ABSTRACT The nose is a complex structure, and nasal alar surgical reconstruction is a delicate process aimed at restitution of functional and aesthetic requirements. The goals of reconstructive surgery for the burn patient are first to restore function, then to restore aesthetic appearances. Restoration of the burned nose should take the highest priority considering its position. In the presence of surrounding facial burns, nasal reconstruction with equally burned tissue is likely to produce a more harmonious appearance. We report our experience with versatility of nasal dorsal turned down flap in reconstruction of nasal ala demonstrated in these 3 cases. Reconstruction was bilateral in two female patients and unilateral in the male patient. A split-thickness skin graft was obtained from the thigh area with adequate matching. None of the patients suffered complications in terms of flap necrosis or graft loss. The patient follows up ranged from 6 months to 18 months. Turned down flap with split-thickness skin graft is a simple, steadfast procedure for nasal alar reconstruction. It is a single staged reconstruction of nasal ala with acceptable aesthetic and functional outcomes.

KEYWORDS Burned Nose, Nasal Ala Reconstruction, Turned Down Flap, Split Skin Grafting, Burns Reconstruction

Key Messages
Patients with thermal injury to the face suffer severe disfigurement. When the nose is involved, the deformities become obvious. Reconstruction should provide a normal appearance (aesthetic) with normal breathing (function) so that early social integration of the burn victims can be commenced.

Introduction
The greatest projection and central point of the face is the nose and is an important aesthetic unit that defines the human face. The nose’s structure, form, and function lead to increased exposure to facial burns and may be associated with impairment of respiratory function. Early aggressive debridement will increase the defect and most likely destroy soft tissue used for future reconstruction [1]. Therefore, initial conservative treatment is the best advisable approach. Full-thickness burns may directly damage the cartilage scaffold of the nose. Indirect damages occur with infected superficial burns affecting the nasal cartilage, most often resulting in necrosis. Successful correction is crucial to the patients’ self-image [2]. Two common deformities of the nose are stenosis of the nostrils and ectropion. Mc Indoe noted that the nose is partially or entirely lost following burns to the head and neck region. However, the loss may be limited to the covering skin with marginal loss of the nostril tip and columella [3]. In addition, pressure necrosis of the soft nasal triangles from the placement of nasogastric and nasotracheal tubes may result in tissue loss [4, 5]. Therefore, the burned nose can be classified as – (a) Burn scar deformity with bands and hypertrophic scar, (b) Ectropion - classic deformity resulting from loss of alar rim, (c) Nostril stenosis and (d) Composite loss of ala. Burn scar deformity is the most common type of problem encountered and consists of bands and scars, hypo or hyperpigmentation. Most of these deformities can be corrected by either simple local flaps or pressure therapy. Ectropion is loss of rim with alar retraction.
We report our experience of nasal ala reconstruction in this three case series is of three patients who underwent nasal alar reconstruction of the burned nose in our institution. All three patients, one male and two females, had sustained thermal burns due to varied reasons. The surgical procedure was individualized to each patient. All patients were operated on under general anaesthesia. Postoperatively rubber tubes were used as stents to prevent newly constructed ala. (Fig 1)

Case Report 1: A 10-year-old male presented with cracker burns to his right nostril of two years duration. He had undergone surgical correction twice before coming to our hospital. The right nostril was completely obliterated, resulting in difficult breathing. He underwent reconstructive surgery with the removal of a core of scar tissue from the right nostril. The raw area was covered using a split-thickness skin graft wrapped around a rubber tube and inserted into the nostril as a splint. Post-op, he had an excellent nostril opening. He was advised to use this splint for 6 months to prevent recurrent contractures. (Fig 2)

Case Report 2: A 35-year-old woman presented with difficulty breathing due to bilateral nostril stenosis following flame burns to the face. She underwent reconstructive surgery by removing a core of scar tissue from both nostrils. The raw area was covered using a split thickness skin graft wrapped around a rubber tube and inserted into the nostril as a splint. Post-op, she had good nostril opening on both sides. She was advised to use this splint for 6 months to prevent recurrence of this deformity. (Fig 3)

