

Lecture 16 – Review for Exam 1

Lecture 1 – Introduction to Binocular Vision

- Advantages of binocular vision
- Disadvantages
- Misconceptions

Lecture 2 – Visual Direction

- What are oculocentric and egocentric localization?
- Binocular direction based on local sign and each eye's orientation

Lecture 3 – Hering's laws, crossed and uncrossed diplopia

- Be able to compute cyclopean eye visual direction
- Don't need to memorize Hering's laws, but be able to apply the principles
- Phi movement and the cover test
- Know direction of vertical & horizontal heterophoria based on perceived motion.

Lecture 4 – Motor fusion & vergence eye movements

- Versions versus vergences
- Combined movements (refer to Figure 1)
- Disparity vergence
- Accommodative vergence
- Vergence adaptation
- Proximal vergence and instrument myopia

Lecture 5 – Combined vergences; Sensory fusion & the horopter

- How the vergences work together (refer to Figure 1)
- Benefits of having a residual fixation disparity
- Definition of the horopter
- Characteristics and assumptions of the Veith-Müller Circle

Lecture 6 – The empirical horopter

- Panum's area/space
- AFPP technique
- Abathic distance
- Why is the Nonius horopter a true horopter?
- What accounts for the Hering-Hillebrand deviation?

Lecture 7 – Introduction to fixation disparity

- Size of Panum's area
- Definition of fixation disparity
- Basic principles of measuring fixation disparity

Lecture 8 – Measuring fixation disparity

- Basic features of a fixation disparity test
- Wesson card approach
- Sheedy Disparometer approach

Lecture 9 – Fixation disparity types

- Know four curve types (Figure 1)
- Interpretation of forced vergence testing
- Determining the fixation disparity from a forced vergence curve
- Associated phoria
- Testing vertical phoria and fixation disparity

Lecture 10 – Binocular summation

- Worth's degrees of fusion
- Probability summation
- Neural summation
- Contrast sensitivity
- Fechner's paradox

Lecture 11 – Ocular dominance

- Sensory versus directional ocular dominance
- Monovision - the ideal case

Lecture 12 – Depth perception

- Stereopsis provides only relative depth perception
- Pictorial cues
- Emmert's law, size constancy illusions
- Motion parallax
- Kinetic depth effect, biological motion

Lecture 13 – Stereopsis I

- Geometry of stereopsis
- Stereopsis computations

Lecture 14 – Stereopsis II

- Maximum distance of stereopsis
- Affect of PD on stereopsis
- Panum's limiting case
- Stereopsis in medical diagnosis
- Axial magnification with 90, 78 and 60 D fundus lenses

Lecture 15 – Stereoscopic phenomena, stereograms

- Pulfrich phenomenon
- Chromostereopsis
- How to make free-fusion stereograms
- How to make a random dot stereogram
- How to make autostereograms

Also understand the principles of Labs 1, 2, 3, 4.