Vision Challenges in the Workplace: How to Assess and Manage Occupational Ophthalmic Conditions

Kenji Saito, M.D., J.D.
President, MedLawPractice.com
Adjunct Faculty, Occupational and Environmental Medicine
University of Pennsylvania
December 2, 2016

Images have been removed from this handout
A condensed version will be presented with images

Disclaimer

The materials presented today are for informational purposes only and not for the purpose of providing medical or legal advice and does not constitute a doctor-patient nor an attorney-client relationship. The opinions expressed at or through this presentation are the opinions of the individual author and may not necessarily reflect the opinions of NECOEM, TAMC/EMHS or UPenn.

Objectives

• Explain how to assess visual requirements based on job duties
• Recognize common occupational ophthalmic conditions
• Recommend when to manage and when to refer patients with ophthalmic problems
Do you know the difference between Optician, Optometrist and Ophthalmologist?

*Use your mobile device for interactive surveys*

- Yes
- No

**Vision Experts: The 3 O’s**

- Optician
  - Fit, grind and dispense spectacles

- Optometry
  - Primary eye care provider

- Ophthalmology
  - Physician specializing in eye disease and surgery

**Vision Experts – What do we do?**

- Healthy eyes
  - Myopia, hyperopia, presbyopia
  - Binocular vision

- Eye diseases
  - Treated with pharmaceutical agents

- Systemic disease with ocular manifestations
  - DM, HTN, thyroid, cancer, HIV

- Provide pre/post-op care
  - Cataract, refractive, retinal, laser surgery
History and Physical

• Just like any occupational medicine encounter, history is very important
  – Where do they work? What kind of work do they do?
  – Visual Acuity/Visual Loss, Double Vision, Headache, Flashes and Floaters
  – Glasses, contacts, surgery, trauma

History and Physical

• Symptoms
  – foreign body sensation (surface problem)
  – itch (allergy)
  – photophobia (uveitis)
  – diplopia (orbital or CN problem)
  – flashes or floaters (retina problem)
  – color vision or distortion (retina problem)

• Physical
  – Usually start of with vitals and then physical exam
  – With the eyes . . .

The Eye Exam

• Visual acuity
• Pupils
• Alignment & Motility
• Visual fields (VF)
• Intraocular pressure
• External exam: lids and lashes, conjunctiva, sclera, cornea, anterior chamber, iris, lens
• Dilated fundoscopic exam (DFE): optic nerve, vessels, macula, periphery

VITALS
Anatomy

• Images have been removed

Visual Acuity

• General physical examination should include:
  – Visual acuity (distance and near)
  – Pupillary reaction
  – Extraocular movement
  – Direct ophthalmoscope
  – Dilated exam (in case of visual loss or retinal pathology)
• Visual Acuity: Measured with & without glasses (Vacc & Vase), want to know best corrected acuity

Snellen eye chart  Rosenbaum pocket chart

• Images have been removed
Distance Visual Acuity Testing

- VA - Visual acuity
- OD - ocular dexter (right eye)
- OS - ocular sinister (left eye)
- OU - oculus uterque (both eyes)
- e.g. 20/20
  - Distance between the patient and the eye chart
  - Distance at which the letter can be read by a person with normal acuity

Distance Visual Acuity Testing

- Place patient at 20 ft from Snellen chart
- OD then OS
- VA is line in which > ½ letters are read
- Pinhole if < 20/40

Other eye charts

- Images have been removed

Lea Symbols (left) and HOTV letters (right).
Distance Visual Acuity Testing

- If VA < 20/400 or its equivalence
  - Counting Fingers (CF, include distance)
  - Hand Motion (HM, include distance)
  - Light Perception (LP)
  - No Light Perception (NLP)

Early Treatment Diabetic Retinopathy Study (ETDRS)

- Visual acuity scores were significantly better on ETDRS charts compared to Snellen charts
- The difference was greatest with poor visual acuity (<20/200) and in patients with exudative AMD

Near Visual Acuity Testing

- Indicated when
  - Patient complains about near vision
  - Distance testing difficult/impossible

- Distance specified on each card (14 inches or 35 cm)

Pupillary Examination

- Direct penlight into eye while patient looking at distance
  - Image(s) have been removed

