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# Prevelence of Trigger Points at Lower Back among Dentists in Cairo at Maadi District by Using Algometer

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## Abstract

*Background:* Low Back Pain (LBP) is most common symptom among dentists due to working in a standing position and prolonged stooping over a reclined or supine patients which lead to trigger points formation at lower back.

*Aims of Study:* Localized most common level of trigger point formation among dentists at lumbosacral area and identified the possible risk factors for the development of trigger points by Algometer which eased for physical therapist to find trigger point easily and save time and effort for treatment.

*Subjects and Methods:* This study was carried out on fifty dentists males with low back pain and their ages were ranged from 30 to 45 years, dentists have recurrent episode of pain at lower back and all dentists worked daily at hospital or in thier private clinics examinated from El-Yom El-Wahed and El-Hayaa El-Arabya Hospitals in Maadi District, Cairo Governorate.

*Results:* L5 level was the common site of trigger points at lower back detected in 15 (48.3%) subjects followed by S1 level in 7 (22.5%) subjects and S2 level in 7 (22.5%) subjects and Trigger points at lower back was detected in L4 level in 2 (6.7%) subjects 19.

*Conclusion:* L5 level was the common site of trigger point formation at lower back among dentists.

***Key Words:*** *Back trigger points – Back pain among dentists – Algometer.*

## Introduction

**LBP** is the most common musculoskeletal condition affecting the adult population, with a prevalence of up to 84% **[1]**. Work related factors, such as awkward postures and repetitive motions affecting the dentists back, neck, shoulders, elbows, hands, and wrist increase the dentist's exposure to Musculoskeletal Disorders (MSDs). Sustaining static postures and enduring repetitive motions requires coactivation or the continual shortening and lengthening of muscles. These static exertions are low-level forces which constitute a corresponding risk, if repeated or sustained for a prolonged time **[2]**. Chronic Back Pain (CBP) is a complex, heterogeneous medical condition that includes a wide variety of symptoms **[3]**. In clinic practice, patients with CBP are categorized into three groups: (1) Associated with a specific underlying disease; (2) With the presence of a neuropathic component, that is Back Pain (BP) associated with an injury or disease of the somatosensory nervous system; (3) Non-specific, which in most cases is of mechanical origin **[4]**.

Myofascial Trigger Point (MTrP) is described as "a hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band" **[5]**. There are many factors that have been proposed to result in the development and persistence of MTrP pain. These factors include anatomic abnormalities, various postural habits, and vocational activities causing excessive strain on a particular muscle, tendon, or ligament, endocrine dysfunctions, psychological stressors, sleep disorders, and lack of exercise **[6,7]**. MTrP are classified into active and latent trigger points.

An active MTrP is a symptom-producing MTrP and can trigger local or referred pain or other paraesthesiae. A latent MTrP does not trigger pain without being stimulated. MTrP are the hallmark characteristics of Myofascial Pain Syndrome (MPS) and feature motor, sensory, and autonomic components. Motor aspects of active and latent MTrPs may include disturbed motor function, muscle weakness as a result of motor inhibition, muscle stiffness, and restricted range of motion **[8,9]**.

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The postural demands of delivering dental care predispose dental operators to trigger points in some muscles more than others. These muscles tend to become tight, short, and weak and can refer pain to specific areas in the body. One of these muscles that are especially problematic in dentistry is the iliopsoas muscle. Trigger points that develop here can lead to low back pain and also pain in the upper buttocks and anterior thigh.

Pain is one of the main causes of the decrease of the quality of life, being of great personal, social, physical and psychological impact, is a subject of great interest in several areas of health [10].

The Pressure Pain Threshold (PPT) is defined as the point at which a non-painful pressure stimulus turns into a painful pressure sensation. Pressure Algometry (PA) is a method described to objectify this PPT. This technique is a well-known and well-validated method to induce acute experimental pain. Different studies have been published about using this tool to evaluate pain in different locations of the body and showed high levels of reliability [11]. So the study used algometry to determine and localize common site of LBP trigger point between dentists.

