

Preventing Musculoskeletal Disorder (MSD) in Dental Hygienists at Beddington Dental

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Date: December 19, 2019

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Abstract

The purpose of this literature review is to find out what dental hygienists have reported about improving their working posture to reduce work related injuries.

It has been reported that physical, social, and psychological environment ameliorate some of the occupational factors affecting the health of dental hygienists. Increased emphasis on occupational health and prevention through ergonomics, improvement in work setting and work relations, alternate between sitting and standing, individual risk assessment, active life-style, yoga, wearing loupes, relieving trigger points, and social satisfaction may help dental hygienists balance some of these factors to prevent Musculoskeletal disorders (MSD).

MSD in dental hygienists has been multi-factorial, hence it requires a solution which is multifactorial as well. With available research, one can look at the problem from different angles and manage it effectively using a multifaceted approach. Dental hygienists should aim to focus on their individual risk which affects their health and manage it according to their need.

Introduction

Background

Dental hygienists as well as other dental professionals are required to work with high attention and concentration which often requires repeated movements, working in awkward positions causing stress on their neck, upper back and arms away from the body for prolonged periods.¹ Dental professionals along with other health care professionals face variety of work-related hazards including musculoskeletal disorder (MSD), eye injuries, vibration induced neuropathy and psychological nature.¹ Out of which MSD is considered as one of the significant diseases amongst many health professionals.²

According to world health organization (WHO), MSD is considered work-related if it is induced by work related activities and exacerbation.¹ Work-related Musculoskeletal Disorder (WMSD) has been reported as much as 48%, the most common work-related injury across the world.¹⁻³ MSD injuries involve muscles, joints, cartilages, nerves, ligaments and vertebral column.¹⁻³ MSDs in dental professionals are a result of uncomfortable working position with posture stress on head and back, prolonged procedures and psychological stress.² Inappropriate working posture leads to increased fatigue, decreased work efficiency and high risk of musculoskeletal injuries. Perhaps improvement in ergonomic positions may help reduce MSD.³ Workplace related interventions can help control MSD and reduce the stress in dental professionals. Moreover, looking into increasing individual's capacity to handle work related physical and psychological stress can help control symptoms of MSD.

Optimal postures are still under discussion to help dental hygienists reduce musculoskeletal injuries and improve their overall health. To prevent further work-related injuries, especially MSD, strategies of prevention and ergonomic techniques must be studied in detail.

Purpose of Report

The purpose of this report is to find out what dental hygienists have reported about improving their working posture to reduce risk of MSD and work-related injuries. This report covers how physical, psychological, and social environment ameliorating some of the occupational factors affecting the health of dental hygienists.

Method of Inquiry

This report is completed through primary and secondary resources. Primary resources include survey data responses from dental hygienists at Beddington Dental. Secondary resources will include systemic reviews and meta-analysis, randomized control trials, and case-control studies related to prevalence of MSD and interventions recommended for dental hygienists.

Scope of Inquiry

The scope of the inquiry is to assess the risk of work-related MSD in dental hygienists at Beddington Dental and possible factors to help reduce such risk.

Data Section

Dental hygienists report their work a physically demanding with common musculoskeletal symptoms and discomfort which continues even after working hours.^{1,4,5} Hand, fingers, neck, shoulder, and back symptoms are common amongst the hygienists who reports pain. Some remedies to reduce pain include use of nonsteroidal anti-inflammatory medications, use of splints at night, massage therapy, acupuncture or chiropractic treatment.^{1,4} However, there are other preventative approaches which must be studied and applied into practice as needed. It has been reported that

physical, psychological and social environment ameliorate some of the occupational factors affecting the health of dental hygienists. ⁴⁻⁶

Physical Factors

Chairs. Many patient and operator’s chairs are not ergonomic, not user friendly and has minimal range of adjustments. ¹ Some chairs could not be lowered to ground, making it especially difficult for short female hygienists. ¹ Figure 1 shows that 67% of the hygienists use chair that is not meeting their needs.

