

# INCIDENCE AND IMPACT OF LIMITED MOUTH OPENING ON THE QUALITY OF LIFE AND HEALTH MEASURED THROUGH GTQ INDEX

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## ABSTRACT

Limited mouth opening affects many essential functions of daily life, such as chewing, swallowing, speaking and maintaining effective oral hygiene. The aim of this study was to investigate how limited mouth opening affects the quality of life and mental health in patients with oral sub mucous fibrosis, infection, ankylosis, TMD and post-extraction measured through “Gothenburg trismus questionnaire”. A cross-sectional study was conducted at Fatima Jinnah Dental College and Hospital (FJDC&H). The sampling technique was convenience. The sample size of 70 patients was calculated at 95% confidence interval and 5% margin of error using OpenEpi software. The GTQ comprises 21 items of which it divided into jaw problems, eating problems, facial pain, lifestyle problems, and inter-incisal distance. The duration of the study was from Jan 2020 to Dec 2020. A verbal consent was taken from the participants. The ethical approval was obtained from the institutional ERC. As per the GTQ, jaw related issues were significantly associated with oral submucous fibrosis ( $p=0.031$ ) and temporomandibular disorders ( $p=0.05$ ). The eating and lifestyle changes were significant affecting the routine of those patients who were suffering from temporomandibular disorders ( $p=0.037, 0.043$ ). The domain of facial pain was related to odontogenic infection ( $p=0.05$ ) and not with any other cause of limited mouth opening. It is necessary to diagnose the accurate etiology of limited mouth opening (trismus) in those patients, who reported to the out-patient department with this complaint for its effective and complete management; also to improve patient’s quality of life.

**Key words:** Trismus, oral submucous fibrosis, TMJ disorders, pericoronitis, quality of life.

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## INTRODUCTION

Limited mouth opening (trismus) is one of the most commonly reported problems to dental practitioners. The term trismus is derivative of a Greek word “Trismos” which means ‘grinding’ or ‘rasping’.<sup>1</sup> Trismus is defined as a limitation in opening the mouth due to a hindrance in the mobility of mandible.<sup>2</sup> According to the literature, Maximum Interincisal Opening (MIO) is ≤

35mm often applied as the cut-off value for trismus.<sup>1</sup> Trismus can be frequently present in conditions like extraction of the wisdom tooth, oral submucous fibrosis (OSF), temporomandibular joint disorders (TMD), head and neck cancer and post outcome of radio-therapy.<sup>3</sup>

In our population, the three most important causes of limited mouth opening are oral submucous fibrosis (26.7%), infections (24.0%), and trauma (15.0%), respectively.<sup>4</sup> In the OSF patients, restricted mouth opening mainly results due to muscle fibrosis and mucositis of the oral mucosa.<sup>5</sup> While infection associated with mandibular impacted third molars may spread to facial spaces of the neck which could lead to trismus.<sup>6</sup> Limited mouth opening affects many essential functions of daily life, such as chewing, swallowing, speaking and maintaining effective oral hygiene, pain, and overall health related quality of life (HRQL).<sup>7</sup> Impaired HRDL may interrupt the physical and psychological health of the affected patients which leads to nutritional deficiencies and depression.<sup>8</sup> These were distressful consequences observed and reported in various studies conducted previously.<sup>4-8</sup>

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To assess a patient's health status a self-administered comprehensive questionnaire "Gothenburg Trismus Questionnaire (GTQ)" was developed in 2012 implemented as the first symptoms associated with trismus-specific questionnaire.<sup>8</sup> The GTQ has been well accepted by patients with good compliance, fewer items to be left as blank and exhibits better psychometric properties.<sup>9</sup> The questionnaire comprises 21 items divided into three domains such as jaw-related problems (7 items), eating limitation (6 items) and facial pain (3 items) and two additional items were lifestyle changes (5 items) and inter-incisal distance.<sup>10</sup> The fields are scored by measuring the mean of each aspect and converting it to a scale of range 0 to 100, where a highest score indicates more symptom burden due to trismus and 0 equates to no symptoms.<sup>8</sup> The GTQ demonstrated high internal consistency (Cronbach's alpha 0.72-0.90) with good validity and reliability.<sup>9</sup> The aim of this study was to investigate how limited mouth opening affects the quality of life and mental health in patients with oral sub mucous fibrosis, infection, ankylosis, TMD and post-extraction measured through GTQ index. Also assess the incidence of limited mouth opening and its prevalent causes in our study setting.

