

# RADIAL KERATOTOMY — A PRELIMINARY REPORT ON 18 EYES

C Chiang, A S M Lim, B Fleck, P Chew, C H Low

## SYNOPSIS

**This is a preliminary evaluation of 18 eyes which underwent radial keratotomy performed at the National University Hospital, Singapore. All 18 eyes (100%) had improvement in their uncorrected visual acuity to 6/12 or better and 9 eyes (50%) achieved 6/6 uncorrected visual acuity. There were no major complications. The results are better than those reported in other studies. Further evaluation is being done.**

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## INTRODUCTION

Radial keratotomy is a form of refractive surgery to correct myopia. This is achieved by making radial cuts on the cornea in order to flatten the central cornea. When properly done, it allows the patient freedom from the use of spectacles or contact lenses. As in any operation, there are complications. These range from transient signs and symptoms to complications that result in a decrease in best corrected visual acuity.

The operation is not new. As early as 1894, corneal incisions were made to correct astigmatism. In the late 1930s and early 1940s, Sato(1) of Japan made incisions on the anterior and posterior surfaces of the cornea. In 1974, Dr S Fyodorov of Russia was the first to carry out the operation successfully on a large scale.

## MATERIALS AND METHODS

This is a preliminary report of 18 cases of radial keratotomy performed at the National University Hospital

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**Dept of Ophthalmology**  
**Singapore General Hospital**  
C Chiang, FRCS  
Registrar

**Dept of Ophthalmology**  
**National University Hospital**  
ASM Lim, FRCS, FRACS, FRACO  
Chief  
B Fleck, FRCS (Edinburgh)  
Specialist  
P Chew, MBBS  
Resident-in-Charge  
C H Low, FRCS  
Visiting Consultant

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between March to November 1987. Two eyes were done by Prof George Waring, two by Richard Lindstrom, when they were here in June (both of them are from the PERK study group), four cases by Dr Low Cze Hong and 10 by Dr Arthur Lim. The data in this study and the evaluation of results were done by Dr Currie Chiang, Dr Brian Fleck and Dr Paul Chew who were not involved in the surgery to avoid bias. All the patients belong to the low myopia group (i.e. -1.50 to -3.00 dioptres) and middle myopia group (i.e. -3.00 to -6.00 dioptres). Surgery is carried out under local anaesthesia. Just prior to surgery, the patient is given a facial block using lignocaine 2% and topical anaesthesia is instilled into the eye to be operated on. The patient is then instructed to fixate on the light of operating microscope. The visual axis is marked on the cornea on the inferonasal aspect of the reflection of the microscope filament, using a small hypodermic needle. The optical zone is then marked. Next, intra-operative ultrasonic pachymetry is carried out to measure the thickness of the cornea in the four quadrants. The results are compared to those taken pre-operatively in the outpatient. The diamond knife is then set between 100% to 110% of the thinnest para-central pachymetry reading. The length of the blade is verified with the coin gauge. The cornea is properly dried before making the incisions. Four or eight radial incisions are made depending on the degree of myopia. The incisions start from the centre outwards to the periphery. The temporal incision is made last as this is the thinnest site. Each individual incision is then inspected and irrigated with balanced salt solution. Topical gentamycin is instilled at the end of the operation.

## RESULTS

A total of 18 operations were carried out on 13 patients (Table I). The follow-up period range from 1 month to 7 months (with mean of 3.7 months).

**Table 1**  
**NUMBER OF EYES**

Number of eyes	: 18
Number of patients	: 13

**Table 2**  
**IMPROVEMENT IN UNCORRECTED VISUAL ACUITY**

Number of eyes	18	
		= 100%
Total number of eyes	18	

**Table 3**  
**PERCENTAGE OF IMPROVEMENT OF**  
**UNCORRECTED VISUAL ACUITY**  
**6/12 AND BETTER**

Uncorrected visual acuity	Number of eyes	Percentage
6/6	9	50%
6/12 or better	18	100%
6/18 or worse	0	0%