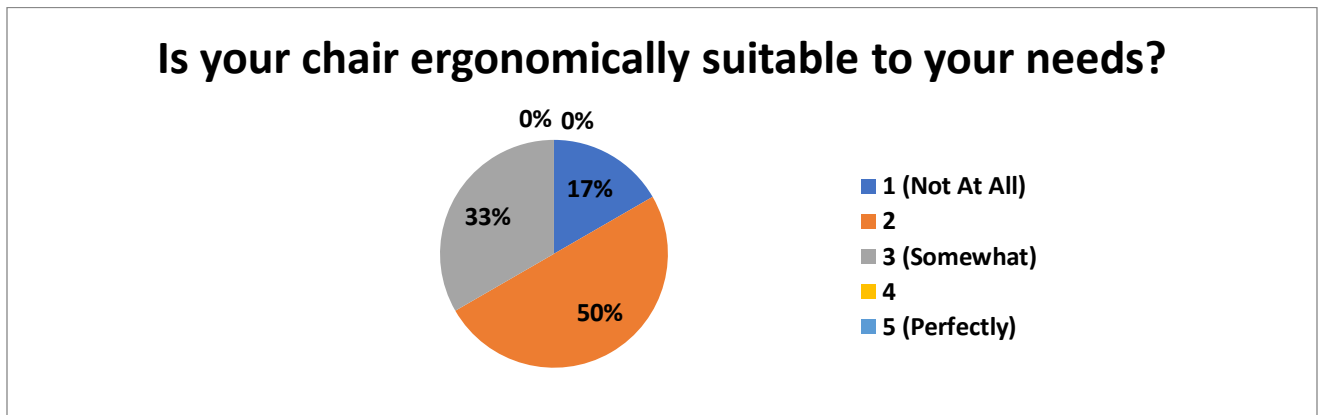


Figure 1. Chair Ergonomics

Operatory Room. Smaller operatories not giving enough space to move operator’s chair around patient’s chair, resulting dental hygienists to work in an awkward position. ¹

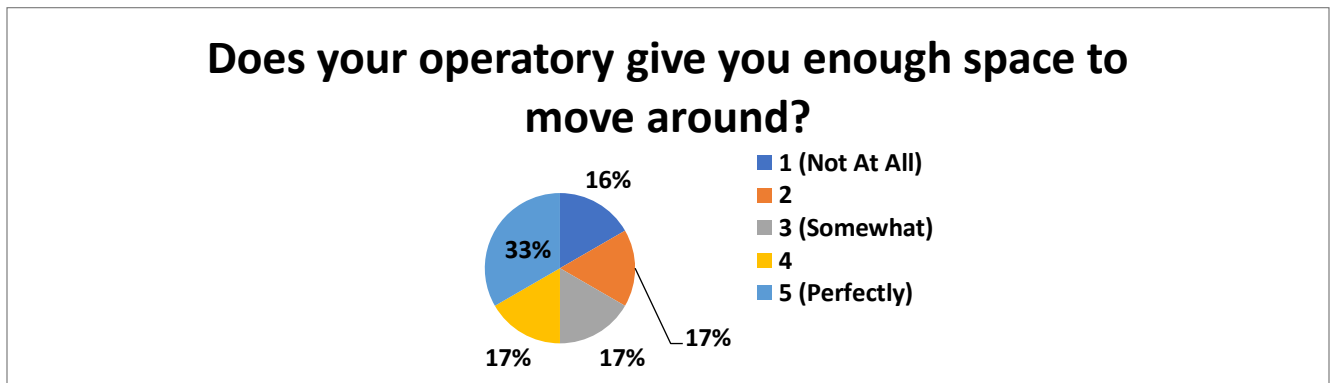


Figure 2. Operatory Space

As seen in figure 2, only 33% dental hygienists report of have enough space in their operatory to move around.

