

# Fundamentally Different

TacCon 2024

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# Fundamentally Different

## Are Males & Females Different?

- Discouragement vs. empowerment
- Social & political hot topic
- Perceptions about females vs. males
- Performance enhancements
- Shooting as sport and learning from other sports
- Science-based studies about physical differences between men and women as they relate to shooting
- Examine how female traits and experiences can affect shooting performance

# Empowerment

## Not Discouragement

- Offer insight into what has helped me progress as a female shooter
- Provide tools for instructors of female students to help students
  - Learn faster
  - Reach their potential
  - Achieve personal goals
- Help female gun owners and shooters build confidence and improve shooting performance

# Hot Topic

## Political & Personal Opinions

- Biology vs. gender
  - This presentation does not address sexual identity
  - Definition from Duke Law
    - “Athletes with ovaries instead of testes and testosterone levels capable of being produced by the female non-androgenized body.”
  - To my knowledge, the studies/examples I cite use biological male and female sexes

# Doping

## Performance Enhancing Substances

- What we know about androgens/testosterone
  - Stimulate muscle mass
  - Reduce body fat
  - Increase aggression and motivation for competition
- Regulated vs. non-regulated sports
  - Scheduled and non-scheduled testing
  - Approved lists of supplements/meds

# Perception

## What/How We Think of Female Shooters

- Personal experiences - frequency
  - How many women do we see at our local clubs and ranges?
  - How many females participate in our classes?
- Frequency bias - the tendency to notice something or give attention to it if it is of interest
  - Baader-Meinhof Phenomenon - Terry Mullen coined the term through a letter to the St. Paul Pioneer Press. After mentioning the name of the German terrorist group Baader–Meinhof once, he noticed it more often.

# Perception

## What/How We Think of Female Shooters

- Women and girls...
  - Are better students
  - Learn faster
  - Don't have egos
  - Make better shooters

Do you agree?



# Perception

## What/How We Think of Female Shooters

- Outliers - exceptions who stand outside individual samples of populations
  - Exception, not the rule
  - Motivation vs. unrealistic expectations
  - Uncontrolled variables
    - Level of competition/participation
    - Scoring when based on percentage



“Past and present studies of athletic performance, acute exercise and exercise training involve the testing of more males than females or fail to distinguish between the sexes. Consequently, less is known about the physiology of female athletes than males, the limits of their athletic abilities, and the acute and adaptive response of females to exercise and training.”

**American College of Sport's Medicine**

# Sport

## The Science

- “Adult males are stronger, more powerful, and faster than females of similar age and training status. The sex difference in athletic performance where endurance or muscular power is required is roughly 10-30% depending on the event.” (ASCM)
- After comparing track and field events (omitting Shot Put) Duke Law article concludes, “There is an average 10-12% performance gap between elite males and elite females.”

# Things Tested in Sport

- Speed - how fast we move
- Strength - how much weight we can move
- Agility - our ability to change direction and body position quickly
- Power - the combination of speed and strength
- Endurance - maintaining activity over time
- Balance - controlling body movements to maintain a position
- Coordination - moving two or more body parts under control and with efficiency

# Sport

## Comparing Males and Females

- Comparing shooting to 3 sports
  - Tennis - grip strength, explosive movement, grip changes
  - Basketball - endurance, ball manipulations, hand-eye coordination, accuracy
  - Golf - driving power, putting finesse, grip and body positioning

# Tennis

## Gear/Game Differences

- Racket size variation (Grip Size 1 - 4)
  - Most women opt for grip sizes 2 or 3
  - Most men opt for 3 or 4
- At Grand Slams (Australian Open, Roland Garros, Wimbledon, US Open)
  - Men play best-of-five sets
  - Women play best-of-three

# Basketball

## Gear/Game Differences

- Ball size
  - Males in NBA and FIBA use a Size 7 basketball (75cm)
  - Females use a Size 6 ball measuring 72.5cm
- Game style
  - Men's game is fast-paced and more physical with higher frequency of dunks, fast breaks, and one-on-one matchups
  - Women's game is slower, relying more on precision passing, teamwork, shooting accuracy, and strategic positioning

