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Teletransmitted stereoscopic video images in oculoplastic surgery

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Purpose To establish an easy and inexpensive system to record stereoscopic images in video, its stereo visualization and publishing on an internet platform for collaborative research or remote surgery supervision.

Methods For stereoscopic video recording a NuView (i-O Display Systems, USA) adapter was attached to a mini-DV camcorder Panasonic NV-DS30 (Panasonic corp, Japan). Eight patients having oculoplastic surgery (i.e basaliom excision) were recorded by means of this system. Visualisation of stereoscopic video images was performed using a CRT monitor or TV set that display left/right images time-sequentially. The TV set was connected with a TV adapter P/N103822 which controls wired LCD-shutter glasses P/N 103624 (H3D, Inc).

Results Flicker free stereoscopic video visualization was achieved with this system permitting excellent spatial orientation related to surgical instruments, recognition surgeon's hand movements etc.

Conclusion The use of stereoscopic video technology bears a great potential to enhance the comprehension in oculoplastic surgery and may improve in the future telemedical assistance in this type of surgery. The use of stereoscopic video in eye surgery will be developed for research and educational purposes, specially using internet as a communication medium.

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Accommodative convergence measurement in strabismus using a oculomotor register system by infrared

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Purpose To develop a new measuring technique of accommodative convergence (AC) in patients with strabismus that calculates deviation of each eye related to accommodation.

Methods One student of psychology, female, 24 years old with right esotropia (22ΔBI) and normal visual acuity (VA right eye =VA left eye= 1.2). An infrared oculomotor register system (Eye Track) was used. Horizontal and vertical gaze position (X/Y) on the display screen, fully compensated for head position, was obtained. Individual holded up fixation on a dot of screen for a minute. Five sessions were carried out for each experimental condition. In each session 15000 measurements of each eye horizontal and vertical gaze position were obtained (Xre, Yre, Xle, Yle; re: right eye, le: left eye). Independent variables were: a) Binocular/monocular conditions, b) Eye (re/le) and c) Accommodation (A): -3.00D / -2.00D/ -1.00D/ 0.00D/ +1.00D/ +2.00D/ +3.00D (varied with soft contact lenses, radius=8.90mm, diameter=14.0mm). Dependent variables were Xre, Yre, Xle and Yle.

Results Regression lines X're, Y're, X'le, Y'le were calculated in terms of accommodation. Null and alternative hypothesis (Ho:b=0 and H1:b≠0, b: line regression slope) were tested using Student´s t Test. Only right eye changed its horizontal position, in binocular position, when accommodation was varied (X're=5.90*A+350.25, t=4.66, p=0.006). No significant variations were found for other conditions.

Conclusion This technique allows compute, with very high accuracy, contribution of each eye to AC in patients with strabismus.

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The AC/A ratio in University Students in Portugal

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Purpose To examine how the response AC/A ratio varies as a function of refractive error, age and sex.

Methods The refractive error was measured by the standard subjective refraction and all refractive errors were corrected.The AC/A ratio were measured by the gradient method in to the phoropter.The refractive error of the sample, ranged from –8.75 to +3.75 D mean spherical equivalent + 0,20 ± 1,53D (Mean ± SD.). The maximum amount of astigmatism was –2,25 D.

Results The mean value for the population was 4.3 ± 2.13 D/D (mean ±SD). Statistically there are no significant differences between male and female (male AC/A ratio = 4.3 ± 2.10 D/D; female AC/A ratio = 4.3 ± 2.16 D/D) or any significant differences between the age groups (less than 20 years old AC/A ratio = 4.5 ± 2.29 D/D; between 20 and 25 years old AC/A ratio = 4.2 ± 2.00 D/D, more than 25 years old AC/A ratio = 4.2 ± 2.38 D/D) or any significant differences between myopes, hyperopes and emmetropes, (myopes AC/A ratio = 4.6 D/D ±2.15 D; hyperopes AC/A ratio = 4.4 ± 2.52 D and emmetropes AC/A ratio = 4.0 ± 1.77 D).

Conclusion The results show an AC/A ratio similar to results obtained in other populations. An elevated response AC/A ratio were present in the myopic group but the difference was not statically significant.

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The Frisby-Davis 2 (FD2) distance stereotest in evaluation of exotropia

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Purpose We have recently developed a presentation protocol for the new Frisby-Davis 2 distance stereotest (ARVO 04), which allows measurement of distance stereoacuity free from monocular cues. Tests of distance stereoacuity may be useful in evaluating strabismus when the angle of deviation, or control of that deviation, differs at distance and near fixation. We therefore conducted a pilot study to evaluate the FD2 in patients with exotropia.

Methods Twelve patients with exotropia were tested with the FD2 distance stereotest, using our new presentation protocol which incorporates a monocular phase to determine whether initial binocular thresholds represent true stereopsis. Stereoacuity at near was also tested with the Preschool Randot and Frisby tests. Angles of distance exotropia ranged from 18 to 80 PD. The control of the distance deviation ranged from constant tropia to very intermittent (control score of 5 to 1, on a scale of 0 to 5, where 0 is always phoric and 5 is always tropic).

Results None of the 7 patients with constant exotropia had measurable distance stereoacuity using the FD2. In contrast, all 5 patients with intermittent exotropia had measurable distance stereoacuity, ranging from 20 secarc (the finest disparity on the FD2 test at 3 m) to 160 secarc (p=0.001, Fisher's exact test). Near stereoacuity was 40-60 secarc in all intermittent cases, whereas patients with constant exotropia had no near stereopsis.

Conclusion Patients with intermittent exotropia have a wide range of distance stereothresholds using the FD2, in contrast to more uniform near stereoacuity. Constant exotropia was associated with no measurable stereopsis. The new FD2 distance stereotest may be useful for monitoring deterioration of intermittent exotropia.