Cindy Purdy, BSDH, CEAS
September 25, 2015
New Mexico Dental Hygienist Association Scientific Session

HEALTHY strategies
to avoid workplace tragedies

This course is supported by an educational grant from

Orasoptic

Please show your appreciation for their generous support of professional continuing education programs

...additional support provided by

Crown Seating

Our purpose at Orasoptic is to assist clinicians in delivering better procedural outcomes through superior visualization.

Joe Mann
joe.mann@orasoptic.com

Objectives

— Recognize risk for work-related injuries in the dental profession
— Appreciate the role of neutral position in reducing ergonomic challenges
— Reduce ergonomic challenges through equipment positioning, room design, lifestyle activities

Joe Mann
joe.mann@orasoptic.com

ADHA National Survey 2007

Dental Hygienists Injuries

Percent of Dental Hygienists

Leg Injury
Infection Acquired at Work
Back/Spinal Injury
Carpel Tunnel Syndrome
Neck Injury
Shoulder Injury/Tendonitis
Venous Problem
Other

ADHA National Survey 2007

Dental Hygienists Injuries

Percent of Dental Hygienists
**Ergonomics**

Finding the best possible match for the greatest number of people by adapting the product to fit the user.

**Ergonomics History**

What occupation was the genesis for modern day ergonomic studies?

1946-65% of dentists back pain
1958-DentalEZ Chair reclining patient chair
1960-Four-handed dentistry to reduce operator stress and fatigue

**Ergonomics in Dentistry**

- 1946-65% of dentists back pain
- 1958-DentalEZ Chair reclining patient chair
- 1960-Four-handed dentistry to reduce operator stress and fatigue

**We've Come a Long Way**


**Ergonomics in Dentistry**

- 81% DHC workers pain
- 4-Handed Dentistry - work longer, fewer breaks, higher pain frequency
- Lower back pain - 2.700% increase 1980-1993

**Injury rates - dental hygienists**

- 51% - one or more injuries
- 19% - worried about getting hurt

**Primary injury sites**

- Neck: 61%
- Shoulder: 34%
- Lower back: 34%
- Mid/lower back: 28%
Neck injuries
Triple - First 10 years

Shoulder injuries
Double - First 10 years

Lower back injuries
More than double - First 10 years

Mid/upper back injuries
Nearly triple - First 10 years

Over 70% of dental hygienists miss work days due to musculoskeletal injury

Musculoskeletal Disorder Risks
• duration – minutes/hours/weeks/years
• frequency - days a week/back-to-back
• intensity - complex procedures/simple tasks
Musculoskeletal disorders - how do injuries happen?

- single episode of overexertion
- repetitive motion
- strenuous physical activity
- posture + activity

Musculoskeletal disorders - work shift symptoms

- Aching and tired - End work shift
- Early recurrent pain, aching, tiredness
- Constant pain, fatigue and weakness

Musculoskeletal disorders - symptom progression

- Disappears at night/days off
- Persists at night
- Persists during rest/frequent sleep disturbances

Musculoskeletal disorders - workplace performance

- No reduction in work performance
- Reduced capacity for repetitive work
- Inability to perform light duties

How hygienists deal with MSDs

- Stretching during clinical day - 50%
- Core fitness / strength training - 39%
- OTC pain medications - 53%
- Prescription medications - 14%
- Chiropractor - 39%
- Massage - 50%
- Reduced work hours temporarily - 27%
- Reduced work hours permanently - 38%

Fit the job to the person
Neutral Position

Strongest, most stable position
- Spine
- Bones
- Discs
- Muscles
- Ligaments
- Tendons

Optimal: Maintain postures from neutral to 20° in any plane

Neutral Position in Dentistry??

Trunk >30° angle 50% of the time
Neck >30° angle 85% of the time
Shoulders >30° angle >50% of the time

WHO IS KIDDING WHO?

