



## CONJUNCTIVAL CYTOLOGICAL CHANGES IN SOFT CONTACT LENS WEARERS

## Ophthalmology

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## KEYWORDS

## INTRODUCTION

Conjunctival and corneal epithelial cell changes have been noticed in both symptomatic and asymptomatic contact lens wearers. The main changes in conjunctival epithelial changes are squamous metaplasia, decrease in goblet cell density and presence of abnormal chromatin materials in epithelial cell nuclei.<sup>1-6</sup>

Incompatibility of soft contact lenses lead to changes in conjunctiva and cornea which frequently appear in the region of the corneal limbus. The impaired function of corneal epithelial stem cells located in the limbus is responsible for corneal surface damage and is clinically characterised by recurrent epithelial defects, conjunctivalization, neovascularisation, and corneal opacities. This study has been conducted to study the conjunctival changes in soft contact lens wearers, using impression cytology.

## AIM OF THE STUDY

- To evaluate the conjunctival changes in soft contact lens wearers, using impression cytology.
- To find any correlation between the severity of cytological alteration and symptoms related to soft contact lens wearers

## MATERIALS AND METHODS

In the present study, the effects of long term use of soft contact lens in conjunctiva using impression cytology were evaluated. Patients attending contact lens clinic for a period of 18 months, were studied for conjunctival changes using Impression cytology techniques. 45 eyes of 40 patients (35 cases with unilateral contact lens wear & 5 cases bilateral contact lens wear) were included in the study.

CIC was done before soft contact lens wear as control of study and then at 1<sup>st</sup>, 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup> and 15<sup>th</sup> month of the follow up visits. During each visit any history of dry eye symptoms were noted. Slit lamp examination of both eyes and any corneal / conjunctival surface lesions, deposits on contact lens, loose / tight fitting contact lens were noted. Inclusion criteria included patients wearing contact lens in one or both eyes for the first time, patients willing to come for regular follow-up, patients ranging from 7 year of age to 40 years of age only. Both eyes were anaesthetised using 4% xylocaine.

A cellulose acetate paper was cut into strips of 1 cm<sup>2</sup>. These strips were pressed for 3-5 seconds on the 12 o'clock position of limbal surface conjunctiva and gently massaged using finger tip pressure. The filter paper was gently removed in a peeling motion, avoiding shearing. This removes 1-3 layers of conjunctival epithelium. When the filter paper is pressed against the conjunctival surface, areas of conjunctival mucus cells adhere to the filter and are removed with it, retaining their surface distribution. The filter paper was immediately pressed cell side down on to a clear glass slide. To ensure better cytology evaluation, a modified procedure was used, where by the filter dissolves leaving the cells on the slide. A solution containing three parts acetone and one part of a mixture of ¼ 95% methanol and ¾ 95% ethanol was freshly prepared. Immediately after the filter was pressed on to the slides, the slides were placed in the above solution for 3-4 hours in a glass Petri-dish. The slides were fixed in absolute alcohol, stained with haematoxyline and eosine, papinicolaou and periodic acid Schiff and

mounted in DPX. The slides were studied in low power and high power. Cytological gradation as per Nelson and Wright done<sup>36</sup>.

## OBSERVATION RESULTS

Out of 45 cases, 41 cases had Grade 0 light microscopic grading at beginning of study. At 6<sup>th</sup> month follow up visit, none of these patients had Grade 0 light microscopic findings. 40 patients had Grade 1 finding and 5 patients had Grade 2 finding. At 12<sup>th</sup> month follow up visit 19 patients had Grade 1 changes and 25 patients had Grade 2 findings and 1 case developed Grade 3 changes.

Statistically significant mean difference was observed between the light microscopic grading done at each follow-up time when compared to baseline grading. The mean difference increased over the period of contact lens wear. The mean difference between base line vs. 1<sup>st</sup> month was 0.333 whereas the corresponding difference between the base line vs. 15<sup>th</sup> month was 1.574.

In each group (<4D, ≥4D) mean difference over the time is significantly different compared to the baseline. However there was no significant mean difference in light microscopic grading between high power contact lens (≥4D) and low power contact lens (<4D) over the time period. The mean difference at 15<sup>th</sup> month follow up (at the end of the study) in low power contact lens users was 1.727 and in high power contact lens users was 1.363 compared to the grading at baseline

There was significant mean difference in light microscopic grading from 1<sup>st</sup> month onwards when the contact lens was used for > 6 hours/day. Mean difference at 1<sup>st</sup> month was 0.441 and this difference increased over time reaching 1.853 at 15<sup>th</sup> month. Significant mean difference in light microscopic grading was noted in patients using contact lens for < 6 hours/day only from the 6<sup>th</sup> month follow up visit. Mean difference at 6<sup>th</sup> month was 0.900 which increased to 1.100 at 15<sup>th</sup> month follow up.