## METHODOLOGY

A cross-sectional study was conducted at Fatima Jinnah Dental College and Hospital (FJDC&H). The sampling technique was consecutive. The sample size of 70 patients was calculated at 5% incidence of trismus<sup>15</sup> at 95% confidence interval and 5% margin of error using OpenEpi software. There were a total of 70 patients included in the study who presented with the complaint of restricted mouth opening (trismus) to the Department of Oral and Maxillofacial Surgery of a teaching hospital. The patients presented with oral submucous fibrosis (OSF), infection, ankylosis, temporomandibular pain dysfunction (TMPD) and post-extraction were included in the study. Congenital, genetic, malignant and degenerative causes of TMJ disorders were excluded. The duration of the study was one year from Jan 2020 to Dec 2020. A verbal consent was taken from the participants. Those who were not willing to give consents were not included in the study. The ethical approval was obtained from the institutional ethical review committee (Aug-2021-ORS01).

Patients were asked a group of closed ended questions with the help of a Gothenburg Trismus Questionnaire (GTQ),<sup>12</sup> to conduct a survey. The Gothenburg Trismus Questionnaire has been already validated and modified by the previous researchers.<sup>11, 12</sup> The GTQ comprises 21 items of which it divided into jaw problems (7 items), eating problems (6 items), facial pain (3 items), lifestyle problems (5 items) and inter-incisal distance. The mean GTQ scoring ranges from 0-100,

where 100 indicates maximum symptom burden and 0 equates to no symptom.

The statistical analysis of data was calculated by statistical package for social sciences (SPSS version 20). For quantitative data (age, mouth opening) means, SD and range were calculated. The Chi-square or likelihood test was applied to find association of age group and gender with causes of trismus. T-test was applied to assess the statistical correlation of different domains of GTQ for trismus. One-way ANOVA was applied to find association of GTQ domains and cause of trismus. P-value  $\leq .05$  was considered to be significant.

## RESULTS

In the present study, the most commonly observed etiology of limited mouth opening (trismus) was attributed to oral submucous fibrosis 41, 58.6% followed by infections 11, 15.7% (pulpal, periodontal, mandibular space infections, etc.). The less common causes of limited mouth opening were trauma (8, 11.4%), temporomandibular problems (8, 11.4%), and dental treatment related to lockjaw (2, 2.9%). Table 2 represents the socio-demographic and clinical characteristics of patients. The mean inter-incisal distance of  $11.8 \pm 5.9$  mm was measured in patients presented with limited mouth opening in our clinical setting. Females were more commonly presented with temporomandibular dysfunction (7, 87.4%), and odontogenic infection (8, 72.7%). Males were prevalently presented with oral submucous fibrosis (28, 68.3%), and ankylosis (5, 62.5%).

In the study, the utilization of the Gothenburg trismus questionnaire GTQ was proved as highly relevant. The t-test results showed that jaw-related problems were most commonly affecting the quality of patients' life (table 3). The jaw related issues were significantly associated with oral submucous fibrosis ( $p=0.031$ ) and temporomandibular disorders ( $p=0.05$ ). However, the eating and lifestyle changes were significant affecting the routine of those patients who were suffering from temporomandibular disorders ( $p =0.037, 0.043$ ). The domain of facial pain was statistically significant in odontogenic infection ( $p=0.05$ ) and not with any other cause of limited mouth opening (table 1).

