

## REGULAR CONTROL OF VISUAL CAPACITY IN CLERKS

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**Abstract:** The effects on the eye function due to prolonged work with visual terminals has not yet been thoroughly studied. With this work we wish to underline the importance of regular controls of the visual capacity in clerks with sustained use of visual terminals.

We have investigated 223 employees of a bank, including 60 men and 163 women, with an average age of  $32,6 \pm 7,78$  years. We have performed the medical control, investigating also the visual function using a VISIOTEST Essilor device.

Out of the 223 employees, 93 (41.7 %) were already known with eye pathology. 49 (52.69 %) of these had an adequate visual correction, and 44 (47.31 %) needed a specialist control according to the VISIOTEST investigation.

130 employees were not aware of having any eye pathology. 90 (69.23 %) of these had a normal eye function, and 40 (30.77 %) were advised to see a specialist in oftalmology, as a result of our investigation.

Regular VISIOTEST eye function control helps detecting eye pathology as well as monitoring employees with a known diagnostic.

**Key words:** regular control, visual function.

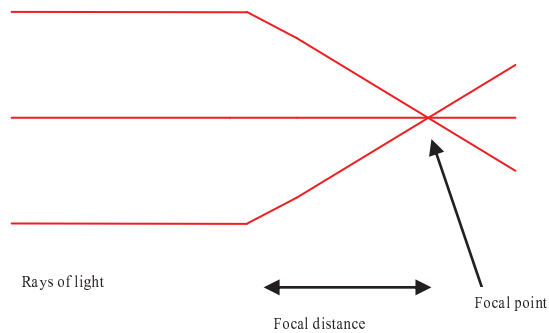
### **Introduction**

- The visual function is essential for the human being
- The visual function plays a primordial role in working life
- Any profession that requires prolonged activity in front of a display screen can lead to overload of the visual analyzer.

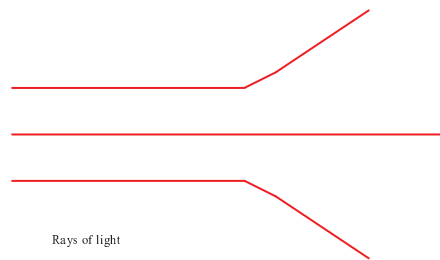
### **Motivation**

- The computer is used increasingly at the workplace and also for recreational purposes.
- The damage of visual analyzer through prolonged work in front of a monitor has not been studied as much as musculo-skeletal impairment related to computer work.
- Through this study we wanted to emphasize the importance of regular checks on employees which are working a long amount of time in front of a display screen.
- Physical principles
- Light passes through air at a speed of 300,000 km/s, but this speed is reduced when it crosses transparent liquid and solid environment.
- Changing direction of propagation of the rays at the interface between two environments with different refractive indices is called **refraction**.
- The degree of refraction depends on the ratio of the refractive indices of the two environments and the degree of angulation between the interface and the front entrance of light rays.

Convex-converging lenses turn a parallel beam of rays of light into convergent rays



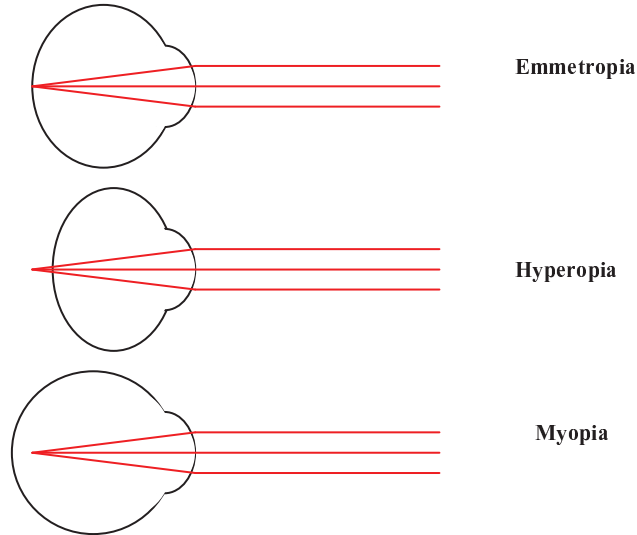
Concave-diverging lenses turn a parallel beam of light into divergent rays



### Refractive vices

- The normal state of the eye, where the light rays form a remotely accurate picture at the level of the retina and when the ciliary muscle is completely relaxed is called emmetropia.
- All deviations from the state of emmetropia are grouped under the generic name of ametropia.
- These refractive vices are represented by hyperopia, myopia, astigmatism and presbyopia.

