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Assessment of Postoperative Sensitivity in Direct Resin Composite Restorations with and Without Liners

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ABSTRACT

Background: Trismus or lockjaw, characterized by limited mouth opening, presents as a complication associated with odontogenic infections commonly involving mandibular teeth. Due to limited literature providing insight to probable odontogenic causes of trismus, this study is oriented to determine the incidence of Trismus severity in association with fascial space infection resulting from odontogenic causes, i.e., pericoronitis, pulp infection, or periodontal infection.

Methods: This study was conducted at the Department of Oral and Maxillofacial Surgery, Azra Naheed Dental College/ Chaudhry Muhammad Akram Dental Hospital from July 2024 to December 2024. In this descriptive cross-sectional study, following non-probability purposive sampling, 87 patients who had trismus secondary to fascial space infections were enrolled. All required demographic and clinical data were recorded in a purpose-designed form. The collected data were analyzed by the Chi-square test, using SPSS version 25. A p-value of ≤ 0.005 was considered significant.

Results: The average mean value of Trismus was 23.5±5.5mm. Submandibular space infection most frequently involved the fascial space 42 (48.2%), and the mandibular third molar was frequently involved, offending tooth 43 (49.4%) in this study. The most common cause of odontogenic infection was Pulp infection/caries 58 (66.6%), followed by pericoronitis 27 (31.3%) and periodontal infection 2 (2.3%).

Conclusion: Mandibular third molars are the most involved teeth, leading to fascial space infection and associated with increased severity of Trismus. The submandibular space is the most affected fascial space, and pulp infection is the major cause of odontogenic infection, leading to fascial space involvement.

Keywords: Pericoronitis, Periapical Abscess, Periodontal Abscess, Trismus, Third Molars.

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INTRODUCTION

Fascial space infections emanating primarily from odontogenic cause pose a major challenge for oral and maxillofacial surgeons. The most frequent dental origin of fascial space infection includes mandibular second and third molars[1,2]. However, commonly reported causes of infection are caries/ pulp infection, pericoronitis, and periodontal infection[3,4]. Odontogenic infections extending to involve fascial spaces are sequelae of untreated dental infections. Swelling, pain, fever, Trismus, dyspnea, dysphagia, tachycardia, and tachypnoea are the symptoms associated with space infections[5,6]. Progression of odontogenic infections to deep neck spaces could lead to severe morbidity and associated mortality [7,8.]

Trismus refers to restricted mouth opening and is linked to the odontogenic fascial space infections involving masticatory muscles [2,9]. Trismus is the hallmark of severe odontogenic infection, and if left untreated, could lead to life threatening consequences[10,11]. Odontogenic infections are prevalent despite the availability of antibiotics and dental care advancements, particularly in patients with limited access to dental services and compromised immune responses. Better knowledge about the incidence and risk factors associated with Trismus is crucial for prompt diagnosis and effective treatment planning of severe odontogenic infections[12]. Early detection and effective management could therefore prevent the unpredictable progression of infection.

This study aims to determine the incidence of Trismus severity in association with fascial space infection resulting from odontogenic causes i.e, pericoronitis, pulp infection, or periodontal infection.

METHODS

The study was conducted at the Oral and Maxillofacial Surgery Department, Azra Naheed Dental College/Chaudhry Muhammad Akram Dental Hospital, Lahore, from July 2024 to December 2024, after approval from the ethical review committee (ANDC/RAC/2024/36). Non-probability purposive sampling by keeping confidence level 85% and 5% error margin, a sample of 87 patients with fascial space infection of odontogenic origin from mandibular molars and limited mouth opening between 15-80 years were enrolled in the study (https://www.calculator.net/sample-size calculator.html?type=1&cl=85&ci=5&pp=38.3&ps=154&x=Calculate)[5]. Non-odontogenic and non-infectious causes of trismus and fascial space infection were kept in the exclusion criteria. Written and verbal informed consent was taken from all patients. All required demographic and clinical data were recorded in a purpose-designed form. Detailed intraoral and extraoral examination was performed, primarily to identify the offending tooth, swelling, Trismus, and other associated

complications. Periapical x-ray, Orthopantomogram, and Ultrasonography were done to confirm the diagnosis of the involved tooth and fascial spaces[13].