Poor Lighting/ Visual Ergonomics. Not enough light in the operatory or lights kept dim causes strain on operator's eyes, especially when they are working long hours. ⁴⁻⁵ Figure 3 shows 67% of dental hygienists are satisfied with the lighting in their room, but still think it could be better.

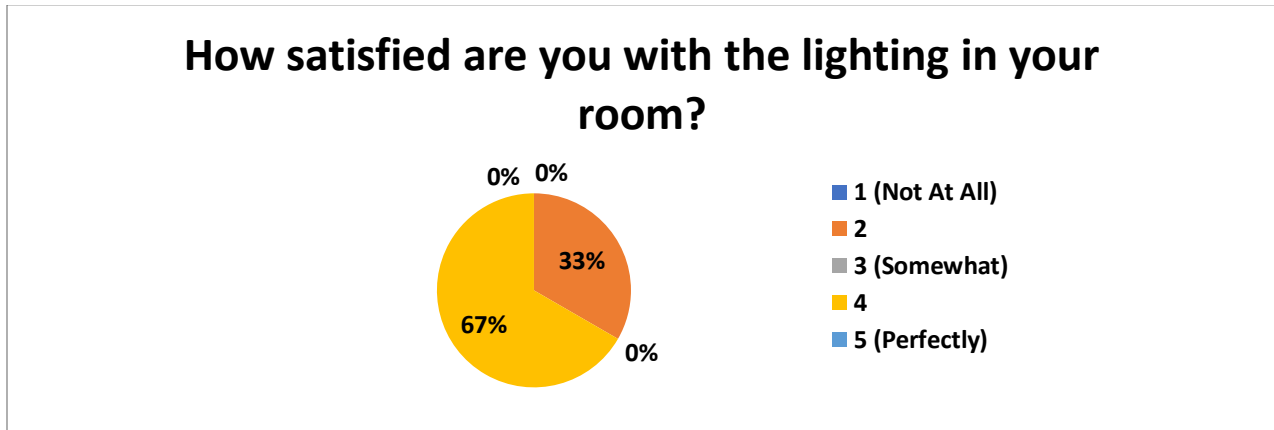


Figure 3. Lighting in the Room

Awkward Work Positions. Dental hygienists often work in an awkward position due to insufficient space for the operator chair to move around patient chair, as well as not being able to recline patient chair to meet operator's ergonomic needs. ^{1, 4-5} Working with neck flexion greater than 30°, shoulder abduction greater than 45°, wrist extension greater than 30°, and lower back kyphosis can all lead to increased risk of MSD. ⁵ These types of awkward positions lead to adaptive shortening or lengthening of muscles leading to muscle imbalance.

Instruments. When instruments are not maintained or sharpened as required, it increases the physical stress on dental hygienist. ⁴⁻⁵ Dental hygienists perform repetitive tasks, with a greater number of prehensile tasks including instrumentation with about 30 strokes per minute; holding suction, mirror or ultrasonic cords with increased pressure; sharpening instruments, writing client notes; exposing radiographs; etc. ⁵ 50% of dental hygienists sharpen their dental instruments

frequently, but other 50% only sharpens occasionally as shown in figure 4. Using dull instruments often leads to frequent fatigue on dental hygienists' hands.