# Golf

## Gear/Game Differences

- Women's clubs tend to be lighter and therefore easier to swing
  - Lighter shafts made of graphite instead of steel
  - Shorter shaft length (usually by 1 inch)
  - Smaller grip
  - Increased lofts on women's drivers, fairway woods and hybrids

# Females in Sport Over Time

National Library of Medicine

- “Women and Men in Sport Performance: The Gender Gap has not Evolved since 1983”
  - Examines the difference between men and women’s best performances in the analysis of 82 quantifiable events since the beginning of the Olympic era.
  - “Stabilization of 26 years is the expression of a significant drop in the variation of these gaps' magnitude. After a significant narrowing of gender gaps, women and men now evolve in parallel, in the same direction. The late implication of women in competition, their increasing participation, as well as the individual doping behaviours and state programs for performance enhancement may all have had a historical role but no longer reduce the gap.”





Is shooting a sport?

# Things Tested in Shooting Sports

- Speed - how fast we move
- Strength - ability to control recoil, lifting or moving a body
- Agility - our ability to change direction and body position quickly
- Power - draws, reloads, jumping, lifting or moving a body quickly
- Endurance - maintaining activity over time
- Balance - controlling body movements to maintain a position
- Coordination - moving two or more body parts under control and with efficiency - the essence of shooting

# Shooting as Sport

## Competition Considerations

- Precision-based events, slow-fire competitions, supported shooting positions
  - Female Rifle Champion Nancy Tompkins - First woman to win the High Power Rifle Championship 1998
- Pistol and Rifle Performance: Gender and Relative Age Effect Analysis Results
  - Men scored higher than women in pistol events
  - No performance differences were found in rifle events

# Shooting as Sport

## Competition Considerations

- Timed events vs. timed fire
  - Bianchi Cup Average female winning score over 5 years is 1905/1920 (98.44%)
- Low round count with ample recovery time
  - Female Shotgun Olympic Medalist Kim Rhode

# Shooting as Sport

## Competition Considerations

- Recoil considerations
  - Rimfire Events
- Firearm weight and allowed modifications
- Physicality of the sport
  - Movement
  - Prop manipulation
  - Shooting through ports



**What's measured/evaluated?**

# Shooting Sports

## A Closer Look at Handgun Sports

- Practical/defensive shooting (non-fixed courses/sports)
  - Foot speed
  - Hand-eye coordination at speed for gun handling skills (draws, reloads, firearm controls)
  - Prop manipulation
  - Maneuvering around obstacles
  - Recoil control
  - Accuracy on demand for various levels of target difficulty
  - Target-to-target transitions
  - Multiple shots on a single target

# Shooting Sports

## A Closer Look at Handgun Sports

- Sports with fixed courses of fire
  - Hand-eye coordination at speed
  - Recoil control
  - Accuracy on demand for various levels of target difficulty
  - Target-to-target transitions
  - Multiple shots on a single target



# Case Study

## 2022 IPSC World Shoot Results

<b>Division</b>	<b>Overall Champion</b>	<b>Women's Champion</b>
Open	Christian Sailer	81.89%
Production Optics	JJ Racaza	79.02%
Classic	Jeufro Lejano	76.49%
Production	Eric Grauffel	71.43%
Standard	Adrian Kahlil	68.92%

# Case Study

## Published Steel Challenge World Records

Division	Year	Men's Champion	Time	Year	Women's Champion	Time	%
Open	2016	Max Michel, Jr.	74.84	2018	Jessie Harrison	88.62	84.45
Limited	2017	BJ Norris	79.39	2018	Jessie Harrison	95.49	83.14
Production	2023	BJ Norris	81.41	2021	Ashley Rheuark	102.40	79.50
Carry Optics	2019	BJ Norris	75.37	2021	Ashley Rheuark	99.83	75.50
Rimfire Pistol Optics	2022	Kenshiro Negata	55.73	2022	Carleigh Chadwick	63.53	87.72
Rimfire Pistol Irons	2022	Neal Norman	66.56	2023	Kylie Wells	70.35	94.61

**Note: 2023 Carleigh Chadwick shot a total time of 59.88 seconds in Rimfire Pistol Optics (93.07%), the 2nd fastest time posted in the entire event at the US Steel Shoot Nationals**



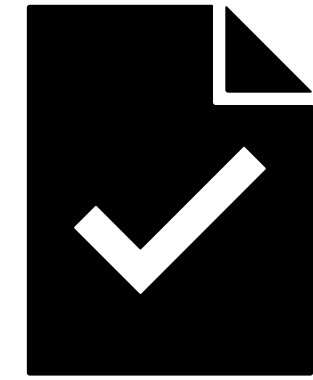
But what if I/they don't care  
about competing?

