

# Occupational or mainstream?

## Part two - dispensing degressive lenses

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**Competencies covered:**  
**Target groups:**

Optical appliances  
Dispensing opticians, optometrists

Part one of this article (*Dispensing Optics, June 2011*) discussed the need for degressive lenses, the difference in design principles between enhanced reading lenses and occupational progressive lenses, and concluded with the technical specifications of some currently available lenses. This article will discuss the practical application of the dispensing of degressive lenses through two case studies. The article will conclude with a series of frequently asked questions (FAQ's) relative to this topic. Definitions of terms used such as, arc of clear vision, static and dynamic can be found in part one of this article.

The key to successful dispensing starts with a thorough assessment of the patient's visual needs through careful discussion and thorough questioning. Taking Mr A (**Figure 1**) as an example

of a presbyopic dispensing, there is a significant increase in the reading addition which may affect intermediate vision. A thorough visual task analysis will ascertain whether or not this is likely to cause a problem. As a sales representative Mr A reports that he mainly wears his spectacles whilst working which involves calling on clients to update and sell product ranges, reviewing data on a laptop and then, taking notes and recording orders by hand in an order book. Originally, he chose a pair of readymade half eye reading spectacles +1.50D from the local garage and has now found although these are ok for the laptop he is struggling with completing the order book. Mr A drives around 40,000 miles a year and reports no problems with distance vision, glare or seeing the instrument panel in the car without

spectacles. He decides that he would like to continue wearing a half eye and now suitable lens and frames choices must be found.

Applying the principles discussed in part one of this article, it is necessary to determine the working distances involved in Mr A's primary tasks in order to determine the arc of clear vision that is required (**Figure 2**). Having established the arc of clear vision required is 40 - 65cm and that he spends his time working equally between the two distances, we should now consider the position of the eye in relation to the task and whether the task is static or dynamic. Like most laptop users, Mr A. looks down to view the laptop screen and he would be generally seated and static when he is working.



This article has been approved for **1 CET point** by the **GOC**. It is open to all FBDO members, including associate member optometrists. Insert your answers to the six multiple choice questions (MCQs) online at [www.abdo.org.uk](http://www.abdo.org.uk), or on the answer sheet inserted in this issue and return by **16 February 2012** to **ABDO CET, 5 Kingsford Business Centre, Layer Road, Kingsford, Colchester CO2 0HT** OR fax to **01206 734156**. If you complete online, please ensure that your email address and GOC number are up-to-date. The pass mark is 60 per cent. The answers will appear in our March 2012 issue.

General Optical Council  
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For Dispensing Optician  
Optometrist

C-17822

Right	Sph	Cyl	Axis	Prism	Base	Left	Sph	Cyl	Axis	Prism	Base
	+0.50	-0.25	180				+0.25DS				
	Add	+2.50DS					Add	+2.50DS			

Comments:  
Sales Rep drives and uses laptop  
Previously worn +1.50DS ready-made, found ok for screen and poor for near

Figure 1: Case study Mr A

My personal preference is to always start the dispensing process by considering the choice of lens. From the information gleaned, there are at least seven degressive lenses available with a 1.00D degression that may be suitable. (BBGR Extenso 10, Essilor Computer 3V, Nikon Online, Norville Continuum, Rodenstock Nexyma, Seiko P-1 Computer, Zeiss Business 10). The question of choosing the most suitable lens is a process of elimination based on the patient's visual requirements. **Figure 3** shows a possible selection process.

As no distance vision is required, the optimum choice will be an enhanced reading lens. From this selection, the Rodenstock Nexyma is rejected because lens design is based on a viewing distance of either 40 or 80 cm leaving Extenso 10, Online and Business 10 for consideration.

The technical information provided by manufacturers for the three remaining lens choices (Extenso 10, Online and Business 10) is inconsistent between designs and final lens choice to some extent will be determined by frame depth.

Extenso requires a minimum fitting height of 12mm, Online of 19mm and Business 10 16mm, it should also be noted that Extenso 10 and Business 10 have half of the degression at the fitting cross whilst Online provides a stable reading area 5mm below the geometrical centre of the lens. Whilst the Zeiss lens has the longest progression corridor of 24mm fitting it into a deep half eye is not generally practical as some of the intermediate portion may be lost.