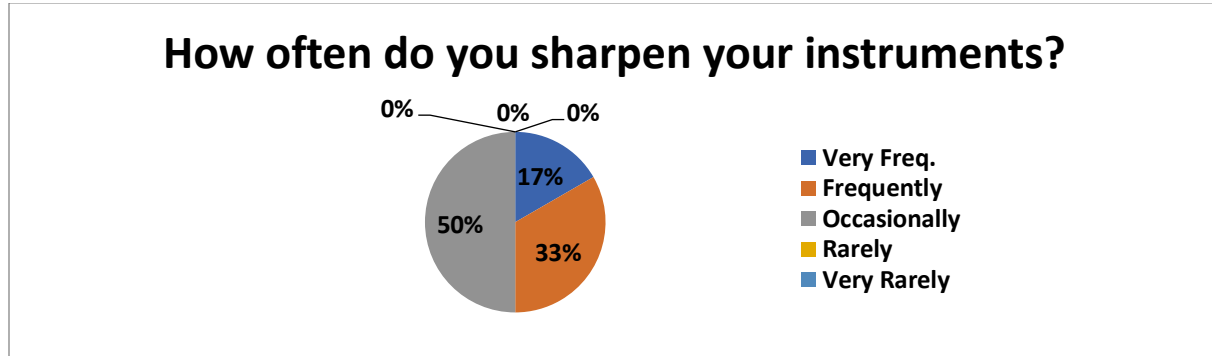


Figure 4. Sharpening Instruments

Psychological Factors

Scheduling. Working for more than 34 hours in a week increases the risk for MSD.⁵ As seen in figure 5, 67% of dental hygienists work between 30 to 40 hours, but 17% report working more than 40 hours a week.

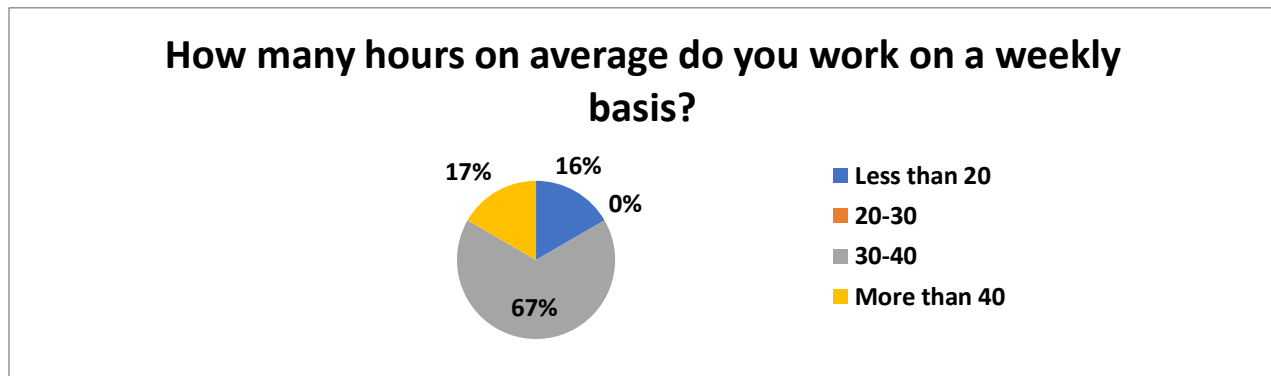


Figure 5. Weekly hours

Time Pressure. Dental Hygienists are often affected by lack of schedule control leading to physical and emotional impact.⁴⁻⁶ Moreover, dental hygienists lose their chair-time and run behind in schedule when they need to wait for dentist to do the exam.⁴⁻⁶ This results in time pressure often affecting loss of breaks for dental hygienists and working under time pressure.⁴⁻⁶

