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Information to Authors

Chattagram International Dental College (CIDC) started its historical and memorable journey in the 2013 year. CIDC is the only Private Dental College in Chattogram which is smoothly running under the guidance of Chittagong Medical University.

CIDC is approved by the Government of the Peoples Republic of Bangladesh and is recognised by the Bangladesh Medical and Dental Council (BMDC). CIDC is representing pioneer and exemplary academic and clinical oriented research institute of Bangladesh. About 65 Dental students completed their graduation from CIDC per annum.

Chattagram International Dental College commenced to publish a peer reviewed Journal from 1st January 2018 which is recognized by BMDC and having International Standard Serial Number (ISSN) 2707-2185. The journal intend to publish article of authors from any part of the globe, but has a special interest in publishing research articles of authors from Bangladesh and of relevance to developing countries. It interested in Editorial, Original (Research) articles, Special articles, Review articles, Short Communications, Case report and letters on new findings of Medical Science.

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Appropriate measures has been taken to make the journal indexed / abstracted in major international indexing systems including the PubMed/MEDLINE, Index Medicus, Google Scholar, DOAJ, Hinari and Scopus etc.

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A structured abstract should not be of more than 250 words. It should be a factual description of the study performed organized with the heading of Background (Includes aim or objectives) Methods (Includes patient population, procedures and data analysis) Result and Conclusion. The abstract should contain the data to support the key findings or conclusions of the study and this should be self explanatory without references to the text. the first time an abbreviated term is used it should be spelled out in full form and follow with the abbreviation in parentheses for example :- CKD (Chronic Kidney Disease). Please do not cite any references in the abstract.

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Regarding references please follow the Vancouver style (Uniform requirements for manuscripts submitted to biomedical journals prepared by the International Committee of Medical Journal Editors (ICMJE guideline http://www.icmje.org).

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Competing Interests

Chattagram International Dental College Journal requires authors to declare any competing financial or other interest in relation to their work. Where an author gives no competing interests, the listing will read the author (s) declare that they have no competing interests.

Editorial

Chattagram International Dental College Journal

Volume 08 Issue 01 January 2025; 1-2

Academic Integrity and Medical Students

M Jalal Uddin[1*]

The word Academic Integrity is defined as a commitment to the fundamental principles and values in academic environment.

Academic integrity is built on six overlapping principles that reflect the core values needed for good academic work.

This principles are as follows:

Fairness

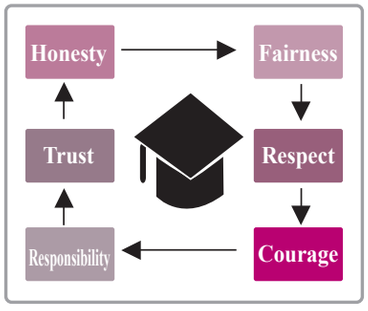
Fairness is vital for maintaining an ethical environment. It involves key aspects such as being reasonable, transparent, unbiased, and just. We demonstrate fairness when we act honestly and complete our own tasks. Acknowledging the ideas, words, and efforts of others shows fairness to authors and creators. Additionally, upholding academic standards and practices reflects fairness towards the academic community.

Honesty

Honesty requires being truthful and sincere, avoiding deceit, and acting fairly. It begins with personal integrity and extends to relationships within the community. To acquire and benefit from knowledge, we must be honest with ourselves and others. Practicing honesty forms the basis for a lifelong commitment to integrity.

Trust

Trust is the confidence in someone's reliability, truthfulness, capability, or strength. It is essential for academic collaboration and the free exchange of ideas. Trust ensures that individuals can share knowledge without fear of their work being exploited or their reputation being harmed.



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Respect

Respect involves appreciating someone or something for their abilities, qualities, or achievements. Mutual respect entails valuing others as one wishes to be valued. In academic settings, respect includes caring about the opinions, reputation, and overall well-being of the community.

Responsibility

Being responsible involves standing firmly against wrongdoing, resisting harmful peer influences, and setting a positive example. Responsible individuals take accountability for their actions and actively discourage unethical behavior in others. Within an academic setting, this includes upholding the values of integrity in scholarship, teaching, and research.

Courage

Courage is a trait that empowers individuals to maintain high educational standards by holding themselves and others accountable for academic integrity, even when facing risks or social disapproval. It means acting in alignment with one's beliefs and principles, regardless of potential challenges or consequences.

