

Neck, Back & Beyond: Preventing Physical & Financial Loss with Evidence-based Ergonomics

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The Problem

- Brief history of dental ergonomics
- Impact of CTDs

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

Contributing Risk Factors in Dentistry

5 Steps to Resolving Work-Related Pain in Dentistry

1. Resolve ergonomic challenges in the operator
2. Stress management (down-regulate ANS)
3. Myofascial therapy
4. Chairside stretching
5. Specific strengthening

Safe Postural Working Range

- Head posture: 0 – 20 degrees neck flexion
- Forward arm reach: 0-25 degrees (≥ 15 degrees requires armrests)
- Forearms parallel to floor, or angled upward 10 degrees
- Hip angle 105 – 125 degrees

#1 DENTAL ERGONOMICS

9 Step Positioning Sequence

1. Operator Stool Adjustment

- Adjust backrest height so convex portion aligns with low back curve
- Move backrest away from the back
- Sit all the way back on the seat
- Perform 3-finger test
- Tilt seat slightly forward 5-15 degrees
- Adjust height till thighs slope slightly downward
- Adjust backrest forward to snugly nestle in low back curve

Saddle Stool Adjustment

- Adjust backrest height so convex portion aligns with low back curve
- Do not tilt the seat unless hyper or hypo-lordotic
- Adjust height till thighs slope downward 45 degrees



2.Recline the patient (supine or semi-supine)

3.Adjust headrest to orient occlusal plane

Flat headrest – ‘Scoot to end of headrest’. Use [larger cervical cushion](#), lumbar & knee cushions.

Double articulating headrest – Angle steeply downward (upper) OR forward (lower). ‘Scoot up until you are comfortable’. Use [smaller cervical cushion](#).

4.Adjust height of patient chair – until forearms angle 10° upward.

5.Head rotation (is it needed?)

6.Clock position (direct or indirect?)

7.Delivery nearby

8.Lighting – paralleling your line of sight as closely as possible

9.Fulcrums (inter or extra-oral)

BACK PAIN & OPERATOR STOOLS

Primary Risk Factors for Low Back Pain in Dentistry

Postural awareness for low back pain - *Maintain your low back curve*

How Traditional Operator Stools vs. Saddle Stools Impact Your Health

- Non-tilting operator stools _____
- Tilting operator stools _____
- Saddle stools _____

Saddle Style Stool Features:

Cylinder height (available in short, med or tall)

Places pelvis in the most neutral position to optimize posture

Solves many ergonomic problems/allows closest positioning to the patient

Doctors should consider armrests

Operator Pivot Exercise

- Scoot all the way back on seat.
- Sit tall, lift chest up.
- Assume operator position of arms
- Exhale, and perform abdominal contraction or ‘bracing’
- Slowly pivot forward from the HIPS. Slowly return.



Periodic Stretches – *Take frequent breaks & stretch*

Delivery Systems

- Rear Delivery _____
- Side Delivery _____
- Over-the-patient Delivery _____
- Over-the-head Delivery _____

Patient Chair – ‘Must have’ Ergonomic Features

- Small, thin headrest
- Narrow upper back

ASSISTANTS

Stool Types: Support bar only, Backrest with Support bar and Saddle Stool

Stool Adjustment:

- Assistant’s eye level 4-6” above doctor
- Footring supporting feet so thighs slightly sloping downward
- Support bar adjusted to support elbow (must be re-adjusted for assistants of different heights)
- Support bar only: positioned at side and slightly in front
- Support bar & backrest: adjust backrest forward, seat tilt 5-10 degrees forward and support bar in front.

Proper Assisting Posture

- Thighs angled toward head of patient, or (better) interlocking knees with doctor
- Asst. tray should extend over assistant’s lap. If located behind asst, they should stand or face patient with tilting seat pan.
- Assistant should consider standing for up to half of treatment time, if possible



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.

Strategies to prevent Neck Pain

- Magnification
- Armrests
- Target muscle imbalances with specific neck and shoulder girdle endurance exercises
- Use indirect vision

Magnification Systems

- **Flip-up loupes (vertical slide adjustment)**
- **Through-the-lens (TTL) loupes (pantoscopic tilt frame)**



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

Limits how low the scope can sit in relation to the pupil

- **Microscopes**

SHOULDER DISORDERS

- **Trapezius Myalgia**

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

Strategies to prevent shoulder pain

- Patient positioned at proper height (not too high!)
- 12:00 position
- Arms relaxed, elbows close to body
- Avoid over-strengthening upper traps
- Control emotional stress
- Avoid positioning delivery system too high

LECTURE SUPPLEMENT

YES! I would like to receive Dr. Valachi's lecture supplement & monthly e-zine!

Text 42828 and type in POSTURE by end of lecture.

(OR...e-mail your full name with PDPF in the subject line to: info@posturedontics.com)

REFERENCES

We are keeping the handout as 'green' as possible! Bethany will gladly send you her lecture references upon request.

Please e-mail her at bvalachi@posturedontics.com for the lecture references.

RESOURCES

Dr. Valachi's WELL BODY SYSTEM FOR DENTAL PROFESSIONALS at www.posturedontics.com

Seminar attendees may receive a **discount by entering the Coupon Code **ValSemDisc** within 3 days after lecture.

Dental Ergonomic Equipment Recommendations

Access Dr. Valachi's proprietary list of recommended operator stools, loupes, patient chairs by signing up for Dr. Valachi's *Lecture Supplement* above. List includes hyperlinks directly to the manufacturer for each product.

Books

Valachi, B. "*Practice Dentistry Pain-free: Evidence-based Strategies to Prevent Pain and Extend your Career.*"

www.posturedontics.com

Schmidt R, Boudro M. *The Dental Microscope.* www.thedentalmicroscope.com

Egoscue, P. *Painfree: A revolutionary method for stopping chronic pain.*

Damany S, Bellis J. *It's Not Carpal Tunnel Syndrome!*

Finkbeiner, B. *4-Handed Dentistry: A handbook of clinical application and ergonomic concepts.*

Ergonomic Dental Stools

BQ Ergonomics – www.bqe-usa.com

Crown Seating – www.crownseating.com (only certain stools are recommended)

RGP – www.surgitel.com (only certain stools are recommended)

Ergonomic Dental Loupes

Surgitel - www.surgitel.com

Q-Optics - www.q-optics.com - (only certain loupes are recommended)

Heine - www.heine.com

Patient Positioning Aids

Dental Neck & Body Cushions: www.mediposture.com

www.crescentproducts.com

About the Speaker



Dr. Bethany Valachi, PT, DPT, MS, CEAS 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.

Dr. Valachi has published over 70 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.