Reviewer’s report

Title: Contact Lens Rehabilitation following Repaired Corneal Perforations

Version: 1 Date: 24 October 2005

Reviewer: Marek Brabec

Reviewer’s report:

As a statistician, I cannot judge the subject-matter content of this paper, so that I will focus solely on technical (statistical) details, (although I do appreciate that the general message of the text is clearly and nicely formulated).

Statistically speaking, the structure of the data used for analyses is quite simple. It is not mentioned explicitly, but it seems that there is one eye per person, so that there is no problem with within-subject correlation when comparing various groups (like those formed according to nature of corneal opacity or according to lens status) in terms of variable describing one corrective action (e.g. BCVA with contact lenses). Therefore, there should be no problem in using one-way ANOVA for comparison of these groups. Presumably, this would be used as a basis for Table 1 and related comments and discussions in the text. The ANOVA is able to provide:

i) p-value for the overall effect of the factor under investigation (e.g. for “Nature of Corneal Opacity” with 3 levels),

ii) residual standard error, which might be used for calculation of standard error of the mean (SEM=(residual standard deviation)/sqrt(number of patients within the particular group)) for each of the three groups. It seems that the authors did not calculate SEM’s in the Table 1 this way. This could be seen from the fact that e.g. the +/- figure for the Central and Paracentral groups (within the same column) are different in Table 1, while they would be the same in the residual standard error based calculation of the SEM (because n is the same for both groups, as indicated in Table 1). It seems that the authors computed standard errors of the mean (or standard deviations without dividing by sqrt(n) ?) for each group. In any case, it should be indicated whether standard deviations or (better) SEM’s are given as +/- figures.

iii) detailed comparisons among the three groups (which would go beyond the overall test saying that there are differences among the 3 groups by saying which groups actually differ). One can use contrasts of nice subject-matter meaning, or at least to use all pairwise differences of the groups (3 in total) with correction for multiple comparisons.

Although this detailed analysis should be interesting, not all of this might be considered necessary by the authors. If the authors are not interested in such a deeper insight, it is OK to go without ANOVA too, but then it should not be mentioned in the “Statistical analysis” section.

The situation is somewhat different when comparing results with lenses with results with spectacles (or without correction). As far as I understand it from the paper, results of the same patient are compared - e.g. result of spectacle correction (done first as the standard method) is compared with the result of the lens correction (done later in time) on the same. This leads to correlation between the two results that was computed and reported e.g. in Table 1. This correlation is probably not what the authors are really interested in. It measures how much similar are the corrective results of the two methods in the sense of (any) linear relationship. High positive correlation (as in Table 1) means that lens correction leads to a result that is (almost) a positive multiple of spectacle result (plus possibly a constant). While this loosely suggests that that the two methods work in a “structurally similar” way, from practical point of view, it is perhaps (much) more important whether the lens correction is better than standard spectacle correction. Although it seems to be the case “visually” (when looking at averages as those listed in Table 1), the statistical tests should take the correlation into account. This means that one should use paired t-test for comparing the spectacle vs. lens means and McNemar’s test for comparing percentages for spectacle and lens. It is not clear whether
this is what the authors did (at least they did not mention it in the “Statistical analysis” section). One might also consider other means of looking into the problem, e.g. to regress results of lens correction on spectacle correction and interpret the slope coefficient as the magnitude of the improvement (although this approach brings some additional subtle technical issues). General question to be considered is whether one should think of the improvement acts additively (as used implicitly in the paper) or multiplicatively (in a relative way, depending on starting, i.e. uncorrected value).