Mouth opening was measured using vernier calipers positioned between the incisal edges of the upper and lower central incisors. Severity of Trismus was recorded under the classification given in a study, Mild Trismus > 30mm, Moderate Trismus 15-30mm, and Severe Trismus < 15mm[14].

After collecting all required data and patient evaluation, all patients were treated accordingly. Collected data were entered into SPSS version 25, and the results were analyzed. The qualitative variables in the data, which is gender, causes of trismus (pericoronitis, pulp infection, and periodontal infection), involved mandibular fascial spaces (submandibular, sublingual, buccal, somesthetic, pterygomandibular), and mandibular molars (1st, 2nd, and 3rd molar) were presented as frequency and percentage. The quantitative variable, age and severity of trismus, was presented as mean ± standard deviation. Descriptive statistics, including frequency, percentage, and mean ± standard deviation, were calculated. Inferential statistics, such as the chi-square test (for categorical variables), were used to identify significant associations. A p-value of < 0.05 was taken as significant.

RESULTS

Total 87 patients with mean age 42.43±7.4 years and fulfilling the inclusion criteria were enrolled in the present study to evaluate the frequency distribution of odontogenic causes (pericoronitis, pulp infection, periodontal) of fascial space infection, involved fascial spaces and mandibular molars concerned with Trismus in patients visiting the Azra Naheed Dental College/ Chaudhry Muhammad Akram Dental Hospital, Lahore. Descriptive analysis provided a gender distribution ratio of 1.7:1, with 55(63.5%) male and 32(36.5%) female patients (**Figure 1**).

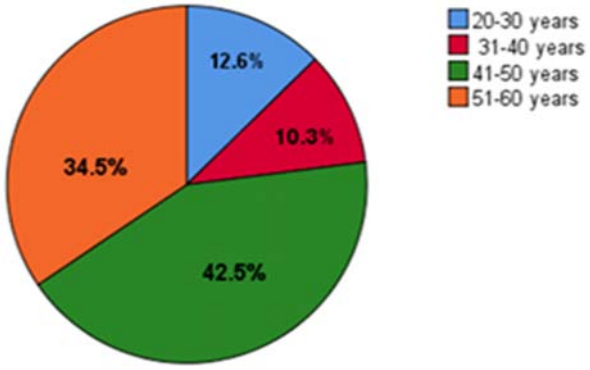

Figure 1: Frequency of Age Distribution

Table 1: Fascial Space Infection and Severity of Trismus

Fascial Spaces	Mild Trismus	Moderate Trismus	Severe Trismus	Total
Sublingual	0	3 (3.4%)	0	3 (3.4%)
Submandibular	5 (5.7%)	34 (39.08%)	3 (3.4%)	42 (48.2%)
Buccal	10 (11.4%)	8 (9.2%)	0	18 (20.65)
Submesseteric	0	14 (16.09%)	7 (8.05%)	21 (24.1%)
Pterygomandibular	0	0	3 (3.45)	3 (3.4%)
Total	15 (17.2%)	59 (67.8%)	13 (14.9%)	87 (100%)

According to the data evaluated, 49.4% (43) fascial space infections causing trismus were caused by 3rd molars, 28.7% (25) by 2nd molars and 21.8% (18) by mandibular 1st molars. The mean value of Trismus in all patients was 23.5±5.5mm with 67.8% (59 patients) having moderate Trismus (15-30mm), 17.2% (15 patients) mild Trismus (30-40mm) and 14.9% severe Trismus (≤15mm) (13 patients). The incidence of buccal space involvement by mandibular molars infection was 20.6% (18 patients) out of which 11.4% (10 patients) had mild Trismus and 9.6% (8) had moderate Trismus. Submesseteric space was involved in 24% (21) patients with 8% (7 patients) having severe Trismus (≤15mm) and 16% (14) with moderate Trismus (average value 20mm). Submandibular space was involved in 48.2% (42) cases with distribution of 5.7% (5), 39% (34), 3.4% (3) in mild, moderate and severe Trismus respectively, whereas sublingual 3.4% (3) and pterygomandibular space 3.4% (3) involvement was observed with patients having only moderate and severe Trismus respectively.