# Not For Sport

“But I’m not training to compete.”

- Benefits of Shooting Sports
  - Increased mental toughness
  - Improved coordination
  - Increased grip strength
  - Motivation
  - On-demand testing/evaluations
  - Defensive application (body, mind improvements)

# Potential Factors Affecting Female Shooting Performance



# About Face

## National Library of Medicine Studies

- Perception and Deception: Human Beauty and the Brain
  - Men and women of all cultures agree on which men and women are attractive and who are not
- Facial attractiveness: Evolutionary-based research
  - Perceived attractiveness & health

# Risk Taking

## Daring Differently: Gender Differences in Risk-Taking Behavior

- Women are more averse to risk than men due to heightened sensitivity to potential losses
- Men exhibit greater optimism, more willing to engage in risk-taking
- Relating to shooting
  - Fear/safety concerns
  - Participation in a male-dominated activity
  - Less likely to choose to risks in competition
  - Reluctant to take proactive steps for personal safety

# Noise Aversion

## Women's Reaction to Noise

- Gender differences in cognitive performance and psychophysiological responses during noise exposure study:
  - Significant difference in noise sensitivity between men and women with noise sensitivity for women higher than that of the men
  - Women experience more noise-induced annoyance and fatigue



# Safety Gear Fit

Eye and ear protection concerns for women

- Ear protection
  - Smaller - ear plugs and muffs for smaller head sizes
  - Adequate seal
  - How they fit with glasses
  - Custom fit ear plugs/electronic hearing protection

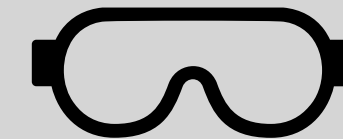
Double up on  
hearing protection



# Safety Gear Fit

## Eye and ear protection concerns for women

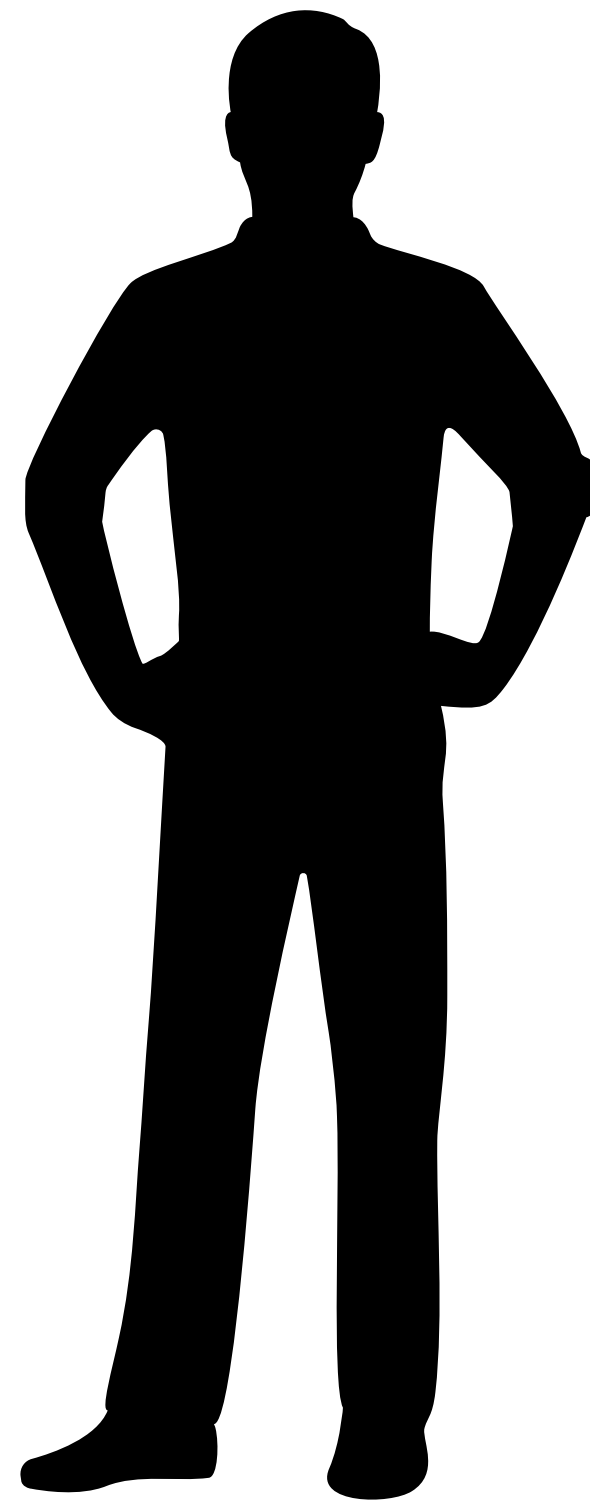
- Designated shooting glasses with
  - appropriate ANSI rating
  - ample eye coverage
  - adjustable nose and temple to account for smaller faces, longer eyelashes



