

Practice Dentistry Pain-Free: Evidence-based Strategies for a Healthy Career, while Improving Patient Outcomes

Vermont Dental Team Meeting
September 14, 2017
Burlington, VT



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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 CTDs that result in Sub-optimal Patient Outcomes

- 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

Microtrauma resulting from Prolonged, Static Postures

- 1.
- 2.
- 3.
- 4.

Safe Postural Working Range (SPWR)

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

Positioning Sequence

1. Operator Stool Adjustment (dentist & hygienist)

- Adjust backrest height so the 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



2A. Patient Positioning to Optimize Treatment: (upper arch)

- Supine position
- Double articulating headrest adjustment with _____ neck cushion. The occlusal plane of the upper arch should be oriented _____.
- Flat headrest adjustment with _____ neck cushion. Ask the patient to scoot to end of headrest.
- Adjust patient chair height until forearms are _____ above horizontal.
- Rotate or side-bend the head as needed.

2B. Patient Positioning to Optimize Treatment: (lower arch)

- Semi-supine position (backrest adjusted _____ above horizontal)
- Double-articulating headrest adjustment: _____.
- Flat headrest adjustment: Raise backrest until occlusal plane of lower arch is about _____ *degrees above horizontal*.
- Adjust patient chair height until forearms are _____ above horizontal.
- Rotate or side-bend the head as needed.

3. Operator Position to Minimize Shadowing and Improve Visualization.

- Clock position that enables a line of sight perpendicular to the tooth surface/quadrant
- Delivery system within easy reach
- Overhead light to parallel operator's line of sight as closely as possible
- Identify finger fulcrums on both hands

Hygienist Patient Positioning

- Same as above, except leave backrest elevated 10° throughout treatment. Upper arch: occlusal plane angled _____. Lower arch: Occlusal plane angled _____.

LOW BACK PAIN

Primary 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 & maintain the low back curve

1. Hip angle and stool adjustment
2. Saddle stools - benefits
3. Move patient to end of headrest
4. Change positions frequently
5. Operator weight

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.



Periodic Stretches – *Take frequent breaks & stretch*

Delivery Systems – Ergonomic considerations and impact on quality of patient treatment

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

Patient Chair Features

- | | |
|----------------------|---------------------|
| Small, thin headrest | Narrow upper back |
| Swivel feature | Base location/size |
| Adjust up/down | Low-profile armrest |

How Traditional Operator Stools vs. Saddle Stools Impact Your Health

- Non-tilting operator stools _____
- Tilting operator stools _____
- Saddle stools _____
- Saddle-style stools with backrest _____

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

ASSISTANTS

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

Stool Adjustment:

- Assistant's eye level _____ inches 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 5-15 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.
- 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.

Risk Factors for Neck Pain in Dentistry

Strategies to prevent Neck Pain

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

Magnification Systems to Improve Visualization of Treatment Surfaces and Outcomes

- **Flip-up loupes (must be vertically adjustable)**



- **Through-the-lens (TTL) loupes**

Criteria to determine if loupes will benefit or worsen your neck health:

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**

Headmounted Lighting

Best way to prevent shadowing for improved outcomes. Ultra-lightweight models now on the market, .4 grams.

SHOULDER DISORDERS

- **Rotator Cuff Impingement**

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

Risk factors for Rotator Cuff Impingement

- **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.

Risk factors for Trapezius Myalgia

Postural awareness for shoulder pain

Neutral shoulder posture: Arms relaxed, elbows close to body and at the occlusal plane.

Strategies to prevent shoulder pain

WHEELCHAIR TRANSFERS IN THE OPERATORY

Most patients should be transferred to the patient chair for optimal positioning and access to the oral cavity. Carefully assess the patient before the transfer to determine reason for confinement. Always use a gait belt during transfers.

- Sliding Board Transfer
- 1-person Transfer
- 2-person Transfer

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

Books, DVDs and Articles

Dr. Valachi's books, DVDs and articles - available at www.posturedontics.com

Operator Stools

RGP – www.surgitel.com (select stools only)

BQ Ergonomics – www.bqe-usa.com

Crown Seating – www.crownseating.com (select stools only)

Ergonomic Flip-up Loupes

Surgitel - www.surgitel.com (800) 959-0153

Q-Optics - www.q-optics.com

Delivery System: Over-the-head

Design Ergonomics: www.ergonomic-products.com

Patient Positioning Aids

Crescent Dental Neck Cushions: www.posturedontics.com (with free DVD and positioning chart)

Operator Positioning Aids

ErgoRest articulating arm support. Multiple vendors online

Ergonomic Virtual Coaching

Customized dental ergonomic Skype consultations – available at www.posturedontics.com

Equipment Recommendations

Dr. Valachi's 'go-to' list of operator stools, loupes, patient chairs, etc... at www.posturedontics.com

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Dr. Bethany Valachi, PT, DPT, MS, CEAS is a doctor of physical therapy, certified ergonomic assessment specialist and author of the book, *“Practice Dentistry Pain-Free”*. 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 and provided expertise on dental ergonomics to faculty and students at numerous dental universities. Dr. Valachi 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)