surgeries increase conjunctival scarring, leading to increased contracted socket and risk of implant exposure, by accelerating orbital soft tissue atrophy. We have obtained satisfactory results with a new one-stage approach, combing orbital implantation and contracted socket surgery.

SUBJECTS AND METHODS

Totally 114 patients with conjunctival sac narrowing and orbital retraction after enucleation in our hospital from January 2008 to June 2014, 85 males and 29 females, age 18 to 56, average age 31 years, in which 54 cases had enucleation caused by trauma, 44 cases had atrophy of eyeball, 8 cases had artificial eye removal surgery, 5 cases had enucleation caused by tumor, and 3 cases had entophthalmia. The course of disease ranged from 6mo to 40y.

Based upon patient age, disease course, and the degree of orbital deformity, all patients had different spherical hydroxyapatite (HA) orbital diameters (20-22 mm; U.S. IOI Co. Producer: Integrated Orbital Implants, Inc., San Diego, USA). The same skillful physician and an assessment performed all surgical operations (operators: Yuan HF and Cheng M). Surgeries were performed under general anesthesia.

Orbital Implantation In the surgery, the operator made a transverse incision on the bulbar conjunctiva along the horizontal palpebral fissure, excised and loosen scar tissue, fully separated the bulbar conjunctiva and Tenon's capsule, avoiding damage to the palpebralis when separating the dome to the rim of the orbit. The upper, lower, inner, and outer rectus muscles were separated and traction sutures were placed with 5-0 suture. According to the orbital space and the size of the contralateral eyeball, a 20 mm to 22 mm hydroxyapatite orbital station was placed in the eye cone muscles. The four rectus muscles were tied over the orbits, completely covered the front of the orbital implant, with the fascia tightly sutured in pairs.

Conjunctival Sac Reconstruction The normal size of the artificial eye was molded into the conjunctival sac, so that the formation of the conjunctival flap becomes the upper and lower fornices. Whether the separation is sufficient and the dome is fully formed are observed. For the well-formed fornix, the conjunctiva should be carefully separated from the fascia. There should be no obvious tension when the eyelid is closed. The transparent eye mask is removed and the conjunctival defect area assessed. According to the vertical diameter length of the conjunctival defect, patients were divided into four groups: Group I: the length ≤5 mm; Group II: the length 6-10 mm; Group III: the length 11-15 mm; Group IV: the length ≤16 mm (Figure 1). In all cases, the conjunctival sutures were placed backwards and the conjunctiva was sutured on the fascia at the retreated upper and lower conjunctival flaps. The conjunctival defect emerged in the central portion, with the fascial ball directly exposed to the ocular surface. The transparent eye mask is placed into the conjunctival sac, after smearing with antibiotic ointment. Patients whose dome became shallow or disappeared often had below vault plasty performed simultaneously. Group III patients underwent temporary palpebral suture, for 3 to 4wk; all group IV patients had eyelid adhesions sutures for 6mo postoperatively.

Postoperative Treatment The monocular was pressurized bandaged and conjunctival healing had been closely watching. Infection was strictly prevented and controlled. According to the shape and size of the conjunctival sac, the conformer was usually implanted into the location within 2 to 3mo. Patients with total eyelid adhesion suturing should have prosthetic eyes implanted along their eyelid incisions 6mo later.

Complications Patients with conformer prolapsed due to contracted socket should have conjunctival sac reconstruction 3mo after the surgery and permanent suturing of the eyelid.

RESULTS

The 114 conjunctival exposure exclusion zones ranged from 3 mm to 16 mm. There were 64 cases in Group I, 31 cases in Group II, 16 cases in Group III, and 3 patients in Group IV. Patients were followed from 6mo to 3y postoperatively; the exposed fascia was gradually covered by conjunctival and scar tissue, over an average time period of 1mo. Ten conjunctival sac constrictions underwent conjunctival sac plasty. Two orbital implant exposures underwent orbital repair. The conjunctival sac acquired a good shape postoperatively, with the conjunctival sacs of eight patients slightly narrowed in follow up, but the space could be placed in a small mill