## DISCUSSION

In the present study, we have assessed that limited mouth opening is one of the prevailing clinical presentation in the dental OPD. Limited mouth opening (trismus) is multifactorial manifestation which may include odontogenic infection, pericoronitis, OSF, injury, TMD, head and neck oncology, and postoperative difficulties.<sup>12, 13</sup> In our study, oral submucous fibrosis and odontogenic infection were found to be the commonest etiological factors associated with limited mouth opening. In other studies, the most widely recognized

TABLE 1: GTQ - DOMAINS X CAUSE OF TRISMUS

GTQ - DOMAINS X CAUSE OF TRISMUS	OSF (N=41/70)			INFECTION (N=11/70)			ANKYLOSIS (N=8/70)			TMD (N=8/70)			Post Extraction (N=2/70)		
	Mean	SD	p-Value	Mean	SD	p-Value	Mean	SD	p-Value	Mean	SD	p-Value	Mean	SD	p-Value
Jaw Problems	18.9	5.2	0.030	20.8	5.7	0.625	20.9	6.6	0.661	23.5	4.0	0.05	23.0	4.0	0.439
Eating Problems	11.3	4.8	0.196	11.2	4.8	0.584	12.0	5.0	0.973	15.4	5.5	0.037	15.5	5.0	0.308
Facial Pain	9.2	3.9	0.756	9.5	2.8	0.05	8.3	4.3	0.503	8.4	4.2	0.568	11.0	4.2	0.475
Lifestyle Changes	14.9	5.3	0.265	15.5	5.1	0.925	14.5	3.5	0.584	18.8	4.3	0.043	16.5	2.1	0.756
Inter Incisal Dis-tance	12.4	5.5	0.340	13.3	6.0	0.381	8.4	6.1	0.083	11.0	8.4	0.685	9.0	1.4	0.502

\*Statistically significant p-value  $\leq 0.05$  (One way ANOVA)

causes of limited mouth opening were oral submucous fibrosis and cancer-related issues.<sup>14, 15</sup> In this study, the average mouth opening was found to be 11.8 mm among the study participants. In contrast, the normal mouth opening should be  $\geq 35$  mm in an average person. This shows that such patients might have difficulty in performing routine functions like eating, speaking, swallowing, and esthetics concern which brings them to the clinician urgently.

In the study, the foremost common cause of limited mouth opening was oral submucous fibrosis (58.5%). Siddiqui and colleagues also found oral submucous fibrosis (26.7%) most prevalent cause of limited mouth opening. The reason behind was that the consumption of smokeless tobacco products (betel nut, betel quid and gutka) are very common in our population.<sup>16</sup> The constant consumption results in submucosal and muscle fibrosis of the oral tissues.<sup>17</sup> This may occur due to abnormal collagen deposition in the connective tissue and deeper structures which hinders the normal mouth function.<sup>18</sup> It affects patient quality of life as a result of immobile jaw, eating difficulty, and maintaining oral hygiene which can further aggravate the existing condition by nutritional deficiency and opportunistic infection.<sup>19</sup> It also creates difficulty for the practitioners to treat any associated pathology or perform procedures like scaling, extraction and root canal treatment. OSF has also a potential to transform into oral malignancy if the cause is not eradicated and symptoms not resolved effectively.<sup>20</sup> The GTQ represented the statistically significant outcome between OSF and jaw related issues ( $p=0.031$ ) but not with other domains.

In this study, we have come across the second common cause of limited mouth opening was dental originated infections (periapical infection or pericoronitis). Similar result was found by the Trimarchi et al in their study they have reported the dental related infection was usually associated with mandibular posterior region especially third molars.<sup>22</sup> The accumulation of pus in the oral soft tissue spaces results in severe pain, swelling and reduced mobility of mandible.<sup>21</sup> According to the Gothenburg trismus scoring most of the patients experienced severe facial pain in the dental related infection which is also statistically significant ( $p=0.05$ ). The infection if not treated timely may spread to deeper head and neck spaces which become an emergency situation and need immediate treatment.<sup>22</sup>

In the study, the patients diagnosed with temporomandibular disorders were facing many health related issues like immobile jaw ( $p=0.05$ ), eating difficulty ( $p=0.037$ ) and disturbed lifestyle (0.043). Dahlstrom et al convincingly stated that Oral health-related quality of life (OHRQoL) was negatively affected among TMD patients<sup>25</sup>. TMD is the most common type of non-odon-

