



By Dr Ian Chan, Ophthalmologist

Collagen cross-linkage for keratoconus

Collagen cross-linking is a novel treatment that can arrest and optically improve keratoconus. Previously, only corneal transplantation could stop this progressive disease that distorts the shape of the cornea. As this disorder often begins in adolescence, it can become a major impediment during the formative years.

Keratoconus prevalence is from 1:500 to 1:2000 in Western populations and the advanced form is the most common indication for corneal transplantation. This is a progressive disorder in the structural integrity of the cornea causing it to bulge in the centre, resulting in an irregular conical shape.

In the early stages, a patient notices ghosting in spectacle corrected vision. The glasses power then changes rapidly over months to years and until glasses are no longer able to correct vision adequately and rigid contact lenses are required. In around 10-20% of those affected either rigid contact lenses cannot correct vision to driving standard or they cannot tolerate the lenses. Corneal transplantation is then required. Although improved corneal transplantation techniques have resulted in better long-term safety and graft survival, it is still major eye surgery with significant risks and long term problems.

Until recently we have had no way of arresting the progression of this disease to reduce the need for transplantation.

Collagen cross-linking can markedly increase the structural strength of the cornea and stop keratoconus progression. This phenomenon is well known in other industries where collagen strength is enhanced by inducing covalent cross-links between the collagen fibrils. Leather tanning, for example, is a form of chemical collagen cross-linking.

In the last five years, more clinical evidence has emerged to support this treatment in humans. Not all patients are suitable for this treatment however - corneas that are too thin due to very advanced disease will not be suitable.

The treatment involves a minor procedure lasting around 45 minutes. The corneal epithelium is abraded and a solution of riboflavin is repeatedly instilled over the cornea prior to treatment. The cornea is then irradiated with a narrow spectrum specialised ultraviolet (UV) light source for 30 minutes. The UV light causes a photodynamic reaction in the riboflavin, which then induces collagen cross-links.

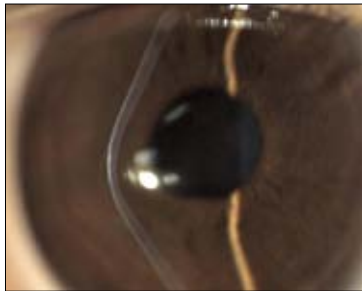
Published results so far indicate an arrest of progression of this disease in over 90% of subjects. More than 50% of subjects also had improved vision after. The risk of the procedure is low. However, the longest follow-up for this procedure is only 5 years.

This treatment will change the way keratoconus is managed. Previously, ophthalmological intervention was only required in the advanced stage but now keratoconus needs to be diagnosed early and monitored for progression. Treatment is indicated if the disease is progressing.

There are also several new treatments such as implantable corneal ring segments and implantable phakic intraocular lenses that can further improve these patients' vision. The future goal will be maintenance of optically correctable vision through early minimally invasive procedures. Ultimately, less corneal transplantation will be required.

At least two private clinics in WA offer this treatment.

This clinical update is supported by the Eye Surgery Foundation. ■



■ Advanced nipple-shaped keratoconus in a 20-year-old female - counting finger-only vision



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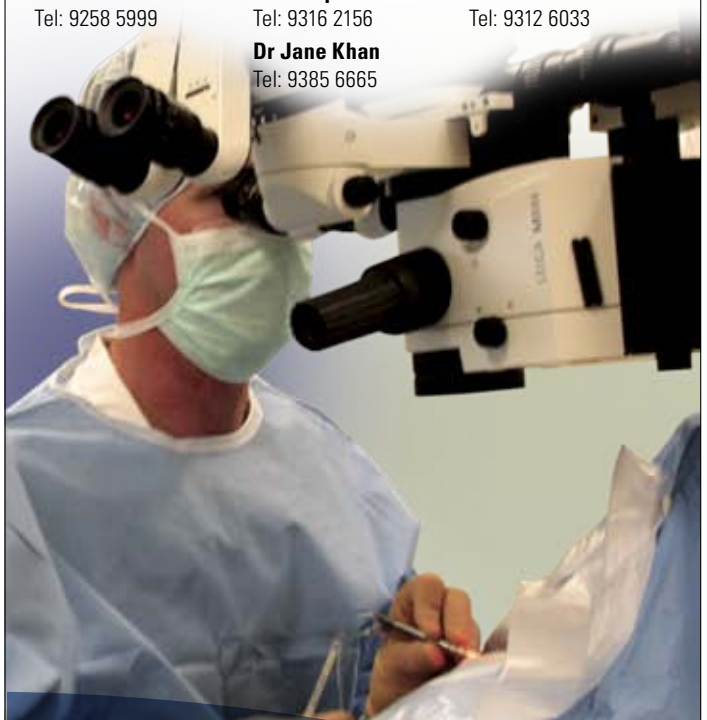
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