Musculoskeletal Complaints Among Dental Practitioners

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ADA American Dental Association®

Musculoskeletal Disorders (MSD)

- Caused by body position, overexertion, compression of soft tissues, or repetitive motion, psychosocial factors…[1]
- A potential occupational hazard for dental professionals[2]
  - Sit in static postures
  - Precision hand and wrist movements
  - Use of hand tools and vibrating hand tools

Objectives

- Describe the prevalence of musculoskeletal problems and provisional McKenzie classifications among dental practitioners.

- Identify risk factors associated with symptoms.

Methods

- American Dental Association Annual Session Health Screening Program (HSP)
  - Self administered survey
  - 965 people participated in 2012
- Clinical evaluation
  - Symptom survey followed by evaluation and provisional diagnosis
  - Three physical therapists certified in the McKenzie Method of Mechanical Diagnosis and Therapy
  - Each screening took approximately 40 minutes
  - 120 dental practitioners participated in 2012

McKenzie Method of Mechanical Diagnosis and Therapy Classification System[3]

- Postural: End-range stress of normal structures
- Dysfunction: End-range stress of shortened structures (scarring, fibrosis, nerve root adherence)
- Derangement: Anatomical disruption or displacement within the motion segment

Methods

- Variable classification
  - Pain, tingling, numbness symptoms categorized as any vs none.
  - Symptom duration collected as categorical variable.
  - Age, years practiced collected as continuous, categorized.
  - Years and hours practiced collected as continuous variables.
- Analysis performed using SAS 9.3 (SAS Institute, Inc, Cary, NC)
- Statistical significance set at $P<0.05$
- Categorical variables compared using X^2 tests or Fisher's Exact Test when appropriate.
- Continuous variables compared using ANOVA or Kruskal-Wallis tests.
- Restricted to currently practicing dentists and dental hygienists/chairside assistants.

Study Population

Characteristic	Health Survey Sample	Evaluated Sub-sample
Age, mean (min, max)	55 (22-91)	54 (27-91)
Years Practiced, mean (min, max)	24 (0-55)	26 (1-55)
Male	61.6%	56.0%
Race		
White	64.5%	67.9%
Asian	27.9%	25.5%
Black	2.5%	2.8%
Other Race/Ethnicity	5.1%	3.77%
Occupation		
Hygienist/Assistant	10.8%	6.7%
Dentist	86.9%	92.4%
Dental Student	1.0%	0.8%
Non-dental professional	1.3%	0%
Dentists	85.6% general practitioners	87.5% general practitioners