- Direct
  - Constriction of ipsilateral eye

- Consensual
  - Constriction of contralateral eye

Extraocular movements

- Medial
- Lateral
- Upward
- Downward

- Image(s) have been removed
Ocular Motility

- Rt superior rectus
- Lt inferior oblique
- Rt lateral rectus
- Lt medial rectus
- Rt inferior rectus
- Lt superior oblique
- Lt superior rectus
- Rt inferior oblique
- Lt lateral rectus
- Rt medial rectus
- Rt inferior rectus
- Lt superior oblique
- Lt inferior rectus
- Rt superior oblique

Intraocular Pressure Measurement

- Range: 10 - 22
- Images have been removed

Anterior chamber depth assessment

- Images have been removed
- Likely shallow if
  - ≥ 2/3 of nasal iris in shadow
Direct Ophthalmoscopy

- Tropicamide or phenylephrine for dilation
  - unless shallow anterior chamber
  - unless under neurological evaluation
- Use own OD to examine OD
  - Same for OS

Rosenbaum Near Vision Screener

- Images have been removed

Depth Perception

- Images have been removed
Summary of steps in eye exam

• Visual Acuity
• Papillary examination
• Visual fields by confrontation
• Extraocular movements
• Inspection of
  - lid and surrounding tissue
  - conjunctiva and sclera
  - cornea and iris
• Anterior chamber depth
• Lens clarity
• Intraocular Pressure - Tonometry
• Fundus examination
  - Disc
  - Macula
  - Vessels

Federal Motor Carrier Safety Administration (FMCSA)

• On December 9, 1999, President Clinton signed into law the Motor Carrier Safety Improvement Act of 1999
• FMCSA is one of nine U.S. Department of Transportation administrations
• Mission statement: FMCSA is focused on “reducing crashes, injuries, and fatalities involving large trucks and buses”

Medical Certification Requirements

physical qualification standards is required when the driver is operating a commercial vehicle in interstate commerce that:

• Has a combined gross vehicle weight or weight rating of 10,001 lbs. or more
• Is designed or used to transport 9-15 passengers (including the driver) for compensation
Medical Certification Requirements

Physical qualification standards is required when the driver is operating a commercial vehicle in interstate commerce that:

- Is designed or used to transport 16 or more passengers (including the driver) whether for compensation or not
- Transports hazardous materials in quantities that require placarding under the hazardous materials regulations.

Medical Examinations

- When a driver returns from an illness or injury that interferes with driving ability, the driver must undergo a medical examination even if the medical examiner's certificate has not expired.
- The medical examiner is responsible for certifying only drivers who meet the physical qualification standards. Certification cannot exceed 2 years, and at the discretion of the FMCSA medical examiner, may be less than 2 years.
- The Federal Vision and Diabetes Exemption Programs require annual medical certification.

Privacy

- Get a release form signed by the driver if the employer wishes to obtain a copy of the Medical Examination Report form.
- 49 CFR 391.43(g) addresses the distribution of the medical examiner’s certificate:
  - If the driver is physically qualified to drive a commercial motor vehicle in accordance with §391.41(b), the medical examiner shall complete a medical examiner’s certificate and furnish one copy to the driver and one copy to the motor carrier that employs the driver.
  - A release form is not required.
Codification of Statutes

• Standards or Federal Motor Carrier Safety Regulations (FMCSRs) are legal requirements for interstate commercial vehicles, drivers, and motor carriers

• Image(s) have been removed

49 CFR 391.41

• The 13 standards are used to determine driver medical fitness for duty

• Four of the standards: vision, hearing, epilepsy, and diabetes mellitus have objective disqualifiers that do not depend on medical examiner clinical interpretation
  – These standards are the "non-discretionary" standards

• For the other nine "discretionary" standards, clinical judgment are made in accordance with the physical qualification requirements for driver certification

Vision §391.41(b)(10)

• Image(s) have been removed
Vision Regulations

- A driver must have:
  - Distant visual acuity of at least 20/40 (Snellen) in each eye, with or without corrective lenses
  - Distant binocular visual acuity of at least 20/40 (Snellen) in both eyes, with or without corrective lenses
  - Field of vision of at least 70° in the horizontal meridian in each eye
  - Ability to recognize and distinguish among the colors of traffic signals and devices showing the standard red, amber, and green

Administer Vision Screening Tests

- Use the Snellen chart for testing or give results in Snellen-comparable values
- Have drivers who wear corrective lenses for driving wear corrective lenses for testing
- Evaluate drivers who wear contact lenses for good tolerance and adaptation to contact lens usage

Administer Vision Screening Tests

- Assess the ability to recognize and distinguish among red, amber, and green traffic signals (true color perception deficiencies are rarely disqualifying)
- If needed, request a vision examination by a specialist using advanced vision testing equipment to evaluate driver vision adequately
### Disqualifying Vision

- Use of contact lenses when one lens corrects distant visual acuity and the other lens corrects near visual acuity
- Use of telescopic lenses
- Failure to meet any part of the vision testing criteria with one eye or both eyes
- Monocular vision.