Academic integrity is fundamental in education and is the foundation in preparing students to be successful, both personally and professionally.[1] Although adherence to academic integrity principles and core values is crucial for all disciplines, it is particularly significant for medical students because any lapses could compromise patients' safety.[2] In addition to having adequate clinical skills of medical students are expected to behave in accordance with the highest ethical and professional standards to qualify as competent medical professionals who can provide proper healthcare for patients.[3,4]

There is agreement among the medical community that medical ethics education of medical students promotes professionalism in the workplace leading to its wide adoption by medical schools, there is less emphasis on academic integrity and general ethical behavior.[5-7] Many practicing physicians and medical students have expressed dissatisfaction with the lack of emphasis on general ethics education during medical school and it is critical to increase this emphasis during medical training in order to develop ethical patient-doctor relationships.[5,8] Education has a considerable influence on a person's attitude and behavior and significant changes in students' ethical beliefs have been observed as they progress through medical school.[9]

The impact of student academic dishonesty is not just limited to educational institutions, but it also has a correlation with unethical behaviors in workplaces and

corruption in countries.[10,11,3,12] It has been found that cheating during studies was followed by manipulation of clinical data, such as recording patients' vital signs that were not taken or medicines that were never administered.[13]

Therefore, a worldwide increase in disciplinary measures is being witnessed by the medical boards against doctors who engage in unprofessional, incompetent or improper medical behavior.[14]

Finally medical students relating to their level of understanding of academic integrity issues, their awareness of university academic integrity policies, their attitudes and behavior towards academic integrity and the institutional and personal factors affecting academic integrity.

In conclusion a high level of professional integrity is expected from medical students and it has suggested a relationship between unethical behavior of medical students and poor academic integrity behavior at medical school to be avoided.

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Original Article

Chattagram International Dental College Journal

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Oral Hygiene Practice and Treatment Needs among Selected Primary School Children in Chattogram City

Towhida Ahsan[1*] Md Salim Uddin[2] Maliha Tarannum[3] Maisha Ibnath[3]
Robna Hasan Liza[3] Sabrina Sultana Neha[3]

Abstract

Background: *Globally, oral diseases are a major public health concern. The number of oral problems among school-going children is increasing. So, the present study was undertaken to assess the oral hygiene practices and treatment needs among primary school-going children.*

Materials and methods: *In November 2023, this descriptive cross-sectional study was conducted at Shamsherpara Haji Chand Meah Government Primary School in Chattagram. The study involved face-to-face interviews and minor oral health check-ups of 219 students from classthree, four, and five. This study used purposive sampling. Data were collected by pre-tested semi-structured questionnaires and checklists. Statistical analysis was done by using SPSS-26.*

Results: *In this study, most students (29.7%) were 11 years old, with an average age of 10.9±1.3 years. Over 60% of students brushed their teeth in the morning before having a meal, while approximately 40% of students did not brush their teeth at night. The prevalence of caries was 83.6% and only 11% of teeth were filled. About 50% of the students had calculus on their teeth and 30.6% experienced bleeding from their gums. Additionally, pain and sensitivity were reported by 30% of students. This study found that 48.9% of students required pit and fissure sealants, and 47.9% required restorative treatment. Extraction was necessary for 19.2% of students, and 21.5% required endodontic treatment.*

Conclusion: *The evidence from this study clearly shows that many students are suffering from dental problems due to inadequate oral hygiene practices. It is imperative to prioritize maintaining proper oral hygiene and to seek timely dental treatment to prevent further issues.*

Key words

Oral hygiene; Oral health; Practice; Treatment need.

Introduction

Oral hygiene is a crucial part of overall health, especially in children, as it plays a significant role in their growth, development, and overall quality of life. Neglecting oral hygiene can result in various dental issues, such as cavities, gum disease, and other oral infections. These problems can cause pain and discomfort, and may even lead to broader health concerns.[1,2] Untreated dental issues can cause problems with eating, speaking and concentrating, which may affect a child's academic performance and social interactions.[3] Many children do not practice proper oral hygiene, resulting in unmet dental treatment needs despite the well-known importance of maintaining oral health. For instance, the World Health Organization reports that dental caries is one of the most common chronic diseases affecting children worldwide.[4] Factors contributing to poor oral health in children include a lack of knowledge about proper oral hygiene, limited access to dental care and socioeconomic barriers.[5] Schools play an essential role in reaching children, their families and community members effectively. The World Health Organization recommends promoting oral health in schools to enhance students' knowledge, attitudes and behaviors regarding oral health. By implementing these programs, students can inspire positive changes within their families, support primary prevention efforts, and deliver health education to their communities.[6]

