

# Cosmetic Tinted Lenses: A New Soft Lens Option



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**A**lthough tinted contact lenses have been made in different forms for many years, cosmetic tints in soft contact lenses have only recently become available in a workable range of parameters. The commonly used "handling tint" in hard contact lenses has typically been light grey, blue or green, and served only to make the lenses easier to handle, insert, and find when dropped. Generally, no change in appearance was claimed or achieved. In soft contact lenses, only one "handling tint" product has been available—the "Softint" Blue Number 1 lens, introduced by Ciba Vision Care in 1981.

"Therapeutic tints," a second type of tinted lens, are used to mask a scarred, disfigured or injured eye. Often these have been totally opaque or even black. Corneal hard lenses, which frequently cover too little of the cornea and iris, have not always been ideal for this application. Better appearance results have been achieved with larger scleral (haptic) lenses or soft contact lenses.

The intention of the "cosmetic tint" contact lens is to change or enhance the appearance of the patient's own natural iris.

In the soft realm some practitioners have gained experience using "therapeutic tint" lenses supplied by the Narcissus Foundation.

The third area, "cosmetic tint" lenses, is potentially the largest for tinted contact lenses and certainly the most exciting. The intention of the "cosmetic tint" contact lens is to change or enhance the appearance of the patient's own natural iris.

Up to now, this alternative was offered only in hard contact lenses, which resulted in problems similar to those associated with the therapeutic tints in corneal hard lenses. The incomplete iris coverage with corneal hard lenses produces an unacceptable cosmetic appearance because the patients' natural eye color shows in a peripheral band around the lens. Thus, the choice of soft lenses for cosmetic tints has significant practical advantages.

## PRODUCTS AVAILABLE

In recent months, cosmetic-tinted contact lenses have become readily available mainly from two U.S. manufacturers: Custom Tint Laboratories (CTL) of Raleigh, North Carolina and Ciba Vision Care of Atlanta, Georgia. The process for Custom Tint was approved by the FDA late in 1983 and is currently limited to polymacon material. The Ciba process, limited to their tefilcon material, was approved early in 1984.

Because the cosmetic tints from both companies are light and transparent, they produce iris enhancement rather than complete eye color change. The final cosmetic result is a product of color mixing, often producing a quite natural appearance with the individual patient's iris meshwork still clearly visible.

The technology of both processes for tinting hydrated finished lenses results in a *front surface*

tint which extends only microns into the lens material. The result is an even uniform tint regardless of lens thickness. This is particularly significant for higher powered lenses; the surface-only tint prevents possible color density differences that might occur if the tint permeated the entire lens thickness.

Another feature of both products is a clear peripheral band, approximately 1.5 mm wide, at the lens periphery (Figure 1). This is necessary because of the normal soft lens overlap at the limbus. Without the clear periphery, a tint overlap at the limbus onto the sclera would be unsightly against the white background.

Each of the two companies offers different lens products in cosmetic tints. Custom Tint Laboratories (CTL) tints only polycarbonate lenses which are supplied from other manufacturers. The lens products available in the CTL process are those of Hydron (Zero Six Series) and Bausch & Lomb (B4 and U4 series). Both are offered in five colors on an inventory basis. Bausch & Lomb also offers their own products with this cosmetic tint process, under the label "Natural Tint." An interesting difference between the CTL product using Hydron and Bausch & Lomb lenses is that the Hydron lenses feature about a 4.8 mm centered clear pupil, while the Bausch & Lomb lenses have a full tint throughout the central area (Figure 1).

Ciba Vision Care is a soft lens manufacturer restricted by FDA to tinting lenses made from their own tefilcon (38% water) material. These are offered in four colors on an inventory basis for their spherical product and on a custom basis for their specialty lenses (bifocals and torics). The

cosmetic tinted product is marketed under the label "Softcolors" and features a full tint with clear periphery.

The range of cosmetic tint colors offered on lenses from Bausch & Lomb, Ciba and Hydron consists basically of blue, green, aquamarine, and amber in naming variations. Bausch & Lomb and Hydron use the names sapphire, emerald, aquamarine, cocoa, and topaz. Ciba names are blue, green, aqua and amber.

## CLEAR PUPIL OR FULL TINT

Considerable debate over the relative advantages of clear pupils versus full tints is likely to ensue. As mentioned, the Hydron lenses have clear pupils, and the Bausch & Lomb and Ciba Vision Care full tints. Although both procedures offer convincing arguments, the practitioner must make the final choice for each patient. On the basis of both professional and practical considerations, the author is comfortable prescribing these lenses with either clear pupils or full tint.

