



"HAS TMJ GOT YOUR BACK?"

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Abstract

Aim: To determine orofacial predisposing and risk factors among individuals with lower back pain and sciatica.

Materials and methods: This cross-sectional analytical study was carried out at Sancheti Institute for orthopedic and rehabilitation center, PUNE. The population study consisted of 243 people, aged 18-95 years of either sex reporting with lower back pain. Data collection was carried out by the means of a questionnaire along with the clinical examination for orofacial apparatus and temporomandibular joint. Comparison was made for the prevalence of tobacco usage, TMJ disorders and orofacial muscle dysfunction among the population with lower back pain.

Results: Among the respondents, it was found that tobacco usage (36.17%) and temporomandibular joint disorder (37.86%) were significantly associated with lower back pain whereas no significant relation could be obtained with orofacial muscle dysfunction (5.3%).

Conclusion: A strong association was found between temporomandibular joint disorders and tobacco usage with lower back pain, indicating positive correlation between them.

Introduction

Lifestyle is the interests, opinions, behaviours, and behavioural orientations of an individual, group, or culture. In a broader sense it is a "way or style of living". It is a combination of determining intangible or tangible factors.^{1,2} It is an essential factor in health. According to WHO, 60% of related factors to individual health and quality of life are correlated to lifestyle³

Presentation of unhealthy lifestyle includes unhealthy diet, smoking, alcohol, consumption of tobacco, drug abuse, stress and many other chronic disabilities.³ Amongst various such disabilities, most prevalent condition seen in all age groups is the presence of spinal disorders occurring most commonly due to occupation.

Lower back pain is one of the emerging condition with increased incidence in India and is the major cause of disability- affecting performance at work and general well-being. Lower back pain is almost experienced by 60-70% of adults at some point of their life.⁴ Nowadays not only adults but also the young generation have started experiencing lower back pain due to various other factors. However to prevent lower back pain, the associated modifiable and non-modifiable risk factors must be identified.

The chronification of nicotine has adverse effects on multiple organs with increased incidence and severity of several chronic pain conditions including lower back pain. One possible explanation for this association is that long term tobacco use often leads to decreased blood flow and local hypoxia and affects the nervous system in various ways, which in turn influences the pain experience.⁵

Therefore, it is important to remember that the spine function as a unit and dysfunction at one level can trigger compensatory changes in other spinal levels or in other areas of the musculoskeleton. Overtime compensatory imbalances can embed themselves deeply as muscle, ligament, cartilage and even bone undergo changes in structure and function.⁶

To the best of our knowledge no such study has been carried out till date and hence the purpose of this scientific study is to highlight any clinical correlation between tobacco habit, orofacial musculature dysfunction, and TMJ disorders with lower back pain and sciatica pain.

Methodology:

This cross-sectional analytical study comprised of 243 people reporting of lower back pain of varied duration. The samples were taken from Sancheti Institute for Orthopedic and Rehabilitation center, PUNE. The sample collection was initiated from February 2021 till March 2021. A questionnaire was collected from all the study participants. It consisted of variables such as demographic data, presence of lower back pain, patient's personal and other habits. It also included clinical examination of orofacial apparatus (muscles of mastication) and TMJ.

The presence of lower back pain was assessed by asking a simple question, “Are you suffering from lower back pain?”. Those who responded affirmatively were asked further questions regarding the duration of illness, region of involvement, type of pain etc.

Questions concerning tobacco habits were related to form of tobacco used, type of smoker, duration and frequency of use, quantity consumed per day. Further more questions regarding area and duration of placement were asked for the smokeless forms. For smoked forms dependency score was calculated based on Fagerstrom test.

Information regarding other habits such as bruxism, lip sucking/biting, thumb sucking, mouth breathing and tongue thrusting was also obtained.

Clinical examination of 2 masticatory muscles (masseter and temporalis) was done by conventional manual palpation methods, at rest and contracted positions respectively. Interpretation of both the muscles was made as tender/non-tender and into normal/hypertrophied states respectively.

The TMJ Joint was also palpated by conventional manual method and findings about mouth opening, tenderness on palpation, deviation of mandible, clicking/crepitus was noted down accordingly.

Results:

A total of 243 samples reporting of lower back pain aged 18 years and above were included in the study. Amongst them 53.9% were male and 46.09% were female respectively. About 77.3% of the total sample collected, were suffering from chronic lower back pain, 13.9% had sub-acute and 8.64% had acute duration of pain indicating that patients visit the physician only for the long standing and/or lingering pain. Most of the patients diagnosed of radicular pain (64.19%) i.e pain of neurotic origin were of older age group whereas the younger population reported with mechanical pain (35.8%) as a result of poor posture and prolonged sitting. Of the total population collected only 2.88% patients were diagnosed of sciatica which is earliest form of lower back pain occurring due to compression of sciatic nerve, showing patients negligence to visit physician in the earliest period of disease.

A significant population (47.7%) of the total seemed to be using tobacco, of which 36.6% were current and around 11.1% were former tobacco users. This indicates some direct or indirect relation of tobacco for causing lower back pain making it the most probable predisposing factor for the same. Among the tobacco users, 38.6% of people were consuming smokeless form of tobacco and 9.05% consumed the smoked form.

Apart from tobacco usage, attempt was made to find if any relation exists between the orofacial muscle dysfunction with the lower back pain. However not much significant (only 5.3%) relation could be obtained for the same.