The school-age signifies comprehensive development, where a child acquires the skills to contribute positively to their peer group. If sound oral hygiene practices are fixed during this period, they will significantly contribute to sustaining the child's oral health.[7]Hence, promoting awareness of oral health and educating children during this life stage is crucial. Consistent preventive oral care, including effective brushing and flossing, can contribute to the reversal and prevention of dental issues.[8]

This study evaluates the oral hygiene practices and treatment needs of primary school children. Its objective is to promote optimal oral health, enhancing their immediate well-being and contributing to their long-term health and quality of life.

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Materials and methods

This cross-sectional study was conducted among primary school children of Shamsherpara Haji Chand Meah Government Primary School in Chattogramon 13th November 2023. A face-to-face interview was conducted for data collection followed by a minor oral health check-up. Primary school children aged from 8-12 years old were included in this study. Pre-tested semi-structured questionnaires and checklists were used to collect data. This study utilized a convenient type of non-probability sampling. Before data collection, we obtained written informed consent from the school authority and explained the purpose of the study. We also informed the students about the aim of the study and the data collection procedure before collecting data from them. The participation of the students in this study was voluntary and we let them know they could withdraw themselves at any time. Dental mirrors, caries probes, tweezers and torches were used as data collection tools for the oral health check-ups of the students. Students from class one and two and those who were unwilling to participate were excluded from the study. In this study, we collected data from 219 students. A semi-structured questionnaire was initially developed in English to gather relevant data. After creating the questionnaire, it was translated into Bangla, the local language, to ensure that participants could understand and respond accurately. Additionally, a checklist was prepared in English to guide the data collection process, ensuring that all necessary information was captured systematically and consistently.

The data collection instrument was divided into four parts. The first part was related to the socio-demographic information of the students, the oral hygiene practices of the students were included in the second part,the third part was about oral health check-up of the students, and theassessment of treatment needs of the students was included in the last part. Thedata was checked for consistency, relevancy, and quality control. The data was then compiled, coded, cleared, categorized, edited and analyzed by IBM-SPSS 26.

Results

Table I Socio-demographic characteristics of primary school students (n=219)

□	Frequency□	Percentage
Study In		
Class 3□	80□	36.5
Class 4□	75□	34.2
Class 5□	64□	29.2
Gender		
Female□	134□	61.2
Male□	85□	38.8
Age in years		
8□	4□	1.80
9□	27□	12.30
10□	49□	22.40
11□	65□	29.70
12□	74□	33.80

The Table I indicates that out of 219 students, 36.5% were from class 3, 34.2% were from class 4, and 29.2% were from class 5.Also, most of the students were between the ages of 8 and 12 years old, with the highest percentage (33.8%) being 12 years old and the lowest percentage (1.8%) being 8 years old and the maximum number of students being female.

Table II Distribution of Oral Hygiene Practice of the students (n=219)

□	Frequency□	Percentage
Brushing regularity		
Regular□	6□	2.7
Irregular□	213□	97.3
Brushing frequency		
1 time□	95□	43.4
2 times or more□	123□	56.2
Not at all□	1□	0.5
Duration of brushing		
1-3 mins□	130□	59.4
More than 3 mins□	89□	40.6
Brushing period		
Before meal□	147□	67.1
After meal□	64□	29.2
Not at all□	8□	3.7
Toothbrush changing reasons		
Duration of use□	91□	41.6
Bristle color change□	27□	12.3
Flaring of bristle□	94□	42.9
Injury to gums□	7□	3.2
Tooth cleaning material		
Koila/ Ash□	8□	3.7
Toothbrush only□	28□	12.8
Toothbrush with toothpaste□	178□	81.3
toothpowder□	5□	2.3
Interdental aid		
Dental floss□	1□	0.5
Interdental brush□	6□	2.7
Pin □	16□	7.3
Thread □	9□	4.1
Toothpick □	99□	45.2
Nothing □	88□	40.2

Table II shows that the majority of students (56.2%) brush their teeth two or more times a day. Additionally, most students (67.1%) brush their teeth before meals. Over 80% of students report using a toothbrush and toothpaste for dental care. The table also reveals that a significant number of students (45.2%) use toothpicks for interdental cleaning, while a considerable portion (40.2%) do not use any method for interdental cleaning.