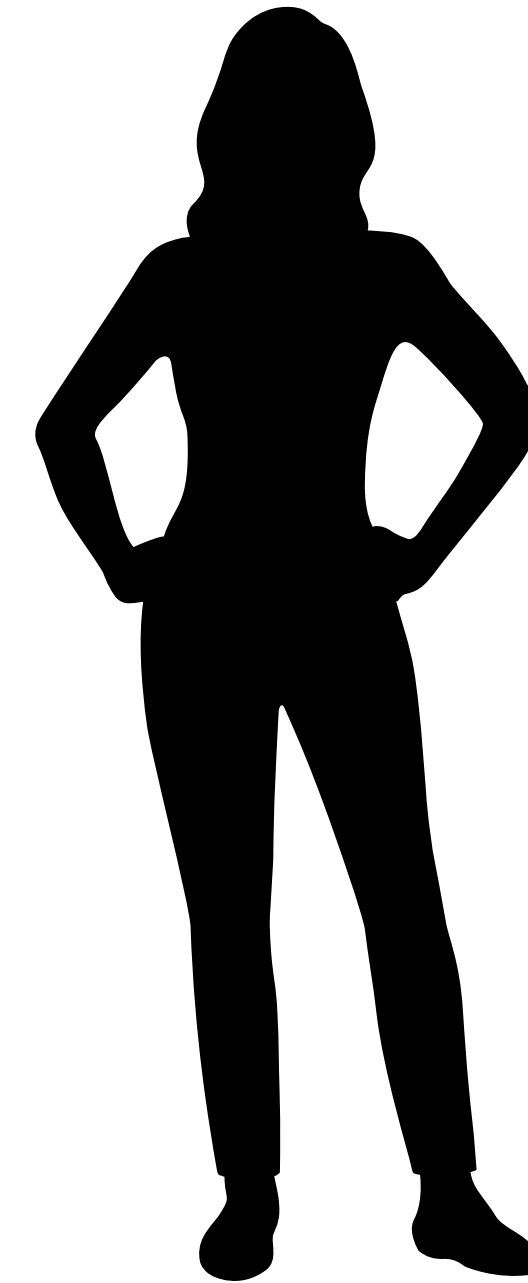
Designer glasses are most often not appropriate eye protection.