- One size fits all
- Ergonomic principles, chair
- Standardized operatory design
  - patient chair, equipment, location, delivery systems
- Rigid schedules
- No breaks – excessive hours
- Increased productivity demands
- Electronic data entry

Dental Neutral - new normal

Pelvis
- level on stool – not oblique
- forward seat pan tilt of 5-15°

Feet
- flat on floor
- shoulder width apart
- in front of hips

Knees
- slightly lower than hips
- rotated downward & forward
- popliteal arch > 90°

Proper spinal alignment & lumbar curve reduces stress
- ligaments
- muscles
- intervertebral discs

Increased Intervertebral Pressure
- Upright/traditional sitting
- 400% - Forward flexion & rotation

**Dental Neutral - new normal**

**Neck**
- 0-20° forward tilt
- align ears with shoulder joint

**Trunk**
- upright, minimal bending
- minimal twisting
- hip hinge for maximum reach

**Shoulders**
- squeeze back and down
- shoulder blades close to touching
- ears aligned with shoulder joint

**Elbows**
- at your side
- forearms nearly parallel to floor

**Wrist**
- reduce twisting
- avoid sustained flexion

**Hands**
- reduce forceful grip
- reduce muscle load & pinch force

**Common Dental Practices**
- bird perch
- crossed ankles
- shifting weight to one buttock
- forward and/or lateral head tilt

**Common Dental Practices**
- marshmallow on a stick chair
- rest elbow on tray, counter, patient chair

**Common Dental Practices**
- twisted torso
- arm abduction
- lateral shifting

Muscle strength in arm:
- neutral position = 100% arm strength
- 30 degrees or less = 100%
- 90 degrees = 83%
- 150 degrees = 60%

Hand strength:
- neutral position = 100% hand strength
- extension 45° = 20% reduction
- flexion 60° = 55% reduction
- radial 25° = 20% reduction
- ulnar 40° = 25% reduction

Hand strength promotes neutral posture - neck, shoulder, back
- decrease fatigue
- reduce risk for MSDs
Must be properly fitted
- declination angle
- working distance

Career longevity

Inadequate working distance
Shallow declination angle

Choosing loupes ...
what’s important?
- Resolution
- Magnification
- Field width
- Field depth
Resolution
- Image clarity
  - High resolution
  - Low resolution

Magnification
- Increases image size
  - 1x
  - 2x

Width of field
- Maximum area that can be seen
  - Wide
  - Narrow

Depth of field
- Range that stays in focus
  - Deep
  - Shallow

Magnification basics - frames

**Materials**
- Titanium - adjustable
- Carbon fiber - adjustable
- Plastic - lightest weight

**Design**
- Fit facial geometry
- Larger carrier lens - supports steeper declination

(Applied Materials, June 2015, Vol. 36, No. 1)
RDH Elite | A loupe designed by hygienists, for hygienists

- 2.5 crisp precision optics
- Field - 4" wide - 6" deep
- Deep/wide carrier lens
- Allows steep declination
- Eye protection - side shields
- Lightweight, sturdy frame
- Accommodates personal Rx

RDH Elite | The first and only wireless loupe and headlight in one

- Cable less design
- Capacitive touch controls
- Counter balanced
- Built-in battery power

Custom made & specific to your...

- Facial geometry
- Inter-pupillary distance
- Working distance
- Declination angle
- Eye prescription

Cheaters.....why NOT?

- Plastic optics - less clear
- View - flat plane
- Working distance - preset at 16"
- Frame may not fit PPE specs
- Non-adjustable frame

Hygienists using magnification...

80% would not work without loupes!

Benefits of LED Headlight

- Improve posture
- Combat physical stress
- Reduce eye strain
- Enhance clinical outcomes
Headlights

- Shadow-less illumination
- Reduces overhead adjustments
- Light follows line of sight
- Multiple intensities

Choosing headlight ... what's important?

- Balanced on frame
- Reinforced power cord
- Use while charging
- Warranty
- Battery life span

Hygienists using illumination...

