INTRODUCTION

- Optometric Involvement in Shooting Sports
  - Olympics
  - Recreation and Competitive
  - NRA Schools and Clinics
- Optometric Involvement with the Tactical Athlete
  - Research
  - Publications
  - Performance Programs
  - Personal Involvement
PHILOSOPHY

• Why is the Visual System so Important?
  – 80% of everything you will ever respond to comes through the Visual System. Unfortunately, we take this neuromuscular response system totally for granted, until we need it most, in a life-or-death situation.
  
  – As a profession, Optometry understands concepts used in input and response to stimuli.

OPTIMAL COMBAT PERFORMANCE SKILLS

• Visual Processing
  – Wide visual field
  – Distinguish shapes, colors and shades
  – Perceive quick, subtle movements
  – Quickly adjust far and near vision
  – Enhanced visual reaction time

• Analytical Processing
  – Analyze and evaluate subtle cues (threat assessment)
  – Formulate survival responses
  – Prioritize threats
  – Anticipate
  – Remain calm
OPTIMAL COMBAT PERFORMANCE SKILLS

• Motor Performance
  – Execute fine motor skill (precision shooting)
  – Execute complex motor skills (combat shooting, pursuit driving)
  – Execute gross motor skills (physical movement)

BODILY RESPONSE TO A THREAT

• What happens when a threat is encountered?
  • Increased Blood Pressure
  • Increased Respiration
  • Increased Galvanic Skin Response
  • Increased Blood Glucose
  • Increased Mental Activity
  • Increased Muscle Strength
  • Increased Emotions
  • Increased Reaction Time

BODILY RESPONSE TO A THREAT

• Responses caused by Sympathetic Nervous System discharge
  – Controlled to Uncontrolled environment
    • Controlled – low arousal (present training environments)
    • Uncontrolled – activates Reticular Activation System
  – Bodily Protection – reflexes, flinch
  – Arousal and Attention
  – Fight, Flight or Fright
  – No Direct Control
  – Mass Discharge
BODILY RESPONSE TO A THREAT

• Sympathetic Mass Discharge will orient the body to receive as much information as possible for threat analysis and bodily protection – “Survival Stress”
  – Head will turn square to center visual input upon each eye
  – Pupils dilate to allow more light and information
  – Hyperopic shift
  – Lid lift
  – Suppression of accommodation or focusing - parasympathetic
  – Loss of night vision
  – Loss of depth perception
  – Loss of peripheral vision – perceptual narrowing
  – Divergent posturing (outward positioning of eyes)

BODILY RESPONSE TO A THREAT

• Results of Sympathetic Nervous System Response On Shooting
  – Two –Eyed Firing
  – Eye Dominance
  – Perceptual Narrowing
  – The Perceptual Stress Response

STRESS RESPONDERS DECREASE EFFICIENCY IN:

• Depth Perception - where is it?
• Movement Analysis - where is it going?
• Perception - where am I in relation to the threat?
• Reaction Time – what is happening?
VISION IS DOMINANT – THIS SENSORY RESPONSE WILL SUPPRESS ALL OTHER SENSES

TOPICS

• Binocular Shooting
• Sight Picture
• Eye Dominancy
• Visual Reaction Time

TWO-EYED SHOOTING ADVANTAGES

• Visual sensitivity, or the ability to respond to environmental changes, is more than twice as great as one-eyed
• Less light needed
• For a visual cortex cell to fire efficiently, there needs to be a summation of signals from the two eyes
• Monocular deprivation causes disruption of cortical connections
• Tracking of a moving target is binocularly monitored
• A 20-30% improvement in visual-motor task efficiency
• Needed for distances of 25 feet or less
• Open motor skill – uses feedback from the environment
• Natural response – not a “stance”
WHAT HAPPENS WHEN YOU SHOOT WITH ONE EYE?

- Increases in body and visual stress
- Disrupts body balance
- Relies more on skeletal than somatic nervous responses
- Relies more on parasympathetic nervous system
- Relies more on stationary targets that don’t shoot back
- Decrease in acuity
- Decrease in localization – where are you in relationship to the threat?
- Decrease in speed and efficiency of information processing
- Closed motor skill – learned response...does not respond to outside influences
- Not natural – a “stance”

WHEN CAN YOU USE YOUR SIGHTS?

- Time
- Distance
- Cover
- Stationary Threat

- What does history tell us about shooting accuracy in fire fights?
THE PROBLEM OF EYE DOMINANCY

- Eye, hand, foot “preference”
- Crossed dominancy
- Scopes
- Weak-handed firing
- Alignment confusion
- Teach voluntary alignment changes

VISUAL REACTION TIME

- Physiology of the Visual Process
  - Eyes
  - Optic Chiasm
  - Lateral Geniculate Body
  - 70/30 rule
  - Visual Cortex
- Physiological Response to a Visual Stimulus
  - Perception
  - Analysis/Evaluation
  - Formulation of Strategies
  - Initiate Motor Response

VISUAL REACTION TIME

- Can Response Efficiency be Enhanced and Who Would Benefit?
  - Shoot-Don’t-Shoot decision
  - Defensive response
  - Surveillance
  - Survival training
  - Special Forces
VISUAL REACTION TIME

• How the Body Responds to What the Eye Sees
  – Sensory pathways
  – Short Term Sensory Store (STSS)
  – Short Term Memory (STM) * “choke”, “panic”
  – Long Term Memory (LTM)
  – Neuromuscular response

VISUAL REACTION TIME

• What is the Foundation?
  – Efficient perception
  – Stress causes breakdown in perception
  – Results? Failed scenarios or tactical problems
  – Perceptual Narrowing
  – Issues on what is perceived by the eyes

TRAINING PROGRAMS

• Trained Observer Qualification
• Eye Dominance Changes
• Binocular Sight Training
• Visualization
• Tunnel Vision (Perceptual Narrowing) Training
VISUAL ODDS AND ENDS

• Correction – IZON (ophthonix.com)
• Night vision
• Visual-Body balance
• Officer or recruit visual standards
• Training time
• Academy entrance visual requirements

QUESTIONS, ANSWERS AND COMMENTS

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THANK YOU

• “Put your confidence in God, my children, and fire at their shoe laces” – Cromwell

• He who is calm and strong of heart awaits his enemy, and has all the advantage of fire. He who is frightened sets his sights no longer – he does not even aim his piece – Ardant Du Picq