Assessment of Muscle Activity of Dental Students Using Surface Electromyography

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Introduction

Musculoskeletal problems among dental students have become prevalent and the exposures to physical stressors have been reported to be beginning at an early stage of the dental career.

(Thornton et al, 2004; Melis et al, 2003)
The aim of this study was to investigate whether modification of seating decreases muscle activity and thereby reducing the physical stress among dental students.
Types of Seats

- Bambach Saddle Seat
- Conventional Flat Seat
Methodology

Research Design
Mixed Experimental Design
Methodology

Research Design
Mixed Experimental Design

Participants
60 year 2 students
(30 Bambach and 30 conventional)
Methodology

Research Design
Mixed Experimental Design

Training
Lecture Session
Individually trained for 5 to 10 minutes

Participants
60 year 2 students
(30 Bambach and 30 conventional)
Muscles Investigated

- **Longissimus Thoracis**: Spinal Extensor (thorax)
- **Multifidus Lumborum**: Spinal Extensor (lumbar)

(Adapted and Modified from Primal Pictures © 2001)
Placement of Electrodes

**Longissimus Thoracis**
L1 Level 2-finger width lateral to midline
(Elfving et al. 2002; SENIAM 2005)

**Multifidus Lumborum**
L5 Level 2 cm Lateral midline
(Kramer et al. 2005; Stokes et al. 2003; SENIAM 2005)
Methodology – Cont’d

Maximum Voluntary Contraction (MVC)
Spinal Extensors
Methodology – Cont’d

- Maximum Voluntary Contraction (MVC)
  - Spinal Extensors

- Phantom Head Apparatus
Methodology – Cont’d

Maximum Voluntary Contraction (MVC)
Spinal Extensors

Phantom Head Apparatus

The Task
Simple Drilling
Crown Preparation
Methodology – Cont’d

- Maximum Voluntary Contraction (MVC)
  - Spinal Extensors

- Phantom Head Apparatus

- The Task
  - Simple Drilling
  - Crown Preparation

- EMG Recording
  - 10 Minutes
Measurements
Baseline (0 months),
3 months, and
6 months
Measurements
Baseline (0 months), 3 months, and 6 months

Percentage MVC was taken for analysis.
Methodology – Cont’d

Measurements
Baseline (0 months),
3 months, and
6 months

Percentage MVC
was taken for
analysis.

Statistics
Doubly Multivariate
Mixed Design
ANOVA.
EMG Recording

Bambach Seat

Conventional Seat
Results - Comparing 0, 3 and 6 Months EMG

Left Longissimus Thoracis

Right Longissimus Thoracis

Spinal Extensors
Results - Comparing 0, 3 and 6 Months EMG

Left Multifidus Lumborum

Right Multifidus Lumborum

Spinal Extensors
The students using the Bambach seat recorded significantly decreased muscle activity over the 6-month period.
Conclusion

The results of the study indicate that dental students the Bambach seat have shown reduced back muscle work and this may decrease the development of musculoskeletal disorders among dental students.
Thank You

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