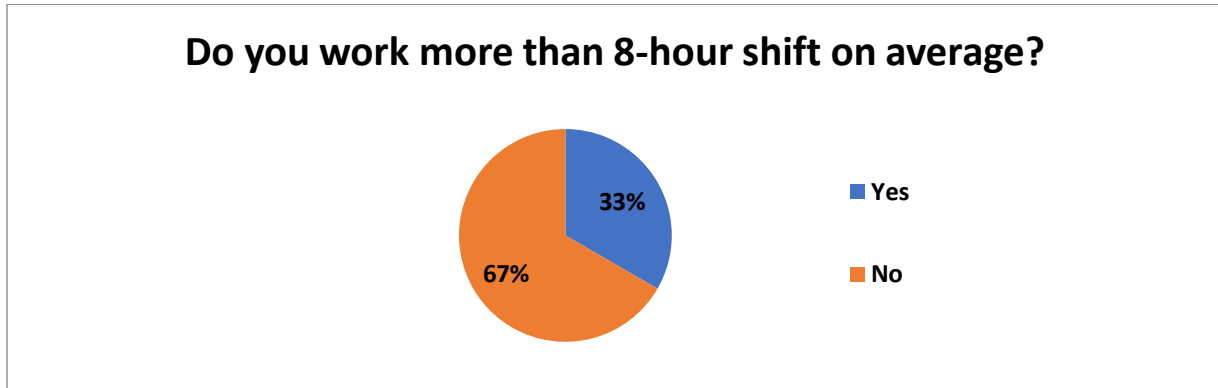


Figure 6. Average hours per shift

Lack of Control. Dental hygienists know their clients better and know when they should return and how much time they require.⁴⁻⁵ Hence they should be under control in making decisions for clients and scheduling rather than other office staff booking them back on a fixed time interval.⁴⁻⁶

Figure 7 shows 67% of dental hygienists have somewhat control over scheduling their clients.

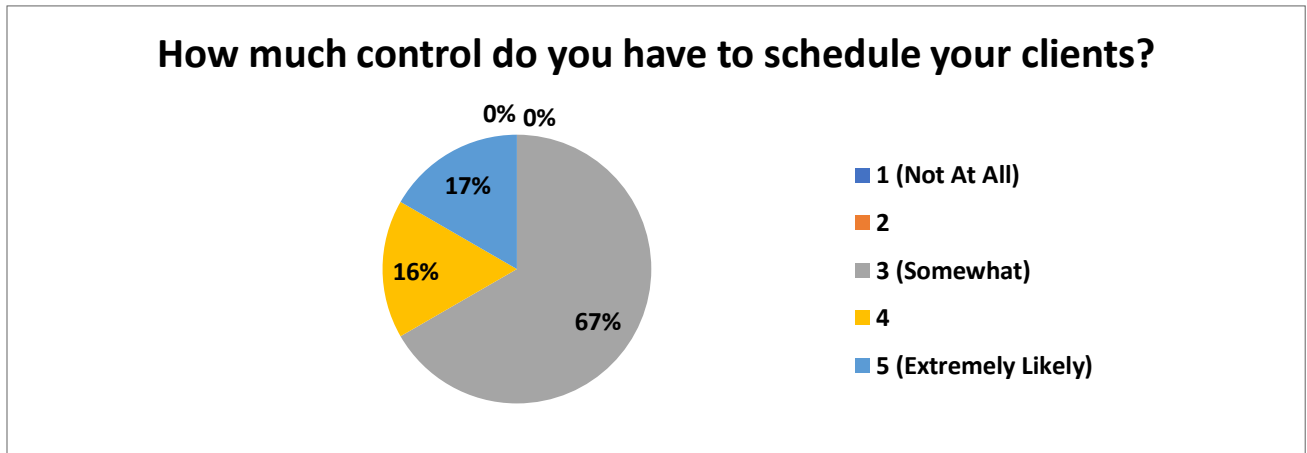


Figure 7. Control over scheduling

Working in Multiple Offices. Dentists often avoid hiring full-time dental hygienists due to benefits they need to pay. Dental hygienists who choose to work in multiple offices need to know each office policy and their work standards.⁴ Working part-time often leads to no medical benefits, retirement plan, and promotion at work.⁴

Social Factors

Role Ambiguity. Employee versus independent practitioner satisfaction can affect role ambiguity. ⁴ Higher career satisfaction has only been seen in younger age, fewer years of work experience, and experience with working in fewer practices. ^{4,6} About 15% dental hygienists reported having very little recognition from their office staff. ⁴ As seen in figure 8, 50% of dental hygienists are very satisfied with their position, while other 50% is somewhat satisfied.