According to collected data submesseteric and pterygomandibular space infections were associated with severe Trismus 14.9% (13 patients), Moderate Trismus 67.8% (59 patients) was associated with highest incidence in submandibular space infections (34 patients) followed by submesseteric space (16.09%, 14 patients), buccal space (9.2%, 8 patients) and sublingual space (3.4%, 3 patients), Mild Trismus was reported in 17.2% patients (15) and majority of patients in this category had buccal space (11.4%, 10 patients) infection and only 5 patients (5.7%) had submandibular space infection (**Table 1,**).

Table 2: Frequency Distribution of Causes of Odontogenic Infection and Severity of Trismus

Cause of Trismus	Mild Trismus	Moderate Trismus	Severe Trismus	Total
Pulp Infection	15 (17.24%)	39 (44.83%)	4 (4.6%)	58 (66.6%)
Pericoronitis	0	18 (20.69%)	9 (10.34%)	27 (31.3%)
Periodontal Infection	0	2 (2.3%)	0	2 (2.3%)
Total	15 (17.24%)	59 (67.8%)	13 (14.9%)	87 (100%)

Incidence of Odontogenic causes (pericoronitis, pulp infection, and periodontal infection) leading to fascial space infections and Trismus was evaluated. Mandibular space infection and Trismus were caused by pulp infection in 66.6% (58 patients), 31.3% (27 patients) had pericoronitis, and only 2.3% (2 patients) had periodontal infection. Upon comparing the severity of Trismus with the cause of odontogenic infection, severe trismus (observed in 13 patients) was most commonly associated with pericoronitis (in 8 patients). Moderate Trismus (59 patients) was observed in a major proportion with pulp infection (44.8%), whereas mild Trismus was observed in 15 patients, and all had pulp infection (**Table 2**).

Table 3: Frequency Distribution of Mandibular Molars with Odontogenic Fascial spaces involved and causes of Odontogenic Infections

		1st Molar	2nd Molar	3rd Molar	Total
Fascial Spaces	**Buccal Space**	14 (16.1%)	4 (4.5%)	0	18 (20.65%)
	Submesseteric Space	0	0	21 (24.1%)	21 (24.1%)
	Sublingual Space	0	2 (2.2%)	1(1.1%)	3 (3.4%)
	Submandibular Space	5 (5.7%)	19 (21.8%)	18 (20.6%)	42 (48.2%)

	Pterygomandibular Space	0	0	3(3.4%)	3 (3.4%)
	Total	19 (21.8%)	25 (28.7%)	43(49.4%)	87 (100%)
Causes of Infection	**Pericoronitis**	0	0	27 (31.0%)	27 (31.0%)
	Pulp Infection	16 (18.3%)	25 (28.7%)	17 (19.5%)	58 (66.6%)
	Periodontal Infection	2 (2.3%)	0	0	2 (2.3%)
	Total	18 (20.6%)	25 (28.7%)	44 (50.5%)	87 (100%)

DISCUSSION

Trismus in addition to pain, fever, dysphagia and swelling is one of the several complications emanating from Odontogenic fascial space infection[15,16,17], progression of these infections accounts for mortality rate of 10-40% because of severe complication[1,18]. Literature is deficient in data highlighting the severity of Trismus in association with odontogenic origin. This study orients to identify the most prevalent odontogenic cause, involved fascial spaces and their impact on severity of Trismus.

The mean average age of patients in present study was 42.43±7.4 years. Several other studies evaluating odontogenic infections reported similar mean age values.[5,7,15] Male predominance (63.5% male and 36.5% female patients) was also consistent with similar finding of other researchers[2,5,15]. Patients with odontogenic infection and fascial space involvement in this study, presented mostly in 4^{th} to 5^{th} decade of life, this finding was like the findings of other authors, this might be due to poor oral health conditions and compromised systemic health conditions[3,18].