The disability associated with dentistry is an increasingly serious, alarming problem. The nature of profession itself carries onerous and harmful effect on the body of the dentist, which cannot be overlooked. The strained posture put overstress in the spine region. The twisted spine can sustain the stress for small period of time, but gradually the chronicity of the disability sets in. The constant gnawing pain deteriorates the quality and quantity of the work and may later on become carrier ending disability. Therefore, early identification and intervention is deemed necessary [12]. Studies have found that the mechanism leading to work related musculoskeletal pain are multifactorial. This pain can be attributed to prolonged static postures; repetitive movements; suboptimal lighting; improperly designed and positioned operatory; genetic predisposition; mental stress; physical conditioning; and age [12].

Dentists with LBP associated with more faulty at lumbar level but degeneration occurring in spinal structures due to ageing is also contributing factors [13].

LBP refers to pain the lumbosacral area of the spine including the distances from distal lumber vertebrae to distal sacral vertebrae, the most frequant site of LBP as in the fourth and fifth lumber segament [14].

Job-related MSDs usually happen over a period of time, resulting from repeated workload exposures. The neck, low back, and upper limbs are commonly vulnerable to MSDs [15].

Dentists are at high risk for neck and BP. Awkward working postures, repetitive work, and prolonged standing can result in damage to muscles, joints, bones, ligaments, tendons, nerves, and blood vessels, which can then lead to pain, fatigue, and various MSDs. The type of pain varies, ranging from a stiff feeling to definite pain. LBP is the most frequent complaint, and almost all dentists worldwide have experienced this during their careers [16,17].

The dentists are at high risk of neck and lower backache problems due to the limited work area with a limited scope of movement and narrow visual field associated with the oral cavity. These working restrictions frequently cause a clinician to assume stressful body positions to achieve good access and visibility inside the oral cavity. Furthermore, dental procedures are usually long; require much more concentration during work [18].

## Material and Methods

*Subjects:*

This study was carried out on 50 dentists males with back pain and their ages were ranged from 30 to 45 years during the period from July to October 2020, they were selected from Elyom Elwhahed and El-Hayaa El-Arabya Hospitals, hospitals in Maadi District, Cairo governorate.

*Instrumentation:*

*Algometer device:* Localized the common trigger point, it is a useful device for rough quantitation of pain perception and pain tolerance, and localize the common site of pain at lower back between L4, L5, S 1 and S2 levels [19].

*Procedures:*

The study was approved by the Ethical Committee of the Faculty of Physical Therapy of Cairo University and all dentists signed consent form, the dentists requested for leaning forward and the Therapist localized four levels at lower back and used Algometer device to localize most common level of trigger point formation at lumbosacral area between L4, L5, S 1 and S2 levels 19 and collected data about age, weight, height working hours per day, number of patient treated per day and exercise practice and made correlations between trigger points formation and previous factors but the study localized and defined most common level of trigger by objective method.

*Statistical analysis:*

Descriptive statistics of mean, standard deviation, frequencies, percentages and Confidence Interval (CI) were utilized in presenting the subjects demographic and measured data. Quantitative variables were summarized using mean and standard deviation while categorical variables were summarized using frequencies and percentage. Chi-square statistics (Fisher Exact test) and logistic regression were utilized to examine associations between trigger points and risk factors. The level of significance for all statistical tests was set at $p$ <0.05. All statistical measures were performed through the Statistical Package for Social Studies (SPSS) version 25 for windows.

## Results

*Subjects' characteristics:*

Fifty male dentists with LBP participated in this study. The mean ± SD age of the study group was 38±6 years with minimum of 30 years and maximum of 45 years. The mean ± SD weight of the study group was 85±9Kg with minimum of 66kg and maximum of 101kg. The mean ± SD height of the study group was 176±6cm with minimum of 165CM and maximum of 188CM. The mean ± SD Body Mass Index (BMI) of the study group was 27.73±2.35kg/m$^2$ with minimum of 21.55kg/m$^2$ and maximum of 32.11kg/m$^2$ (Table 1).