**NOTE:** Some drivers with monocular vision may be able to be certified if otherwise medically fit for duty and are granted a Federal vision exemption certificate.

### Health History

Here are important vision questions to ask.

- Eye disorders?
- Impaired vision (do not include corrective lenses)?
- Symptoms related to or caused by eye diseases?
- Use of ophthalmic preparations that have side effects that can affect safe driving?

### Ophthalmic Preparations

- Determine if the treatment is having the desired effect of preserving vision that meets qualification requirements without any visual and/or systemic side effects that interfere with safe driving (e.g., stinging, blurring, decreased night vision, sensitivity to glare, headache, or allergic reaction)
Physical Examination

Examine the eyes for:
• Pupillary equality
• Reaction to light and accommodation
• Ocular motility
• Ocular muscle imbalance
• Extraocular movements
• Nystagmus
• Exophthalmos

Snellen Distant Acuity Test

• The Snellen chart is widely used for measuring central visual acuity.
• The Snellen wall chart should be 20 feet away from the driver.
  – Measure distance.
  – Mark testing location.
• The chart should be illuminated with white light.

Snellen Distant Acuity Test

• The driver may wear corrective lenses during the examination.
• When the driver is reading larger lines easily, the medical examiner may ask the driver to skip to smaller lines.

• Image(s) have been removed
**Visual acuity test results**

- The Snellen eye test results use 20 feet as the norm, represented by the numerator in the Snellen test result.
- The number of the last line of type the driver read accurately is recorded as the denominator in the Snellen test result.
- The minimum qualification requirement is distant visual acuity of at least 20/40 in each eye and distant binocular acuity of at least 20/40.
- If a test other than the Snellen is used to test visual acuity, the test results should be recorded in Snellen-equivalent values.

**Visual acuity test results**

- The minimum qualification requirement is distant visual acuity of at least 20/40 in each eye and distant binocular acuity of at least 20/40.

- Image(s) have been removed

**Visual acuity test results**

- If a test other than the Snellen is used to test visual acuity, the test results should be recorded in Snellen-equivalent values.
- There are versions of the Snellen chart that compensate for failure to read letters because of limited English reading skill, not because of poor eyesight.
- One example is the "Snellen Eye Chart – Illiterate" Orientation of the E is evaluated.

- Image(s) have been removed
Protocol for Screening the Visual Field

- The driver must have at least 70° in the horizontal meridian for each eye
- Some form of confrontational testing that tests vision of selected horizontal points is generally used in the clinical setting
- Image(s) have been removed

Confrontational Testing

- Stand or sit approximately two feet in front of the driver so that your eyes are at about the same level as the eyes of the driver
- Instruct the driver to use the palm of the left hand to cover the left eye
- Ask the driver to fixate on your left eye
- Extend your arms forward and position your hands halfway between yourself and the driver

Confrontational Testing

- Position your right hand one foot to the right of the straight-ahead axis and six inches above the horizontal plane
- Position your left hand one-and-a-half feet to the left of the straight-ahead axis and six inches above the horizontal plane
- Ask the driver to confirm when a moving finger is detected
- Repeat the procedure with your hands positioned six inches below the horizontal meridian
Color vision

• The color vision requirement is met by the ability to recognize and distinguish among red, amber, and green, the standard colors of traffic control signals and devices
• True color perception is not required

• Image(s) have been removed

Reports - How Medical Conditions Impact Driving

http://www.fmcsa.dot.gov/regulations/medical/reports-how-medical-conditions-impact-driving

- Cochlear Implants  - Seizure Disorders
- OSA  - Sleep Disorders
- Diabetes  - Renal Disease
- TBI  - MSK Disease
- Stroke  - Hearing
- MS  - Schedule II Medication
- PD  - Cardiovascular Disease
- Psychiatric Disease

Final Rule

• On May 21, 2014, FMCSA will require that motor carriers and drivers use only those medical examiners on the Agency’s National Registry and will only accept as valid medical examiner’s certificates issued by medical examiners listed on the National Registry
Pictures of Ophthalmic Conditions

- Come to the live presentation to see images and determine whether it is:
- Urgent or Semi-Urgent
  - Red Eye
  - Trauma
  - Chemical
  - Radiation
  - Video Display Terminal