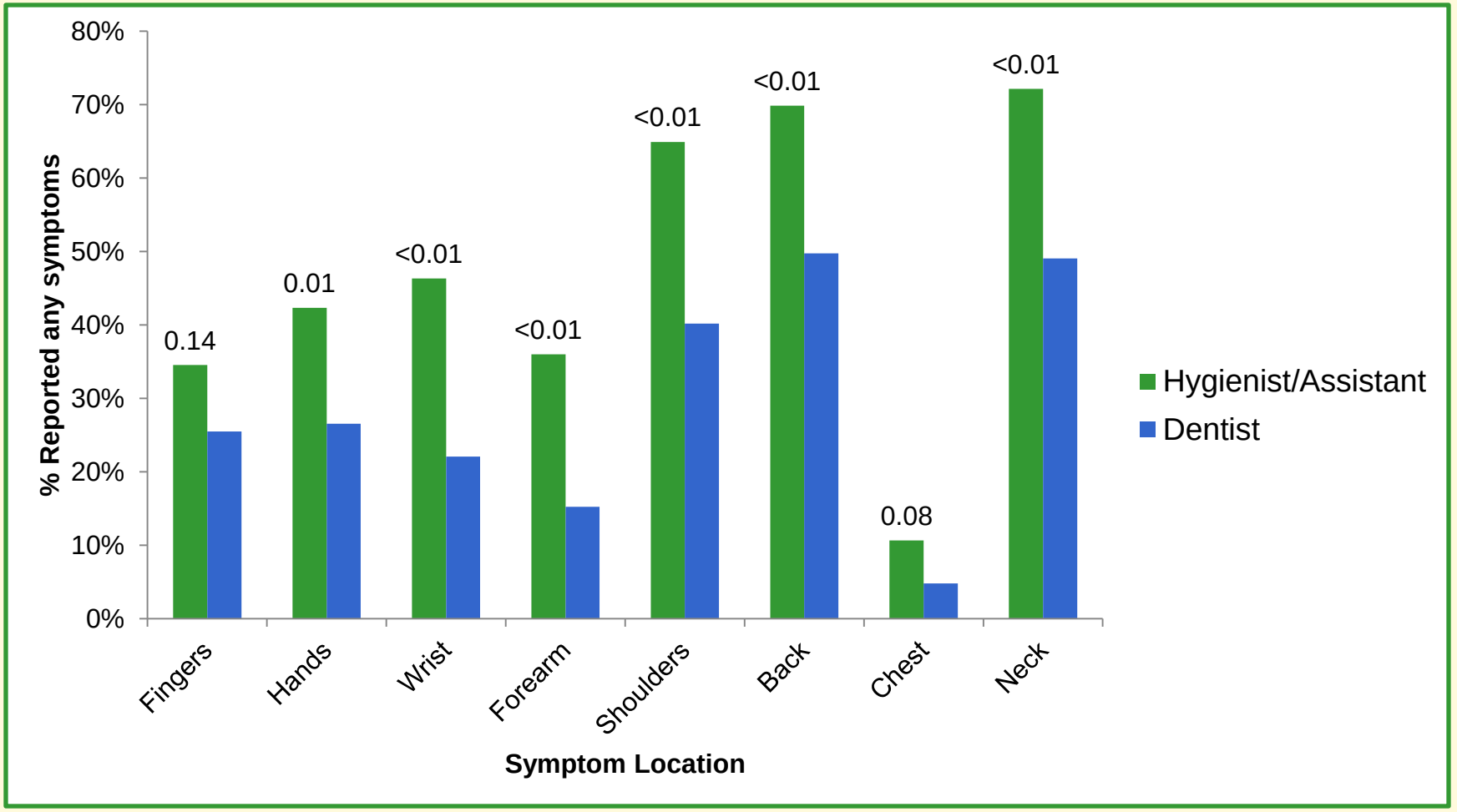
Symptom Prevalence in HSP Sample

- 61.0% of currently practicing dental professionals reported regularly experiencing pain, tingling, or numbness.
  - The most commonly reported symptoms were located in the back (51.0% reported) and neck (51.1%).
- Symptoms prevented 8.0% of currently practicing dental professionals from working.
- Of those with symptoms, self-rated pain ranged from none (0) to extreme (10), with a mean of 3.9.