## DISCUSSION

In our study out of 40 contact lens wearers, 27 were females and 13 males. A female preponderance similar to the studies by D.K. Tomatir et al and Anshu et al is observed. In the present study the purpose of contact lens wear was myopia (73.3%) followed by cosmetic use (17.8%).<sup>23-35</sup>

In almost half of the cases (51.5%), the power of contact lens worn was more than - 4 D. Most of the patients were myopic. The only hypermetropic patient in this study used +6 D contact lens. 75.6 % of the cases used lens for more than 6 hours/day.

Conjunctival impression cytology was done before soft contact lens wear and then at 1<sup>st</sup>, 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup> and 15<sup>th</sup> month of the follow up visits. 46.7% cases were asymptomatic at the 1<sup>st</sup> follow up visit. At the end of the study 77.8% cases were asymptomatic.

Symptoms mentioned during the study included irritation, watering, foreign body sensation, and redness. Irritation was the commonest symptom following contact lens wear (31.1% at the 1<sup>st</sup> month follow up). Proportion of various symptoms following contact lens wear decreased during the follow-up time. 24 (53.3%) cases had symptoms

during their 1<sup>st</sup> month follow up visit. At 15<sup>th</sup> month follow up visit the number of symptomatic patients had decreased to 10. In a study conducted by Aragona et al<sup>(7)</sup> abnormal cytological finding were found more in symptomatic soft contact lens users when compared with rigid and gas-permeable lens users.

Out of 45 eyes, 41 eyes had Grade 0 light microscopic grading at beginning of study. At 6<sup>th</sup> month follow up visit, none of these patients had Grade 0 light microscopic findings. 40 eyes had Grade 1 finding and 5 eyes had Grade 2 finding. Early cytological changes noted may be due to hot climate in our surroundings which leads to early evaporation of tears. Increased friction between the contact lens and conjunctiva along with superior eyelid movements can cause mechanical irritation which increases the conjunctival cytological changes. Albietz et al, reported that mechanical influences are responsible for the conjunctival squamous metaplasia changes associated with contact lens wear.<sup>1-10</sup>

At 12<sup>th</sup> month follow up visit, 19 eyes had Grade 1 changes and 25 eyes had Grade 2 findings and 1 eye developed Grade 3 changes. Statistically significant mean difference was observed between the light microscopic grading done at each follow-up time when compared to baseline grading. The mean difference increased over the period of contact lens wear. In some studies no relationship was established between the wearing period and cytologic changes, whereas in some other studies a relationship was noted between the wearing period and cytologic changes.<sup>4-12</sup>

More than 75% of the cases used lens more than 6 hours/ day. There was significant mean difference in light microscopic grading from 1<sup>st</sup> month onwards when the contact lens was used for > 6 hours/day. Mean difference at 1<sup>st</sup> month was 0.441 and this difference increased over time reaching 1.853 at 15<sup>th</sup> month. Significant mean difference in light microscopic grading was noted in patients using contact lens for < 6 hours/day only from the 6<sup>th</sup> month follow up visit. Mean difference at 6<sup>th</sup> month was 0.900 which increased to 1.100 at 15<sup>th</sup> month follow up. This finding was similar to Anshu et al, in which significantly higher biomicroscopic and cytological grades were observed when the soft contact lens was used for more than 6 hrs of average daily lens wear compared to those with less than 6 hrs of average daily lens wear. Gender wise, there was no mean difference in light microscopic grading at the end of 15 months time period.<sup>13-23</sup>

## CONCLUSION

The use of soft contact lenses will induce the development of cytological changes in the conjunctival surface. So after prescription of contact lens, it is important to check for cytological conjunctival changes also in asymptomatic patients. Conjunctival impression cytology is a practical, safe, non invasive easily reproducible technique that is strongly recommended for evaluation of ocular surface before contact lens fitting, for detection of eyes with imminent risk of developing contact lens intolerance, for follow up of the state of ocular surface in eyes with contact lens intolerance, and for ascertainment of reversibility of the cytological findings in the patients in whom contact lens wear is discontinued. Follow-up studies with follow-up periods longer than 15 months will help in providing more information regarding the changes in symptoms and conjunctival cytology following long term contact lens use.

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