

Spectacle Mounted Synoptophore: The Cutting Edge

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Abstract

Synoptophore, the foundation of orthoptic clinic was designed in nineteenth century and has come up with three variants earliest being Stereoscope, then Amblyoscope and lastly the present day Synoptophore. All are for assessment and treatment of ocular motility disorders, Amblyopia. These all are to be used in institutes only and cannot be customised for home use thus reducing compliance. Now a day's its need has become more palpable because of prolonged computer use. Keeping this in mind we have designed spectacle mounted Synoptophore which can be customized according to degree of squint. It can be used at home for anti amblyopia therapy by alternate flashing with music to enforce perceptual learning. This instrument is also effective for controlling near point of vergence and accommodation thus can be used at work place too.

Keywords: Synoptophore; Cutting Edge; Amblyopia

Introduction

Extra ocular muscle imbalances are managed by orthoptic methods comprehensively by using Synoptophore. For the diagnosis and treatment of ocular motility disorders accurately and performing the most comprehensive binocular vision assessment it is the ideal instrument available today. First stereoscope was made by Sir Charles Wheatstone in 1838. Second modification was done in the beginning of 20th century by Claud Worth named as Amblyoscope to evaluate and stimulate binocular vision. Slides were designed for use in this major Amblyoscope by M.C. Maddox to assess the extent of simultaneous perception and measure the area of suppression. Initially based on this instrument Synoptophore (Major Amblyoscope) has evolved for measuring angles of deviation, treating binocular anomalies. Pleoptics was incorporated in the synoptophore and was first patented in 1929 by Clement Clarke. Here we present a spectacle based synoptophore which was designed with locally available "bio-scope" toys mounted on a trial frame, fitted with mini laser emitting diode (LED) lights for alternate flashing and sound producing chip.

Apparatus

Miniature spectacle mounted synoptophore was made with locally available "bio-scope" toys and a trial frame. It was fitted with LED light for alternate flashing and sound producing chip for perceptual learning.

Brief description of spectacle mounted synoptophore (SMS)

Spectacle mounted synoptophore is designed and assembled from locally available low cost components (Figure 1-6). It is composed of: 1) Trial Frame: Adjustable to angle of deviation in squint cases 2) Small binocular whose inner wall is covered with non-glossy sticking paper 3) LED bulb and switches 4) Synoptophore slides cut according to the size and shape of binocular tube.



Figure 1: Commercially available Bioscope.



Figure 2: LED Bulbs and music chips.



Figure 3: Slides for spectacle mounted synoptophore.



Figure 4: Miniature spectacle mounted synoptophore ready to use with slits for inserting slides.



Figure 5: Underside of SMS with switches connecting LED lights to illuminate slides which can perform alternate flashing.



Figure 6: Miniature spectacle mounted synoptophore-Ready to use.

Assembly

1. A trial frame is fitted with two eye-pieces made from small plastic conical toys/ binoculars with convex lenses (available in village fare to see different pictures viz. bioscope). Eye pieces can be adjusted on the frame according to the angle of deviation.
2. Slides are miniature from of synoptophore slides.
3. LED lights are further reinforced with the eye pieces.
4. Sound producing music chip is also fitted with the eye pieces. Use of sound with visual stimulus acts as a perceptual task in patients.
5. This is a comfortable eye wear which improves vergence.

Key features

Amblyopia is major cause of reduced vision in children which if detected and treated early can give good result. Though occlusion is the mainstay for treatment of Amblyopia different orthoptic exercises on synoptophore like alternate flashing can give faster result but this requires institutional approach. Such institutions are not easily accessible and also time consuming. Simple spectacle mounted miniature synoptophore made from low cost materials helps the amblyopic patients to exercise at home. Among prolonged computer users convergence deficiency or excess is very common and causes asthenopic problems. This simple device can provide opportunity for exercise at home or workplace and to improve vergence faculty with daily 10minutes use.

Discussion

Synoptophore is outstanding equipment for strabismus angle measurement and treatment of binocular vision anomalies including amblyopia. This is versatile and provides precise measurements in a single, effortless examination. Three models of synoptophore are available, in which, 2001 model is the most comprehensive, capable of all standard measurements and treatments. This model has an automatic flashing unit that allow each eye to be stimulated alternately or simultaneously. The 2002 model has excluded Haidinger brushes and is considered ideal for the assessment and treatment of patients who need orthoptic care. In 2003 model all the standard measurements and treatments including the manual flashing switches and independent dimming rheostats are available.

Colour of synoptophore slides denotes specific function as follows:

- Yellow slides are used for macula, fovea, lazy eyes and headache.
- Green slides are for assessing stereopsis (depth of image).
- Black slides are used for fusion and its range, along with H B motor test.
- Red slides are used for simultaneous prescriptions and to find degree of squint & angle of deviation.

New innovative instrument is designed for spectacle mount and thus can be customised as per need and preference. Moreover, mini laser emitting diode (LED) lights are incorporated for alternate flashing. Sound producing music chip is also used in some of these instruments which are effective in treating amblyopia through perceptual learning even in adults and this can be considered as a relaxing modality in prolonged computer users.

Conclusion

Without change there is no innovation, so learning and innovation go hand in hand. This innovative instrument is a big relief as this can replace institutional therapy using synoptophore. At the first phase, it enhances the level of vision to a certain degree, for the children to accept the patching and resume their usual daily life. Thus, the conformity of the treatment can be well accomplished.

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