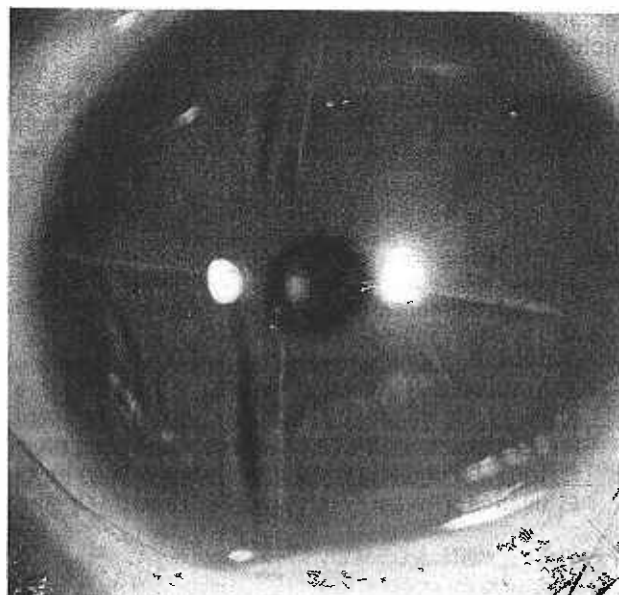
**Table 4**  
**COMPARISON WITH OTHER STUDIES**

	Number of eyes	6/12 or better uncorrected visual acuity (percentage)
Deitz	290	83%
PERK	435	76%
Our series	18	100%

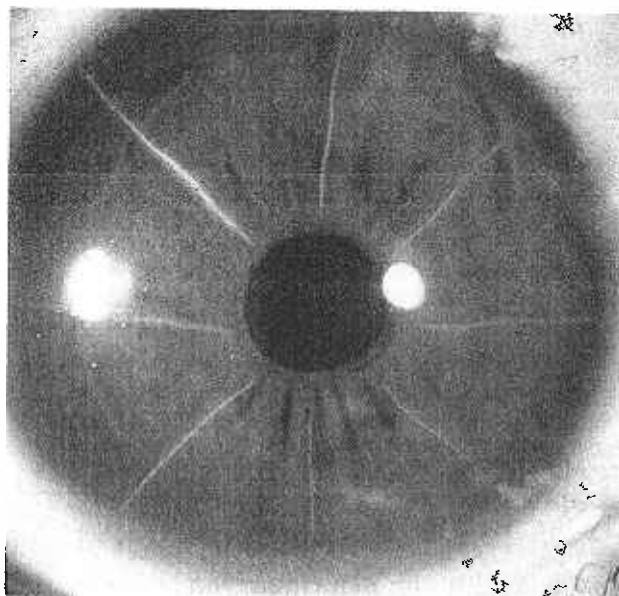
Results showed that the uncorrected visual acuity improved in all eyes (Table 2).

All 18 eyes (100%) had improvement in their uncorrected visual acuity to 6/12 or better, while 9 eyes (50%) achieved 6/6 uncorrected visual acuity (Table 3).

There were no major complications. There were 2 cases of microperforations during surgery. Post-operatively, one eye developed a marginal corneal ulcer. This is probably unrelated to the surgery. These cases recovered uneventfully.



**Fig. 1.** Uncomplicated 4-incision radial keratotomy made with the diamond knife. This is a useful technique in myopia of less than 4 dioptres.



**Fig. 2.** Uncomplicated 8-incision radial keratotomy made with the diamond knife. This technique is useful for myopia of less than 6 dioptres.

## CONCLUSIONS

The results are encouraging. The uncorrected visual acuity results are comparable, if not better than some of the major studies carried out. In his series of 290 cases, Dr Deitz(2) and his co-workers achieved 6/12 or better uncorrected vision in 83% of cases, while 40% of cases had 6/6 uncorrected vision. The multi-centred clinical trial of 435 patients in the PERK study had shown that at the end of 1 year(3), uncorrected vision was 6/12 or better in 78% of eyes. At the end of 3 years,(4) 51% of all eyes tested 6/6 or better uncor-

rected and 76% of eyes tested 6/12 or better uncorrected.

The ability to obtain good results in our series is perhaps due to the fact that only the low and middle myopes of up to 6 dioptres were selected for the oper-

ation. The PERK study had shown that the operation is most effective in eyes with a refraction between  $-2.00$  and  $-4.25$  dioptres. In our series, the operation had not been extended to the high myopes, that is those with more than 6 dioptres. Should these patients be included, the results will be different.

## REFERENCES

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