Case series of corneal neurotization using autologous sural nerve for neurotrophic keratopathy

C Wilde, A Perez, N Lau, M Manisali, R Jayaram, S Osborne

Corneal sensation is vital in maintaining the integrity of the corneal epithelium. Corneal neurotisation (CN) is an evolving technique with direct neural transfer and autologous or allogenic nerve grafting described. Reported outcomes show younger patients have greater amounts of corneal sensation return. We describe two cases including a four year old with bilateral congenital trigeminal anaesthesia (CTA) due to pontine tegmental cap dysplasia (PTCD).

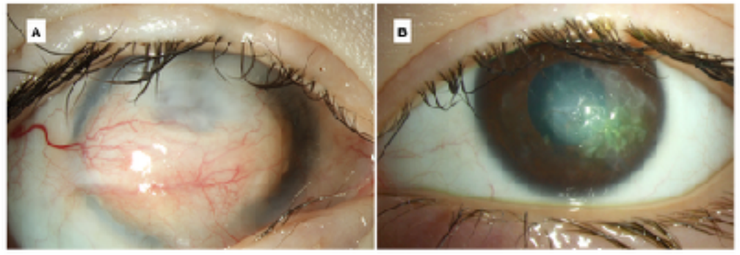


Figure 1. A Right eye at presentation with a conjunctivalised, vascularised cornea B Left central corneal opacity.

Case 1

A four year old boy with CTA due to PTCD presented with a dense scar and conjunctivalisation of his right cornea following perforation (Figure 1, A right eye, B left eye). He had a history of recurrent right eye painless microbial keratitis that started when he was two months of age. His left eye showed progressive neurotrophic changes with central scarring and vascularisation. He was treated with topical lubricants, serum and ciclosporin 0.1%.

Moorfields Eye Hospital NHS Foundation Trust

NHS

CN was planned using the ipsilateral greater auricular nerve (GAN) as he had no sensation in the trigeminal region bilaterally. Nerve conduction studies confirmed normal sensation in the distribution of the GAN and sural nerve. Figure 2 describes the operation details.

Following CN, there was a vast improvement in visual behaviour and corneal sensation at 3 months. Anterior segment photographs show a significant reduction in corneal opacity.

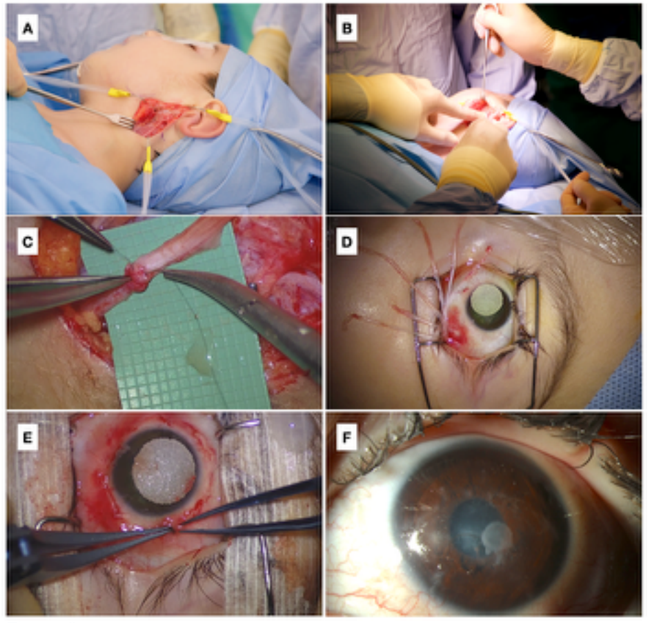


Figure 2
A, B Dissection of the GAN
C Sural nerve harvested and coaptated end to end to GAN
D Subcutaneous tunnel to inferior fornix and sural nerve divided into 6 fasicles
E Branches sutured to 4 quadrants of the limbus
F Significant improvement at 3 months compared to Figure 1B



Figure 3. Pre and postoperative anterior segment photographs showing healing of a persistent epithelial defect following CN

Case 2

A 49 year old male patient with a history of brainstem stroke and previous LASIK presented with severe neurotrophic keratopathy. He underwent CN by coaptation of the sural nerve to the contralateral supraorbital nerve. Four fasicles of the nerve were attached around the limbus. At 6 months post operatively, there was return of sensation and healing of the neurotrophic ulcer. At 18 months, the patient reported ongoing improvements in sensation to his cornea and eyelids. Visual gain was limited by a corneal scar and keratoplasty is planned.

Our results reflect the collaboration between reconstructive maxillofacial surgeons and ophthalmologists. CN has proved effective in severe neurotrophic keratopathy including one case with CTA. In children, CN may cause reversal of scarring. Surgical planning must consider the area of sensory deficit and the armamentarium of surgical techniques available and our results provide evidence for using the GAN as a coaptation site.

In summary, the initial cases at Moorfields at St George's Hospital show promising results but longer follow up is required.