Hygiene Shouldn’t be a Pain in the Neck!
Ergonomics for the Dentist and Team

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Presented by
Bethany Valachi, PT, MS, CEAS
Physical Therapist/Dental Ergonomic Consultant
Author, “Practice Dentistry Pain-Free”
bvalachi@posturedontics.com
(503) 291-5121
www.posturedontics.com

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The Problem
• Brief history of dental ergonomics
• Impact of CTDs on dental hygienists

Cumulative Trauma Disorder (CTD) Definition
Work-related pain or injury to the musculoskeletal system resulting from microtrauma which accumulates at a rate faster than the body can repair it.

Signs & Symptoms of Cumulative Trauma Disorders (CTDs)
• Decreased strength & Range of motion
• Pain, stiffness, swelling or inflammation
• Numbness or tingling in hands or feet
• Shooting or stabbing pain in arms/legs

Microtrauma resulting from Prolonged, Static Postures

1. Operator posture--Stool adjustment
   • Adjust backrest height so the convex portion aligns with low back curve
   • Move backrest away from the back, then sit all the way back on the seat
   • Place 3 fingers behind knee to determine appropriate seat depth
   • Tilt seat slightly forward (5-15 degrees)
   • Adjust height till thighs slope slightly downward
   • Adjust backrest forward to snugly nestle in low back curve

2. Patient position. Adjust the patient to accommodate your neutral posture.
• Leave patient in 10° elevated position throughout treatment and use headrest/ergonomic cushions to position head for upper/lower arch.

   UPPER ARCH:
   o Double articulating headrest: Angle steeply downward, and use smaller (Low Profile) neck cushion. The occlusal plane of the upper arch should be up to 10 degrees behind the vertical plane.
   o Flat headrest: Ask the patient to scoot to end of headrest. Use larger (Original) neck cushion.
LOWER ARCH:
- Double-articulating headrest: Adjust forward so chin tilts downward
- Flat headrest: Raise backrest until occlusal plane of upper arch is about 10 degrees in front of vertical.

- Patient chair height so arms are parallel or sloping slightly upward.
- Head position: rotation and/or head side-bending.
- Move to the appropriate clock position to preserve your neutral posture.
- Establish a direct line of view that is perpendicular to the occlusal surface or quadrant.
- Adjust light to parallel your line of sight as closely as possible.
- Establish intra or extra-oral fulcrums.

CHRONIC LOW BACK PAIN
Risk Factors for Low Back Pain in Dentistry

Postural Awareness for Low Back Pain - Maintain your low back curve

Strategies to Prevent Low Back Pain:
- Hip Angle
- Patient Positioning
- Movement
- Leg Position

Operator Pivot Exercise
- Scoot all the way back
- Lift chest up, stretch through abdomen
- Slight curve in low back
- Assume operator position of arms
- Exhale, pull navel to spine
- Slowly, pivot forward from the HIPS. Slowly return.
**Stretching** – Addresses EVERY microtrauma caused by prolonged, static postures

- Move into and out of stretch SLOWLY
- Assume the starting position.
- Breathe in and exhale as you increase the stretch up to point of mild tension.
- Hold stretches 2-4 breathing cycles. Repeat.
- Perform stretches for symptomatic areas 3-5 times per day
- Do NOT stretch in a painful range!

**EQUIPMENT**

**Patient Chair Features**
- Small, thin upper back & headrest
- Narrow upper backrest

**Delivery Systems**
- Rear Delivery
- Side Delivery
- Over-the-patient (Continental) Delivery

**Instruments/Evacuation**
- Suction mirror
- Blue Boa

**Operator Chair Features**
- Cylinder height (short, med or tall)
- Lumbar support
- Adjustable backrest
- Tilting seat pan
- Textured seat material
- Appropriate width and depth of seat pan
- Waterfall shape seat front
- Armrests (opt.)

**Saddle Style Stool Features**

Cylinder height (available in short, med or tall)
Places pelvis in the most neutral position to optimize posture, which minimizes the need for backrest support
Seat tilt to accommodate different spinal anatomies
Improved circulation in legs
Allows closest positioning to the patient

*Ergonomic reviews of dental operator stools, loupes with contact information at [www.posturedontics.com](http://www.posturedontics.com).*
TENSION NECK SYNDROME

Symptoms include pain and tenderness in the neck and trapezius muscles, between the shoulder blades, and often accompanied by painful muscle spasms or trigger points.