# Let's Get Physical

## Physical Differences Between Males and Females



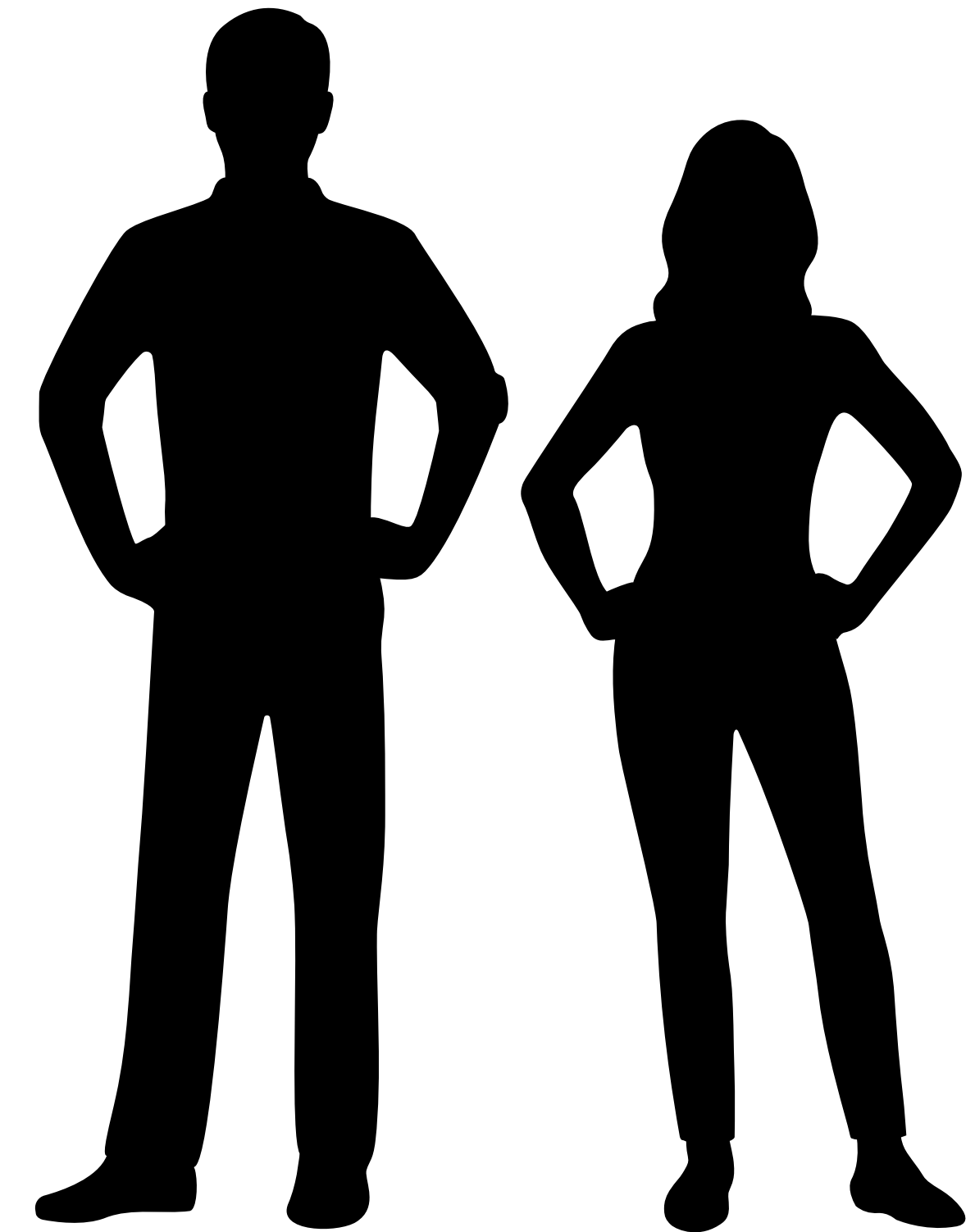
- 36% more lean body mass
- 65% more muscle mass
- 72% more arm muscle



# Let's Get Physical

## Physical Differences Between Males and Females

- Conventional wisdom holds that men run 10-12 percent faster
- Men typically have greater “gains” when working out
- 10% larger hand size
- 16% larger wrist size