*Prevalence of trigger points among dentists:* The prevalence of trigger points at lower back among dentists was 62% with 95% CI of 48.15-74.13%. L5 was the common site of trigger points at lower back detected in 15 (48.3%) subjects followed by S 1 in 7 (22.5%) subjects and S2 in 7 (22.5%) subjects. 19 Trigger points at lower back was detected in L4 in 2 (6.7%) subjects. The mean ± SD PPT at L4, L5, S and S2 were 0.96±0.27, 1.24±0.55, 0.94±0.46 and 1.19±0.51kg respectively. (Table 2).

Table (1): The dentists' characteristics.

| | N | % |
|---|---|---|
| *Age:* | | |
| 30-39 years | 26 | 52% |
| 40-45 years | 24 | 48% |
| *Weight:* | | |
| 66-85kg | 28 | 56% |
| 86-101kg | 22 | 44% |
| *Height:* | | |
| 165-176cm | 26 | 52% |
| 177-188cm | 24 | 48% |
| *BMI:* | | |
| Normal weight (18.5-24.9kg/m$^2$) | 8 | 16% |
| Overweight (25.0-29.9kg/m$^2$) | 33 | 66% |
| Obese (≥30kg/m$^2$) | 9 | 18% |
| *Work hours per day:* | | |
| 4-8h/day | 33 | 66% |
| >8h/day | 17 | 34% |
| *Working years:* | | |
| 6-15 working years | 27 | 54% |
| 16-22 working years | 23 | 46% |
| *Number of patients/day:* | | |
| 2-7 patients/day | 30 | 60% |
| 7-20 cases/week | 20 | 40% |
| *Participation in regular exercise:* | | |
| Yes | 20 | 40% |
| No | 30 | 60% |

Table (2): Prevalence of trigger points and mean PPT of trigger points in the study group.

| | Prevalence | 95% CI |
|---|---|---|
| Trigger points | 31 (62%) | 48.15-74.13% |

Mean PPT of trigger points in the study group

| PPT (kg) | X ± SD | Minimum | Maximum | Range |
|---|---|---|---|---|
| L4 | 0.96±0.27 | 0.67 | 1.22 | 0.55 |
| L5 | 1.24±0.55 | 0.32 | 2.19 | 1.87 |
| S1 | 0.94±0.46 | 0.45 | 1.82 | 1.37 |
| S2 | 1.19±0.51 | 0.56 | 2 | 1.44 |

CI: Confidence Interval.

*Association between trigger points and subject characteristics and risk factors:*

There was a significant increase in the prevalence of trigger points in subjects with 30-39 years compared with subjects with 40-45 years ($p$=0.003), in obese and overweight subjects compared with that of normal weight ($p$=0.03), in subjects working >8h/day compared with subjects working 4-8h/day ($p$=0.007), in subjects with 16-22 working years compared with subjects with 6-15 working years ($p$=0.008) and there was a significant increase in the prevalence of trigger points in subjects without participation in regular exercise compared with subjects participated in regular exercise ($p$=0.04). There was no significant association between trigger points and weight, height, work hours per day and number of patients/day ($p$>0.05) (Table 3).

*Prediction of trigger points among the participants:*

Variables with significant association with trigger points were entered in multivariate logistic regression to identify the significant predictors for trigger points. Age 40-15 years and >8h/day were the significant predictors for trigger points ($p$<0.01), (Table 4).

A Binary logistic regression was performed to determine the variables that can predict trigger points among the participants. Univariate analysis revealed that age, BMI, work hours per day and participation in regular exercise had a significant association with trigger points; while weight, height, working years and number of patients/day had not significant association with trigger points. Subjects with age 40-45 years were 7.87 times more likely to have trigger points compared with subjects with age 30-39 years (Odds Ratio=7.87, 95% CI 2.07-29.94, $p$=0.002). Subjects with obesity were 24 times more likely to have trigger points compared with subjects with normal weight (Odds Ratio=24, 95% CI 1.74-330.8, $p$=0.01). Subjects without participation in regular exercise were 3.36 times more likely to have trigger points compared with subjects with regular participation in regular exercise (Odds Ratio=3.36, 95% CI 1.01-11.11, $p$=0.04.