Based upon personal experience my preferred choice in this instance would

Activity	Working distance	Required addition	Required degressive power
Using laptop	Approx 65cm	$100/0.65 = +1.50D$	
Writing orders	Approx 40cm	$100/0.40 = +2.50D$	1.00D

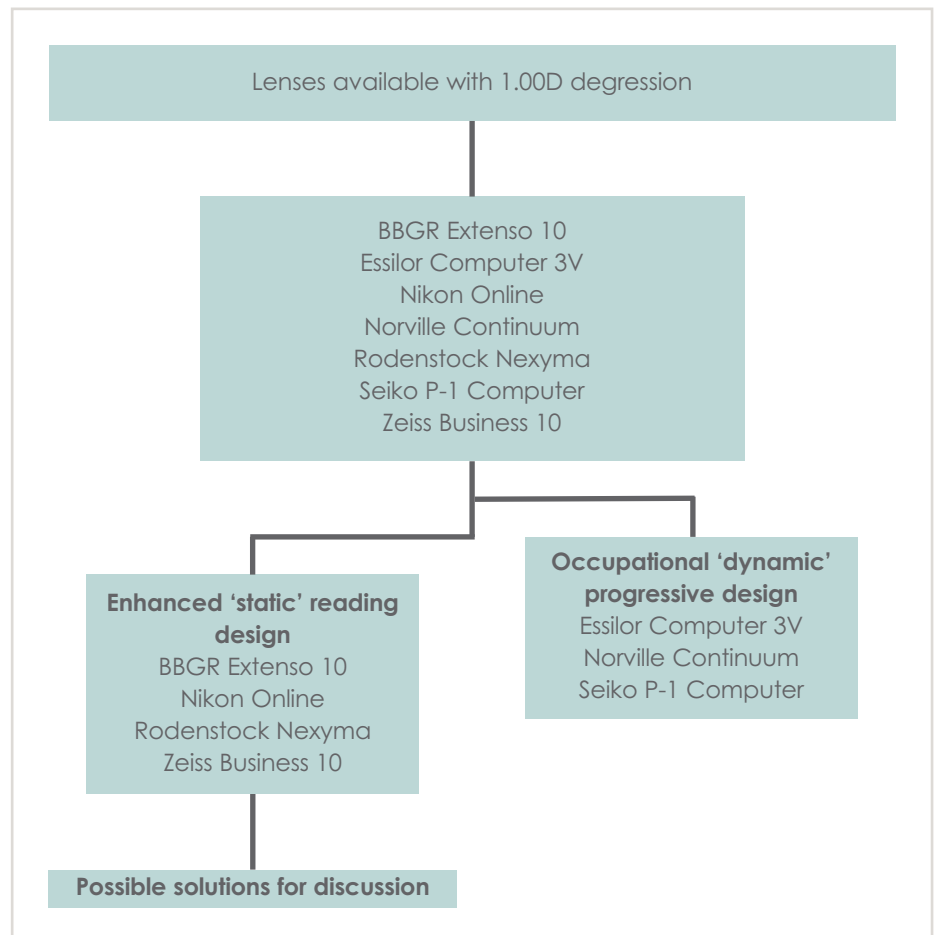
Figure 2

be the Extenso 10 fitted into a deep half eye of around 30mm depth to allow for the progression corridor of 19mm. The long corridor provides a wide field of view both at intermediate and near distances whilst the deep frame choice ensures. The sufficient frame height above pupil

centre, at least 10mm to access the full degressive power for intermediate and 12mm below for full reading. Fitting this type of lens in a deep half eye also has the added advantage that spectacles can be worn towards the top of the bridge for intermediate tasks at eye level, for example

Continued overleaf

Figure 3



Right	Sph	Cyl	Axis	Prism	Base	Left	Sph	Cyl	Axis	Prism	Base
	-2.00	-0.25	180				-0.75	-3.00	140		
	Add	+2.00					Add	+2.00			

Comments:  
 Re-check. Non-tol to new Sola Graduate, finding intermediate vision very restricted  
 Previously worn Graduate with +1.25 add. No change in above Rx found

Figure 4: Case study Mrs B

swapping between a laptop and desktop PC.