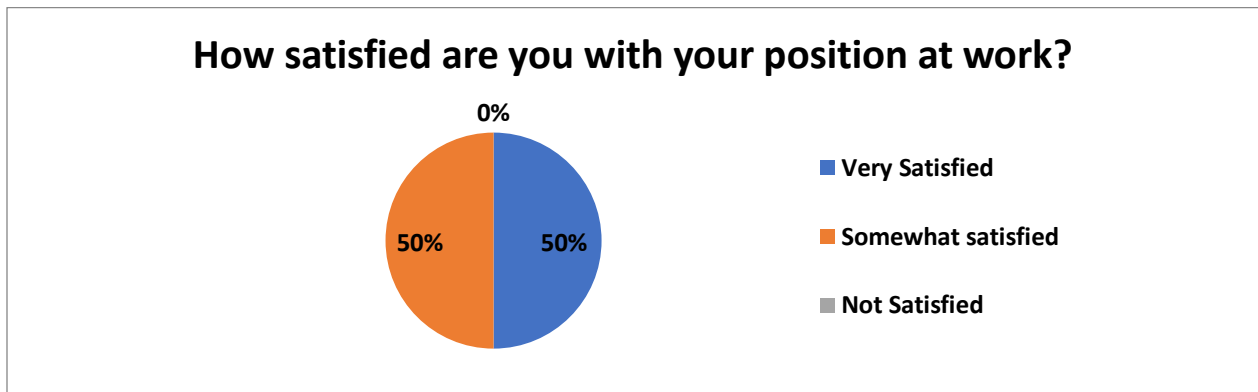


Figure 8. Role Ambiguity

Role Identity/conflict. Public often do not differentiate well between dental hygienists and dental assistants. ^{4,6} Fewer dentists appreciate dental hygienists as partners even though they are important part of the structure in helping with prevention. ^{4,6}

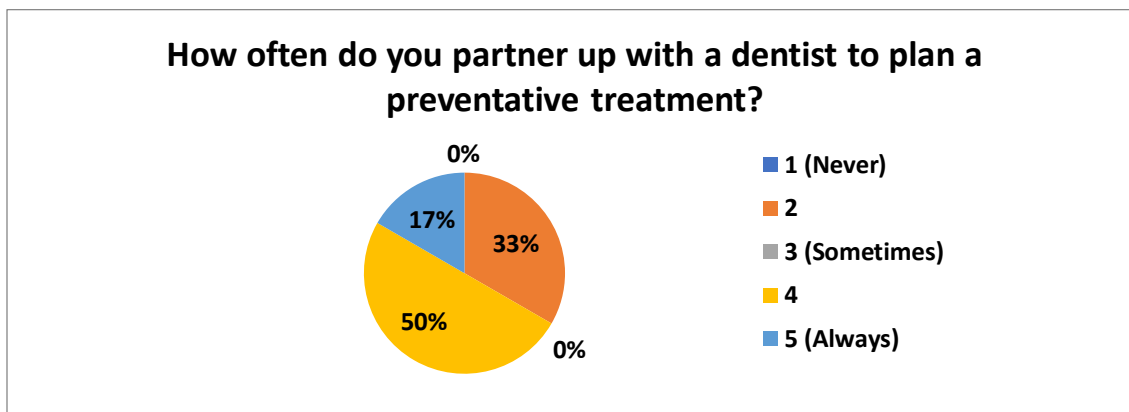


Figure 9. Role Identity

Key to Prevention

Table 1. Factors which helps prevent MSD in Dental Hygienists

Ergonomics
Improvement in Work Setting and Work Relations
Alternate between Standing and Sitting
Individual Risk Assessment
Active Life Style
Wearing loupes
Trigger points
Yoga

Ergonomics. Continuing lifelong education about musculoskeletal health, dental ergonomics and injury prevention helps dental professional to protect their own health. ^{3,5} Adjusting patient and operator position as we move from one area to the other while working, working in sitting neutral position helps reduce the stress on the neck during work. ^{1,3,5} Instruments with larger-diameter can help in reducing stress on fingers. ⁵