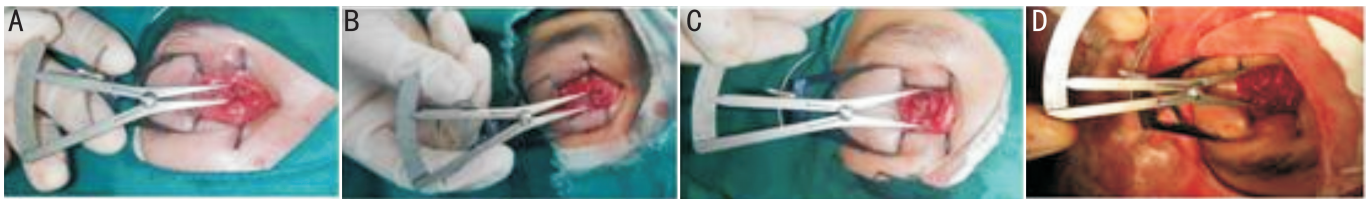

Figure 1 Grouping the conjunctival sac constriction patients according to the vertical diameter length of the conjunctival defect area
A: Group Ⅰ: ≤5mm; B: Group Ⅱ: 6-10mm; C: Group Ⅲ: 11-15mm; D: Group Ⅳ: ≥16mm.

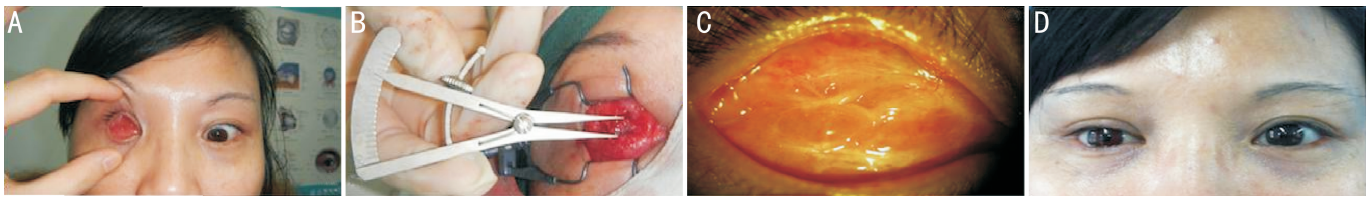

Figure 2 Patient in group Ⅰ A: pre-operation; B: intra-operation; C and D: 6mo post-operation.

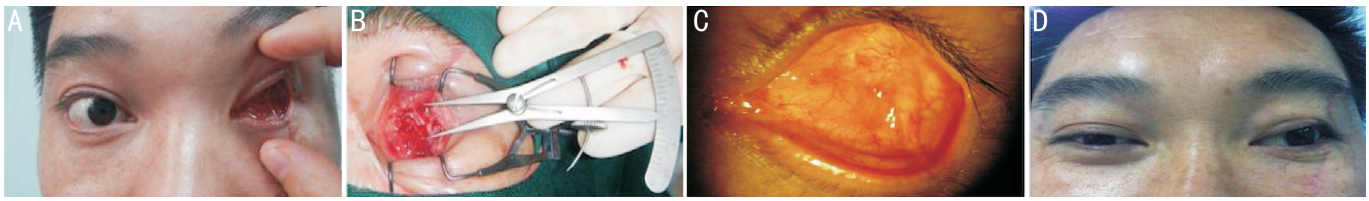

Figure 3 Patient in group Ⅱ A: pre-operation; B: intra-operation; C and D: 6mo post-operation.

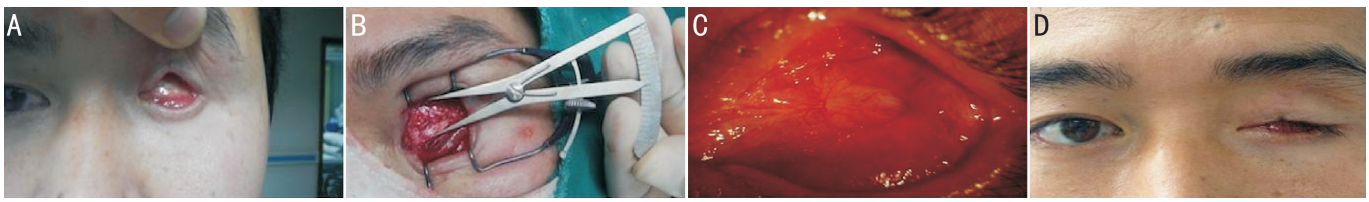

Figure 4 Patient in group Ⅲ A: pre-operation; B: intra-operation; C and D: 6mo post-operation.

prosthetic eye. The other 106 patients were able to have a normal sized prosthetic eye.

Group Ⅰ patients underwent the new approach, in which fascia exposed areas quickly migrated and became completely covered, with a well formed conjunctival sac. There were no complications and patients could successfully wear the prosthetic eye without the need for repeat surgical treatment (Figure 2).

Group Ⅱ patients also underwent the new approach, with the below vault plasty in the very shallow dome, in which the fascia exposed areas were completely covered postoperatively. Three patients had conjunctival sac constriction; one case demonstrated implant exposure, and underwent reoperation. In this case, the conjunctival sac was formed well and had no affect in wearing the prosthetic eye(Figure 3).

Group Ⅲ patients underwent the new approach, combining below vault plasty, in which the fascia exposed areas were completely covered postoperatively; but many patients had mild constriction of the conjunctival sac, which could wear the milled small prosthetic eye. Five cases with severe conjunctival scarring prior to surgery, with repeat conjunctival sac narrowing underwent conjunctival sac plasty. One case with orbital exposure underwent orbital neoplasty and the conjunctival sac was formed well (Figure 4).

Group Ⅳ patients, whose conjunctival defect area was too large, had the new approach combining below vault plasty and eyelid suture, in which whole fascia exposed areas were completely covered by new conjunctiva and scar tissue 6mo postoperatively; however, the healing time was longer and there was obvious conjunctival scar contraction. Even the upper and lower domes were completely synechial and shut, with the transparent eye mask in the conjunctival sac squeezed out. In this situation, patients required repeat conjunctival sac plasty combined with eyelid suture synechial suturing, and could wear a prosthetic eye after removal of eyelid sutures after 3mo; in one case, conjunctival sac constriction recurred, conjunctival sac plasty was performed, and it was possible to wear the mill smaller prosthetic eye. Another patient, with conjunctival sac constriction again, underwent skin graft surgery, and the conjunctival sac was found to be well formed postoperatively, so that a prosthetic eye could be implanted in the space(Figure 5)(Table 1).

DISCUSSION

There are various treatment methods for conjunctival constriction according to the size, volume, shape, and the degree of patient's health. The most common approach is to use a substitute to fill the conjunctival defect[3]. In mild contracted socket, the substrate material is autologous conjunctiva, oral mucosa[4], allograft amnion[5-7], to support the conjunctival graft/migration/breeding, and to completely cover the conjunctival edge for 6 to 8wk[8]. In moderate conjunctival constriction, the mucous membrane

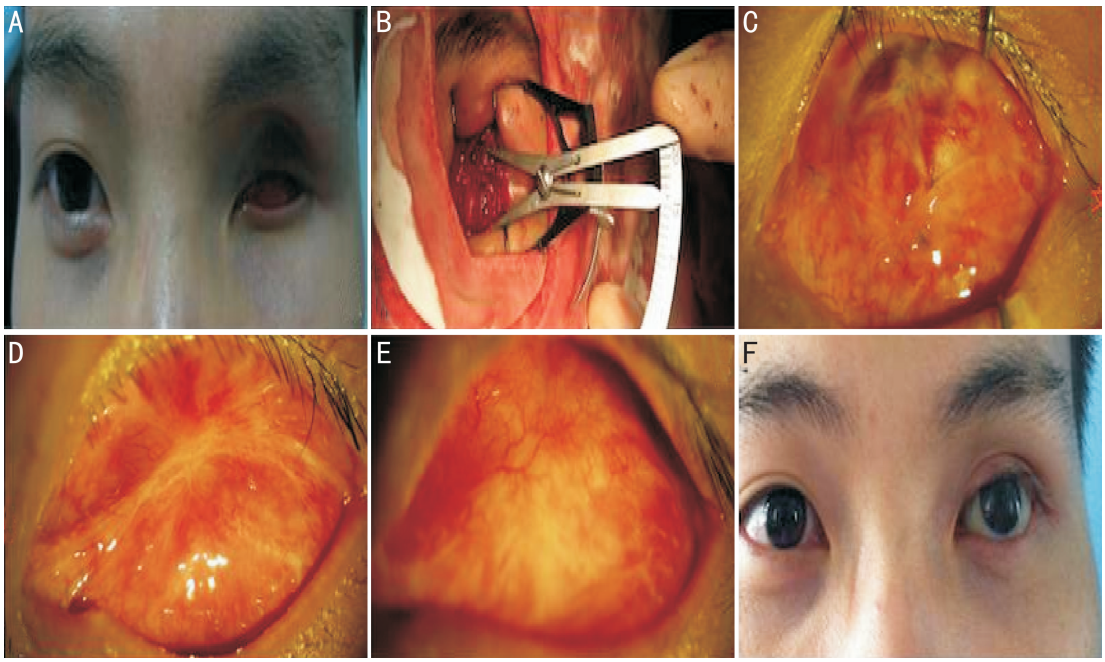

Figure 5　A patient in group Ⅳ　A: pre-operation; B: intra-operation; C: 3wk post-operation; D: 4mo post-operation; E and F: 12mo post-operation.

Table 1　Basic information of contracted socket patients in each group

Groups	Number of cases	Complications		Reoperation (%)
		Restenosis (%)	Implant exposure (%)	
Ⅰ	64	0(0%)	0 (0%)	0(0%)
Ⅱ	31	3(9.68%)	1(3.23%)	4(12.89%)
Ⅲ	16	5(31.25%)	1(6.25%)	6(37.50%)
Ⅳ	3	2(66.67%)	0(0%)	2(66.67%)
Total	114	10(8.77%)	2(1.75%)	12(10.52%)

or the amniotic membrane transplantation is mattress sutured to the conjunctiva, to provide a sufficiently wide space for the conjunctival sac. In severe contracted socket, recurrent cases or radiation injury, a variety of skin grafts[9-10] can be used, transplanted (e.g. orbital side flap, temporal fascia flap, island flap in the front of or behind the ears[11-12]), or the palate[10,13], the auricular cartilage[14], temporalis or frontal muscle flaps[15-16], full-thickness free muscle flap[17], among others. Dermal fat blocks were commonly used in cases where the orbital contents were missing. These implants have different advantages and disadvantages: conjunctival tissue is consistent with physiology, with the limited material from the contralateral eye, which is confined to the mild conjunctival sac or the small conjunctival defect. The conjunctiva obtained from the oral mucosa is bounteous, with a closer appearance to the conjunctiva than the skin. The tissue is thin and has a highly proliferative function, without sebaceous glands and with better mobility and maneuverability. However, the color of the graft is redder, and incision of lip affect eating. The mucosal graft contracted significantly, and shrinkage took a long time, during which some patients may have undergone reoperation[16]. Amniotic membranes are plenteous and have low antigenic properties. But they can only support the basement membrane for epithelial growth, and the autologous normal conjunctiva still requires stretching during the transition. The skin graft is rougher than the conjunctiva, and cannot attach to the moist conjunctival sac easily. Sebaceous glands secrete unpleasant odors, and even lead to infection. Secondary skin graft contraction is more obvious[18-19]; shrinkage also takes a long time, and reoperation may be necessary. For severe cases of contracted socket, transplantation with a fascial flap or blood vessels, with their abundant blood supply, are able to fill the missing portion of the orbital contents. However, disadvantages include a rough skin slice, sebaceous glands, secondary contracture, and damage from the obtained parts[11,20]. The palate or ear cartilage is also commonly used in patients with severe contracted socket; this material is hard and tough. They can expand the conjunctival sac effectively and address the contraction. However, trauma to the obtained parts is significant.

For contracted socket at the time of orbital implantation, past treatment is to have orbital implantation firstly and then treat of conjunctival sac constriction to ensure that the formation of conjunctival sac. Patients who received orbital implants usually first and then contracted socket management experienced the following complications: increased surgery frequency, cost of treatment, prolonged recovery time, and

increased psychological and economic burden.

This is a new method to treat conjunctiva sac constriction and orbital implantation simultaneously. There is no substitute for transplantation and it avoids trauma to obtain autologous grafts. It is a good solution to mild/moderate conjunctival sac constriction after orbital implants. The key points are to ensure sufficient separation of the bulbar conjunctiva and Tenon's capsule, to maintain the integrity of the formation of conjunctival epithelium and fornices, ensuring the right size of the implant, which should not be too big[21]. To prevent postoperative implant exposure, the four rectus muscles and Tenon's capsule should be thick enough to completely cover the surface of the implant. The conjunctiva is completely released from Tenon's capsule to fully form the conjunctival sac; the conjunctival edge is sutured and fixed to the surface of Tenon's capsule. When the conjunctiva is exposed too much, the tension during eyelid closure is too high, the patient has more than degree III conjunctival sac constriction, or recurrent conjunctival constriction is present, these situations require eyelid suturing. The purpose is to increase the conformer support against conjunctival contracture and to form a good space for the conjunctival sac. Patients should be fully bandaged to prevent bleeding and give continued topical antibiotics, which reduces scar formation and prevents increased orbital pressure or infection, leading to orbital implant exposure. We have observed that the conjunctival defect area can be completely covered by new conjunctival and scar tissue 4 to 6wk postoperatively. Conjunctival sac constriction may occur in patients with large conjunctival defect areas, and these patients would achieve better results with conjunctival sac reconstruction or eyelid suture surgery. It is important that patients with recurrent conjunctival sac constriction undergo conjunctival sac reconstruction; one should be particularly careful to avoid operating in the central region of the conjunctival sac to reduce injury of the conjunctiva or fascia, and avoid implant exposure.

Patients in group I had good results by treating conjunctival sac constriction and orbital implantation simultaneously without any complications; few of the patients in Group II and III had complications after treatment and required reoperation, with good postoperative results; most of the patients in group IV required oculoplastic surgery again because conjunctival sac constriction was significant and the conjunctival defect was serious and after the surgery the shaping effect was ultimately acceptable. Thus, there are absolute indications for the new method of treating orbital implantation and conjunctival sac constriction without the eyeball or the conjunctival defect vertical length $\leqslant$5mm diameter of mild conjunctival sac constriction. Relative indications include moderate conjunctival sac constriction and conjunctival defect vertical diameter of 6-15 mm. Physicians can choose the surgical method according to conjunctival scarring and the condition of the superior and inferior fornices, and after that the oculoplastic surgery may be performed. Severe conjunctival sac constriction should not undergo surgery, when defect vertical diameter length $\geqslant$16mm, unless there is the no eyelid deformity or no conjunctival scarring. Once the surgical approach is chosen, repeat plastic surgery should be anticipated.

Implant exposure occurred in two cases: one developed infection due to improper postoperative care at home; in the other case, the scar formation was serious, with too great of an orbital loss and too thin of Tenon's capsule.

The new method described does not damage the other normal parts and the surgical procedure is simple, reducing scar formation and avoiding complications caused by a variety of grafts, ultimately reducing the frequency and duration of treatment. This operation is a new method to better handle conjunctival sac constriction at the time of orbital implantation; this method requires a certain degree of functional conjunctival tissue in the conjunctival sac, to cover the exposed area of Tenon's capsule by growing along the surface of the Tenon's capsule. This method is not suitable for patients with severe stenosis and full lockout of the conjunctival sac. In conjunctiva sac constriction where the defect area is large, the predesigned putting-aside area probably becomes smaller because of scar contraction, resulting in the conjunctival sac being smaller than the pre-designed space. Then, there is a risk of recurrence of conjunctival sac constriction.

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中国科技核心期刊眼科学类期刊 2015 年主要指标及排名

刊名	总被引频次		影响因子		综合评价总分	
	数值	排名	数值	排名	数值	排名
中华眼科杂志	核心版 2037(扩展版 3690)	2(2)	核心版 1.075(扩展版 1.408)	1(1)	75.52	1
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