Adapting frames

Normal glasses and myopic rings

In a return to our series looking at unusual and innovative repairs and adaptations, **Santos Tseng, Feng-Tzu Liang** and **Huai-Te Hsieh** describe how they use a technique for masking the full impact of edge thickness for a high myope

Fitting the high and ultra-high myope is a challenge for even the most experienced clinician. As practitioners in Taiwan, we routinely encounter requests from double-digit myopes to find solutions that are both functionally and cosmetically satisfying.

'Normal' glasses

A 25-year-old male came into our practice, selected a designer sunglass frame (Figure 1), and asked us if there was any way he could wear it. As a lifelong 13.00D myope who was intolerant to contact lens wear, he had never worn sunglasses in his life.

He further expressed a desire to wear 'normal looking' glasses, something he also felt he had never done since he was always fitted with cosmetically unsatisfying frames with small, round lenses that would result in heavy myopic ring-reflections. He wanted to wear 'adult' spectacles unlike the 'kid' glasses he was accustomed to wearing all his life.

The lenses of the sunglasses he chose were rectangular, each with a long horizontal extent. Their 'A' boxed values measured 54mm in length. Typically, any lens this wide would be universally contraindicated in a patient with a prescription as high as his. We told him we had in the past successfully fitted high myopes with 'normal frames', but that every dispense in his myopia range was a challenge. Nonetheless, he earnestly desired the frame, so we went forward with the fit.

To fulfil his desire for sunglasses, we selected Transitions lenses. To minimise lens thickness, we ordered 1.67 high-index plastic lenses. For lenses in this category, the lens company offered free edging and mounting, so we sent the job to its lab. Figure 2 (top) shows how the frame was returned to us. The lenses had an 11mm temporal edge thickness (Figure 3, left).

To improve their cosmetic look, we performed minus lens edge faceting vertically along each temporal edge, as well as diagonally along their supero-temporal corners (Figure 4). Given the degree of myopia, we decided to facet more than what we typically do in an effort to achieve as 'normal' an edge thickness as possible (Figure 2, bottom). In doing so, the lenses gained an 8mm wide posterior facet 'face' temporally, and a smaller face supero-temporally that contributed to the overall appearance of the spectacles (Figure 5).

The result meant the lenses were each 'framed' on two sides by their faceted surfaces and they conferred a distinct cosmetic addition to the frame's overall appearance by their level of added detail. The faceting also eliminated the total internal reflections that result in myopic rings (Figure 5). The temporal edge thicknesses were also reduced to a reasonable 5mm (Figure 3, right). The Transitions Photodark property allowed the glasses to be worn both as sunglasses and for everyday wear. Our patient was therefore a successful fit in his desired but traditionally unsuitable sunglass frame.

Figure 1 The original sunglass frame

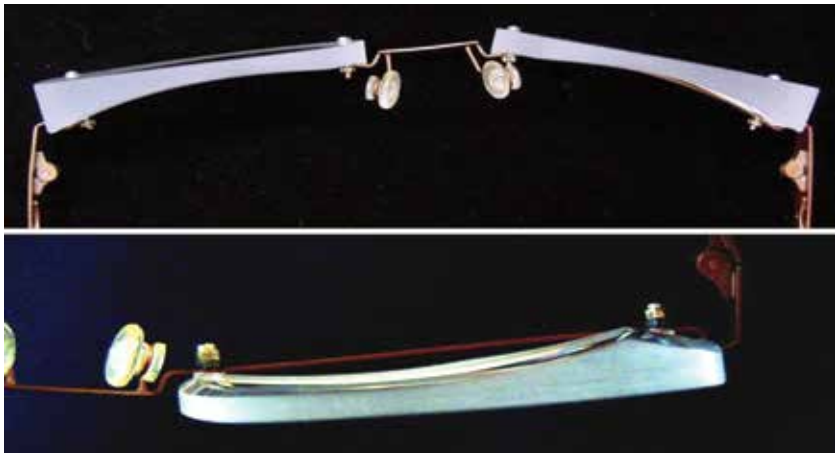

Figure 2 Mounted lenses (top), faceted lens (bottom)

Our case demonstrates that high-powered lenses can be manipulated to fit certain frames, and that they can also contribute a cosmetic element to a frame's overall look. Skill in grinding, however, is an essential ingredient for this technique.

Eliminating myopic rings

An additional point to note is that we introduce a means to deal with myopic rings. These ring images, created by total internal reflections off the front and back surfaces of lenses, exit the fronts of lenses and are responsible for the 'Coke-bottle' appearance of

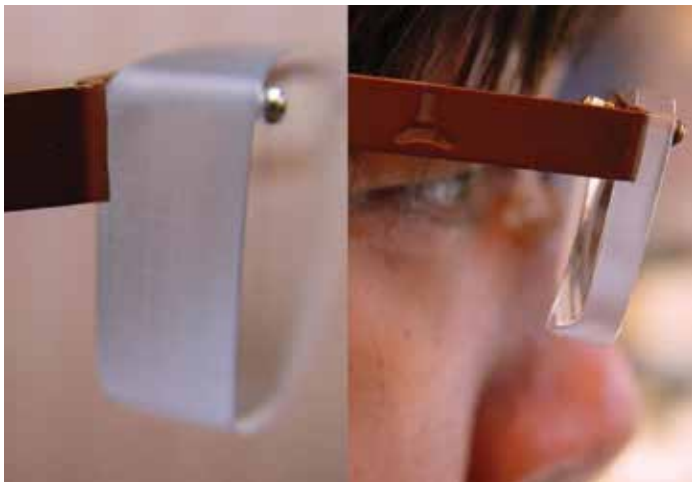

Figure 3 Edge thickness, before (left) and after (right)

Figure 4 Temporal and supero-temporal faceting

Figure 5 The patient wearing the final product

high-minus lenses. Minus lens edge faceting can eliminate these reflections entirely by removing their optical path.

It has not escaped our notice that it should be possible to create mathematical formulae to calculate the amount and angle of faceting required to eliminate ring reflections in a given lens. Given the existence of technologically advanced computerised edgers and their increasing ability to perform edge faceting, this may be an area for future research and design.

Fitting high to very-high myopes is one of the most difficult areas of spectacle dispensing. Solutions are not always obvious or even possible, but with a little bit of ingenuity, many quandaries can be solved.

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