Contact Lens Update
CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Non-Compliance With Contact Lens Replacement Schedules: Does it really matter?

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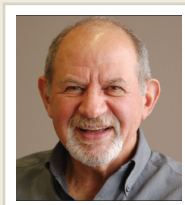

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Background

Patient non-compliance with replacement of their contact lenses at the time they should be replaced is a behaviour frequently reported when wearers are surveyed and something well recognised by eye care practitioners. How can a practitioner best manage this? Is there evidence that stretching replacement periods is truly detrimental to successful contact lens wear?

To begin the search for this evidence, it is worth a trip back in time to determine what drove the development of frequent replacement lenses. In the 1970's and early 1980's, reports began to surface of the deposition of both soft and rigid lenses with components of the tear film.[1-4] This deposition occurred despite extensive cleaning and disinfection methods by patients, and often necessitated practitioners to employ elaborate in-office methods to 'recondition' lenses, in an attempt to salvage the lenses and extend their lifetime. Lenses were only replaced through dire necessity due to cost concerns and often patients presented with heavily deposited lenses (Figure 1).

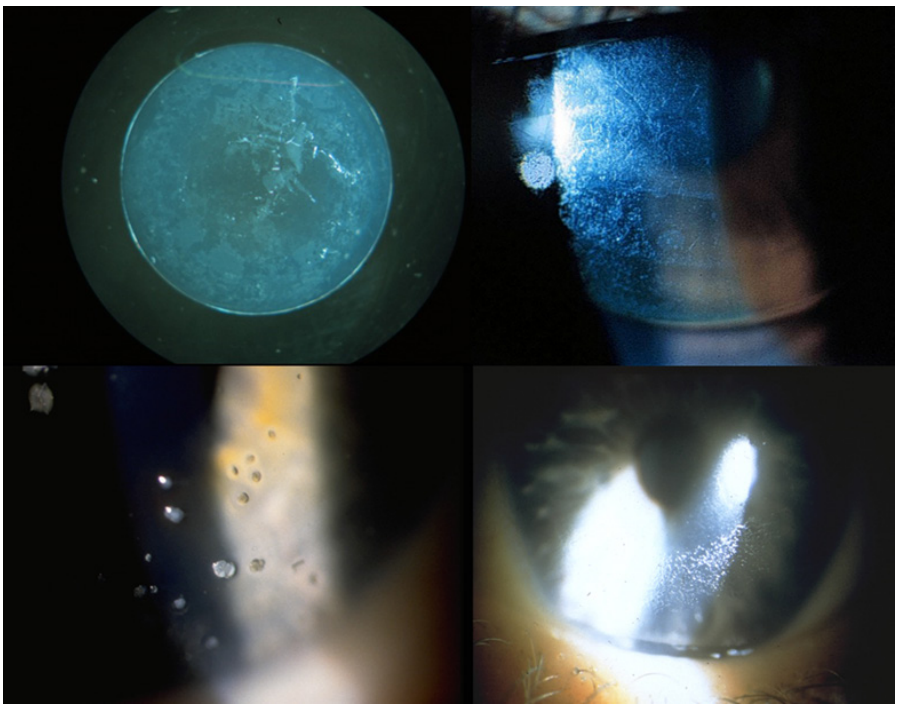

Figure 1: Montage of filmy and nodular deposits on soft and rigid lenses.

Pioneering work in the 1970's by Spring, Allansmith and others linked this deposition with a variety of complications.[5-7] Most notable of these were contact lens associated papillary conjunctivitis (CLAPC), which was linked to denatured protein, especially when the lenses were heat disinfected (Figure 2).

