



HOME MADE VIDEO NYSTAGMOGRAPH (VNG)

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ABSTRACT

Now as our understanding of diagnosis and management of vertigo is increasing, Video Nystagmography (VNG) becomes a necessary tool in the diagnostic battery. It is easy, most reliable and most informative. But cost remains the main prohibitive factor. In India it is available above 9 lac rupees. So it is not available in general ENT and neurology clinics. This is the cause many patients are suffering due to lack of diagnosis and management. In this paper we suggest an easy way of getting the instrument.

Key words:

Video Nystagmography, Nystagmus,
Vertigo, VNG

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INTRODUCTION

Principle of VNG

We need to remove fixation of eyes (vision) so that nystagmus is enhanced. We also need to see and record the magnified eye movements (nystagmus). There is need to see and record patient's head position while recording nystagmus. We need to see both eye and patients position at same time on a single screen. Everything should be recorded and a DVD recording can be given to patient immediately.

Concept of Instrument

Hain¹ reported that VNG is superior to ENG based on higher resolution, greater stability, and an increased ability to observe, capture and record torsional eye movement. McCaslin and Jacobson² shared many advantages with VNG compared to traditional ENG, including:

- VNG goggles are applied quickly to the patient;
- VNG recording systems generally have a low noise floor thus providing better quality recordings; and
- VNG recordings can be recorded and seen again as needed for later analysis.

ENG electrodes are positioned around the eyes to record and measure the corneo-retinal potential (CRP), whereas VNG uses goggles to record the movement of the pupil.³ VNG requires less preparation time (no scrubbing, pasting, or

securing electrodes) and does not require verifying impedances and cleaning/sterilizing electrodes.

Here is a design of VNG which is made by gazettes already present in our clinics or very easily available and cheap. Vestibuloocular reflex gives us most information about both vestibular functions. So just looking into eyes (Nystagmus) we can get a lot of information about the cause of vertigo. To enhance nystagmus we need to remove the fixation of eyes (vision), this is done by closed goggle so the eyes are in dark and no fixation is there, second we need magnification of eye's image video which is done by infra red camera fixed in front of both eyes in the goggle, It gives live magnified display of both eyes simultaneously. The image of the eyes can be fine focused with threads on camera lens. We also need to see and record position of the patient. This is done by a camera mounted on wall in front of patient's couch. All three camera inputs are given to four channel DVR recorders. From DVR recorder these three camera image is presented to LED Monitor where we can adjust position of each camera according to our choice. Without DVR recorder all three camera images are not possible to see on a single screen. The image displayed on monitor is taken through monitor output and presented to computer input which has a video recording software which is used for endoscopy recording. In this software we can feed patient's information, we can save and give still image printout and video recording of VNG test by DVD burning immediately.

Instruments Needed

- Two very small size night vision camera with focusing facility.
- One normal close circuit camera.
- One Electric welding goggle frame.
- Four Channel DVR recorder.
- One TV monitor.
- Computer with Endoscopy Video recording software.
- Connecting cables.



Figure 1 (A) Goggle Front Side



Figure 1 (B) Goggle from Left Side



Figure 2 Infrared Camera



Figure 3 Monitor

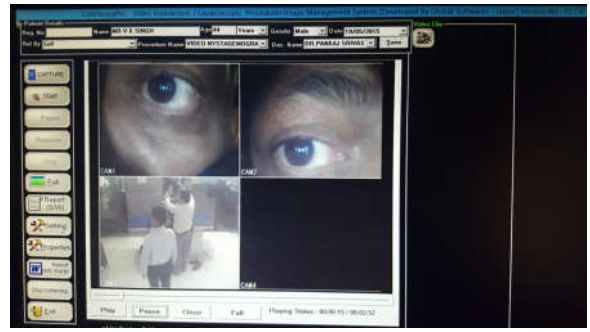


Figure 4 Computer Display



Figure 5 (a) Complete Arrangement of Instruments

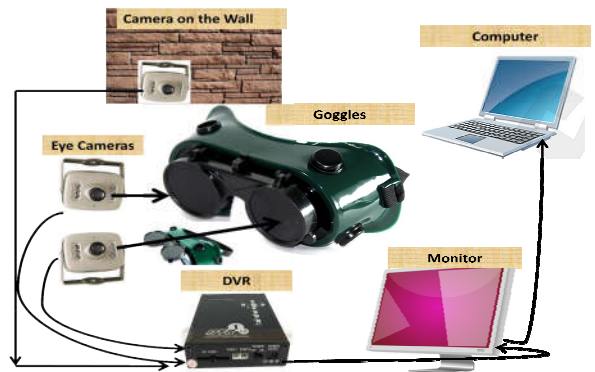


Figure 5 (b) Complete Arrangement of Instruments



Figure 6 Setup

How it is Made

We took a welding goggle frame which is larger and can accommodate two cameras and is well fitting on patient's head with elastic band. Two small sizes, night vision cameras with focus adjusting threads are fixed facing eyes. The camera can be fine focused to see the magnified eye ball clearly by adjusting the threads. One camera is mounted on the wall in front of examination couch in mid point. Image from all the three cameras are presented to four channels DVR which provides all the three image in a single screen simultaneously in the TV monitor. The right and left image can be set in upper row and distant camera can be set in lower row. Without DVR

all the image in single screen is not possible. Now this screen image is taken from TV video output and presented to computer which already has endoscopic recording software. In this software we can see the monitor image in screen, we can feed and display patient's particulars, we can keep recording of the VNG test for future reference and can copy and burn the recording of VNG in CD immediately. We can give still image printout and video recording to the patient. The DVR also records all the image but these images can be seen separately so it is not for any use of us.

Disclaimer

No drug trial was done, no animal harmed, no funding involved, Conflict of interest- none.

References

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