Prevalence of MSD by Personal Characteristics

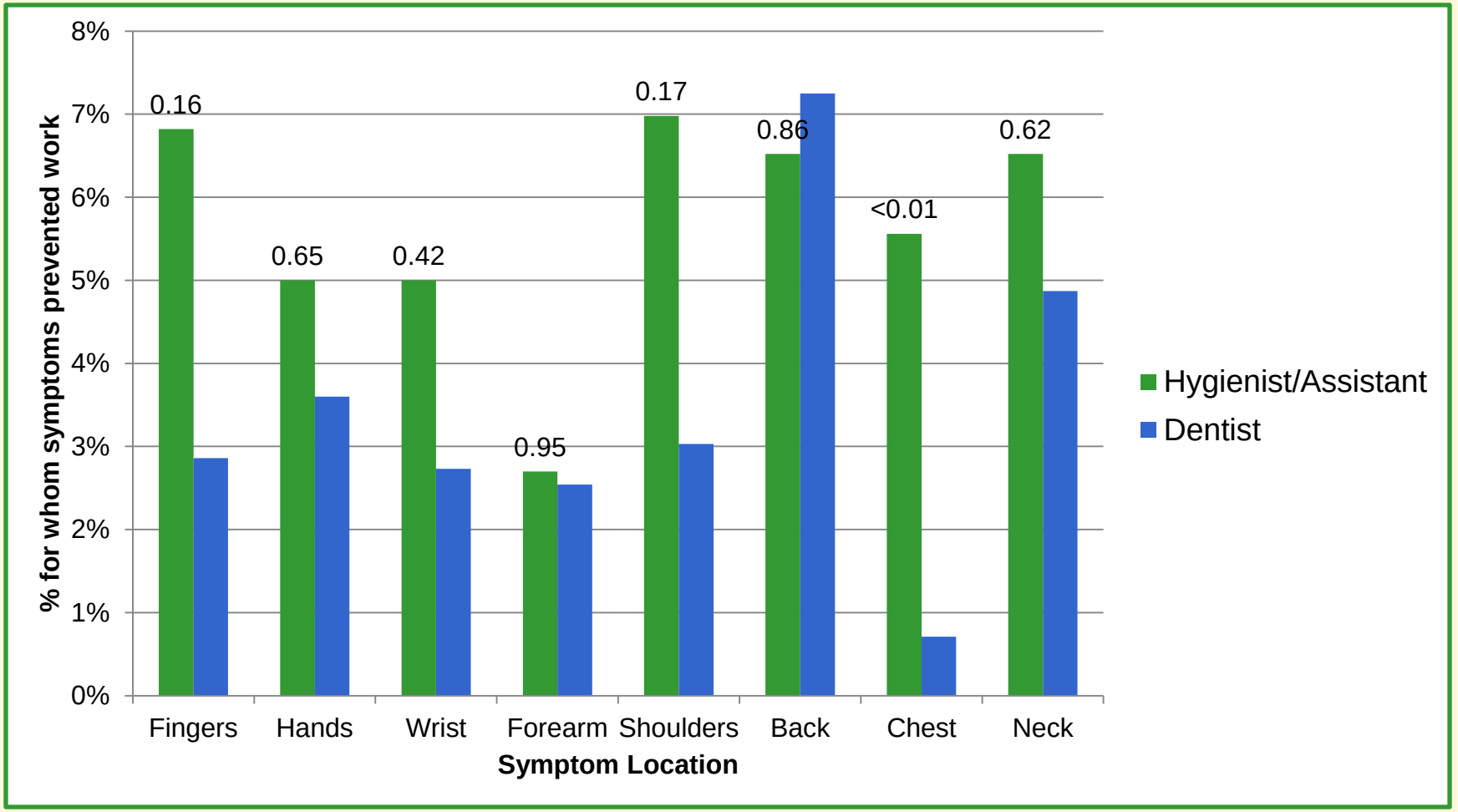
Characteristic	% with Symptoms (N)	Test p-value
Race		0.44
Asian	64.0% (158)	
Black	63.6% (14)	
White	58.1% (331)	
Other Race	62.2% (28)	
Sex		<0.01
Male	53.8% (299)	
Female	68.9% (239)	
Age Group		<0.01
21-35	39.8% (66)	
36-55	66.5% (244)	
56-65	58.6% (188)	
>65	39.6% (44)	
Occupation		<0.01
Dental Hygienist/Chairside Assistant	59.8% (58)	
Dentist	56.4% (439)	
Dental Student	55.6% (5)	
Non-dental professional	8.3% (1)	
Dentist Specialties		<0.01
General Practitioner	60.5% (433)	
Oral and maxillofacial surgeon	30% (3)	
Orthodontist	23.8% (5)	
Pediatric dentist	62.1% (18)	
Periodontist	42.9% (9)	
Public Health dentist	57.1% (8)	
Other specialty	41.7% (5)	

MSD by Profession, Location



X^2 test p-values reported above each bar.