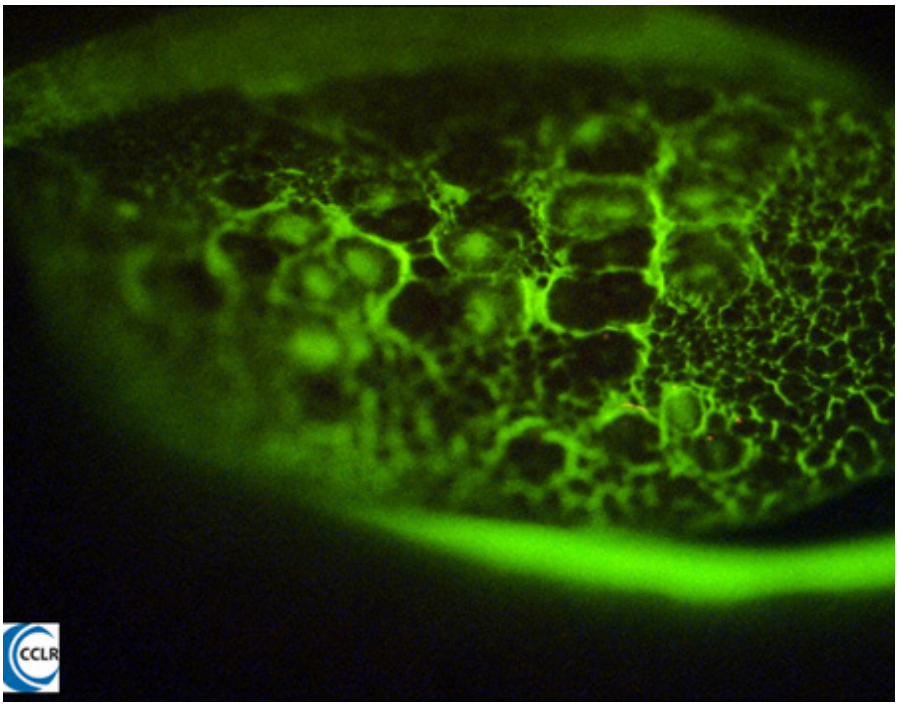

Figure 2: Contact Lens Associated Papillary Conjunctivitis (CLAPC)

At this time, CLAPC was one of the leading causes of discomfort that led to discontinuation of lens wear, with some reports suggesting that over 40% of soft lens wearers exhibited this sign.[5]

The Move to Frequent Replacement (Disposable) Lenses

In 1980, at the Scientific meeting of the International Society for Contact Lens Research, the inventor of soft lenses, Otto Wichterle, proposed that the best solution to lens deposition and the resulting degradation in vision, comfort and performance would be afforded by discarding the lens and replacing it with a new one, and he predicted that the advancement of manufacturing technology would enable lenses to be "sold for a dollar". [8] As always, he was ahead of his time, and it was not until 1988 that Vistakon launched disposable soft contact lenses in the USA. Initially introduced as a weekly replacement, overnight wear option, the lens was quickly switched to daily wear and replaced every two weeks.[9]

Complications Associated with Replacement Frequency

One of the earlier retrospective studies by Porazinski and Donshik found that 36% of patients who replaced their lenses at 4 weeks or longer developed CLAPC, compared to only 4.5% of patients who replaced their lenses at 3 weeks or less.[10] Lenses replaced at 4 weeks or longer were also more noticeably deposited. Numerous reports since this time have described how frequent replacement of lenses has improved clinical performance by reducing ocular complications, minimising lens deposits, enhancing comfort and improving vision compared to longer periods of lens wear.[11-16] There is also a significant reduction in corneal infiltrative events, with daily disposable lenses demonstrating the lowest rate of all types.[17, 18] In their extensive review, Brennan and Coles suggested "More by inference rather than science, we suspect that minor-to-moderate levels of deposition do play a role in

producing a variety of signs and symptoms in contact lens wearers".[19]

The complication that has challenged patients and the contact lens industry more than any other is contact lens discomfort (particularly at the end-of-day) and has been the primary reason for premature discontinuation of lens wear.[20-26] Dumbleton and colleagues attempted to establish whether contemporary lenses (silicone hydrogels and disposable lenses) impacted the "dropout" rate. The study was an online survey of Canadian current and lapsed contact lens wearers conducted during 2011/12. They found that the dropout rate of 23% was similar to studies conducted in Canada in the 1990's, and the main reasons for discontinuation were still primarily end-of-day discomfort and dryness.[20] A review of the literature suggests that, despite the almost universal move to frequently replaced and silicone hydrogel materials, the major reasons for dropout have not changed.