In this study, 76% patients had mouth opening ≤ 25mm, among them majority of the patients (63%) were above 40 years of age. Simple regression analysis suggests that age is an independent risk factor for increased severity of Trismus. This finding could be supported by the evidence of reduced immune response to infections with advancing age[10] thus resulting in more complex outcomes. The association between all mandibular molars and severity of Trismus was evaluated. Trismus of ≤ 25mm, in 45% patients was caused by mandibular 3rd molar infections, 25% by 2nd molars and only 5% by 1st molar. Similar to this study, third molars with increased incidence of space involvement and severity of trismus has been reported by other authors[2,7,19,20,21] however, in contrast to our study 1st molar as most frequent cause of fascial space infection have also been reported in literature[22].

The highest incidence of submandibular space (48.2%) involvement mostly by mandibular 2nd and 3rd molars was observed in this study. Another study reported the highest involvement of submandibular space (44.26%) among the sample of 100 patients[22]. Several other authors have reported similar results [15,19,23,24,25]. In contrast to our study, 23% involvement of submandibular space in patients having fascial space infections was reported[2]. In this study, Submandibular space infection was linked with moderate to severe Trismus. Submesseteric (24%) and pterygomandibular (3.4%) space were involved by only mandibular 3rd molars, 22 out of 24 patients involving these spaces had mouth opening ≤ 25mm, indicating submesseteric and pterygomandibular space involvement linked with increased severity of Trismus. Mahran et al reported submesseteric space involvement of 10.1%, only by 3rd molars as our study[2]. Comparative results regarding submesseteric (28.6%) and pterygomandibular space (4.2%) involvement were reported by another author[5]. In this study, 20% of patients had buccal space involvement mostly by mandibular 1st molars, all patients had mild Trismus. In contrast to this study, 27% involvement of buccal space has been documented among 158 involved fascial spaces[22].

The most common odontogenic cause of fascial space infections in this study was caries/pulp infection (66.6%). Comparable to this study, high frequency of pulp infection as cause of odontogenic infection i.e. 65% was reported in sample of 100 patients[22]. Another study reported caries as common cause of fascial space infection (60%) among sample of 50 patients[19]. Similarly, several other authors documented pulpal infection as common cause of fascial space infection i.e, 44% among 75 patients and 70% among 137 patients [3,20]. Findings of our study concerning pericoronitis (31.3%) was comparable to a study, who reported 36% involvement of fascial spaces by pericoronitis[22]. In contrast to this study (periodontal cause 2.3%), one of the author reported 20% space infections caused by periodontal issue and only 8% infections caused by pericoronitis[19]. Another author also reported periodontal infection in 16% and pericoronitis in 13.3% patients[20]. The incidence of periodontitis in

other studies was high i.e, 20%, 21% when cthe ompared with our study (2.3%)[19,22,25]. This might be due to consideration of all mandibular and maxillary dentition concerned with fascial space involvement in contrast to our study which included only mandibular molars.

CONCLUSION

In conclusion, mandibular third molars are the most frequently involved teeth related to fascial space involvement and present with increased severity of Trismus. Although submandibular space is most commonly involved fascial space, but severity of Trismus increases with the involvement of submesseteric and pterygomandibular space. Pulp infection is the most widely spread cause among the presented population which extends to involve the fascial spaces in orofacial region.

LIST OF ABBREVIATIONS

None.

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CONFLICT OF INTEREST

None.

ETHICAL APPROVAL

The study was conducted following approval from Ethical Review Committee of Azra Naheed Dental College. Reference number: ANDC/RAC/2024/36.

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PATIENT CONSENT

Written Informed consent was taken from all patients.