Comparison between emmetropia, hyperopia and myopia



The quality of a display is given by the performance parameters:

- Brightness, Viewable image size, Screen resolution, Refresh rate, Response time, Contrast ratio, Power consumption, Aspect ratio, Viewing angle

Diseases of the eye and Annexes

<b>OCCUPATIONAL DISEASE</b>	<b>PROFESSIONAL HAZARD</b>
Conjunctivitis	Professional allergens and irritants
Keratitis	UV radiation
Cataracts	Ionizing microwave radiation, infrared radiation, Trinitrotoluen, Naphthalene dinitrophenol, Dinitrocrezol, Ethylene Oxide
Nystagmus	Inadequate lighting
Accommodative asthenopia, worsening preexisting myopia	Visual overload

### Material and methods (1)

- ergonomic job analysis in 32 branches of a banking corporation, from 23 cities in western Romania, in 2011-2013
- periodical medical examination of 223 bank employees, with clinical examination and investigation of visual function with a Essilor VISIOTEST unit
- voluntary completion of a questionnaire

### Material and methods (2)

	<b>Group studied (n=223)</b>
Average age	32.6 ± 7.78 age
Distribution by gender	Men: 60 Women: 163

### Results (1)

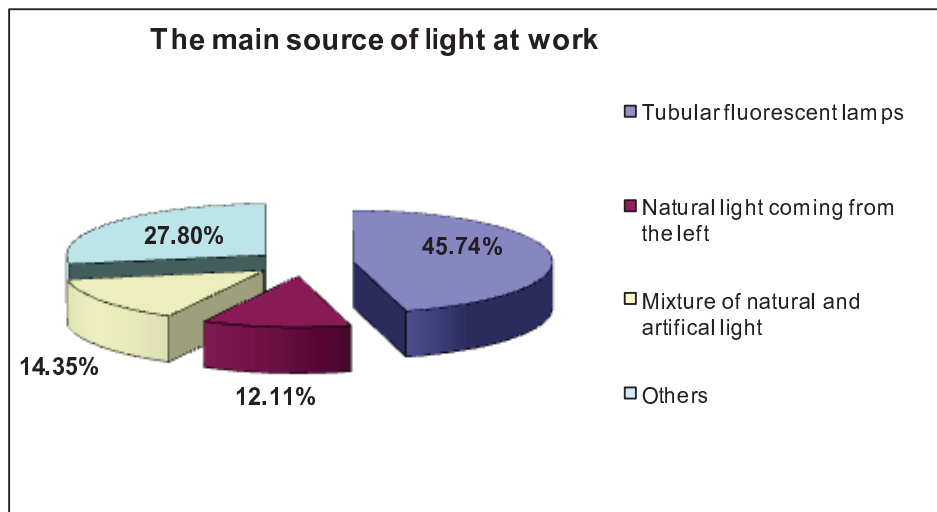
<b>Employees</b>	<b>VISIOTEST Control</b>	<b>Group studied (n = 223)</b>
<b>With pathology (n=93)</b>	Appropriate correction	49
	<b>Requires eye specialist consult</b>	<b>44</b>
<b>Without pathology (n=130)</b>	Normal	90
	<b>Requires eye specialist consult</b>	<b>40</b>

### Results (2)

Effective time spent on a display unit at work	Group studied (n = 223)
over 5 hours/day	172
about 5 hours/day	38
between 1-4 hours/day	10
under 1 hour/day	3

Distance employee – display	Group studied (n = 223)
< 50cm	50
50-70cm	156
70-100cm	14
> 100cm	1
Not specified	2

### Results (3)



## **Results (4)**

### **Symptoms accused by the employees**

- Eye fatigue, Headache, Blurred vision, Fatigue, Diplopia, Irritability, Ocular dryness sensation, Sleep disorders, Flashing tick, Ocular pain, Heavy lids sensation

## **Results (5)**

### **Most frequent accused symptoms**

- Eye fatigue 91%
- Blurred vision 31%
- Most common accused symptoms
- Headache 48%
- Fatigue 47%

## **Conclusions**

- Periodical VISIOTEST control helps detection of visual disorders and tracking employees with known eye pathology
- Thus prophylaxis to all pathologies associated with computer work becomes necessary.
- The most common visual problems encountered were represented by myopia and hyperopia.
- Multifactorial etiology of visual disorders after a prolonged work at computer is underlined by weak correlations between each risk factor and symptoms complained.

## **Recommendations**

- Medical examination at employment and annual regular checks should be accompanied by one VISIOTEST control to detect eye diseases early;

- Ergonomical spatial layout of the workplace is necessary;
- The employers need to implement and maintain a working schedule which shall contain 10 minute breaks every 50 minutes;
- Change of display units by the employer every three years.

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