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# Effect of the Against the Rule Myopic Astigmatism on the Near Vision of the Elderly

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## ABSTRACT

*In the two groups of patients with myopic astigmatism the uncorrected near vision was tested after cataract surgery. Each group with 20 patients ages 60–80. All patients enrolled in study have uncorrected far vision 0.5 or better on Snellen tables. In the first group patients were with the rule after surgery myopic astigmatism (1–1.50 Diopter), and in the second group were patients with against the rule after surgery myopic astigmatism (1–1.50 Diopter). Patients in the second group with against the rule astigmatism achieved significantly ( $p < 0.01$ ) better uncorrected near vision.*

**Key words:** myopic astigmatism, elderly, near vision, cataract surgery

## Introduction

Anatomical and functional changes are developing with the age in the human eye. Some parameters change significantly, particularly in the sixties and seventies, among them is astigmatic progression and trend against the rule orientation<sup>1</sup>. Considerable improvements in intraocular lens (IOL) design and technology as well as new surgical procedures are optimizing the visual outcomes after cataract surgery<sup>2,3</sup>. Some are recommending a low grade of myopia as optimal postoperative refraction while others state that low myopic astigmatism gives more spectacle independence to the patients<sup>4,5</sup>. Implantation of multifocal and toric IOLs in treating after cataract patients in correcting of presbyopia is wide accepted method<sup>6</sup>. But there are still proposal for optimal postoperative refraction in cataract patients with monofocal IOLs for as much as possible spectacle independence, especially for near vision<sup>7,8</sup>. On the other hand Savage<sup>9</sup> in his study did not find essential benefit for vision and quality of life in those with presbyopia and astigmatism compared with those without astigmatism. In our study we tried to answer on this question of the acceptable postoperative refraction in patients with monofocal IOLs.

## Patients and Methods

In the two groups of patients with myopic astigmatism the uncorrected near vision was tested after cataract surgery with Jaeger near vision tables. For far vision testing Snellen optotypes were used. Each group with 20 patients ages 60–80. There were no predisposing age and sex distribution in the groups. All patients enrolled in study have uncorrected far vision 0.5 or better on Snellen tables. Phacoemulsification cataract surgery in topical anesthesia with clear cornea 2.75 mm temporal incision was done. In the first group patients were with the rule after surgery myopic astigmatism (1–1.50 Diopter), and in the second group were patients with against the rule after surgery myopic astigmatism (1–1.50 Diopter).

## Results and Discussion

Results of near vision testing of the patients in both group are in Table 1. Patients in the second group having against the rule astigmatism achieved significantly

**TABLE 1**  
UNCORRECTED NEAR VISION IN PSEUDOPHAKIC WITH MYOPIC ASTIGMATISM

UNCORRECTED NEAR VISION	DIRECT MYOPIC ASTIGMATISM	INVERSE MYOPIC ASTIGMATISM
J1	0	6
J2	0	9
J3	2	3
J4	3	2
J5	8	0
J6	7	0
TOTAL	20	20

( $p < 0.01$ ) better uncorrected near vision. In monofocal intraocular lens (IOL) implants we can sometimes obtain a certain degree of pseudoaccommodation. The use of a slight myopic astigmatism is proposed for postoperative refraction to achieve a significant increase in the depth of field and to reestablish a certain degree of pseudoaccommodation in pseudophakic eyes. By the vision testing tables predominating are vertical and horizontal lines. Patients with against the rule myopic astigmatism are seeing sharper vertical lines in the near what gives them better recognition of letters on Jaeger tables and better capability of the text reading compared with the patients with the



Fig. 1. Focal planes in simple myopic astigmatism, left with the rule, right against the rule.

rule myopic astigmatism (Figure 1). The depth of focus is increased in myopic astigmatism because the shape, rather than the size, of the blurred retinal image changes as Sturm's conoid moves over the retina. Naeser and Hjortdal<sup>10</sup> studied defocus equivalent over full fixation interval for near, intermediate and distance and concluded that minimal cumulative defocus was present for spheres of  $-0.25$  Diopter to  $-0.5$  Diopter. No beneficial effect of the presence of astigmatism was detected. Trinidad<sup>11</sup>, however, found in pseudophakia that a low simple against the rule myopic astigmatism is better than with the rule astigmatism because it provides superior uncorrected near visual acuity. In our study we also found against the rule myopic astigmatism helpful for better near vision of our patients. It seems that this could be helpful in some degree in patients with monofocal IOLs in situation of lack of the possibility of multifocal IOLs implantation.

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## DJELOVANJE INVERZNOG MIOPSKOG ASTIGMATIZMA NA VID ZA BLIZINU U STARIJIH

### SAŽETAK

Nakon operacije katarakte u dvije skupine bolesnika s miopskim astigmatizmom izmjerena je nekorrigirana oštrina vida na blizinu. U svakoj skupini je bilo po 20 bolesnika u dobi 60–80 godina. Bolesnici uključeni u istraživanje su imali nekorrigiranu oštrinu vida za daljinu 0,5 ili bolju na Snellenovim optotipima. U prvu skupinu su uvršteni bolesnici s direktnim miopskim astigmatizmom (1–1,5 dioptrija), a u drugu skupinu bolesnici s inverznim miopskim astigmatizmom (1–1,5 dioptrija). Bolesnici u drugoj skupini s inverznim miopskim astigmatizmom su imali značajno bolju nekorrigiranu oštrinu vida na blizinu ( $p < 0,05$ ) u odnosu na bolesnike prve skupine s direktnim miopskim astigmatizmom.