

Environmental Vision course summary

In this brief course, we studied the following topics:

- Laser safety
- Solar radiation and the eye
- Eye protection
- Sports vision
- Vision and driving
- Computer vision
- Aviation and vision

Laser safety

Laser classification

- Class I – no ocular hazard
- Class II – blink reflex protects the eye
- Class IIIa – 1-5 mW, potential retinal hazard within blink interval
- Class IIIb – 5-500 mW, may burn skin for greater than 1 second exposure
- Class IV – can ignite fires!

Refer to notes to see how a particular laser's power compares to the ANSI Z136.1 exposure limits.

Laser safety glasses must block the specific wavelength of the specific laser.

REF: Sliney, "Safety with Lasers and Other Optical Sources"

Dr. Salmon's web site

Solar radiation and the eye

Family of sunlight-related eye diseases

- Cataracts
- Macular degeneration
- Pterygium and pinguecula
- Photokeratitis
- Skin cancer

Much solar radiation is reflected from common surfaces

- Snow 90%+
- Sand 31%
- Dirt 25%
- Water 10%
- Grass 5%

Protect the eye with

- Hat
- Sunglasses
- Avoid peak exposure times (noon \pm 2 hours)

The ideal sunglass

- Blocks 100% UV A and B block
- Neutral gray
- 15% transmission (more for older folks; less for special uses)
- Side protection + fits closely

Sunlight overexposure during the day can degrade vision that night (pilots, drivers, police, etc.)

REF: Young, Optometry and Vision Science, 1993, p. 255

Borish Chapter 25

Eye protection

Eye hazard categories and protection

- **Impact** from flying fragments, debris, etc. – safety spectacles, goggles, faceshields
- **Heat**, hot sparks, hot splashes, etc. – goggles or goggles + faceshields
- **Chemical** splash, mists, etc. – goggles or goggles + faceshields
- **Dust** – goggles
- Optical radiation, welding, etc. – welding goggles or faceshields with appropriate filter

ANSI Z87.1 standards

- Standard impact protection lenses – logo on lenses (AOS, etc.)
- High impact protection lenses – logo on lenses with + (AOS+)
- Safety frames and plano safety glasses – Z87 or Z87-2 printed on frame

Recommended for all environments with impact hazards:

- Z87 safety glasses
- Side protection, close fit
- Polycarbonate

All safety spectacles must provide side protection.

Goggles can have direct or indirect ventilation.

Remember your duty to warn!

40% of eye injuries occur at home!

Polycarbonate or Trivex - the standard of care for

- Children
- Athletes
- Monocular patients
- Amblyopes
- Anyone exposed to impact hazards at work or home (essentially everyone)

REF: ANSI Z87.1 Practice for occupational and educational eye and face protection
Web sites on Dr. Salmon's web page

Sports vision

10% of eye injuries occur in sports.

Be a sports vision specialist

- Fit contact lenses
- Educate and fit protective eyewear (polycarbonate)
- Screen for sports-specific visual skills – See *AOA Sports Vision Guidebooks*.
- Provide sports-specific vision enhancement training - See *AOA Sports Vision Guidebooks*.

REF: AOA Sports Vision Guidebooks

Vision and driving

Best visual acuity provides a margin of time and safety for drivers.

Federal and Oklahoma commercial drivers

- 20/40 or better OD, OS, OU
- 70° degree horizontal field OD and OS
- Color vision normal (can discriminate red, green, amber)

Oklahoma non-commercial driver's license

- 20/50 or better in either OD, OS, or OU
- 70° temporal and 35° nasal
- Restricted license if 20/100 or better
- Restricted license if greater than 30° temporal and nasal
- Drive with low vision telescopic devices? No!

REF: Environmental Vision course notes (Dr. Salmon web site)

Computer vision

How to manage patient with computer-related eye problems?

- Correct all refractive errors
- Deal with binocular problems
 - Near exo – convergence training
 - Near eso – plus lenses

Vertical phobia – prism

- Accommodative problems
 - Non-presbyopes – Rx low plus

Presbyopes

Standard PAL might not work well. Why not? (working distance, monitor height)

Patient may need office/computer glasses in addition to standard Rx.

- Single vision for computer
- Computer vision PAL (like the SOLA Access)
- Computer-distance inserts/clip-ons
- Trifocals with wide intermediate zone
- Intermediate/near bifocals
- Far/intermediate bifocals

Prescribing the SOLA Access

Patient will need these in addition to standard bifocals

No intended for distance vision

Give options normal far Rx plus standard near add

Select frame with vertical center near pupil center

Let optician computer regression (-0.75 or -1.25), or you can prescribe it

- Manage dry eye
- Ergonomic considerations
 - Minimize glare (off screen, or surround)
 - Lower the monitor to just below eye level
 - 50-60 cm viewing distance
 - Make reading material easy to read

Conclusion

Consider the environmental visual needs of your patients at work and at home

- Standard comprehensive eye exam components
- Hazards/protection
- Working distance
- Angle and field of view
- Dry eye
- Consider specific environmental demands affecting vision or the eyes

Referring to advice from Dr. Donald Pitts, most patients should have at least three pairs of glasses

- General purpose Rx which includes UV protection
- Computer glasses
- Glasses that provide protection from impact and solar radiation