Prevented from Working by MSD, by Profession



X^2 test p-values reported above each bar.

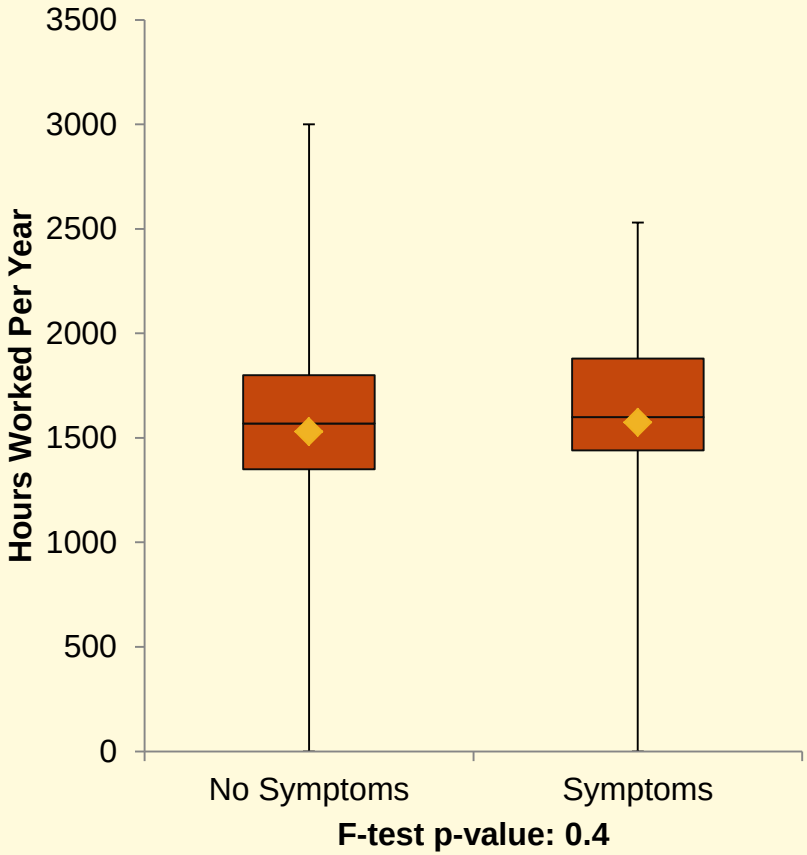
Risk Factor: Physical Characteristics

- Dominant Hand
  - Not significantly associated with overall MSD or hand symptoms.
- Height
  - Ranged from 52 to 92 inches, mean of 67.7. Significantly different by sex and profession.
  - Not significantly associated with overall, neck, shoulder, or back-specific MSD for dental hygienists/assistants (Wilcoxon p-values: 0.2, 0.8, 0.8, 0.08)
  - Male dentists with overall, neck, shoulder, or back-specific MSD were statistically significantly shorter than those without MSD (70.2 inches compared to 69.4 inches, Wilcoxon p-values: <0.01).
  - Height had no association with overall, neck, shoulder, or back-specific MSD for female dentists (Wilcoxon p-values: 1.0, 0.8, 0.6, 0.6).
- BMI
  - Ranged from 16 to 51.7, mean 25.5. Significantly different by sex but not profession.
  - Not significantly associated with overall, wrist, or back-specific symptoms for male or female dentists.
  - Higher BMI significantly associated with overall symptoms for dental hygienists/chairside assistants (27.2 compared to 24, F-test p-value: 0.03), but not wrist or back-specific symptoms.