This particular enhanced reading lens is ordered according to monocular near centration distance, near Rx and fitting cross heights. Taking fitting cross heights in a half-eye spectacle should be carried out in the normal manner with the frame in the usual position of wear. It should be noted that this lens has half of the degression at the fitting cross so the fitting heights may need to be adjusted to give optimum vision. For example, a patient wearing the lenses more for intermediate may prefer the fitting crosses lowered to give easier access to the intermediate zone.

Mrs B (Figure 4) has previously been a contented wearer of the same progressive lens form and has found in the past that one pair of spectacles served her very well in her role as a GP in a busy local surgery. There is no real change between the old and new distance correction with the only difference being an increase in reading addition. She has re-presented with her new spectacles complaining of a very restricted field of view for intermediate that is particularly troublesome at work. On rechecking the prescription, appliance and fitting no errors were found that might account for her visual discomfort.

Although the patient is not complaining of specific symptoms such as diplopia or blurring in this instance, it is worth ruling out any vertical anisometropia before making new lenses.

Clearly vertical power is easily found in the right eye by considering the power of the prescription along each of its principal meridians (Figure 5).

$$-2.00DS/-0.25DC \times 180 = > -2.00DC \times 90/-2.25DC \times 180$$

On first inspection, it looks more difficult to calculate the power in the vertical meridian in the left eye due to the oblique cylinder power (Figure 6).

$$-0.75DS/-3.00DC \times 140 = > -0.75DC \times 50/-3.75DC \times 140$$

However, the vertical lens power in the left eye can be found using the concept of notional powers; in effect the sum of the sphere and the power of the cylinder in the vertical meridian. The cylinder power in oblique meridians can be found using the formula

$$F_{\text{new cylinder}} = F \sin^2 \theta \text{ (Figure 7)}$$

Where

F = Power of the cylinder  
 θ = Angle between cylinder axis and meridian under consideration

$$\text{So } F_{\text{new cylinder}} = F \sin^2 \theta$$

$$F_{\text{new cylinder}} = -3.00 \sin^2 250$$

$$F_{\text{new cylinder}} = -1.76DC$$

Adding the sphere power produces (-1.76 + -0.75) ≈ -2.50DS

Hence, there is very little power difference between the vertical meridians of the two eyes and certainly not enough to produce any significant vertical differential prismatic effect. Having ruled this out as a potential problem for Mrs B the oblique cylinder in the left eye and the increase in the near addition are most likely to be the root of the difficulty, both factors will contribute to a short and narrow intermediate corridor in a conventional 'hard design' progressive lens.

Several options for solutions present themselves at this point one of which could be to provide Mrs B with a different form of progressive lens, separate spectacles for intermediate and near use or perhaps a pair of degressive lenses solely for use at work. Assuming the option of degressive lenses is acceptable to the patient and they are prepared to accept the compromise of a reduced distance visual acuity that will not meet the minimum standard for driving we can select the lens choice using the methodology employed for Mr A (Figure 8).

Working at a variety of distances combined with the need to move around the room renders Mrs B suitable for a dynamic lens dispense. Using the methodology of lenses first we can follow the same process as before (Figure 9).

Mrs B has an oblique cylinder and has complained of small useable areas of intermediate vision with conventional PPLs. The use of freeform surfaces should theoretically provide better optical performance. All of the lenses listed for dynamic use in Figure 9 employ this technology. For optimum control of lens performance, a freeform individual design occupational progressive is the preferred choice. This results in a selection between the Hoya Workstyle 200, Shamir Smart Office and Rodenstock Impression Ergo FS.

The Workstyle 200 is described as having a 'moulded' freeform front surface combined with a freeform back surface and accounts for patient working distance and lens vertex distance (VD). Note that supplying the vertex distance and the