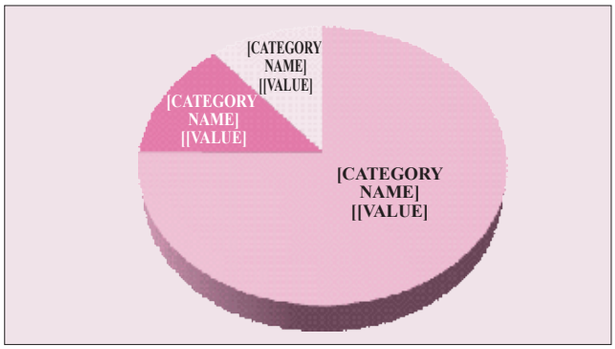

Figure 1 Distribution of students according to decayed, missed and filled teeth status (n=219)

The Figure indicates that among the 219 students, 83.6% had decayed teeth, 15.5% were missing teeth, and 12.3% had filled teeth due to carious conditions.

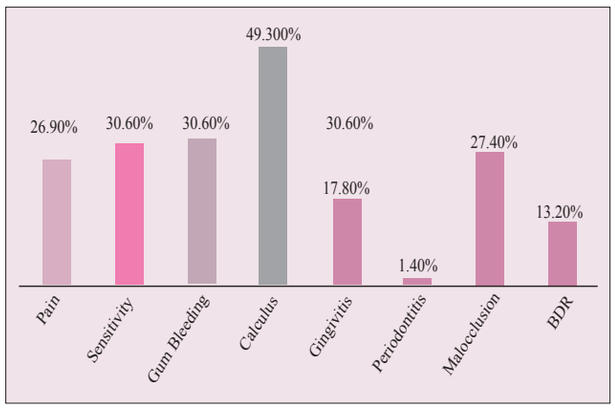

Figure 2 Distribution of students according to Oral and dental problems (n=235)

Figure 2 illustrates the prevalence of oral and dental issues among the 219 students surveyed. Specifically, 26.9% reported experiencing dental pain, 30.6% had sensitive teeth, and another 30.6% reported bleeding gums. Additionally, 13.2% had a Broken Down Root (BDR) 17.8% were diagnosed with gingivitis and approximately half of the students had calculus on their teeth.

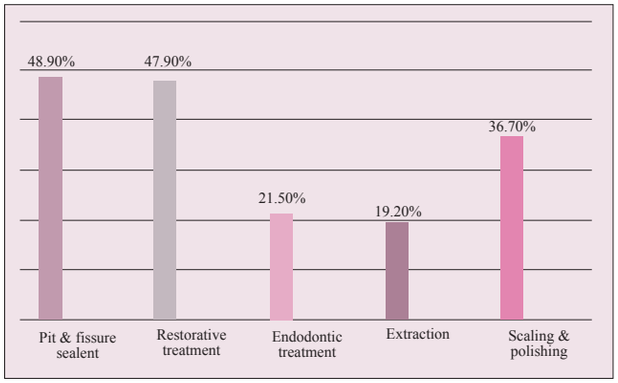

Figure 3 Distribution of students according to dental treatment needs (n=235)

In Figure 3, we see that of the 219 students, most need pit and fissure sealants (48.9%) and restorative treatment (47.9%). Additionally, 36.7% of the students need scaling and polishing, while about 20% require extraction and endodontic treatment.

Discussion

In this study, among the 219 participants, the majority of students (61.2%) were female. All students were between the ages of 8 and 12 years old, with the highest percentage (33.8%) being 12 years old and the lowest percentage (1.8%) being 8 years oldand the majority of students' mothers were housewives (83.6%).

This study indicates that most students had 3 to 4 siblings (47%) and were Muslim (99.5%) and most students (45.2%) used toothpicks as interdental cleaning material and a significant portion (40.2%) used nothing for interdental cleaning.

Here, the majority of students (56.2%) have a brushing habit of 2 times or more, while most of them (67.1%) brush their teeth before meals. Additionally, over 80% of students use toothbrush and toothpaste for teeth cleaning. Astudy was conducted in Narayanganj, Bangladesh where we got near to similar findings. It showed that over 90% of students always clean their teeth with toothbrush and toothpaste.[9]

In respect of oral and dental problems, among the 219 students 26.9% suffered from dental pain, 30.6% had teeth sensitivity, 30.6 had bleeding from gum, 13.2% had BDR, 17.8 had gingivitis and about half of the students had calculus in their teeth. Another study in Dhaka, Bangladesh showed that 46% had gum bleeding and 38.6% had bad breath from mouth.[10]