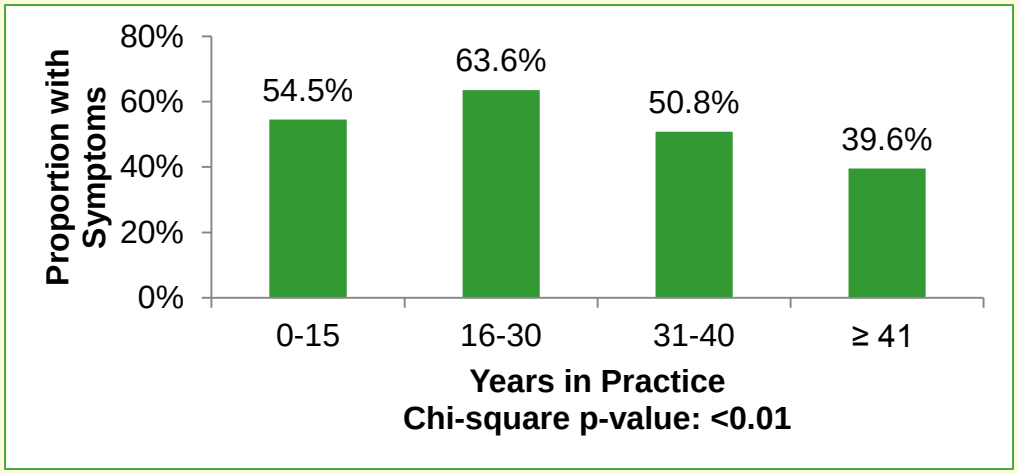
Risk Factor: Hours Worked

- Hours worked per year was not significantly associated with overall symptoms or back symptoms (F-test p-values: 0.4, 0.3).

- Hours spent sitting or standing during patient procedures was not significantly associated with overall symptoms or back pain (F-test p-values:0.3, 0.4).



Risk Factor: Experience



- Lowest symptom rate is amongst those with the most experience.

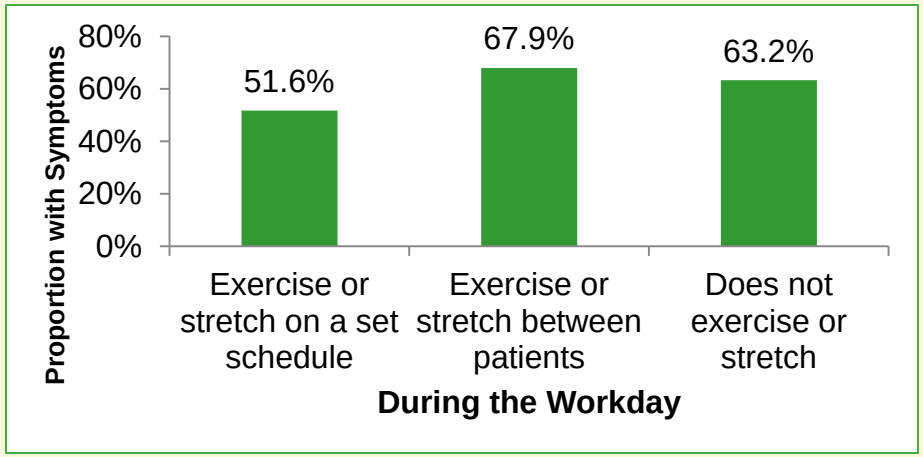
Years in Practice	Symptoms Duration (Years)			
	0-2	2-5	5-10	>10
0-15	46.2%	46.2%	7.7%	0.0%
16-30	30.8%	12.8%	25.6%	30.8%
31-40	31.4%	11.4%	14.3%	42.9%
≥ 41	55.6%	11.1%	0.0%	33.3%
Fisher p-value: <0.01				

- Among currently working practitioners with symptoms, persistence of symptoms is common.