# Importance of Personalization

# Shooting

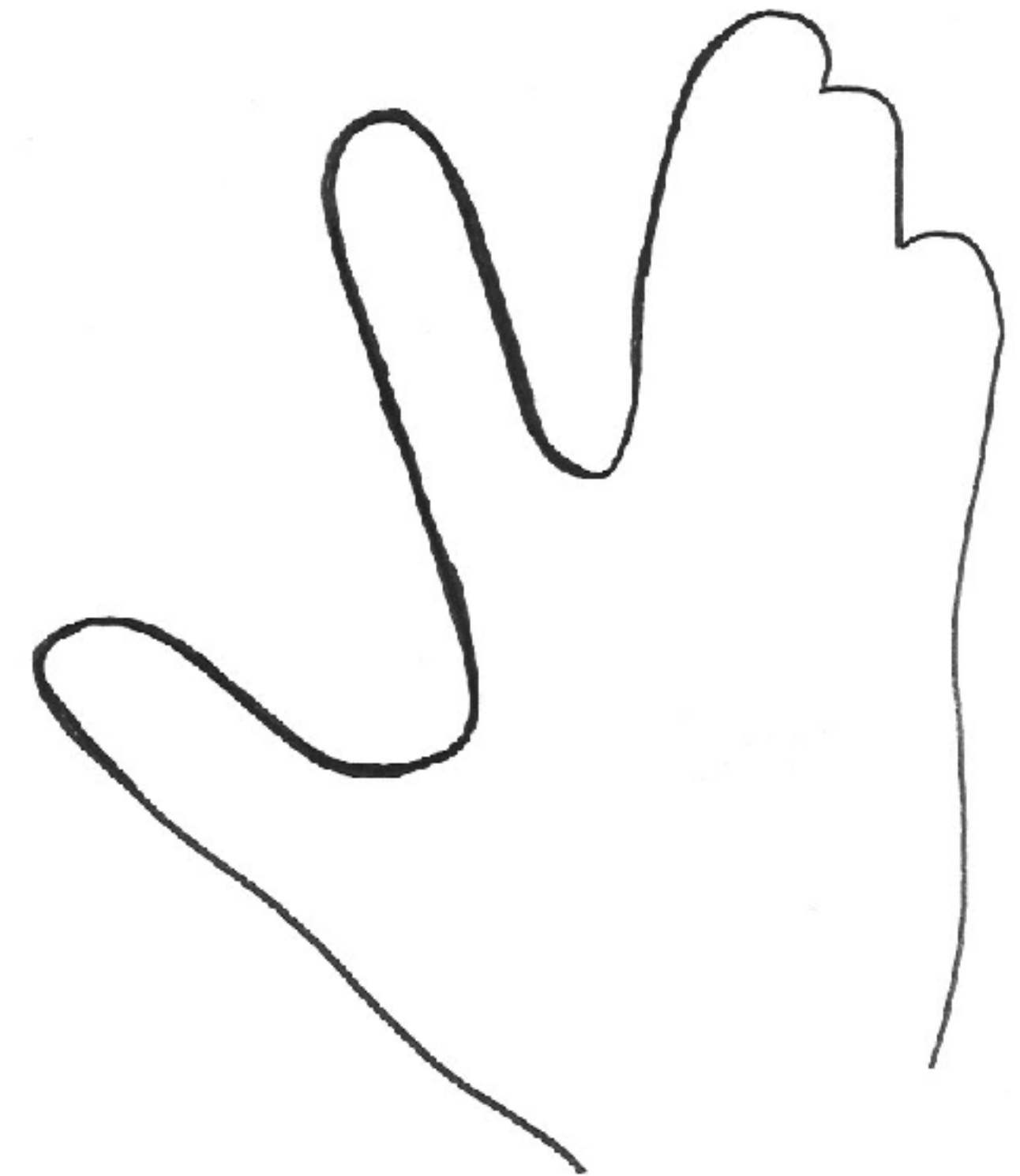
## Customizing Gear to Fit Female Bodies (Personal)

- Belt/gun positioning
  - Range wear (OWB/competition/not concealed) - lower belt loops, designated shooting pants
  - Everyday wear - (IWB/concealed) - location of holster, fit/rise of clothing
- Holster adjustments - concealment or sport
  - Drop and offset
  - Wings and wedges

# Hand Size

## Dimensions Related to Shooting

- Significant measurements
  - Palm size
  - Finger length
  - Middle to pinky finger dimensions
  - Web of hand in relation to the curve of trigger finger



# Hand Size & Grip Strength

## The Precision of the Human Hand: Variability in Pinch Strength and Manual Dexterity

- Males had stronger pinch grip strength while females were more dexterous
- Individuals with wider, rather than longer, hands had significantly stronger pinch grip strength and stronger power grip strength
- “Interestingly, we found no effect of thumb-index finger ratio on either pinch grip strength or manual dexterity.”





