

## Reference

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## Role of autologous serum in persistent epithelial defects

Poon *et al* in their excellent article have reiterated the efficacy of autologous serum in the treatment of persistent epithelial defects (PEDs) of the cornea. We would like to invite the attention of the authors to certain aspects of the study.

The authors have considered a period of 1 week for labelling an epithelial defect to be persistent. However, most studies on a similar subject have taken the criterion to be 2 weeks.<sup>1</sup>

It is generally recommended that a "wash-out" period of at least 2 weeks be given with preservative free artificial tears<sup>2</sup> and only those epithelial defects that remain either static or demonstrate an increase in size in this period be included in the study. The authors have not mentioned such a washout period being included in the protocol. When using autologous serum drops most investigators have not used any other therapeutic modality at the same time to enhance epithelialisation, apart from preservative free lubricants. The use of therapeutic contact lenses in five cases by the authors makes it difficult to evaluate the actual contribution of serum drops in the healing of the epithelial defect in these cases. Further, the use of serum drops in the immediate postoperative period in two patients with poor ocular surface undergoing keratoplasty without waiting for the corneal epithelial defect to heal by itself cannot be extrapolated to making a comment on the beneficial effect of autologous serum. Also the rationale behind the use of 100% serum when previous studies have proved the efficacy of a 20% solution<sup>3</sup> is not understandable. This concentrated serum can cause stickiness, which would be inconvenient to the patients and may reduce the compliance. The use of the slit lamp micrometer by the authors for measuring the epithelial defects may not be accurate because of its inherent interobserver and intraobserver variations. A better method would be measuring the area of the defect instead of the greatest dimensions by the use of digital photographs and area measuring software such as Image Pro Plus available from Media Cybernetics.

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## A re-analysis of astigmatism correction

In a recent perspective by Morlet *et al* there are a number of omissions and fundamental errors of content that lead to erroneous conclusions. These significant inaccuracies overlooked in the review process compromise the article's broad contribution.

In Morlet *et al*'s attempt to detail "the use and limitations of vectors... for the analysis of change in astigmatism" (p 1127) they display an incomplete understanding of the subject. They have made a valiant attempt to assemble an abundance of historical and contemporary references on a subject of significant interest, but key material has been omitted or misquoted. This has resulted in leading statements in the article, in both the body of the text and even the conclusion, that require re-evaluation and substantial revision.

The most obvious omission is the paper's absence of any discussion of the difference vector, a precise *absolute* measure of surgical error described in reference 70.<sup>2</sup> When the difference vector is related to the treatment (that is, TIA or target induced astigmatism vector) one has an extremely useful *relative* value of success of astigmatism treatment. Morlet *et al* have overlooked this key vectorial entity and struggle to find any useful alternative. In sharp contrast Dr Doug Koch, editor of the *Journal of Cataract and Refractive Surgery*, in his editorial introduction to the analysing astigmatism issue of January 2001<sup>1</sup> described the difference vector and the index of success as "remarkably useful and intuitive means of understanding the effects of the surgery."

The authors state more than once for their principal foundation of the article that "Vector analysis alone does not provide any indication of the relative value of the surgical procedure" (p 1132). These statements are erroneous, and the authors' failure to discuss or dispute the value of the difference vector and index of success leaves the assertion unsupported and lacking credibility. If the surgical induced astigmatism vector (SIA) (and its further translation) was the only product of vector analysis, indeed vector analysis would be a limited tool. This seems to be Morlet *et al*'s contention. This is far from the truth and as a result the restatement in the conclusion that "vector analysis does not give a measure of outcome" (p 1134) is factually inaccurate.

In addition, their interpretation that the off-axis effects of treatment at 45° to the surgical plane are deemed to be rotation, would more accurately be termed "torque," the component of the SIA that has been ineffective in reducing astigmatism. The relevant reference<sup>3</sup> describing flattening, steepening, torque, and effect of off-axis treatments has been omitted from the attempt at a comprehensive list of relevant published material. The phenomena of rotation and torque are fundamentally different physical processes. The polar value at 45° to the "surgical plane" (p 1131) quantifies the torque which causes an increase in the existing astigmatism associated with its change in orientation. It does not properly gauge the cylinder rotation where no concurrent change in the amount of existing astigmatism occurs. Rotation includes some associated flattening (or steepening) effect occurring as a result of the SIA.

The article's conclusion that "a better evaluation of the effect of astigmatism axis requires the use of the 'by the rule' or mirror equivalent axis notation, or by a manual scoring method to produce an outcome summary measure" (p 1134) is convoluted and unwork-

able. If implemented this would adversely affect the comprehension of astigmatism outcome analysis by the average general ophthalmic or refractive surgeon.

It is unfortunate the reviewers of this paper did not direct the author to other significant fallacies that merited revision. The statement "vector analysis is only valid in the early post-operative period" because "the healing response has modified the initial result of the surgery" (p 1131) shows the authors' failure to understand that the healing response cannot be divorced from the surgical process. It is part of it. The amount of astigmatism correction (SIA/TIA) achieved shows consistent trends over time when examining aggregate data, and this phenomenon requires surgeons to examine outcomes facilitating adjustment of nomograms based on long term (at least 6 months) and not immediate outcomes. The later statement "the use of vector analysis over time is conceptually invalid, because unlike the initial surgical event, the wound healing process is continuous" (p 1132) is seriously flawed. Vector analysis is an essential component of this refinement process. In fact, vector analysis could be used to determine the astigmatic effect of the healing process itself by comparison of data at various stages in the postoperative period.

The recommendations promoted by Morlet *et al* introduce greater complexity to an already complicated subject. For example, mixing negative and positive cylinder notation is unnecessary. The technique put forward (p 1131 and equation 20) does not address the changes that occur in corneal shape as measured by keratometry and topography, and cannot be readily applied when targeting non-zero goals associated with incomplete or off-axis refractive astigmatism treatments.

It is probable that the authors are careless in raising phantom "problems" (p 1128) for planning techniques based on incorrect quoting of information (such as reference 33).<sup>4</sup> The merits of this customised treatment technique are that refractive as well as keratometric data are employed (contrary to its misrepresentation that the technique "only uses keratometric data for the planning of refractive surgery" (p 1128)).

Morlet *et al*'s unfortunate statement of opinion that "a lack of critical evaluation" has resulted in "the surgical vector's adoption as the de facto standard used in most reports concerning the surgical management of astigmatism" (p 1132) is not shared by many experienced investigative surgeons in the field. This has been shown by its admitted prevalence by the authors, and the usefulness of vectorial analysis in understanding the surgical process.<sup>5</sup> Indeed, many of the erroneous statements and omissions in the Perspective article might lead one to ask where the "lack of critical evaluation" actually lies.

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