Case Report 3: A 30-year-old woman presented with nasal ectropion 2 years after sustaining thermal burns. Surgical correction was carried out by releasing the nostril border through an incision on the cranial aspect of the lobule and turning down the resulting tissue in a caudal direction as a hinged flap to provide lining. This lengthens the nose. The margin and the dorsum were then resurfaced with a split-thickness skin graft. The grafts were secured with a tie over bolsters at the alar bases and rubber tubes inserted as a nasal splint to support nasal ala. Post-op, she had a good rounded nasal ala on both sides of the nose. She was advised to use the rubber tube for 6 months as a splint. (Fig 4) Reconstruction was bilateral in two patients and unilateral in one patient. Two patients in our study were females and one male. None of the patients had any post-operative complications, including flap necrosis or graft loss. All patients were followed for a minimum duration of 6 months.

Discussion

The history of nasal reconstruction dates back to the development of plastic surgery in India by Sushruta – the Father of Plastic surgery. The nose is a complex structure occupying a central position on the face. Following facial burns, the nose is partially or completely lost. Despite proper initial management, would healing inevitably leads to retraction of the tip of the nose, the elevation of the edge of the nostril and flaring of the nostrils with loss ofalar ridge. Pressure necrosis of the soft nasal triangles from nasogastric and nasotracheal tubes may also result in tissue loss. The major deficit is the external covering of the nose. A common deformity that results from spontaneous healing of the nose burns is loss of rim with alar retraction and evasion of the nares.

The goal of nasal reconstruction is to make it look natural and attractive. Successful reconstruction depends on the choice of donor material and the use of nasal support. However, every case is to be individualised, and the appropriate plan is to be devised for the best outcome and satisfaction of both the patient and the doctor.

Medical literature describes nasal alar reconstruction with skin grafts, local and regional flaps, distant flaps with or without skin expansion, free flaps and prefabricated flaps. Aesthetic nasal reconstruction should be delayed until complete scar maturation has occurred. However, resurfacing of the raw area may be done with a skin graft relatively early. The use of unburned distant tissue for reconstruction often results in unacceptable appearance with colour and texture mismatch. In the current study, the surgical procedure uses scar tissue in the form of a

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flap from the dorsum of the nose. The scar transition juncture between the nasal dorsum and mucosal lining forms the base of the flap. The turned down scar tissue flap provides both bulk and support of the future nasal ala. This obviates the need for any cartilage graft, and sufficient projection also can be achieved by this. Even nasal tip projection can be accomplished. Split thickness grafting of the resultant defect on the dorsum of the nose is done. Other than having a robust flap for reconstruction, if required, the procedure can be repeated for further refinement in the next stage.

At our centre, we routinely perform facial burn reconstruction. For nostril stenosis, the core of scar tissue is removed, and the raw area is covered using a split-thickness skin graft wrapped around a rubber tube and inserted into the nostril as a splint. In the case of nasal ectropion, an incision on the lobule’s cranial aspect is made, and the resulting tissue flap is turned down in a caudal direction as a hinged flap to provide lining. The dorsum then resurfaced with a split thickness skin graft. In the presence of surrounding facial burns, nasal reconstruction with equally burned tissue, as in the above cases, is likely to produce a more harmonious appearance.

Nasal alar post-burn sequelae are generally associated with post-burn sequelae of the other parts of the face, which often needs multi-staged operations to reinstate in the burned face an acceptable appearance. Hence nasal alar reconstruction is an integral part of the comprehensive management of a burned face.

According to Foyatier et al., in a burned face treatment, nasal reconstruction is always the foremost step in the restoration process and provides the greatest improvement in appearance [7].

The use of scar tissue reduces further contraction and resultant deformity of the newly constructed nasal ala. This procedure is advantageous in being a simple, reliable technique with minimal donor site morbidity and subsequent scarring.

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**Conflict of interest**

There are no conflicts of interest to declare by any of the authors of this study.

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