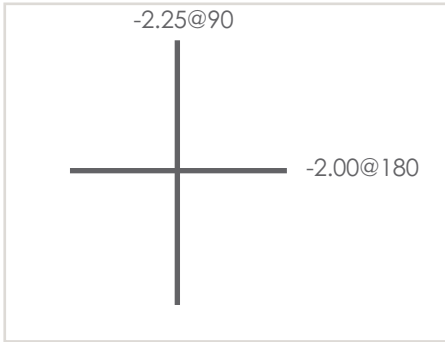


Figure 5

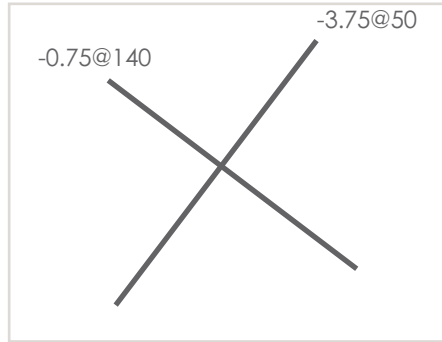


Figure 6

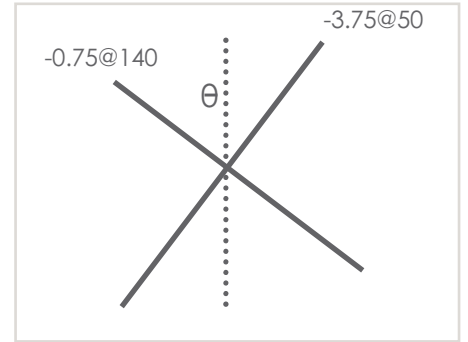


Figure 7

manufacture of the freeform surface seem to account for the individualisation of this design. Lenses are dispensed as a traditional progressives but +0.50D must be added to the distance Rx and the reading Rx reduced by a corresponding -0.50D. It is interesting to note that this 'individual' design will always render the furthest point of intermediate vision at 2m due to the +0.50D addition to the distance Rx. Obviously, the furthest point of clear intermediate vision could be varied by altering the amount added to the distance correction. Minimum fitting height is 17mm and frame depth should be at least 34mm.

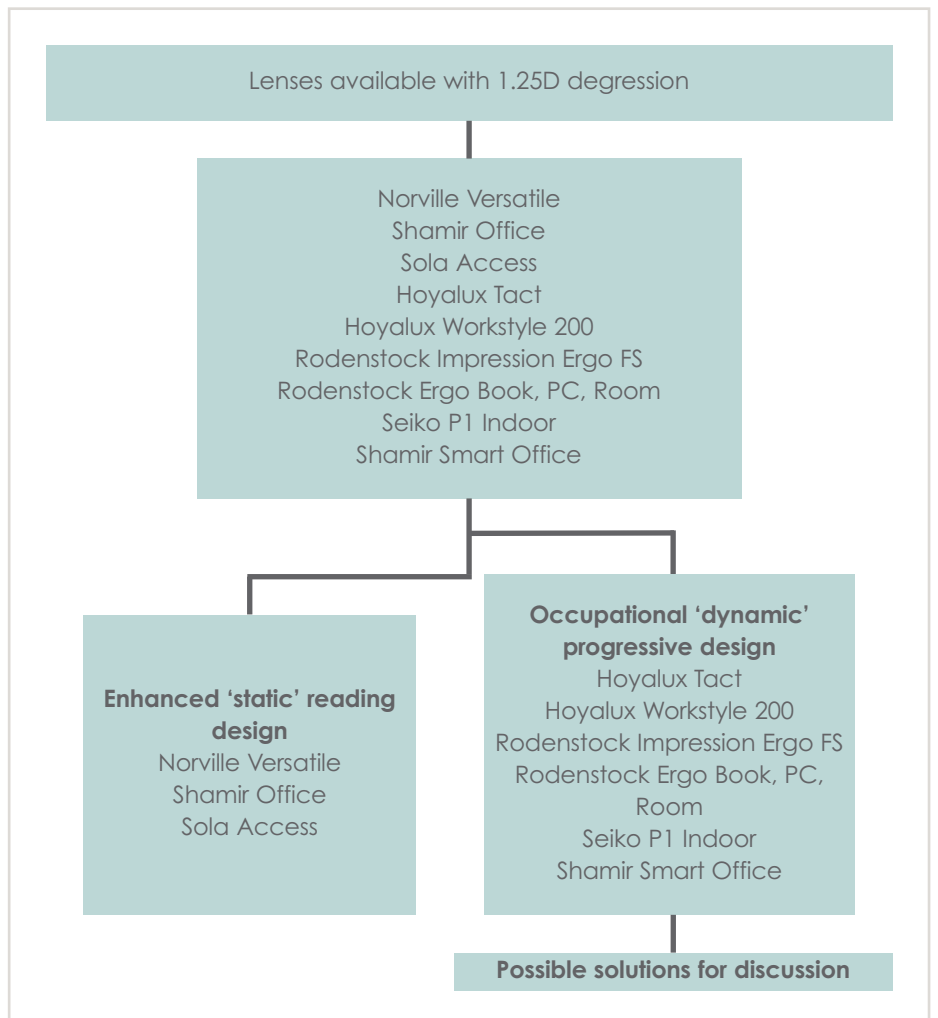
The Shamir Smart Office uses a freeform back surface and requires the additional information of the primary working distance, whether the primary intended field of use is above or below eye level and if the lenses are to be used in static or dynamic conditions. The manufacturer then decides upon an optimum lens design based on the information supplied. Lenses are ordered as standard progressives with full distance Rx and near addition. Minimum height of 14mm and at least 10mm is necessary above the fitting cross height to ensure the full degression is accessible.