71% would not work without a headlight!

Choosing headlight ... what's important?

- Balanced on frame
- Reinforced power cord
- Use while charging
- Warranty
- Battery life span

Hygienists using illumination...

71% would not work without a headlight!

The 15 Jobs That Are Most Damaging to Your Health

#2 Dentists/Dental Hygienists/Assistants/Dental Lab Technicians

- Exposure to disease and infections
- Exposure to contaminants
- Time spent sitting

Common Dental Practices

Upright/Traditional Seating

- Pelvis rotates backward & under
- Flattened lumbar curve
- Increased disc pressure
- POPLITEAL arch at 90°
- Uncomfortable and harmful

Wedge

- Raises hips above knees
- Rotates pelvis downward and forward
- Enhances safer lumbar curve

Dental Neutral Solutions
• wide base of support
• center balanced
• increased range of motion
• safer reach
• ease of movement
• position closer to patient


‣ seated - 68% of the time
‣ adjustments
‣ your stool first
‣ then the patient chair
‣ understand patient chair controls

Dental Neutral - Solutions

Dental Neutral - Solutions

Dental Neutral - Solutions

Dental Neutral - Solutions

Dental Neutral - Solutions
**Static vs. Dynamic**

- Higher energy consumption
- Lower blood flow
- Higher blood needs
- Raised heart rate
- Requires longer resting periods

**Dynamic**


---

**Excessive Repetition/ Prolonged Duration**

Recovery time of less than 30 sec increases risk

---

**Forward bending / Rotation**

- One side - stronger, shorter
- Opposing muscles - weaker, elongated
- Symmetrical changes to spinal column
- Decreases range of motion
- Muscle necrosis, immobilization
- Headaches, hygiene hump!
Constant muscle contraction

- Obstruct blood vessels - Decrease blood flow
- Reduce oxygen supply - Muscle fatigue
- Waste product accumulate

Trigger Points = acute pain!

**Ischemia**

- Trigger Points
  - muscle fibers - constant contraction
  - pea-size knot
  - overuse, stress, trauma
  - lack of / improper stretching
  - active (painful)
  - latent (stiffness/restricted motion)

**Force Demands**

- Excessive Forces:
  - Lifting, carrying,
  - Pulling, pushing
  - Reaching to lift
  - Prolonged holding, pinching, squeezing

**Direct Pressure**:
- No grip on tool
- Heavy twisted cords
- Wrong tool for the job

**Force Demand-Solutions**

- Most Important Tools/Equipment-accessible
- Most frequently used-closest
- Closely related functions-together
- Sequential items-together in order

**Room Design**

**Prolonged Duration-Solutions**

- Cord management
- Rest cycle
**Room Design - Solutions**

Reach-ability
- Working distance - 14 to 18”
- Reaching distance - 22 to 26”

**Lighting**
- Light level uniformity
- Minimal shadows/glare

**Vibration**
- Inhibits circulatory supply
- Diminished muscle function
- Neurological desensitizer
- Pain, numbness, paresthesia in arms/hands

**Common Dental Practices**
- Glare from restorations, soft tissue
- Scratched mirrors
- Glare from ultrasonics, bite blocks, curing light, lighted hand pieces

**Multiple illumination sources**
- Background light to target illumination - 3:1
- Headlight - primary
- Traditional overhead lamp - secondary

Reduce... your total lighting!
**Co-Morbidity**

- Congenital Disorders
- Past history - acquired
- Arthritis
- Diabetes
- Depression

---

**Most Tiring Tasks**

- Scrubbing
- Stopping (ears)
- Standing tip
- Vacuuming
- Hanging (laundry)
- Washing dishes
- Preparing meals
- Duster
- Mowing
- Dusting
- Typing
- Cleaning (conglomerate)

N = 374

---

“A plan in your head isn’t worth the paper that it’s written on”

Joe Mann
joe.mann@orasoptic.com

purdy.cindy@yahoo.com 719-783-0704