Table (3): The frequency distribution of trigger points and association between trigger points and risk factors.

| | Presence of RSI | | $X^2$-value | $p$-value |
|---|---|---|---|---|
| | Yes | No | | |
| *Age classes:* | | | | |
| 30-39 years | 10 (40%) | 15 (60%) | 10.27 | 0.003 |
| 40-45 years | 21 (84%) | 4 (16%) | | |
| *Weight classes:* | | | | |
| 66-85kg | 14 (50%) | 14 (50%) | 3.88 | 0.07 |
| 86-101kg | 17 (77.3%) | 5 (22.7%) | | |
| *Height classes:* | | | | |
| 165-176cm | 13 (50%) | 13 (50%) | 3.31 | 0.08 |
| 177-188cm | 18 (75%) | 6 (25%) | | |
| *BMI classes:* | | | | |
| Normal weight (18.5-24.9kg/m$^2$) | 2 (25%) | 6 (75%) | 7.01 | 0.03 |
| Overweight (25.0-29.9kg/m$^2$) | 21 (63.6%) | 12 (36.4%) | | |
| Obese (›_30kg/m$^2$) | 8 (88.9%) | 1 (11.1%) | | |
| *Work hours per day:* | | | | |
| 4-8h/day | 16 (48.5%) | 17 (51.5%) | 7.52 | 0.007 |
| >8h/day | 15 (88.2%) | 2 (11.8%) | | |
| *Working years:* | | | | |
| 6-15 working years | 12 (44.4%) | 15 (55.6%) | 7.67 | 0.008 |
| 16-22 working years | 19 (82.6%) | 4 (17.4%) | | |
| *Patients/day:* | | | | |
| 2-7 patients/day | 19 (63.3%) | 11 (36.7%) | 0.05 | 0.01 |
| 7-20 patients/day | 12 (60%) | 8 (40%) | | |
| *Participation in regular exercise:* | | | | |
| Yes | 9 (45%) | 11 (55%) | 4.08 | 0.04 |
| No | 22 (73.3%) | 8 (26.7%) | | |

$X^2$: Fisher Exact test. $p$-value: Probability value. RSI: Repetitive Strain Injury.

Table (4): Predictors of trigger points among participants.

| Variables | Univariate analysis | | | Multivariate analysis | | |
|---|---|---|---|---|---|---|
| | Odds ratio | 95% CI | *p*-value | Odds ratio | 95% CI | *p*-value |
| Age (40-45 years) | 7.87 | 2.07-29.94 | 0.002 | 33.01 | 1.96-555.24 | 0.01 |
| Weight (86-101kg) | 3.4 | 0.98-11.77 | 0.053 | | | |
| Height (177-188cm) | 3 | 0.9-9.98 | 0.07 | | | |
| BMI | | | 0.04 | | | 0.33 |
| Overweight | 5.25 | 0.91-30.22 | 0.06 | 0.84 | 0.02-18.75 | 0.84 |
| Obese | 24 | 1.74-330.8 | 0.01 | 0.35 | 0.12-316.21 | 0.35 |
| Work hours per day (>8h/day) | 7.96 | 1.56-40.49 | 0.01 | 94.96 | 5.24-1719.41 | 0.002 |
| Working years (16-22 working years) | 1.35 | 0.33-5.55 | 0.67 | | | |
| Number of patients/day (7-20 cases/week) | 0.86 | 0.27-2.77 | 0.81 | | | |
| Participation in regular exercise (no participation) | 3.36 | 1.01-11.11 | 0.04 | 2.32 | 0.2-25.99 | 0.49 |

CI: Confidence Interval. *p*-value: Probability value.

## Discussion

The study managed to gather a large number of responses with more than a thousand answers, allowing us to reach high statistical significance levels compared to previous studies in France and worldwide **[19]**.

Subhash et al., approved that 73% of dentists complained of lower back and neck pain while 27% did not have lower back and neck pain, the study results showed that the prevalence of trigger points at lower back among dentists was 62% with 95% CI of 48.15-74.13%, and 19 with 38% no trigger points and. Our study results also showed that 31 dentists (62%) subjects of the study group had trigger points at lower back. L5 level was the common site of trigger points at lower back detected in 15 (48.3%) subjects followed by S1 level in 7 (22.5%) subjects and S2 level in 7 (22.5%) subjects. Trigger points at lower back was detected in L4 level in 2 (6.7%) subjects as previously stated by studies **[20]**.