The Rodenstock Ergo FS is perhaps the most tailored freeform design with a spherical front surface and a freeform back surface. Additional measurements of BVD, face form angle, monocular distance PDs and NCDs, pantoscopic angle are required and Rodenstock computer software requires the patient to answer a number of questions in order to determine a number of key scores which are then used in lens design

Activity	Working distance	Required addition	Required degressive power
Eye contact with patients	Approx 140cm	100/1.40 = +0.71D	
	Approx 140cm	100/1.40 = +0.71D	
Computer screen	Approx 70cm	100/0.70 = +1.43D	
Patient examination	Approx 60cm	100/0.60 = +1.67D	
Signing and checking prescriptions	Approx 50cm	100/0.40 = +2.00D	1.29D

Figure 8

Figure 9



and manufacture. Lenses are ordered with full distance Rx and near addition.

On this occasion, final lens choice is the Rodenstock Ergo FS although if one does not have access to the lens choice computer software from Rodenstock this lens is extremely difficult to order. I suspect with careful fitting, and adjusted distance Rx in the case of the Workstyle 200, both of the other lens options would have produced a happy patient.

The lenses included in this article are not intended to be exhaustive. Exact details, order specification requirements and current availability should always be checked directly with supplier.

Dispensing new lens designs can often give rise to a number of questions; here are some answers to some of the most common ones.

• **How do I know if there is any distance vision in a degressive lens?**

Quite simply it depends on the degression power of the lens compared to the prescribed reading addition. If the degression power of the lens is less than the full add the patient will not experience clear vision; ie, degression power 1.00D, full reading add 2.00D the patient will experience +1.00D over the distance prescription at the weakest part of the lens and so distance vision is not clear.

• **How do I know how far the patient can see when using the intermediate part of the lens?**

Again, it depends upon the power of the degression of the lens compared to the reading addition. For example if the degression power is 1.25D and the full reading add is 3.00D the patient will experience +1.75D over the distance prescription at the weakest part of the lens. To find the distance this correlates to take the reciprocal of the 1.75D =  $100/1.75D = 57\text{cm}$ .

• **Although the degression power shows there is some distance power at the very top of the lens the prescription house say the patient should be advised not to drive in degressive lenses. Why is this?**

Even if the degression power is such

that it adds little or nothing to the distance correction, the area that is available for distance vision is extremely small and would not provide sufficient field of view for safe driving.

• **How do I decide on an appropriate lens?**

The easiest method is by process of elimination! Determine the degressive power that is needed, decide if the lens is to be for static or dynamic use, decide whether or a shorter or longer corridor would best for the patient's needs and generally you have reduced the options available. Alternatively, use a manufacturer's degressive fitting set to determine the degressive power that the patient needs.

• **What is the minimum fitting height for degressives?**

Like all progressives, this varies with the lens design so best advice is to check with the manufacturer. Generally, enhanced reading design lenses have shorter progression lengths compared to occupational progressive designs. Minimum height for enhanced reading lenses starts at 8mm (Hoya Add Power) and for occupational progressive designs minimum height starts at 16mm (Rodenstock Impression Ergo).

• **Why do I need a certain minimum height above the fitting cross?**

To ensure that the patient can access the intermediate portion of the lens that extends above the fitting cross position.

