CORNEAL SENSITIVITY AND CONTACT LENSES*

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It is a matter of experience that certain persons adjust well to contact lenses while others do not, despite perfect fitting. This adjustment is greatly facilitated if the sensitivity of the cornea is decreased, as it is after cataract extraction. One is therefore tempted to consider corneal sensitivity as a determining factor for the success of a fitting. Previous investigation of the subject has been mainly directed to examining the change in corneal sensitivity after wearing contact lenses (Cochet and Bonnet, 1960; Boberg-Ans, 1955).

In the past, prediction of contact lens tolerance seemed difficult as threshold measurements were not helpful. At that time no consideration was given to the factors of pressure, friction, and size of contact area. After investigation of these factors (Schirmer, 1963) and assessment of their effects upon corneal threshold and tolerance, it seemed interesting to apply these procedures on patients before their contact lens fitting. The results obtained were compared with the follow-up history of the individual patient.

Method

For an accurate assessment of corneal sensitivity, a spring-gauge Aesthesiometer† ("Corneal Sensitometer") was used. Thresholds and tolerance levels were recorded while friction or pressure was applied over small or large corneal contact areas as previously reported. From 56 patients who were investigated, two groups were selected. Group I comprised patients who became easily adjusted to contact lenses and were able to wear them for more than 4 hours without any difficulty within a 14-day period. Group II comprised those who had great difficulty for more than 4 weeks and could not wear contact lenses for 4 hours without signs of irritation, redness, and lacrimation. The results of the various measurements of corneal sensitivity were tabulated. Groups I and II were compared and statistically significant results were sought by dichotomy.

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† Manufactured by Metropolitan Optical Company, 42 Burton Avenue, Montreal, Canada.

Results

Statistical evaluation of the results showed significant differences between the groups only for tolerance of large surface contact. This pertained to friction as well as to the application of pressure. The results are illustrated graphically in the Figure. The first group shows significant increase of tolerance levels with each subsequent reading, the pressure readings (A) being higher than the friction readings (B). It was found that subsequent readings were necessary as only repeated readings would show whether the tolerance level would increase after an initial low reading.

The second group demonstrates low tolerance levels for pressure and even lower levels for friction. It is interesting to note the irregular changes and decrease of tolerance in subsequent readings.

The findings in the diagram represent the actual measurements obtained from one patient of each group, A and B for Group I and C and D for Group II. The values approximate closely the averages of each group.

FIGURE.—Pressure and friction readings in typical cases of Group I and II. Each vertical line represents one measurement extending from threshold to tolerance.

Discussion

In correlating these findings with the actual case histories, it becomes obvious that it is especially the initial period of adjustment which is best predicted by this assessment of corneal sensitivity. In the exceptional case, final adjustment is possible despite greatly prolonged initial difficulty, if determination and will-power outbalance the initial high degree of sensitivity. This, however, is the exception, as this test measures corneal sensitivity in

relation to motivation and will-power as well. Tolerance to a stimulus that reaches the level of pain and discomfort must greatly depend on this. Any change in motivation or will-power in such a patient will also bring about a lessening of tolerance for contact lenses. A prime example is the middle-aged myopic who reverts from contact lenses to ordinary glasses after marriage. The long-term prognosis for these exceptional cases is rather poor, although transient and limited tolerance of contact lenses is not impossible.

It is interesting that patients of the first group showed a relative loss of sensation during an increase of pressure within certain pressure levels. The gradual increase of tolerance was found only in those patients who were good prognostic risks for contact lens fittings. With prior sedation, threshold and tolerance levels did not change with subsequent readings (Power, 1962). This suggests that increase in tolerance is at least partially due to will-power or abatement of anxiety in the patient who is suitable for contact lenses.

For prognostic assessment of prospective contact lens patients, tolerance levels seem the most important indicator especially if these increase on repeated readings.

Summary

Prediction of contact lens tolerance appears possible in the individual patient by measuring corneal sensitivity and tolerance levels with a spring-gauge Aesthesiometer ("Corneal Sensitometer").

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