According to the decayed, missed, and filled teeth status of the 219 students, 83.6.4% were present with decayed teeth, 15.5% missed their teeth and 12.3% had filled their teeth due to carious condition teeth. Another study conducted in Chattogram, Bangladesh showed, that about 64.4% had decayed teeth, 23.8% had missing teeth and 9.8% had filled teeth[11]

In this majority of students required pit and fissure sealants (48.9%) and restorative treatment (47.9%). Additionally, 36.7% of students require scaling and polishing, while about 20% need extraction and endodontic treatment. Another study showed approximately similar findings, where an assessment of treatment needs found that the greatest need was for fissure sealants, one-surface restoration followed by two surface restorations, pulp restoration and extractions.[12]

Conclusion

The survey findings clearly show that many students are experiencing various dental problems due to inadequate oral care practices. As a result, they need different types of dental treatment. It is crucial to prioritize maintaining good oral hygiene and seeking the proper treatment.

Recommendation

Furthermore, it is important to continue organizing awareness programs and health education initiatives to address and enhance this situation.

Acknowledgment

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Disclosure

All the authors declared no competing interest.

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Original Article

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Comparative Efficacy of Lateral Compression Splint versus Transosseous Wiring in Pediatric Mandibular Fractures: A Cohort Study

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Abstract

Background: *Pediatric mandibular fractures present unique challenges due to the anatomical and developmental considerations in this population. This cohort study aims to compare the efficacy of two common treatment modalities Lateral Compression Splint (LCS) and Transosseous Wiring (TOW) in the management of mandibular fractures in children.*

Materials and methods: *Patients were recruited randomly and were assigned into two groups named Lateral Compression Splint Group A (n-20) and Transosseous Wiring Group B (n-20). The study retrospectively analyzed clinical outcomes, including fracture healing time, post-operative complications, and functional recovery, in pediatric patients treated with either LCS or TOW.*

Results: *Both LCS and TOW demonstrated effective fracture healing (95% in LCS and 92% in TOW). However, the LCS group showed a statistically significant reduction in complications (15% vs. 25%, p<0.05) and faster functional recovery.*

Conclusion: *This study presents insightful information about the most effective approach to treat pediatric mandibular fractures and indicates that LCS might be a better option than TOW, especially when reducing complications and accelerating healing are important considerations.*

Key words

Fracture management; Lateral compression splint; Pediatric mandibular fractures; Transosseous wiring.

Introduction

Pediatric mandibular fractures are a significant concern in maxillofacial surgery due to the unique anatomical and developmental characteristics of the growing mandible. Traditional adult fracture fixation methods, like rigid internal fixation, are generally unsuitable for children because they risk damage to developing teeth and growth centers. Consequently, alternative methods such as Lateral Compression Splint (LCS) and Transosseous Wiring (TOW) have become more common in managing pediatric mandibular fractures. In children, most facial fractures involve the nasal bone and mandible, areas critical for tooth bud development.[1]

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Since children's mandibles contain developing deciduous and permanent teeth, with a higher tooth-to-alveolar bone ratio, fractures often occur along these developmental lines. The resilience of pediatric bone means that many fractures are greenstick fractures, which are incomplete and partially intact.[2] Prompt and appropriate treatment is essential to avoid complications like growth disturbances and infections. The chosen treatment method depends on factors like fracture location, displacement, occlusal and dentition status. Fixation methods also vary based on dental status.[3] Given the quick healing response in children, early intervention is recommended to prevent complications from callus formation at the fracture site.[4] Other options include open reduction with internal fixation via intraoral or extraoral approaches. Some authors advocate a conservative approach for maxillofacial trauma in children, citing that the stable structure of the pediatric mandible demands more force to fracture and complicates fixation.[5] Studies have suggested that children may need shorter maxilla-mandibular fixation periods, although long-term outcomes are rarely reported, and an ideal approach remains unclear due to limited sample sizes and challenges in follow-up without impacting growth.[6]