The full tint has several advantages, and the concerns raised do not seem to be practical problems. The most common concern is that of reduced light through the full-tint lens in subdued

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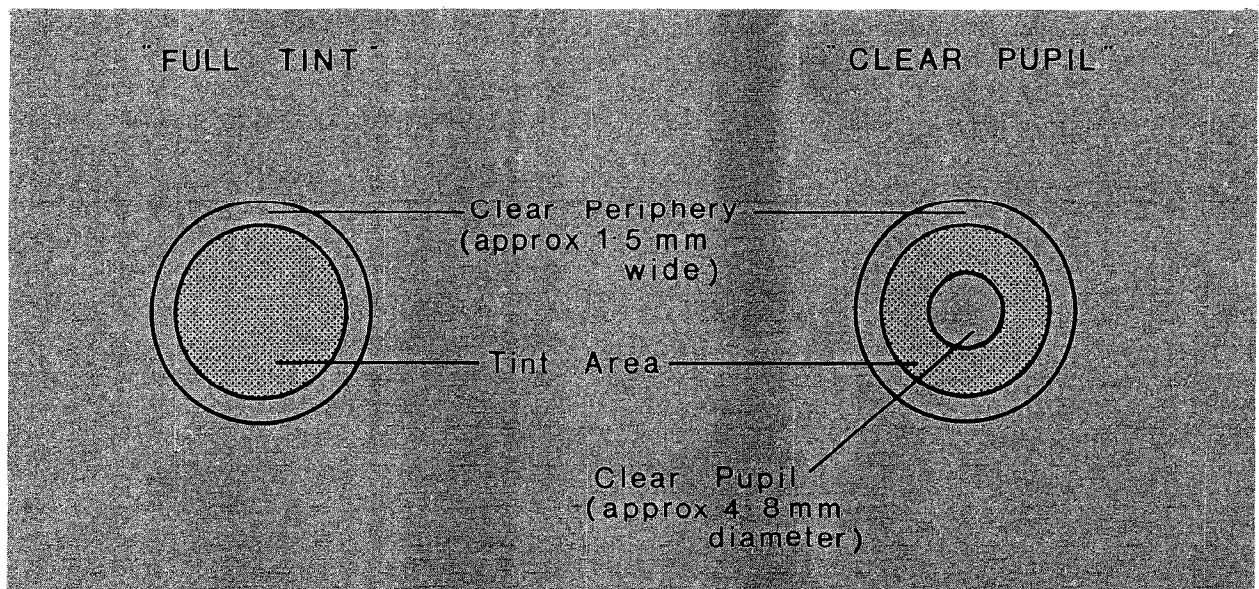


Figure 1 Basic Tint Parameters

conditions. In practice, patients have not reported this complaint. The cosmetic tints being used have light transmissions of approximately 85%. By comparison, a clear spectacle lens will lose 4% transmission by reflection at each surface in air. So even a clear spectacle lens transmits only about 92.0%. Subtract from that the absorption by fashion tints or "clear" photosensitive lenses, and the 85% transmission of contact lenses with full cosmetic tints becomes more reasonable.

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Possible alteration in the patient's color perception of the world has also not proved to be a significant problem. There is a rapid adaptation to the constant slight tint; furthermore, when both lenses are in place, most patients do not usually report any difference in the colors perceived. The exception is the amber or yellow tints where, due to foveal sensitivity, the adaptation is often slower.

Viewing the issue from the other direction, there are practical disadvantages of clear pupil lenses. They are generally more expensive due to the additional manufacturing complexities. No range of pupil sizes is offered for individual variations among patients. Either changes in the patient's pupil size under varying lighting conditions or lens decentration may result in a central zone of natural iris color showing through the clear pupil (Figure 2).

There are also patients for whom a full tint is not indicated. These include patients with diminished dark adaptation or reduced night vision. Cosmetic tints which are darker than those currently offered would also not be suited for full tints. In both these cases, clear pupils are indicated.

## FUNCTIONS OF COSMETIC TINTED LENSES

Cosmetic tinted soft contact lenses produce a change in apparent iris color for most patients. However, the change which occurs in the 50+ percent of the population who have brown irises is usually not acceptable. The changes with lighter irises are generally more subtle. As mentioned earlier, they are often described as "enhancements" of the patient's own eye color, and are simply the result of color mixing. Predicting the likely outcome for any individual patient is relatively easy based upon a knowledge of the colors resulting from additive combinations (Table 1).

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For some patients, the handling advantage has been their prime reason for selecting tinted soft contact lenses.

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In addition to the cosmetic function of apparent iris color change, these lenses also perform some functions in each of the other two tint areas: handling and therapeutic. A tinted contact lens is certainly easier for a patient to handle, locate on the eye, or find when dropped. For some patients, the handling advantage has been their prime reason for selecting cosmetic tinted soft contact lenses. This is especially so for patients with poor uncorrected near vision, such as the higher hyperopes, presbyopes, and aphakics. Tinted lenses for some of these conditions will be available in the near future.

