

The Influence of Light and Vision

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2 hours

DESCRIPTION

Light is ever changing. Considerations include natural lighting, artificial and low light evenings. And weather, position of the sun and time of year. Most individuals declare they are light sensitive; therefore, a need for light management. Clear lenses may not address all of our patients' visual needs. Variable tints, polarization and tinted lenses are great options. Come and join us as we explore the wonders of light theory and how our visual system works.

LEARNING OBJECTIVES

Upon completing this course, the participant should be able to:

1. Describe 4 dimensions of light that affect the human visual system.
2. Cite the differences in short and long light waves and their effects on the human visual system.
3. Explain how our visual system adapts to light and dark environments.
4. Understand the importance of vision, the need for eye comfort, eye care and eye protection.
5. Identify pathological and non-pathological light sensitive patients.
6. Understand the features and benefits of tinted lenses and educate the patient with confidence.

OUTLINE: 120 Minutes

3 minutes – What is Light – Theories

Particle theory – A beam of photons, Wave Theory–A series of waves, Duality of Light – Both at the same time

3 minutes – Electromagnetic Spectrum

Harmful short waves – Safe long waves – ROYGBIV - Nanometers

4 minutes – Role of Retinal Image Focusing

Emmetropia – No refractive error

Hyperopia – Short eye – Far sighted

Myopia – Long eye – Near sighted

Astigmatism - Irregular cornea – Light focusing

3 minutes – The Role of Ophthalmic Lenses

Emmetropia – Plano, Hyperopia – Plus, Myopia – Minus, Astigmatism - Cylinder

3 minutes – Clear Static Lenses

Help to correct and focus for clarity of vision

2 minutes – Good Vision Involves the Ability To...

See a wide range of colors

Perceive Depth

Have good eye movement coordination

Track moving objects smoothly

Have good peripheral vision

2 minutes – Impact of Light on Color Perception

Natural Light – colors tend to appear more vibrant

Artificial Light – colors may appear cooler or warmer

Light bulbs – Electronic & Smart Devices – Industry Lighting

3 minutes – Retinal Photochemistry

Innermost light sensitive layer – Posterior part of the eye

Photoreceptors – Rods 92 million – Cones ≤ 7 million

ROYGBIV – 380nm to 780nm – shorter waves blue/violet- longer waves orange/red

2 minutes – Basis of Light Adaptation

From dim light to bright light – Rods/Cones stimulation – Pupil constriction

From outdoors to indoors – Bleached Rods (temporary) – Cones cease to function

4 minutes – Everyday Applications

Theater lights go up slowly and dim slowly

Airplanes dim cabin lights during take-off and landing so we can adjust to light changes

We can see the illuminated light path to the nearest exit

Lenses that darken and lighten as the human eye naturally adapts to light

Why submarines use red lights.

3 minutes – Outdoors and Night Vision

Rhodopsin's Depletion – Temporary bleaching of photoreceptors – Simple Solutions

3 minutes – What About The Aging Eye?

Pupil Considerations – Smaller – More Fixed

Retina – Slows Down – Slower Visual Reaction

Crystalline Lens – Denser, Less Flexibility, Cloudier, -Yellowing – Most Common Eye Disorder

3 minutes – What about Night Driving?

Emmetropes 20/20 indoors – 20/32 night outdoors – 20/38 in the car at night

Turn down instrument brightness

Suggest premium A-R treatments – 99.75 light transmittance – Reduced recovery time

4 minutes – Light Intensity

Lumens – Indoor to outdoors – 1 to 80,000 – Nighttime Consideration

10 minutes – 4 Dimensions of Light

The Spectrum – Light discomfort, harmful light waves

Intensity - Lumens < 8 night lights – 300 indoors – 2,000 overcast – 30,000 full sun – 80,000

glare

Role of Tinted Lenses,

Don't Forget About Outdoor Glare, Distracting – Discomforting - Disabling – Blinding

We will look at 4 examples of Blinding glare

How polarized lenses work, How they are made, Variable Polarization and how they are made
The Source – The smaller the size = greater discomfort

The position = closer = greater discomfort

Strain from digital device usage

Temporality – Long term light source = Visual system adaptation

Short term light source = Visual system adaptation concerns

- 5 minutes – What about good light?
Light is All Around – Dynamic - Constantly Changing - Life, Energy, Power
Essential for Sight – Do we see with our brain our eyes?
- 4 minutes – Overstimulation
Artificial light – Over/Under exposure – Digital device factors
- 6 minutes – Factors in Human Development
Vision & General Health Impacts - Day-To-Day Performance Impacts
Digital Device Factors - Sun Factors
Circadian Rhythms – Solutions
- 5 minutes – What about Kids?
Healthy Development – Daily Exposure – Go outside and play! – Axial Growth concerns
What can we offer?
- 3 minutes – Light & Vision
Not always a positive experience – The 4 Dimensions
- 3 minutes – Light Sensitivity
90%? – Simply ask – OD prescribes – Helping eyes manage light
- 4 minutes – Human Behavior - Light Compensation
Look Away - Shade The Eyes - Adjust Screen Brightness – Squint - Stay Indoors?
- 6 minutes – Light Sensitivity
Overly bright environments provoke stress, anxiety, desire to retreat
Darker rooms calm anxiety
Pathological – Diagnosed, demonstrable ocular diseases, medications
Non-Pathological – Subjective, no obvious ocular abnormality, The 4 Dimensions
The human factor
- 5 minutes – What patients/consumers want
Knowledge, solutions, longer shelf life, faster, darker, lighter, fashion,
Try sound bytes
- 6 minutes – Managing Light in Various Environments - Solutions
AR Treatments
HEV Treatments
Photochromics
Polarization
Fixed-Tints
Accommodative Relief
- 5 minutes – Reinforce Throughout – Wear By Example
Pre-visit, History – Lifestyle – Profession – Current eyewear
Pre-exam testing, Compare Current eyewear – Ask about protection –
Exam, Prescribe – Medical Facts
Handoff, Find a way – Reiterate – All on the same page
Optical, Concur – Educate – Demonstrate – Recommend
Dispense, Celebrate their choices – Re-educate – Demonstrate
- 5 minutes – Recapping and Questions
- 1 minute – Never Apologize For The Price of Technology and Eyecare
- 10 minutes – Q&A / Discussion