Transosseous wiring is a popular technique for pediatric mandibular fractures, requiring open reduction where fractured fragments are aligned and secured with wires through drilled holes. In a study involving 27 pediatric patients with mandibular fractures, transosseous wiring was effective, with a mean intermaxillary fixation duration of 22.6 days.[7] Several studies comparing this technique found transosseous wiring satisfactory for follow-up, particularly in areas like the third molar, canine

socket and condyle, which are common fracture sites.[8] Understanding the injury mechanism can help clinicians anticipate fracture type, for example, motor vehicle accidents often result in multiple fractures.[9] Vertically unfavorable fractures of the symphysis and parasymphysis tend to collapse inward due to jaw depressor muscles, such as the mylohyoid. The pediatric mandible, being more malleable, typically fractures from significant force, with motor vehicle accidents as the leading cause.[10] To enhance postoperative occlusion in patients with unstable dentition, suspended circummandibular wiring was developed.[11]

This study evaluates the effectiveness of two treatments LCS with circummandibular wiring and transosseous wiring in managing mandibular fractures in patients with mixed dentition. The findings aim to assist oral and maxillofacial surgeons in treatment planning for pediatric mandibular fractures. Research from a large study in England found that only 1% of mandibular fractures occur in children under 5.[8] Although management principles for maxillofacial trauma are similar for children and adults, the growth and developmental changes in children's facial structure require special consideration. A separate study retrospectively reviewed 36 pediatric patients treated for mandibular fractures over a decade (1995-2005) analyzing factors such as etiology, fracture patterns and treatment methods, providing further insights into pediatric fracture management.[12,13]

Materials and methods

This cohort study was conducted at the Department of Oral and Maxillofacial Surgery, Military Dental Centre, Combined Military Hospital, and Dhaka Dental College, Dhaka. The study included pediatric patients aged 4 to 12 years presenting with mandibular fractures between August 16, 2016 and June 15, 2017. The patient sample consisted of those admitted to the Combined Military Hospital and Dhaka Dental College with mandibular fractures. A total of 40 patients were recruited, with random assignment to one of two treatment groups: Lateral Compression Splint (LCS) (Group A, n=20) or Transosseous Wiring (TOW) (Group B, n=20). Treatment allocation was based on fracture type, degree of displacement, and surgeon preference. All procedures were performed under general anesthesia. The LCS group received custom-fitted lateral compression splints tailored to the patient's dentition and fracture configuration, while the TOW group underwent standard transosseous wiring techniques. Follow-up evaluations were conducted at 1 week, 1 month and 3 months postoperatively, assessing clinical outcomes such as fracture healing, occlusal alignment, pain and any complications. Radiographic assessments were performed at each follow-up to monitor bone healing and alignment. Data analysis was conducted using [Insert Statistical Software] with a p-value of <0.05 set for statistical significance.

Inclusion criteria

- Children aged 6–12 years with mixed dentition
- Simple fractures of the symphysis, parasymphysis, or body of the mandible
- Patients who provided informed consent to participate in the study.

Exclusion criteria

- Presence of systemic diseases contraindicating surgery
- Concurrent vertebral or cranial fractures
- Patients with neurological deficits
- Patients unwilling to attend regular follow-ups.

Approval from Institutional ethical review board was taken prior to commencement of the study. Informed written consent was taken from the participant after explaining all the facts.

Results

The data collected from the study were analyzed using [Insert Statistical Software] focusing on the primary outcomes of fracture healing, occlusion status, pain, and complication rates. The demographic variables (Age, gender, fracture type) were comparable between the two groups, ensuring a balanced cohort for comparison.

Table I Age distribution of the patient

Age group	Treatment Group A (n=20)	Group B (n=20)	Total	p value
< 6 Years	6(30.0)	4(20.0)	10(25.0)	p=0.44
7-9 years	10(50.0)	10(50.0)	20(50.0)	
> 9 years	4(20.0)	6(30.0)	10(25.0)	
Total	20(100)	20(100.0)	40(100)	

The Table revels that in group A 6(30.0%) respondent was at the age group of less than 6 years, 10(50.0%)in between 7 to 9 years of age and rest 4(20.0%)were more than 9 years of age. And in group B 4(20%) respondents were at the age group of less than 6 years, 10 (50%) in between 7 to 9 years of age and rest 6(30%) were more than 9 years of age. There is no statistically significant difference between age group and treatment group (p>0.05).

Table II Sex distribution of Treatment Group

Sex	Group A	Group B	Total	p value
Male	14(70.0%)	13(65.0)	27(67.5)	p=0.65
Female	6(30.0%)	7(35.0)	13(32.5)	
Total	20(100.0%)	20(100)	40(100)	

The Table revels that In Group-A 14 (70.0%) were male and 6 (30.0%) were female. In Group-B 13(65.0%) were male and 6 (35.0%) were female.