Riziq Allah Gaowgzeh et al., concluded that 57% of the dentists surveyed suffered from LBP. They also found that LBP was most frequent in the age group of 30 to 40 years and our study results also showed that there was a significant increase in the prevalence of trigger points in subjects with 30-39 years compared with subjects with 40-45 years ($p$=0.003) so there was significant correlation between ageing and BP among dentists.

Jaspreet et al., also showed that as age increases pain symptoms also increases might be due to degenerative changes started in human body with age as previously stated by studies. There was no significant association between weight and trigger points ($p$=0.07) and there was no significant association between height and trigger points ( $p$=0.08) due to they were same BMI. Jaspreet et al., study found that maximum pain intensity present in 4-8 hours of practice and our study results showed that there was a significant increase in the prevalence of trigger points in subjects working >8h/day compared with subjects working 4-8h/day ($p$= 0.007) so there was correlation between working hour per day and BP among dentists. Riziq Allah et al., suggested that the incidence of BP does not correlate with years of experience and that any dentists who are not maintaining a normal working posture are vulnerable to develop BP and Most of the dentists (57%) in our study were treating 1-3 patients per day, which indicates that the incidence of back pain does not correlate with the number of patients treated or number of hours worked per day and the study results showed that there was a significant increase in the prevalence of trigger points in subjects with 16-22 working years compared with subjects with 6-15 working years ( $p$= 0.008) and there was no significant association between number of patients/day and trigger points ($p$=0.17). So the difference between our study and Riziq Allah study at correlation between years of work and back pain due to small sample in my study.

According to Jaspreet Kaur et al., proper exercise management can reduce the effects of overused repetitive micro trauma and relaxation of shortened muscles. This holistic technique might be a challenge to dental professionals, but the result benefits in reducing MSD symptoms. And our study approved significant increase in the prevalence of trigger points in subjects without participation in regular exercise compared with subjects participated in regular exercise ($p$=0.04).

*Conclusion:*

The study was carried out on fifty male dentists with LBP and their ages ranged from 30-45 years old, compared the incidence of trigger point for-

mation between L4, L5, S 1 and S2 levels by using Algometer. The finding of the study approved that L5 level was the common site of trigger point formation at lower back among dentists.

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# مدى إنتشار آماكن إثارة الآلم بين آطباء الآسنان فى منطقة آسفل الظهر فى حى المعادى القاهرة بإستخدام جهاز الآلجوميتر

الهدف من البحث: هو تحديد ومعرفة نقطة الآلم الشائعة بين آطباء الآسنان فى منطقة آسفل الظهر وذلك بإستخدام جهاز الآلجوميتير.

مواد وآساليب البحث: آجريت هذه الدراسة على خمسين طبيب (ذكور) آسنان من مستشفى اليوم الواحد ومستشفى الهيئة العربية للتصنيع بالمعادى يعانون من آلام آسفل الظهر وتتراوح آعمارهم بين ٣٠ إلى ٤٥ سنة وقد إستغرقت الدراسة ثلاثة آشهر وذلك من تاريخ ٢٠٢٠/٧/٢ حتى ٢٠٢٠/١٠/٢.

وقد آظهرت النتائج ما يلى: حددت هذه الدراسة مدى إنتشار الآلم فى آسفل الظهر بين آطباء الآسنان وتم تحديد المنطقة المشتركة إن منطقة الفقرة القطنية الخامسة هى الموقع الآكثر شيوعاً للآلم فى آسفل الظهر وعدد المرضى ١٥ بنسبة (٤٨.٣٪) يليه منطقة الفقرة العجزية الآولى وعدد المرضى ٧ بنسبة (٢٢.٥٪) ومنطقة الفقرة العجزية الثانية وعدد المرضى ٧ بنسبة (٢٢.٥٪). وتم الكشف عن نقطة الآلم فى آسفل الظهر فى منطقة الفقرة القطنية الرابعة وكان عدد المرضى ٢ بنسبة (٦.٧٪) من الآشخاص.