Cosmetic tints offer a therapeutic function for some patients. Traditional therapeutic tints are usually opaque in the iris area to fully mask the condition. Since cosmetic tints are transparent, their therapeutic application is limited. However,

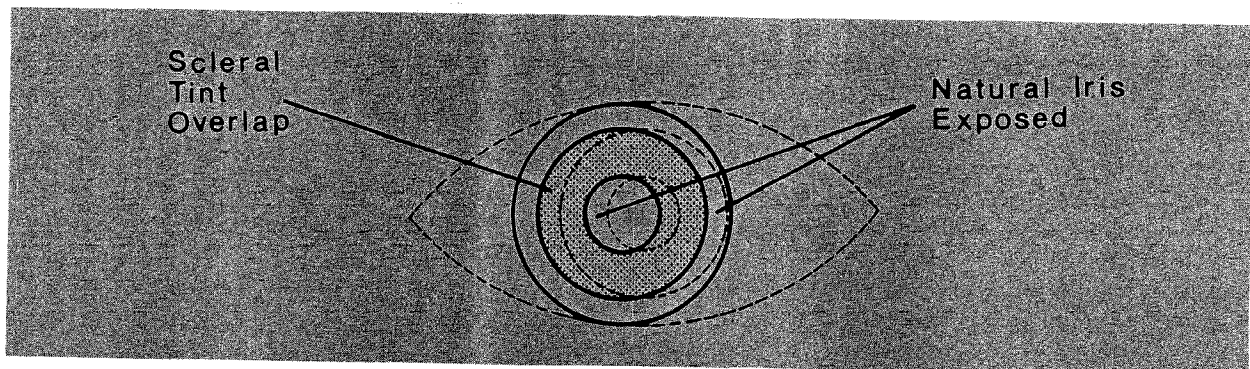


Figure 2 Cosmetic Result of Tinted Lens Decentration

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**Table 1: Estimated Iris Color Enhancement Result**

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Natural Iris Color	Cosmetic Tinted Contact Lenses			
	BLUE	AQUA	GREEN	AMBER
BLUE	Blue	Bright Blue	Turquoise	Muddy Green
GREEN	Turquoise	Bright Turquoise	Green	Muddy Green
BROWN	---	Dark Turquoise	---	Bright Brown
HAZEL	---	Dark Turquoise	Dark Green	Muddy Green
GREY	Blue	Turquoise	Green	Light Brown

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in conditions such as corneal macula or nebula scars or arcus senilis, a *mild* camouflaging may be successfully achieved with cosmetic tints for some patients. Such camouflaging depends upon the width and density of the arcus senilis, the centration of the lens, and the contrast between the resultant apparent iris color and the arcus.

It is important to remember what cosmetic tints on soft contact lenses will not do. There is no change in fitting performance when compared to an identical but clear lens. Comfort is also not affected, and although visibility aspects of handling are very much improved, lens handling is physically the same.

### PHYSIOLOGICAL RESPONSE

Like fitting performance and comfort, physiological response from hypoxia is not changed by the addition of the cosmetic tint to the front surface of the clear base lens. This can be confirmed by results obtained in controlled studies of oxygen transmissibility and corneal swelling.

Fatt\* has tested the oxygen transmission of both CTL and Softcolors lenses. For CTL he measured the clear base lens (Zero Six) and four tints in both clear pupils and full tints. Similarly, for Softcolors a clear base lens was used (Cibasoft) and again four tints in both clear pupils and full tints. The results showed no significant difference for the cosmetic tinted lenses compared to the clear control lenses of identical parameters and

\*Personal communication, 1983.

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Average corneal swelling (between clear and tinted lenses) was not significantly different.

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type. There was also no difference between clear pupils and full tints, and the same results were found for lenses from both manufacturers.

Pachometry studies were undertaken to compare the cornea's swelling response for clear and tinted lenses. For this study the Softcolors blue was tested against its clear base lens, Cibasoft. All lenses were 8.6 mm base curve, 13.8 mm diameter, -3.00D power and a 0.06 mm center thickness (n=10). Lenses were worn for four hours and corneal thickness was measured using the Holden-Payor Micropachometer. Average corneal swelling was not significantly different (1.28% for the clear lenses and 1.13% for the Softcolors).

Cosmetic tinted soft contact lenses must be fitted with good centration and minimal lens movement to prevent overlapping of the tint onto the sclera or exposure of the natural iris color through the clear central portion of the Hydrion lenses. When a slightly tighter fit is needed to produce good centration and minimal movement, practitioners must make certain that the possible physiological problems of limbal injection, conjunctival vessel compression, and debris accumulation between lens and eye do not occur.