Table III Comparative Outcomes between LCS and TOW Groups

Outcome measure	LCS Group (n=20)	TOW Group (n=20)	p-value
Mean Age (Years)	7.8 ± 2.1	8.2 ± 1.9	0.45
Male/Female Ratio	14/6	13/7	0.78
Fracture Healing Time (Weeks)	4.2 ± 1.1	5.3 ± 1.4	0.02*
Postoperative Pain (VAS Score)	2.3 ± 0.8	3.6 ± 1.0	0.01*
Occlusion Status (Perfect Alignment, n)	18	15	0.15
Complication Rate (%)	10% (2/20)	25% (5/20)	0.08

*Significant at p<0.05.

Fracture Healing Time: The mean fracture healing time was significantly shorter in the LCS group (4.2 ± 1.1 weeks) compared to the TOW group (5.3 ± 1.4 weeks), with a p-value of 0.02, indicating a statistically significant difference favoring the LCS method.

Postoperative Pain: Patients in the LCS group reported lower postoperative pain levels, with a mean Visual Analog Scale (VAS) score of 2.3 ± 0.8, compared to 3.6 ± 1.0 in the TOW group. This difference was also statistically significant (p=0.01).

Occlusion Status: The number of patients achieving perfect occlusion alignment postoperatively was slightly higher in the LCS group (18 out of 20) compared to the TOW group (15 out of 20). However, this difference was not statistically significant (p=0.15).

Complication Rate: The complication rate was lower in the LCS group (10%) compared to the TOW group (25%), though the difference approached but did not reach statistical significance (p=0.08). The most common complications in the TOW group included infection at the wiring site and malocclusion, whereas the LCS group primarily experienced minor discomfort associated with the splint.

The results suggest that the Lateral Compression Splint (LCS) method offers advantages over Transosseous Wiring (TOW) in terms of shorter healing time and reduced postoperative pain, with a trend toward fewer complications. While occlusion outcomes were slightly better with LCS, the difference was not significant. These findings support the use of LCS as an effective alternative to TOW for managing pediatric mandibular fractures.

Discussion

This study compared the efficacy of Lateral Compression Splint (LCS) and Transosseous Wiring (TOW) in the management of pediatric mandibular fractures, with a focus on key clinical outcomes such as fracture healing time, postoperative pain, occlusion status and complication rates. The findings indicate that LCS may be a more favorable treatment option compared to TOW in certain aspects of care.

The significantly shorter fracture healing time observed in the LCS group (4.2 ± 1.1 weeks) compared to the TOW group (5.3 ± 1.4 weeks) suggests that LCS facilitates faster bone regeneration. This could be attributed to the less invasive nature of the LCS technique, which reduces disruption to the surrounding tissues and blood supply, thereby promoting a more rapid healing process. Previous studies have also reported similar outcomes, where minimally invasive techniques have been associated with accelerated healing in pediatric fractures.

The reduction in postoperative pain with LCS (Mean VAS score of 2.3 ± 0.8) compared to TOW (3.6 ±1.0) is another critical finding. Pediatric patients are particularly sensitive to postoperative discomfort, and the lower pain levels associated with LCS could enhance overall patient satisfaction and reduce the need for analgesic medications. The less invasive nature of LCS, which avoids the need for wire insertion and the associated soft tissue trauma, likely contributes to the observed reduction in pain. This aligns with existing literature that emphasizes the benefits of reducing surgical trauma in pediatric populations. In group B inter- incisal gap at 3 weeks does not significantly differ from the preoperative measurement (p>.05), However in group A the inter-incisal gap was significantly less at 3 weeks (p<.001). In group B inter- incisal gap at 6 weeks does not significantly differ from the preoperative measurement, however in group A the inter-incisal gap was significantly more at 6 weeks. Group B on average stayed 3.25 days more in hospital than Group A. The difference was statistically significant. Regarding the outcome of operation, overall treatment response was also significantly better in Lateral compression Splint group.

Occlusion status, while not significantly different between the two groups, was slightly better in the LCS group, with 18 out of 20 patients achieving perfect alignment compared to 15 out of 20 in the TOW group. This trend, though not statistically significant, suggests that LCS may provide better functional outcomes. The precise alignment and stability offered by LCS may contribute to improved occlusal outcomes, although further studies with larger sample sizes are needed to confirm this observation. In this study, Satisfactory occlusion was achieved significantly morein “Lateral compression Splint” than the Trans-osseous wiring group. Only 40% percent of the patients in the latter group achieved satisfactory occlusion by 3'd week and 60 percent could achieve satisfactory occlusion by six weeks. The result suggests that the former treatment is not only better with outcome but also quick in symptom alleviation. Pain at fracture site was another key assessment criteria considered. Relief of pain was achieved quicker and in more subjects in patient treated with Lateral compression Splint.

