Integrated versus Customized Neural Photostimulation
Clinical experience of the Low Vision Research Centre of Milan

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Purpose:
Neural Photostimulation is a biofeedback method which aims to improve the results of visual rehabilitation on low vision patients. It can increase VEPs, Visual acuity, reading speed and fixation steadiness. Our thesis is that photostimulation could recover fixation and foveal detection and with a cascade mechanism it could improve all the other visual parameters too.

The purpose of this study is comparing fixation steadiness inside PRL and the resulting increase of visual performances in low vision patients who underwent Customized Photostimulation versus those who underwent Integrated Photostimulation.

Patients and methods:
We analyzed a sample of 21 low vision patients (34 eyes) who had already undergone visual rehabilitation and neural photostimulation and who where clinically stabilized.

All the patients of the sample undertook a periodical treatment of five sessions cycles every six months. At the start we used Integrated Photostimulation (association of Visual Pathfinder, IBIS, Sound Biofeedback). At the end of the treatment we used Customized Neural Photostimulation (association of Visual Pathfinder, IBIS, Sound Biofeedback). We find PRL with micrometer MP1 by Nidek.

At the beginning and at the end of each cycle we analyze fixation inside foveal 2° and 4°, with steadiness more BOVA by the residual near visual acuity, visual acuity with low vision aids, VEPs, reading speed and reading coefficient.

We used Snellen Reading Chart by far, Nidek's Reading Chart in printing types (pt) by near, Nidek's micrometer MP1 (which makes a microperimetry through an high frequency autotracking program and a device for electrophysiological recordings (Visual Pathfinder LACE).

Results:
In the sample integrated photostimulation had increased BCVA from 0.31 to 0.48, residual visual acuity by near from 24.24 to 16.16 pts, near visual acuity with low vision aids from 6.27 to 7.31 pts, residual retinal sensitivity from 6.53 to 9.18 decibels, fixation steadiness inside 2° increased from 48.24% to 58.82%, decentralization improved from 2.65 to 2.04°. VEPs increased from 2.64 to 3.62 micronsVolts, reading speed increased from 80.50 to 95.50 word per minute.

Six months after the same sample underwent Customized Neural photostimulation. With this new method BCVA increased from 0.40 to 0.53, residual visual acuity by near increased from 18.5 to 14.1 pts, residual visual acuity with low vision aids increased from 7.5 to 6.8 pts, retinal sensitivity increased from 8.4 to 8.1 db, fixation steadiness in foveal 2° increased from 58.06% to 68.09%, decentralization improved from 3.06° to 2.39°. VEPs increased 1.7 to 3.3 micronsVolts, reading speed improved from 83.1 to 94.6 words per minute. We have then compared the results obtained with the two different techniques.

Conclusions:
We underline that photostimulation through the stabilization of the PRL inside foveal central 2°, determines an increase of foveal detection thus obtaining an increase of visual acuity, VEPs, and reading performances. This increase can be modulated and improved according to the chosen rehabilitative method.

References:
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