

Dispensing bifocal spectacles to children (and adults) with Down's syndrome: Guidelines for eyecare practitioners

Q: Why prescribe bifocals to children with Down's syndrome?

A: The majority (76%) of children with Down's syndrome under-accommodate at near, as assessed by objective testing. Our research has shown that these children gain optical benefit from bifocal spectacles, i.e. improved near focusing.

Q: How can accommodation be measured objectively?

A: Using the technique of dynamic retinoscopy.

Q: What is the procedure for dynamic retinoscopy?

A: 1) place an interesting near target at the child's habitual working distance and the retinoscope alongside
2) attract and maintain the child's attention on the target
3) using a retinoscope, assess the accuracy of the accommodation response by observing the retinoscope reflex. A 'neutral' reflex will be seen if the child is focusing accurately on the target. A 'with' movement will be seen if the child is focusing behind the target, i.e. has reduced accommodation - the retinoscopist must therefore move away from the target to find 'neutral'. It is normal for some children to show a small error (under-accommodation or 'lag') of accommodation; up to 0.75D is acceptable. The lag is calculated from the difference (in dioptres) between the distance of the target from the child and the distance at which the 'neutral' point is found. For example, with a target distance of 25cm from the child (4D stimulus demand) and a neutral reflex at 33cm from the child (3D response), the lag of accommodation is 1D.

An alternative 'screening' technique is to place the retinoscope at 0.75D behind the target and note the movement. If the movement is neutral or against, the child is accurately accommodating; if the movement is with the child is under-accommodating.

Q: When should bifocals be prescribed for children with Down's syndrome?

A: When the child consistently under-accommodates to near targets (on more than one occasion) in spite of full correction for a distance refractive error.

Q: What power of near addition should be prescribed for children with Down's syndrome who under-accommodate?

A: A +2.50D near addition was used for the children in our study, regardless of the amount by which they under-accommodated at the outset. We don't yet know whether other powers are as successful. We are confident in recommending +2.50 additions for children, who usually have a short working distance. A higher add might be appropriate for children with especially poor vision, or high myopes who are used to very close working distances. Some practitioners choose the add that brings the accommodative lag to within the normal range of 0.75D at the habitual working distance – this technique might be appropriate for an adult with Down's syndrome, since the add can then be adapted for the tasks to be undertaken.

Q: What near segment fitting height should be used?

A: *Straight-topped bifocals and a near segment fitting height of at, or just below pupil centre* is recommended for all children with Down's syndrome. As for all children, a comfortable and stable frame is essential. A high-fitting seg is likely to be suitable for an adult with Down's syndrome as well, but the precise positioning will depend on the sort of tasks to be undertaken.

Q: At what age should bifocals be prescribed?

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A: Our study involved school-age children, but there is no reason to deny bifocals to younger children. Our previous studies have shown that children with Down's syndrome rarely emmetropise (outgrow infantile refractive errors) in the way that typically-developing children do. We therefore recommend that refractive errors, especially hypermetropia, are corrected at an earlier age than for ordinary children, once it becomes clear that the error is not decreasing. We recommend prescribing for the distance error first, with single vision lenses. Follow-up checks will then allow an assessment of accommodation with the correction, and if accommodation is consistently poor, bifocals can be considered.

Q: How often should a child with Down's syndrome be reviewed once bifocals have been prescribed?

A: We recommend follow up once bifocal wear commences, at: 1 month, 3 months, then 6 month intervals if bifocal wear continues in a straight forward manner (more frequent review may be needed if complications/concerns arise). At each review, the segment height should be checked and adjusted if necessary.

Q: When should children with Down's syndrome wear their bifocals?

A: We recommend that bifocals be worn at first, in school time only, and during near activities if the child is not yet at school. Separate single vision lenses should therefore be available. Once it is clear that the child is comfortable in their bifocals, can move about in them with no problems and is using the near addition correctly, then full time wear can begin. For adults, appropriate near activities can be identified so that the adult gets used to the bifocals before wearing them full-time.

Q: What should be done if a child with Down's syndrome does not wear their bifocals or fails to use the near addition?

A: If a child will not wear or use their bifocals correctly, it may be due to poor fit, but also could indicate improved accuracy of accommodation. At each follow up visit, accommodation should be measured through both the near addition and distance portion of the bifocal lens. Increased accuracy of accommodation through the distance lens has been noted during the study in several children wearing bifocals. In each of these cases, the next step will be to take the child out of bifocals and return to single vision spectacles. We do not yet know whether children who show this unaided (not using near addition) improvement can sustain it, so continued monitoring of accommodation will be essential.

Q: Who should be informed when bifocals are prescribed?

A: Obviously parents should be fully informed of the decision to prescribe bifocals. It is also essential that the school and the child's teacher (and for adults any instructors or supervisors) understand the reasons for and the correct wear of bifocals. An explanatory leaflet or letter should be sent to the school (or day centre). The child's GP, Paediatrician and all other professionals involved in the child's care should also be informed, so that everyone becomes aware of the difficulties that children and adults with Down's syndrome have in accommodating for near, and the remedy that is being provided.

Reference

Stewart, RE., Woodhouse, JM., Trojanowska, LD. (2005) In Focus: The Use of Bifocal Spectacles with Children with Down's Syndrome. *Ophthalmic and Physiological Optics* 25: 514-522