Risk Factor: Equipment

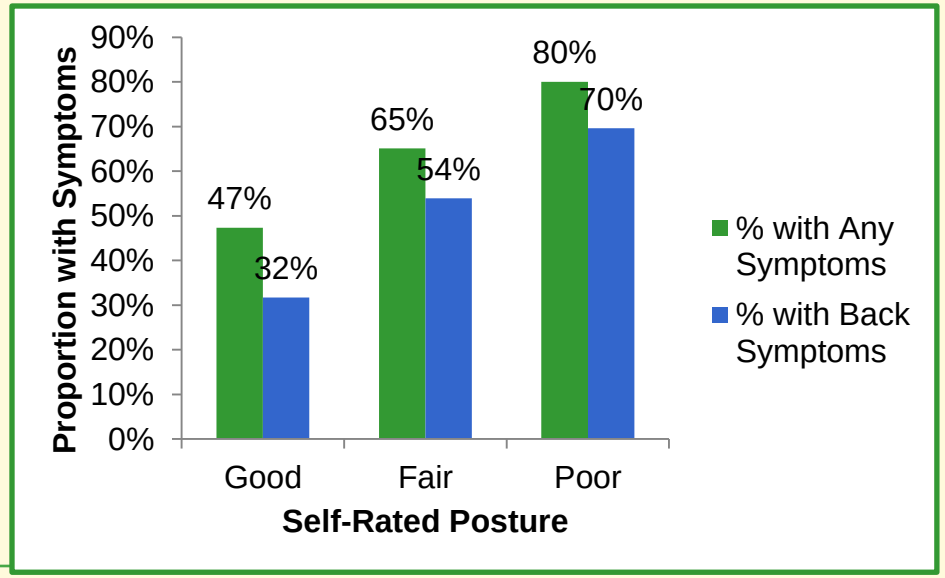
- Operator chair/stool type
  - Those who used chairs with back support had higher rates of symptoms (84.7% compared to 67.8%, X^2 p-value<0.01), but no other chair/stool type was significantly associated with symptom rates.
- Use of vibrating or impact hand tools
  - Those who used hand tools and those who did not had similar rates of hand (27.6% compared to 28.1%) and finger symptoms (29.4% compared to 26.1%) (X^2 p-values: 0.9, 0.4).
- Magnification type
  - Dentists who did not use magnification had the same rate of symptoms as those who did use magnification devices (59.4% compared to 59.0%, X^2 p-value: 0.9).
- Light source
  - Intra-oral light sources were the most commonly used, but users also had the highest rate of symptoms (61.7%) compared to lights located over the patient or headlights (X^2 p-value: 0.07).