Risk Factors for Neck Pain in Dentistry

Dental Loupes

- Through-the-lens (TTL) loupes  (look for pantoscopic tilt frame)
- Flip-up loupes  (look for vertical adjustability of scopes)

Ergonomic criteria for selecting loupes

1) Working Distance
Distance from eye to working surface.

2) Declination Angle
The angle at which the scope is inclined downward toward the work area.

3) Frame Size
Affects where scope is placed in relation to pupil.

ROTATOR CUFF IMPINGEMENT

Symptoms include pain with overhead reaching, lifting, dressing or sleeping on the affected arm.

Risk factors for Rotator Cuff Impingement in Dentistry

TRAPEZIUS MYALGIA

Symptoms: pain, spasms, tenderness or trigger points in the upper trapezius muscles, frequently on the side of the operator’s mirror or retracting hand.

Risk factors for Trapezius Myalgia in Dentistry

Postural Awareness for Shoulder Pain
Neutral shoulder posture: Arms relaxed, elbows close to body and at the occlusal plane.

Strategies to prevent Shoulder Pain
CARPAL TUNNEL SYNDROME
Symptoms include pain, numbness, weakness and/or tingling into the hands and first 3 ½ fingers.

Primary risk factors for CTS

Postural Awareness for CTS
- Maintain neutral wrist position
- Avoid excessive flexion combined with ulnar deviation of wrists

Strategies to prevent CTS
Hand Movement
- Number of heavy calculus patients per day
- Sharp instruments
- Grip (force)
- Instrument handle size
- Ultrasonic
- Textured, light balanced instruments

Stretching

Conditions that mimic CTS
Cervical Radiculopathy
Thoracic Outlet Syndrome
Trigger Points (pronator teres, trigger thumb)
Tight gloves

OA of the CMC Thumb Joint
Symptoms: Pain at the base of the thumb

DeQuervain’s Syndrome
Symptoms: Pain on the thumb side of the wrist

Lateral Epicondylitis
Symptoms: Pain on the lateral side of the elbow
RESOURCES

Books
Valachi, B. “Practice Dentistry Pain-free” - Available at www.posturedontics.com

Articles
Valachi, B. Over 50 articles on dental ergonomics at www.posturedontics.com

DVDs /Continuing Dental Education at www.posturedontics.com
Valachi, B. “Smart Moves in the Operatory: Chairside Stretching” DVD kit with laminated wall charts.
Valachi, B. “Smart Moves for Dental Professionals on the Ball” DVD kit w/exercise bands/door anchor & ball.

Ergonomic Dental Flip-up Loupes with vertical adjustability:
Surgitel – www.surgitel.com
Q-Optics - www.q-optics.com

Patient Positioning Aids
Dental Neck Cushions: www.posturedontics.com

Operator Stools
RGP –www.surgitel.com
BQ Ergonomics – www.bqe-usa.com
Crown Seating –www.crownseating.com

Operator Positioning Aids
ErgoRest articulating arm support. Multiple vendors online

Ergonomic Product Reviews
Unbiased reviews of operator stools, loupes, patient chairs, etc… at www.posturedontics.com
**About the Speaker**

**Bethany Valachi** is a physical therapist, dental ergonomic consultant and author of the book, “Practice Dentistry Pain-Free: Evidence-based Strategies to Prevent Pain and Extend your Career”. She is CEO of Posturedontics®, a company that provides research-based dental ergonomic education and is clinical instructor of ergonomics at OHSU School of Dentistry in Portland, Oregon. Recognized internationally as an expert in dental ergonomics, she has delivered over 700 lectures worldwide, including the International Dental Ergonomics Congress in Krakow, Poland and the Asia Pacific World Dental Conference in Dubai. She has also provided expertise on dental ergonomics to faculty and students at numerous dental universities.

Bethany has published over 50 articles in peer-reviewed dental journals and has developed patient positioning and exercise DVDs specifically for dental professionals. She lives in Portland, Oregon with her husband, Dr. Keith Valachi, who operates a private dental practice. She offers free newsletters, articles and product reviews on her website at [www.posturedontics.com](http://www.posturedontics.com).