Improvement in Work Setting and Work Relations. Frequent breaks with stretches of full body movements should be incorporated in dental hygienists' work routine. ⁵ Using the right operator

chair which supports the operator's lower back and allows height adjustment according to client chair.¹⁴ Movable counters should be considered to reduce twisting and backward reaching.⁵ Adjustable arm support can also help reduce stress on shoulders and improve overall comfort while working.⁵ Controlling over schedule helps schedule clients based on their needs for hygiene intervals as well as scheduling at the time which works best for clients and operator can help reduce strain.⁵

Alternate between sitting and standing. There are different group of muscles activated during standing compared to sitting.³ Alternating between standing and sitting gives rest to one group of muscles while the other is working.³

Individual Risk Assessment. Work hours per shift and working days should be planned according to dental hygienists' capacity to work.⁵

Active Life Style. Decreased blood flow and lack of nutrients with oxygen to the muscles is one of the major contributing factors to MSD.³ Aerobic exercises performed three to four times a week for at least 20 minutes helps increase blood flow to all the muscles and improve musculoskeletal health and reduce stress amongst dental professional.³ Regular exercises such as tendon gliding, posture strengthening, and full body stretches should be considered to help reduce physical stress.^{3,5}⁶ Stretching helps with ischemia, trigger points, muscle imbalances, joint hypomobility, nerve compression and disk degeneration by helping with improving blood flow to muscles, increasing synovial fluid production in joints, reducing trigger points formation, maintaining normal range of motions in joints, and increasing nutrients supply to vertebral disks.³ Furthermore, stretching helps with relaxing central nervous system, identifies areas that may be at high risk of injuries, and warms up the muscles before beginning to work.³ Dental hygienists should incorporate microbreaks during work to allow rest periods to replenish and nourish stressed areas in the body by stretching.³

Wearing loupes. Dental hygienists with regular use of loupes in their practice reported fewer complaints about MSD compared to those who did not use. ³ Right selection, adjustment, and use of magnification loupes can help reduce neck and lower back pain allowing the dental hygienist to keep healthier postures. ³ Right loupes should help you keep neck flexion at 20° or less to reduce neck pain and help maintain optimal posture by keeping shoulders relaxed and elbows close to operator's sides. ³

Trigger points. Dental hygienists often feel pain that is not relieved by stretching is caused by sustained contractions within a tight band of muscles known as a trigger point. ³ These trigger points may feel like a hard point and often painful with pressure, not allowing the muscles to relax or contract and reducing the blood flow to the area. ³ It is recommended to release these trigger points as soon as possible by seeing a physical therapist, a neuromuscular therapist, a massage therapist, or a physician who are qualified in releasing these trigger points. ³ Dental professionals can also self-release these trigger points by using a tennis ball rolling between the back and a wall. ³

Yoga. Occupational stress often elicits muscle contraction and pain which is commonly seen in dental hygienists. ³ Stress reduction techniques such as breathing techniques, progressive relaxation, visualization, massage, aerobic exercise, meditation or yoga can all help reduce stress related to muscular tension. ³ Yoga has helped reduce not only functional disability, but also pain intensity and depression compared to other medical options used. ³ Moreover, yoga has shown to help reduce pain medication intake. ³

Conclusion

There is no one correct method alone which will help prevent prevalence of MSD. As seen, MSD in dental hygienists has been multi-factorial, hence it requires a solution which is multifactorial

well. With available research, one can look at the problem from different angles and manage it effectively using a multifaceted approach. Dental hygienists' performance is greatly affected by their comfort of job satisfaction and thoroughly understanding the workplace risk factors. There are about 63 studies focusing on intervention strategies to help reduce the risk of MSD while handling patients at work.⁷ However, there is a strong evidence of no impact on work stress and occupation health due to interventions alone on handling patients or ergonomic. Active lifestyle and good management have major influence on general health and well-being. Other multiples factors such as psychological and social factors must be considered along with physical factors to help reduce the prevalence of MSD in dental hygienists. Dental hygienists should focus on their individual risk which is affecting their health and manage it according to their need. Further research on such controllable variables can help strengthen the influence and effectiveness of recommended programs to reduce MSD.