AUTHORS' CONTRIBUTIONS

IP: Conceptualization and methodology, Data Collection, Data Analysis, Manuscript writing, **SMAR**: Data Collection, Data Analysis, **MZAK**: Manuscript review, Data Interpretation **MAS**: Literature Review, **SFAK**: Manuscript Review, **MN**: Data Interpretation, Manuscript Review

REFERENCES

1. Bali RK, Sharma P, Gaba S, Kaur A, Ghanghas P. A review of complications of odontogenic infections. National journal of maxillofacial surgery. 2015 Jul 1;6(2):136-43. DOI:10.4103/0975-5950.183867

2. Mahran H, Hassanein AG, Rizq M. Trends and outcome of aggressive fascial space infections. Surgical Infections. 2023 Jun 1;24(5):475-81. DOI: 10.1089/sur.2023.079

3. Mathew GC, Ranganathan LK, Gandhi S, Jacob ME, Singh I, Solanki M, Bither S. Odontogenic maxillofacial space infections at a tertiary care center in North India: a five-year retrospective study. International Journal of Infectious Diseases. 2012 Apr 1;16(4):e296-302. DOI:10.1016/j.ijid.2011.12.014

4. Evsen EA, Candan M, Dur MP. Serious Complications and Treatment Strategies Associated with Odontogenic Infections. The Eurasian Journal of Medicine. 2023 Dec;55(1):S142. DOI: 10.5152/eurasianjmed.2023.23378.

5. Yew CC, Sivamuni SS, Khoo SE, Yuen KM, Tew MM. Clinical Management of Orofacial Odontogenic Infection: A Four Year Retrospective Study. Archives of Orofacial Science. 2021 Jun 1;16(1). doi:10.21315/aos2021.16.1.3

6. Ullah M, Irshad M, Yaacoub A, Carter E, Cox S. Hospitalisations Due to Dental Infection: A Retrospective Clinical Audit from an Australian Public Hospital. Dentistry Journal. 2024 Jun 6;12(6):173. DOI: 10.3390/dj12060173.

7. Ekici Ö. Epidemiological analysis and management of patients with facial space infections of odontogenic origin: A retrospective evaluation of two years. Clinical and Experimental Health Sciences. 2023 Mar ;13(1):58-66. DOI:10.33808/clinexphealthsci.994256

8. Fornari V, Souza MA, Dallepiane FG, Pasqualotti A, Conto FD. Maxillofacial infections of dental origin: risk factors for hospital admission. Brazilian Journal of Oral Sciences. 2024 Nov 29;23:e243442. DOI: https://doi.org/10.20396/bjos.v23i00.8673442

9. Raj R, Thankappan K, Janakiram C, Iyer S, Mathew A. Etiopathogenesis of trismus in patients with head and neck cancer: an exploratory literature review. Craniomaxillofacial Trauma & Reconstruction. 2020 Sep;13(3):219-25. DOI: 10.1177/1943387520917518

10. Quiros-Roldan E, Sottini A, Natali PG, Imberti L. The Impact of Immune System Aging on Infectious Diseases. Microorganisms. 2024 Apr 11;12(4):775. DOI: 10.3390/microorganisms12040775

11. Neal TW, Schlieve T. Complications of severe odontogenic infections: a review. Biology. 2022 Dec 8;11(12):1784.DOI: 10.3390/biology11121784.

12. Burgos-Larraín LF, Vázquez-Portela Á, Cobo-Vázquez CM, Sáez-Alcaide LM, Sánchez-Labrador L, Meniz-García C. Brain complications from odontogenic infections: a systematic review. Journal of stomatology, oral and maxillofacial surgery. 2022 Nov 1;123(6):e794-800. DOI: 10.1016/j.jormas.2022.07.018.

13. Shah N, Patel S, Rupawala T, Makwana S, Mansuri S, Bhimani K. Evaluation of efficacy of ultrasonography as an additional diagnostic tool for deciding management protocol of odontogenic superficial fascial space infections: a prospective clinical study. Journal of Maxillofacial and Oral Surgery. 2021 Apr 11:1-7. DOI: https://doi.org/10.1007/s12663-021-01560-x

14. Somay E, Kucuk A, Yilmaz B, Pehlivan B, Selek U, Topkan E. Definitions of Radiation-induced Trismus in Head and Neck Cancer: Current Concepts and Controversies. Exon Publications. 2022 Oct 28:23-40. DOI: 10.36255/radiation-induced-trismus.