Patient And Practitioner Adherence to Soft Lens Replacement Schedules

Given the proven impact of reduced complications with lenses that are frequently replaced, how compliant are patients with replacing their lenses when recommended to do so, and do practitioners comply with prescribing the suggested replacement periods with the lenses they prescribe?

Patient non-compliance with contact lens wear is a very general term and patients have invented all sorts of strategies to bypass or skimp on adhering to lens replacement recommendations provided by their eye care practitioner. Failure to comply with lens replacement frequency is well documented.[27-32] This level of adherence with replacing lenses on time differs with lens modality, with about 10% of patients in North America extending their use of daily disposable lenses beyond one day. However, this can be considered as relatively good adherence compared to the 50% of patients who extend the use of two-week replacement lenses and 30% who extend their use of one-month replacement lenses.[27] The proportion of wearers disposing of both daily disposable and one-month lenses being closer to the actual recommended replacement rate as reported by Dumbleton and co-workers is consistent with other reports.[28, 33]

Two reports specifically included the length of time that patients exceed the recommended replacement frequency. Dumbleton and colleagues found that mean replacement frequency was 2.6X the manufacturer's recommendation for 2-week replacement lenses and 1.5X for 1-month recommended replacement, with median values of 31 and 37 days, respectively.[31] Hickson-Curran et al. showed that when using 2-week replacement lenses that 45% replaced them within 2 weeks, 68% within 3 weeks, 89% within 4 weeks and 4% ≥8 weeks.[32] For monthly recommended replacement, 37% replaced them within 4 weeks, 57% within 5 weeks and 23% ≥8 weeks.[32]

An interesting point with respect to this issue of non-replacement is that some eye care practitioners are 'guilty' of actually suggesting to patients that they can extend the wearing period of lenses beyond the recommended replacement frequency, implying that they are unaware of the clinical issues this may cause.[27, 29]

Review of the literature clearly demonstrates that non-compliance with replacement schedules does have clinical implications. These effects may be considered to be relatively 'minor', such as reduced vision and decreased comfort,[29, 34] although patients may already suffer from these problems and the exacerbation could cause them to discontinue lens wear. Stretching lens wear seems also to be linked with longer intervals between eye examinations, potentially resulting in other complications aside from those related to contact lens wear.[30] Even though adherence to replacement is highest for daily disposables lenses, any reuse of these lenses is a significant concern given that patients are not provided with adequate information concerning lens storage between wears, potentially resulting in them using tap water[35, 36] or blister pack saline,[37] opening them up to the risk of microbial keratitis, including acanthamoeba infection.[38, 39]

Frequent Replacement of Rigid Gas Permeable Lenses?

Most of the published work to date on frequent replacement has related to soft lenses, but what about rigid gas permeable (RGP) lenses? RGP lenses represent only a modest 10% or so of the contact lens market,[40] but interest in orthokeratology for myopia management has resulted in renewed interest in these lenses. There is relatively scant information about the value of frequent replacement of RGP lenses except from the work of Woods and colleagues, who studied this concept in the mid 1990s. In essence, he found value in replacing RGP lenses every 3-6 months to mitigate lens deposition, corneal staining and lens binding.[41-44] Despite no recent publications on this topic, a growing number of RGP and orthokeratology lens suppliers have introduced regular replacement schemes that vary from one to 12 months.

Summary

Practitioners need to be aware of the consequences of their patients not replacing their lenses on-time, and need to encourage wearers to understand that stretching lens replacement times does result in reduced comfort, vision, satisfaction and does increase the chance of them ceasing lens wear. They should review adherence with recommended replacement times at each aftercare and use tools such as the poster in this issue of Contact Lens Update to reinforce the reasons behind this advice.

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