Risk Factor: Posture and Movement



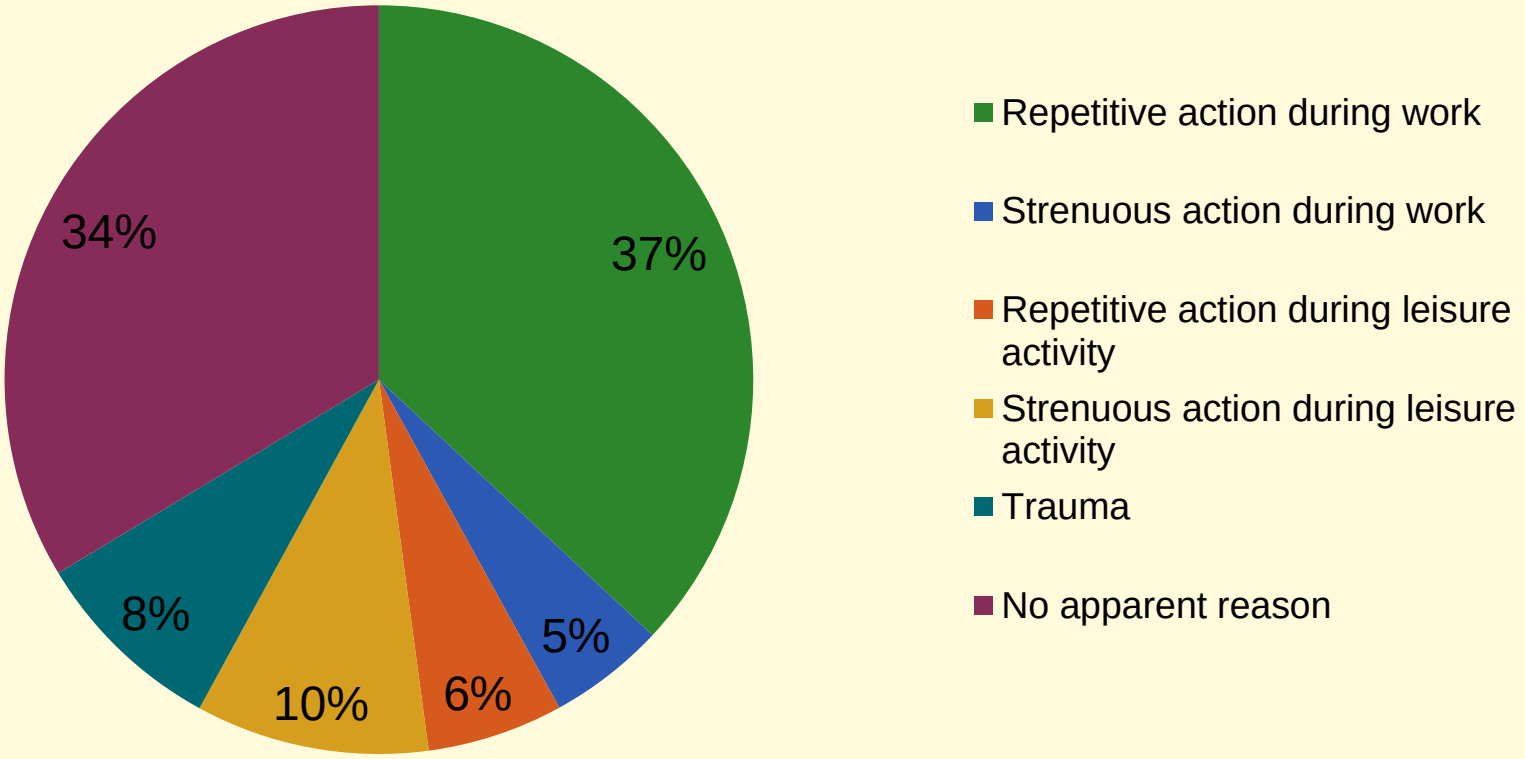
Stretching or exercising during the workday was significantly associated with MSD (Chi-square p-value: <0.01).

Self-rated working posture was significantly associated with MSD (CMH Non-Zero Correlations: <0.01).



Risk Factor: Self-Reported Causes of MSD

Symptoms commenced due to:



Clinical Evaluation of Sub-Sample with Symptoms

- 2.1% (2) exhibited wry neck
- 1.6% (1) exhibited sensory deficits
- 7.3% (5) exhibited motor deficits
- 52.5% (53) exhibited protruded head
- McKenzie Method Syndrome Classification:
  - 64.7% (66) classified with derangement syndrome,
  - 17.7% (18) with dysfunction syndrome,
  - 2.9% (3) with postural syndrome.

Conclusions

- Consistent with literature, musculoskeletal problems present a burden on the dental profession.
  - 61.0% of currently practicing dental professionals regularly experienced symptoms.
  - 42.6% of those with symptoms reported they began as a result of work.
- Risk factors differ by profession.
- Height, BMI, age, years in practice, equipment type, and posture were all significant risk factors for musculoskeletal disorders.

Limitations

- Most data based on self-report.
- Cross-sectional study precludes establishment of temporal relationships.
- Number of non-dental professionals insufficient for analysis as “control” group.
- Small sample size of clinically evaluated sub-group.
- Questionnaire combined upper and low back pain.
- Survey at dental conference biases sample toward those still practicing or interested in dentistry.

References

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2. Hayes MJ, Cockrell D, Smith DR. A systematic review of musculoskeletal disorders among dental professionals. Int J Dent Hygiene 2009; 7:159-165.
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Thank you!

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