15. Rahim SM, Shahzad MA, Qureshi SW, Ahmad MZ, Khan SF, Alvi IR. The Prevalence of Odontogenic Infections: An Analysis of Most Commonly Affected Teeth and Fascial Spaces. Journal of Rehman College of Dentistry. 2024 Jul 3;5(1). DOI https://doi.org/10.52442/jrcd.v5i1.85

16. Neal TW, Carr BR, Schlieve T. Are higher odontogenic infection severity scores associated with difficult intubations?. Oral and Maxillofacial Surgery. 2024 Mar;28(1):435-40. DOI: https://doi.org/10.1007/s10006-023-01168-0

17. Qian Y, Ge Q, Zuo W, Cheng X, Xing D, Yang J, Costa Viana MG, Atsawasuwan P. Maxillofacial space infection experience and risk factors: a retrospective study of 222 cases. Irish Journal of Medical Science (1971-). 2021 Aug;190:1045-53. DOI: https://doi.org/10.1007/s11845-020-02431-z

18. Igoumenakis D, Gkinis G, Kostakis G, Mezitis M, Rallis G. Severe odontogenic infections: Causes of spread and their management. Surg Infect (Larchmt). 2014;15(1):64-8. DOI: 10.1089/sur.2012.178

19. Adesina OA. Fascial space infection of odontogenic origin: A review of cases treated in a Nigerian teachinghospital.LASU-JMS. 2020;Apr(1). https://www.researchgate.net/publication/342349197

20. Eltohami YI, Abuaffan AH, Bakry I, Abdulla I, Mahmod I, Abdulla AM. Pattern of odontogenic fascial space infections among a sample of Sudanese Patients. Indian J Dent Educ. 2016 Oct;9(4):209-17. DOI: https://dx.doi.org/10.21088/ijde.0974.6099.9416.1

21. Prabhu SR, Nirmalkumar ES. Acute fascial space infections of the neck: 1034 cases in 17 years follow up. Annals of maxillofacial surgery. 2019 Jan 1;9(1):118-23. DOI: 10.4103/ams.ams_251_18

22. Shakya N, Sharma D, Newaskar V, Agrawal D, Shrivastava S, Yadav R. Epidemiology, microbiology and antibiotic sensitivity of odontogenic space infections in Central India. Journal of maxillofacial and oral surgery. 2018 Sep;17:324-31. DOI: 10.1007/s12663-017-1014-y.

23. Eshghpour M, Sabouri M, Labafchi A, et al. Maxillofacial infections: A 5-year assessment of the epidemiology and etiology in an Iranian population. J Maxillofac Oral Surg. 2024 Apr;23:1470-7. DOI: 10.1007/s12663-021-01569-2.

24. Neal TW, Hammad Y, Carr BR, Wahidi J, Cannon S, Schlieve T. Assessment of pro re nata inpatient opioid consumption following surgical treatment of severe odontogenic infections. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2022 Aug 1;134(2):159-62. DOI: https://doi.org/10.1016/j.oooo.2022.01.001

25. Ali I, Alam F, Shah A, Naeem M, Zaman R, Khan A. Prevalence of Odontogenic Infections in Primary Facial Spaces and Identify Associated Demographics in Patients Presenting to a Tertiary Care Hospital at Swat. Journal of Saidu Medical College. 2025 Jan 29;15(1):25-9. https://doi.org/10.52206/jsmc.2025.15.1.1026

26. Martins CA, Goldenberg DC, Narikawa R, Kowalski LP. Trismus and oral health conditions during diagnosis of malignant oral neoplasms. Brazilian Journal of Otorhinolaryngology. 2020 Nov 9;86(5):552-7. DOI: 10.1016/j.bjorl.2019.02.004.

27. Kusumoto J, Iwata E, Huang W, Takata N, Tachibana A, Akashi M. Hematologic and inflammatory parameters for determining severity of odontogenic infections at admission: a retrospective study. BMC Infectious Diseases. 2022 Dec 12;22(1):931. DOI: https://doi.org/10.1186/s12879-022-07934-x