# Grip Strength

## The Relationship Between Wrist Position, Grasp Size and Grip Strength

- Evaluation of grip strength of “normal” wrist position during unconstrained maximal grip and the relationship between wrist position and grip strength
  - Grip strength is significantly reduced when the wrist position deviates from self-selected optimum position
  - With the wrist in only 15 degrees of extension or in neutral radio-ulnar deviation, grip strength was reduced to two-thirds to three-fourths of normal
  - Effect on grip strength was more significant for smaller hands

# Optimized Grip

## Considerations

- The hardest fundamental for people to adjust quickly and completely
  - Positioning can seem awkward
  - Combatting established habits
- Solutions
  - Start drills or shooting exercises with ideal grip
  - Dedicate dry fire time - methodical and intentional

# Optimized Grip

## Considerations

- Beauty and accessories that compromise and distract from ideal grip
  - Nails
    - Long/sharp
    - Embellished
  - Jewelry
    - Rings (especially on the strong hand)

# Optimized Grip

## Considerations

- Consistency
  - Amount of recoil (caliber) - training with rimfire vs. primary firearm with defensive loads
    - Intentional training when using softer recoiling options
- Defensive pistol vs. shooting sports
  - Shooting sports - shooters will make changes in grip pressure based on targets and gun handling much like a tennis player will adjust for a shot

# Optimized Grip

## Considerations

- Improve grip strength
  - Shoot and dry fire more
  - Physical training to increase grip strength
    - Weight lifting
    - Pull-ups
    - Grip exercisers (balls, bands, Captains of Crush)

# Optimized Grip

## Connection Between Grip and Stance

- Establishing the framework - body positioning
- Tighten the muscles along the back and chest
- Think of squeezing/compressing with the arms to apply pressure to the back of the grip
  - Keep in mind, because women have less upper-body strength they may not be aware of upper-body strength cues or may not have significant enough strength to see much of a difference at first.

# Handguns

## Features/Customizations/Considerations

- Grip
  - Size/circumference
  - Finger grooves
  - Grip panels/palmswells/backstraps

# Handguns

## Features/Customizations/Considerations

- Trigger
  - Dimensions - angle, shape, size of pad
  - Distance from the web of the hand
  - Length of pull (fatigue)
  - Weight of pull (lack of control)



# Handguns

## Features/Customizations/Considerations

- Caliber
  - .380/9mm/30 Super Carry, etc.
  - .40, .45, 10mm, etc.
  - Defensive loads with more recoil

# Handguns

## Features/Customizations/Considerations

- Texture - checkering/stippling, degree of sharpness & location
  - Study: smaller fingers are more sensitive to texture
- Additional controls - slide lock/release, mag button, de-cocker, etc.
  - Location - how can they be accessed
  - Extended/enlarged - pros/cons

# Handguns

## Features/Customizations/Considerations

- Total weight (finding the right balance)
- Distribution of weight (muzzle or grip heavy)
- Recoil spring (balance of optimal ejection with cycling)

# Gun Fit

## Carry Guns



# Gun Fit

## 1911's



# Gun Fit

## Double Column





**Shoot Smart**

# Shoot Smart

What we can learn from women in sports

- Golf - play smart
  - Women able to make calculations for wind based on their gear. (Golf Digest)
- Basketball - emphasis on passing precision and shooting fundamentals
- Tennis & Golf - gear customized for female anatomy



# Shoot Smart

## Taking advantage of strengths

- For tasks of the same relative intensity, women are often observed to be more resistant to fatigue and have better endurance
- Generally, males outperform females in spatial tasks, working memory, mathematical and numerical abilities, while females have more precedence in verbal fluency, perceptual speed, accuracy, and fine motor skills
- Mental differences between male and female - learn how you learn
- Value of training, repetitions

# Takeaways

## Fundamentally Different

- Gear, firearm features & fit matter
- Hand size considerations and how they can affect shooting performance
- Even small changes can make a significant difference as seen in other sports
- Progress is personal
- Optimized equipment, proper mindset and training level the playing field for real-life