• **Why do these lenses produce wider intermediate and near lens areas than conventional progressives?**

In simplistic terms, the change in lens power from intermediate to near is less than the change in lens power required from distance to near and it is produced over a longer progressive corridor. This means that the change in power per mm of progressive corridor is much less than a 'standard' lens design and subsequently produces less aberrational surface astigmatism and therefore produces a wider field of useable vision.

• **What should I do if the patient is a non-tolerance?**

The most common cause of intolerance to this design of lens tends to be the degressive power chosen to match the patient's requirements. After having checked fitting heights and horizontal centration re-check the working distances for intermediate and check they correspond to the degressive power ordered.

• **The patient says the vision is good in the new degressives but complains they have to raise their chin a lot to read for long periods, what is the solution?**

If the intermediate vision is good, try choosing a lens design with the same degression but a shorter corridor length. This should allow the patient to access the reading area more easily. It may also be possible to achieve a similar effect by fitting the original lenses a little higher.

• **What can be done if the patient complains that the intermediate width is too narrow?**

Consider using a lens with a longer progressive corridor, choose the minimum power of degression that allows the patient to see clearly, fit with the appropriate pantoscopic angle and ensure a short BVD for maximum field of view.

**Abi Grute is a practical examiner and distance learning course tutor for ABDO. She is also chief examiner for the WCSM Level 3 OPS qualification and a GOC Fitness to Practice Panel member. She lectures internationally for ABDO and a number of independent companies. ■**



Abi Grute

## Multiple choice questions (MCQs): Occupational or mainstream Part two dispensing degressive lenses

1. What are the dioptric distances associated with 30cm and 80cm?

- a. 3.33D and 1.25D
- b. 3.00D and 1.25D
- c. 3.33D and 0.80D
- d. 0.30D and 0.80D

2. Which statement is true?

- a. Computer 3V is suitable for active workers
- b. Enhanced reading lenses, if the powers are suitable, can be used for driving and near vision
- c. Business 10 is a good choice for shallow frames
- d. Continuum is a progressive power lens for general use.

3. If Mrs B were to be dispensed bifocal lenses with equal segment sizes and positions, what differential vertical prismatic effect would she encounter 10mm below the distance optical centre?

- a. 0.25 prism dioptres down L
- b. 0.25 prism dioptres up L
- c. 4.25 prism dioptres down L
- d. 4.25 prism dioptres up L

4. Find the notional vertical power of the Rx:

R: -2.75 / -2.00 x 60.

- a. -4.25D
- b. -3.75D
- c. -3.25D
- d. -2.75D

5. Which degressive design has the shortest progression length?

- a. Add Power
- b. Online
- c. Nexyma
- d. Extenso

6. If the progression length is reduced in order to give easier access to the reading prescription, what problem may result?

- a. The patient may have to raise their head more.
- b. The reading area may be reduced
- c. There will be more off-axis astigmatism in the top of the lens
- d. The intermediate portion might become too narrow

The deadline for posted or faxed response is 16 February 2011 to the address on page 4. The module code is C-17822

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## Frequently asked questions

Answered by Kim Devlin FBDO (Hons) CL

### Copying without a prescription

**Q.** May I copy a pair of spectacles brought into the practice, without a prescription? The customer is not one of ours; he's a student, here to learn English, and broke the bridge and lens of his rimless spectacles playing football.

**A.** As a registered dispensing optician (or optometrist) you may copy a pair of spectacles brought in to you, without a prescription. There are of course certain safeguards, to protect yourself and the customer. The circumstances you describe, a broken pair of spectacles not easily repairable, is typical of the situation, which happens often in any practice. Simply copying the prescription and dispensing a new frame is not only legal it is a service to the patient. This is only permissible by registered practitioners not unregistered sellers who must by law have an in date prescription.

The need for good record keeping is rarely more important than in

these circumstances. Your records should show the prescription, which was obtained from the broken spectacles – not easy when a lens itself is broken. Also note and replicate the optical centres of the said specs, the previous optician may well have used decentration to correct a muscle imbalance. If a tint or coating is to be copied warn the customer it may not be possible to match it exactly.

Record also the style and colour of the broken specs, if that is not possible describe the frame in detail, its shape, size, trims and colour so that on a future occasion the spectacles replicated could be identified.

Once the new specs are ready the broken pieces should be returned to the patient, they remain his property. There may be insurance issues in the future or indeed a claim that you had repaired the frames and resold them – it happens. ■