Recommendations

Increased emphasis on occupational health and prevention through ergonomics, improvement in work setting and work relations, alternate between sitting and standing, individual risk assessment, active life-style, yoga, wearing loupes, relieving trigger points, and social satisfaction may help dental hygienists balance some of these factors to prevent MSD. It is important for dental hygienists to incorporate different preventative strategies to obtain balanced musculoskeletal health to enable longer and healthier career growth; increase productivity; provide safe work environment; and prevent MSDs. Some approaches include working in neutral postural position, using magnification loupes, living active lifestyle, upgrading knowledge about MSD through continuing education, etc.

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Appendix

Dental Hygiene Survey

Dear fellow dental hygienists,

I am an undergraduate student at UBC currently working on a technical writing project. The purpose of this survey is to collect primary data to analyse and further investigate to provide recommendations to reduce risk of Musculoskeletal disorders (MSD) in dental hygienists. The final formal report will be addressed to team of dental hygienists at Beddington Dental. Our work requires us to work in awkward positions and perform repetitive motions. This eventually increases the risk for injuries and chronic pain. This survey is part of the formal report which will serve the ultimate purpose of recommendations to reduce MSD in dental hygienists.

The survey consists of 14 multiple-choice questions, and it should take less than 5 minutes of your time. Your responses are voluntary and anonymous. Please do not hesitate to contact me if you have any questions pppatel45@alumni.ubc.ca. I appreciate your participation and support in completing this survey.

Name (optional)

Your answer

1. How long have you been practicing dental hygiene?
 - 0-5 years
 - 6-10 years
 - 11-15 years
 - 15+ years

2. Is your chair ergonomically suitable to your needs?
 - 1 Not at all
 - 2
 - 3
 - 4
 - 5 Perfectly

3. Does your operatory give you enough space to move around without working in an awkward position?
 - 1 Not at all
 - 2
 - 3
 - 4

- 5 Perfectly
4. How satisfied are you with the lighting in your room?
- 1 Not at all Satisfied
 - 2
 - 3
 - 4
 - 5 Very Satisfied
5. How often do you find yourself working in awkward position? (this includes bent neck, twisted back, awkward wrist angle, etc.)
- Very frequently
 - Frequently
 - Occasionally
 - Rarely
 - Very rarely
 - Never
6. How often do you sharpen your instruments?
- Very frequently
 - Frequently
 - Occasionally
 - Rarely
 - Very rarely
 - Never
7. How many hours on average do you work on a weekly basis?
- Less than 20
 - 20-30
 - 30-40
 - More than 40
8. Do you work more than 8-hour shift on average?
- Yes
 - No
9. How much control do you have to schedule your clients for a recommended time interval?
- 1 Not at all likely
 - 2
 - 3
 - 4
 - 5 Extremely likely

10. Do you work in more than one office?
- Yes
 - No
11. How often do you receive health benefits through work?
- Always
 - Usually
 - About half the time
 - Seldom
 - Never
12. How satisfied are you with your position at work?
- Very satisfied
 - Somewhat satisfied
 - Not satisfied
13. How often do you partner up with a dentist to plan a preventative treatment?
- 1 Never
 - 2
 - 3
 - 4
 - 5 Always
14. What factors have helped you reduce your risk of developing MSD or work-related injuries?
- Improved ergonomics
 - Improvement in Work Setting and Work Relations
 - Alternate between sitting and standing
 - Active Life Style
 - Wearing loupes
 - Understanding/distressing trigger points
 - Yoga
 - Other: