

Autogenous Dermis-Fat Orbital Implant for Anophthalmic Socket

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الزراعة الذاتية لشحمة ادمة الحجاج لعديم المقلة

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الملخص: كما هو معلوم لدينا لا يوجد هناك أي تقرير من السلطنة عن ترقيع شحمة أدمة الحجاج. نستعرض هنا تقرير عن حالة صبي كفيف يبلغ من العمر عشر سنوات ويعاني من ألم بالعين اليسرى نتيجة إصابة نافذة بالعين حيث تم فقء العين بغرس غاز الميثاكريليك بولي ميثيل وبعد هذا الإجراء تم قلع العين وعمل ترقيع ذاتي لشحمة أدمة حجاج العين. لوحظ بعد العملية التئام الترقيع جيدا مع أنسجة الحجاج. وهي نتيجة جيدة من الناحية العملية والجمالية.

مفتاح الكلمات: فقدان مقلة العين، استئصال العين، ترقيع محجر العين، تقرير حالة، عمان

ABSTRACT To our knowledge, there is no report of dermis-fat graft (DFG) implant for orbital reconstruction from Oman. We hereby presented a case report of a 10-year-old boy with a blind and painful left eye secondary to penetrating eye injury presented with implant extrusion following evisceration with a polymethyl methacrylate implant. The evisceration procedure was converted to enucleation and a DFG orbital implant was then performed. Postoperatively, the graft was observed to be well integrated with the host orbital tissues and had good cosmetic and functional outcomes.

Keywords: Anophthalmos; Eye enucleation; Orbital implants; Case report; Oman.

THE AUTOGENOUS DERMIS-FAT GRAFT (DFG) orbital implant, composed of dermis and appended subcutaneous fat, is one of the many alternatives available for orbital volume augmentation in an anophthalmic socket.¹ In adults, unpredictable fat reabsorption poses a serious drawback to this technique; however in children the composite DFG demonstrates continued growth along with the surrounding orbital tissue, thereby stimulating orbital development and maintenance of lost orbital volume after enucleation.²

To the best of our knowledge this is the first case of a DFG implant for orbital reconstruction performed in Oman.

CASE REPORT

A 10-year-old boy presented with an exposed orbital implant in an anophthalmic socket. He had under-

gone evisceration of the left eye three weeks prior to presentation. The patient had sustained a penetrating cornea-lens-retina injury with a knife at the age of 9 years and was left with a blind and painful left eye. Examination revealed an unaided Snellen visual acuity of 20/20 at distance and near in the right eye and no light perception in the left eye. Anterior segment and fundus examination of the right eye were unremarkable. Additionally, visual field examination of the right eye was within normal limits. Examination of the left eye showed complete exposure of a spherical polymethylmethacrylate implant with conjunctival and scleral wound dehiscence [Figure 1].

After obtaining informed consent, the child underwent socket reconstruction with DFG. The scleral shell was removed by transection of the optic nerve after imbricating the four recti muscles with 6-0 vicryl sutures, thus converting the evisceration into an

Table 1: Dermis-Fat Graft - Indications and Contraindications

Indications	Contraindications
Primary implantation post enucleation post evisceration	Severely contracted socket
Secondary implantation post irradiation	Compromised orbital vascular supply severe chemical injury post irradiation
Spherical (alloplastic implant related complications)	Multiple orbital surgery

enucleation. Hemostasis was obtained with pressure and mild wet-field cautery. Orbital soft-tissue reconstruction was then done with DFG obtained from the left gluteal region. After raising the epidermis with a subcutaneous injection of xylocaine with epinephrine, an elliptical skin incision was made. The epidermis was dissected away from the underlying dermis by a combination of sharp and blunt dissection [Figure 2a]. Subsequently, a 20x20mm area of dermis with underlying fat was harvested [Figure 2b]. The gluteal wound was closed with interrupted 4-0 vicryl sutures. The dermis-fat graft was then inserted into the orbital socket cavity with the dermis layer anteriorly and the fatty side posteriorly oriented [Figure 3a]. The extraocular muscles and conjunctiva were sutured into the border of the dermis-fat graft using 6-0 vicryl sutures for the former and 5-0 interrupted vicryl sutures for the latter [Figure 3b]. A plastic conformer was inserted and after instillation of ointment, the eye was patched with a light pressure pad.

On the first post-operative day, examination showed the graft tissue well apposed with the host tissue [Figure 4], thus the patient was discharged with instructions to use antibiotic eye ointment. When



Figure 1: Complete exposure of the polymethyl-methacrylate spherical orbital implant after the first surgery

Table 2: Complications of Orbital Dermis-Fat Graft

- Hematoma
- Infection
- Graft-wound dehiscence
- Conjunctival Cysts
- Granulomas
- Graft Ulcers
- Pyogenic granuloma
- Socket keratinization
- Cilia retention at the recipient site
- Fat atrophy and volume loss
- Excessive dermis-fat growth
- Graft failure

seen in the clinic a month later, the DFG was well integrated with the orbital tissue. The graft-host junction was healthy, with epithelialization of the surface of the graft. There was no evidence of necrosis or infection [Figure 5].

DISCUSSION

Since their first use in orbital surgery by Smith and Petrelli in 1978,³ DFGs have been widely used in the reconstruction of the anophthalmic socket, both primarily after enucleation and secondarily after extrusion or migration of an existing alloplastic implant. DFG orbital implant is an effective means of replacing orbital volume and affording motility of the ocular prosthesis. It is associated with low morbidity and a satisfactory cosmetic result.¹

The DFG is composed of dermis and appended subcutaneous fat, after removal of the epidermis. The dermis is believed to enhance vascularization and decrease the incidence of fat atrophy. It also acts as a barrier against fatty augmentation. The site most frequently used to harvest the graft is the gluteal area, but other areas such as the abdomen and the periumbilical can also be used to harvest such a graft.⁴



Figure 2a: An elliptical skin incision has been marked. The epidermis is being dissected away from the underlying dermis

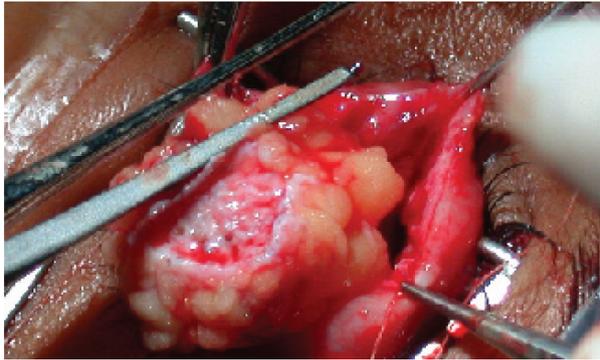


Figure 2b: *The dermis fat graft (20x20mm)*

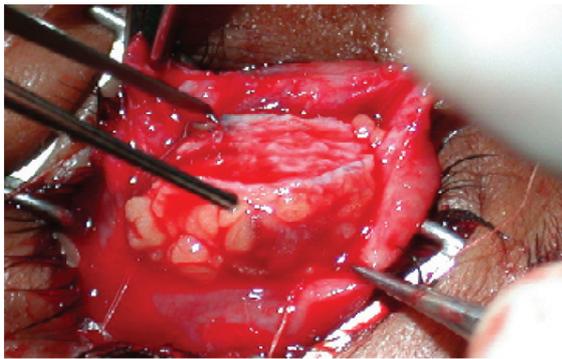


Figure 3a: *The DFG is being inserted into the orbital socket cavity with the dermis layer anteriorly and the fatty side posteriorly oriented*

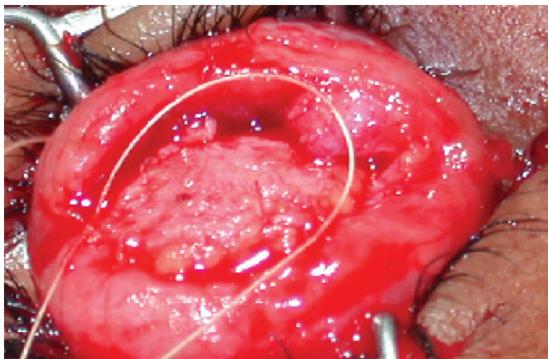


Figure 3b: *The extraocular muscles and conjunctiva are being sutured into the border of the dermis fat graft using 6-0 vicryl sutures for the former and 5-0 interrupted vicryl sutures for the latter*

In the orbit, special attention should be given when performing this procedure, the most important being to respect the vascular supply of the recipient bed. Thus, it should not be used in any orbit with compromised vascular supply, such as after severe trauma (in particular chemical burns), irradiation, or in patients with systemic vascular disease because the risk of graft atrophy and loss is significantly increased [Table



Figure 4: *First post-operative day: Graft tissue is well- apposed with the host tissue*



Figure 5: *One month postoperative period: The DFG is well integrated with the orbital tissue. The surface of the graft has epithelialized. There is no evidence of necrosis or infection*

1]. The DFG should be in contact with orbital fat to enhance graft viability. Thus, Tenon's fascia, sclera, or pseudocapsule left after implant extrusion should be incised or excised to facilitate this. Other important aspects to prevent or minimize the complications are to avoid the following: excessive cautery of the graft bed, use of oversized grafts, excessive handling of the graft and excessive pressure on the graft following implantation. A meticulous suturing technique is mandatory. It has been seen that a fat pad thickness of 20mm significantly lowers the incidence of enophthalmos and superior sulcus deformity with no compromise to implant motility.⁵

Although mainly performed following enucleation, DFG orbital implants have been performed following evisceration whereby the edge of the graft was sutured to the anterior scleral ring.⁶ Conjunctival re-epithelialization of the dermal surface and enhancement of

orbital volume after dermis-fat grafting in eviscerated sockets have been reported.⁶ It is advisable to make relaxing incisions into the base of the existing scleral bed to provide an adequate vascular bed for the composite DFG.⁷

DFG offers the advantages of replacing the lost orbital volume as well as preserving conjunctival surface area. This is achieved by partially covering the implanted dermis with conjunctiva and leaving an exposed area of dermis similar to the diameter of the cornea. Normal fornix depth is also maintained. There is no risk of infection transmission, implant extrusion or exposure. Additionally, this procedure carries no extra cost and offers excellent cosmetic and functional results. Disadvantages include a certain lack of predictability such as underestimation of the adequate volume required of the harvested graft. Further, DFGs also produces a scar at the donor site.

Complications are usually minor [Table 2]. Most complications can be avoided by employing the careful surgical techniques mentioned earlier. Fat atrophy and volume loss are variable and may require further dermis-fat grafting. This complication is commonly seen in cases of secondary implantation, particularly following chemical injuries.¹ Graft atrophy is usually seen in older patients. In contrast, fatty augmentation causing increase in the size of the graft is usually seen in young children, representing the normal proliferation of fat cells seen in the young. This complication is managed by surgical debulking of the graft.⁸ Graft failure is usually associated with a compromised orbital vascular supply.

CONCLUSION

In summary, a DFG orbital implant is a relatively extensive surgery with minor complications. The excellent functional and cosmetic results and safety of this method make it an excellent alternative procedure for orbital volume augmentation in anophthalmic sockets.

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