TABLE 2: SOCIO-DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF PATIENTS

VARIABLES	OSF N%	INFECTION N%	ANKYLO-SISN%	TMPDS N%	POST EX-TRACTIONS N%
Age group					
<20	3 (4.2%)	3 (4.2%)	1 (1.4%)	3 (4.2%)	0 (0%)
20-30	17 (24.2%)	1 (1.4%)	5 (7.1%)	4 (5.7%)	1 (1.4%)
31-40	12 (17.1%)	5 (7.1%)	1 (1.4%)	1 (1.4%)	1 (1.4%)
41-50	6 (8.6%)	2 (2.8%)	1 (1.4)	0 (0%)	0 (0%)
51-60	3 (4.2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	41 (58.6%)	11 (15.7%)	8 (11.4%)	8 (11.4%)	2 (2.8%)
p-value	.048*	.146	.668	.023*	.905
Gender					
Male	28 (40%)	3 (4.2%)	5 (7.1%)	1 (1.4%)	1 (1.4%)
Female	13 (18.5%)	8 (11.4%)	3 (4.2%)	7 (10%)	1 (1.4%)
Total	41 (58.6%)	11 (15.7%)	8 (11.4%)	8 (11.4%)	2 (2.8%)
p-value	.005*	.048*	.457	.015*	.902
Average MO (mm)	11 mm	12 mm	6 mm	12 mm	13 mm

MO=Mouth opening

\*Statistically significant results on Chi-square

TABLE 3: GTQ DOMAINS OF PATIENTS

GTQ Domains	Score Range	Mean (SD)	t-Test	p-value
Jaw Problems (GTQ 1-7)	7-35	18.9 (5.2)	2.214	0.031*
Eating Problems (GTQ 8-13)	6-30	11.4 (4.8)	1.307	0.196
Facial Pain (GTQ 14-16)	3-15	9.2 (3.9)	-0.312	0.756
Lifestyle Changes (GTQ 17-21)	2-25	14.9 (5.3)	1.125	0.265
Inter-Incisal Distance (Mouth Opening)	-	11.81 (5.9)	-0.96	0.34

\*Statistically significant p-value  $\leq 0.05$

togenic oral and facial pain and patients present with pain affecting the face, TMJ and teeth, limited mouth opening and clicking sounds during jaw movements.<sup>23</sup>

TMDs are classified into extra capsular (predominantly myofascial) and intracapsular issues (disc displacement, arthritis, fibrosis, and so forth).<sup>24</sup> Intra-capsular problems usually take place due to trauma and clicking sound may indicate anterior disc displacement.<sup>25</sup> Painless clicking alone doesn't need treatment. Presence of TMJ trauma or separation should be considered in young adults who have dysphagia and limited mouth opening.<sup>26</sup> If the mouth opening is extremely less than the practitioner thoroughly examining the TMJ, it may be associated with muscular origin.

Traumatic or complicated dental extraction may cause postoperative restricted mouth opening.<sup>27</sup> The lockjaw may also happen after the dental extraction,

especially third molars, which aggravate muscle spasm or direct injury to the TMJ.<sup>4</sup> Another important cause of limited mouth opening has been noticed in routine practice is occurred by incorrect placement of the needle while administering the inferior nerve block.<sup>28</sup> The impact of limited mouth opening on a patient's routine can be impactful and can affect many domains corresponding to the overall health and lifestyle including oral hygiene, eating, swallowing, nutrition, and speech etc.<sup>29, 30</sup>

## CONCLUSION

The present study has been conducted to identify the prevalent cause of limited mouth opening (trismus) which appeared to be oral submucous fibrosis and dental infection in our population. We found that trismus is basically a common symptom or condition of various oral diseases which could cause deleterious impact in



a patients' quality of life. However, these problems do not represent an immediate risk of death; they are responsible for decreasing the quality of patient's life as they suffer prolonged states of pain & discomfort, which cause functional, aesthetic, nutritional and psychological problems. It is necessary to diagnose the accurate etiology of limited mouth opening (trismus) in those patients, who reported to the out-patient department with this complaint for its effective and complete management; also to improve patient's quality of life.

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- |                      |  |
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| 1 Urooj Saqib:       | Designed, literature review, data collection, manuscript writing |
| 2 Hasan Mehdi:       | Concept, designed, Literature review and proof-reading           |
| 3 Mehwish Feroz Ali: | Literature review, data analysis, manuscript writing             |
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