### PRACTICE IMPLICATIONS

Practitioners can expect patients to be enthusiastic

about cosmetic tints which may increase patient referrals. There are several implications for the optometric practice using cosmetic tinted soft contact lenses. Since this visual aid includes a cosmetic component, patients will often wish to include friends or relatives in the selection process. These additional people need to be expected and accommodated in the practice. One can also expect that some patients will select more than one color. This requires consideration of a pricing policy for multiple pairs, as well as appropriate patient instruction for care of the alternate lenses not currently being worn. The author's instruction to patients with more than one pair of lenses is that each pair must be disinfected after removal and within 24 hours of wearing again.

Another practical area encountered is that of emmetropic or near emmetropic patients seeking only the cosmetic result. These patients will account for an unusual increased distribution of dispensed lens powers from plano to + or - 1.00D.

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In order to control chair time, practitioners will find it useful to approach the tint color selection by either the use of assistants or with tinted diagnostic lenses. In the first alternative, the practitioner can perform the fitting with standard clear lenses and the assistant can oversee color selection and give instructions. The author prefers the use of tinted diagnostic lenses, though this is not to understate the importance of a trained professional assistant.

Tinted diagnostic lenses in a workable range of parameters allow for combination of both the fitting and color selection procedures. After the case history discussion and external eye exam, the practitioner usually has a firm idea of at least a primary and secondary color for tint selection. Diagnostic lenses with the indicated fitting parameters are then selected with one lens having the primary color and the other having the secondary color. This enables the patient to make a choice of color enhancement during the settling period or after the fitting evaluation. Comparisons can be made between the two most likely colors and, if necessary, one lens can be removed or slipped onto the sclera for contrast to natural iris. The tinted diagnostic lenses also aid the practitioner in such fundamental areas as lens handling. Patients

should evaluate the iris enhancement effect under both artificial light and natural daylight, as appearance may change in different types of lighting.

## CARE REGIMES

The two cosmetic tints currently available and discussed here are both compatible with hot and cold-care regimes. This was not the case with earlier trapped-dye handling tints such as Softint, but newer technologies have brought cosmetic tints which are permanent under normal care procedures.

CTL and Softcolors cosmetic tinted soft contact lenses do not fade under normal care procedures. Heat, cold disinfection, and hydrogen peroxide systems have been used both in the United States and other countries. Based upon the results, the author believes that all three systems can be used confidently and with little or no fading of the tint. Some practitioners and researchers believe that heat or hydrogen peroxide may possibly contribute somewhat to tint fading; research is underway to determine this with greater specificity.

CTL and Softcolors cosmetic tinted soft contact lenses however, do age. Just as a 12-month-old clear lens will be different from a brand new one, so will cosmetic tinted lenses change due to lens deposits and weathering of the tint. If one of a pair of lenses is much older than the other, they may be noticeably different when viewed in the storage case, but these small differences are generally not apparent on the eye.

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## AVOIDING CHEMICAL ALTERATION

Exceptions to normal lens stability will occasionally include instances of unusual tear chemistry or a noxious vapour environment. A warning regarding "noxious vapours" is usual for clear lenses and also for cosmetic tints. Also, if patients try to economize by dissolving salt tablets in tap water (against recommended procedure), a sufficient chlorine concentration in the water used to prepare the saline solution may bleach some of

the lens tint. Thus, patients should be warned to prepare saline according to the label directions.

**RELATIVE FREQUENCIES OF TINT CHOICES**

Since lenses are available on an inventory basis it is useful to have an expectation of relative frequencies of color choice for cosmetic tints. Statistics for differences in color are readily available, but are not very relevant in predicting frequencies of lens colors. Initially one might expect blue to be the most popular, but when lenses are tried, it is often found that patients seeking blue eyes are in fact interested in the brighter result achieved with aquamarine. Once patient trials have taken place, the proportions of color selection in North American practices usually occur in the following frequencies:

Aquamarine	43%
Blue	32%
Green	17%
Amber	8%

**CONCLUSION**

The new area of cosmetic tinted soft contact

Current tint manufacturers will offer additional colors and parameter choices in the future, including tinted toric and bifocal lenses.

lenses has the potential to add an exciting aspect to all of our practices. Patients are enthusiastic in their acceptance and none of the practitioner's fitting or evaluation techniques need to be revised. For such a large additional realm of contact lens practice, there are surprisingly few new skills for the practitioner to master. The cosmetic tinted soft contact lenses available today are only the beginning. Current tint manufacturers will offer additional colors and parameter choices in the future, including tinted toric and bifocal lenses. Other companies may make possible lenses to screen ultraviolet for other therapeutic and preventative applications. Considering their capabilities, cosmetic tints can be expected to capture and maintain a significant proportion of soft contact lens practice.

**SUGGESTED READING**

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