Another factor considered was temporomandibular joint disorders with lower back pain. On examination it was found that 37.86% of total population suffering with lower back pain had temporomandibular joint disorders, manifesting as deviation of mandible on opening and closure of jaw (25.9%), clicking/crepitus (24.2%) and tenderness of joint on palpation (4.11%). This also proves a positive co-relation between the two of them.

Table-1 Habit of tobacco consumption

Gender	Tobacco habit					Total
	Smoked form		Smokeless form		Non-smokers	
	Current	Former	Current	Former		
Male	10 (4.1%)	11 (4.52%)	64 (26.33%)	9 (3.70%)	37 (15.22%)	131 (53.9%)
Female	0 (0%)	1 (0.41%)	15 (6.17%)	6 (2.46%)	90 (37.03%)	112 (46.09%)

Table 2: Lower back pain duration.

Duration of illness:	Number of patients out of 243	Percentage
Acute	21	8.64%
Sub- acute	34	13.9%
Chronic	188	77.3%

Table 3: Type of lower back pain.

Type of pain:	Number of patients out of 243	Percentage
Mechanical	87	35.8%
Radicular	156	64.19%

Table 4: Patients status on sciatica

Patients status on sciatica:	Number of patients	Percentage
Patients suffering from sciatica:	7	2.88%
Patients not suffering from sciatica:	236	97.1%

Table 5: Other habits

(Bruxism, lip sucking/biting, thumb sucking, mouth breathing, tongue thrusting)

Habit	Number of patients	Percentage
Present	11	4.52%
Absent	232	95.47%

Table 6: Examination of orofacial apparatus

Status of orofacial apparatus	Number of patients	Percentage
Normal	230	94.6%
Abnormal	13	5.3%

Table 7: TMJ examination

TMJ examination	Number of patients	Percentage
TMJ disorders	92	37.86%

Discussion:

The results of the present study demonstrate significant association of tobacco usage and temporomandibular joint disorders with the intensity and severity of lower pain back and sciatica however no such significant relation could be obtained for orofacial muscle dysfunction.

In a study by Annie E et al (2011)⁷ concluded that smoking is one such risk factor for lower back pain and sciatica along with various others with the possible explanation that nicotine

consumption for lower duration can cause vasoconstriction but its prolonged use can cause atherosclerosis which may lead to decreased blood flow to the internal organs and bone. Reduced blood flow affects the spinal cells leading to decreased nutrition to the intervertebral disc which further causes degenerative diseases, bone resorption and delayed healing.

A meta-analysis was done by Shiri R et al (2016)⁸ to estimate the effect of smoking on lumbar radicular pain and clinically verified sciatica they concluded that smoking is a modest risk factor for lumbar radicular pain and sciatica and thus its cessation appears to reduce, but not entirely eliminate, the excess risk of the disease.

According to Sambatrao S et al (2019)⁹ temporomandibular disorders has a relation with lower back pain and vice versa, meaning a dysfunction at any level of spinal cord will induce compensatory musculoskeletal changes over the subsequent joint, tendon and muscles. Temporomandibular joint has a central role in the cybernetic unit of head and neck. Craniovertebral joint and TMJ are strictly related to each other and form a cybernetic unit which is regulated by motoric programs via descending cortico- bulbar and cortico-spinal tracts. As a result the movement of TMJ and craniovertebral joint occurs in a coordinated fashion. Together they control and regulate various neuromuscular and neurophysiological reflexes.

A similar study carried out by Kim D et al (2019)¹⁰ analysed for the relationship between temporomandibular joint disorders (TMD) and spinal pain in greater detail by using nationwide data and they concluded strong association between the two, indicating a positive correlation between the severity of TMD and spinal pain.

Another study conducted by Wiesinger B et al (2007)¹¹ demonstrated statistically significant associations between long-term back pain and musculoskeletal disorders in the jaw-face indicating comorbidity between the two conditions.

Lee K C et al (2020)¹² conducted a nationwide population-based cohort study with a 15-year follow-up to determine the prevalence of first-onset temporomandibular disorder in low back pain and associated risk factors. They recognized lower back pain as a risk factor contributing to the development of first-onset TMD and suggested that clinicians should be reminded to manage lower back pain disorders concurrently when treating TMD.

Costa Y M et al (2017)¹³ concluded in a study on temporomandibular disorders and painful comorbidities that biomechanical aspects are not the main factors involved in the comorbid relationship between TMD and cervical spine dysfunction, which can be better explained by the neuronal convergence of the trigeminal and cervical spine sensory pathways as well as by central sensitization processes.

Parreira P et al (2018)¹⁴ conducted a study to provide an overview of risk factors for lower back pain they completed an umbrella review of the evidence from existing systematic reviews where they concluded that poor general health, physical and psychological stress, and characteristics of the person increase risk for a future episode of LBP or sciatica.

In a cross-sectional study conducted on American adults by Green B et al (2017)¹⁵ association between smoking and back pain was determined. They found significant association between back pain and smoking, and the pain increased with increased smoking exposure. So, they

suggested that there may be a biological gradient associated with exposure to smoking cigarettes and back pain in adult Americans.

Hence amongst multiple etiologies for lower back pain, tobacco use and TMJ disorders can be considered as potential risk factors in causation of same. Thus interventions to stop tobacco usage and treating TMJ disorders might be considered as a method to improve health or reduce chances of lower back pain.

Conclusion:

A strong association was found between temporomandibular joint disorders and tobacco usage with lower back pain, indicating positive correlation between them. Thus interventions to stop tobacco usage and treating TMJ disorders might be considered as a method to improve health or reduce chances of lower back pain.

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