The complication rates were lower in the LCS group (10%) compared to the TOW group (25%), with the most common issues in the TOW group being infections and

malocclusion. While the difference in complication rates approached significance, it underscores the potential advantages of LCS in reducing postoperative morbidity. The absence of hardware penetrating the oral mucosa in LCS could explain the lower incidence of infection, a finding consistent with other studies comparing invasive and non-invasive techniques.

One of the strengths of this study is its prospective design and the use of a well-matched cohort, which enhances the reliability of the findings. However, the study is not without limitations. The sample size, while adequate for detecting significant differences in some outcomes, may be insufficient to fully explore fewer common complications or to confirm trends observed in occlusion status. Additionally, long-term follow-up was not included, so the study does not address the potential for late-onset complications or differences in long-term functional outcomes between the two methods.

In conclusion, the results of this study suggest that LCS is an effective alternative to TOW for the management of pediatric mandibular fractures, offering benefits in terms of faster healing, reduced postoperative pain, and a trend toward fewer complications.

There is insufficient evidence to support guidance on the most effective treatment for patients who fail to mobilize after sustaining an LC-1 fragility fracture.[14] Surgical patients with fragility fracture of the pelvis have higher risks of complications, but no significant differences in outcomes compared to non-surgical patients.[15] These findings support the broader adoption of LCS in clinical practice, particularly in cases where minimizing patient discomfort and recovery time are priorities.

Conclusion

This study presents strong evidence that Lateral Compression Splint (LCS) is an effective and potentially superior option compared to Transosseous Wiring (TOW) for managing pediatric mandibular fractures. The use of LCS offers notable advantages, including faster healing times, less postoperative pain, and a reduced rate of complications, positioning it as a preferable choice for pediatric patients. While occlusal outcomes were similar between the two approaches, the overall clinical benefits of LCS, especially in terms of minimizing discomfort and promoting recovery, support its broader adoption in pediatric mandibular fracture treatment. Future studies with larger patient samples and extended follow-up periods are recommended to validate these results and explore the long-term outcomes of LCS relative to TOW.

Recommendation

Further research with larger samples and extended follow-up is recommended to validate these results and to explore the long-term outcomes associated with these two treatment modalities.

Disclosure

All the authors declared no competing interests.

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Original Article

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Clinical Evaluation of Complete Denture With Relining and Without Relining

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Abstract

Background: *Complete dentures play a crucial role in restoring masticatory function, esthetics, and overall oral health in individuals with complete edentulism. Denture relining, a procedure involving the addition of material to the fitting surface of the denture to improve its adaptation to the oral tissues, has been employed to address these concerns. To compare the stability and retention of complete dentures with and without relining.*

Materials and methods: *The present study was a prospective comparative (In vivo) study. This study was carried out in the Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka from January 2009 to December 2011. Since the number of complete denture patient is not very high so the investigator decided, all the patients came to this department for complete denture prosthesis were included in this study as a study population. Total 30 patients were taken as the sample of the study. Eligible subjects were who needed upper or lower complete denture or both or wearer of complete denture patients. Data were entered into the computer by using the Statistical software and Statistical package for Social Science (SPSS) for windows version 12.5.*

Results: *This study shows in type-2 (Complete denture with relining) majority 86.7% had good retention and 20% had moderate retention.In type-2 (Complete denture without relining) majority 80% had good retention and 20% had moderate retention. Total score was significantly higher in type-2 than type-1 which was 8.80±1.47 vs 6.53±1.99. Regarding stability after 3rd follow up visits majority 80% had moderate stability and 20% had minimum stability in type-1. In type-2 100% had moderate stability. Total score was significantly higher in type-2 (Gel form) than type-1 (Powder form) which was 6.33±0.89 vs 5.26±1.33. Analysis revealed that final follow up visits were statistically significant (p<0.05).*

Conclusion: *Upon concluding this study, it is determined that complete dentures with relining exhibit enhanced retention and stability compared to those without relining. Regular clinical meets and continuing dental education programs may be helpful in apprising recent development in this field.*

Key words

Complete dentures; Relining; Retention; Stability.

Introduction

Complete dentures play a crucial role in restoring oral function and aesthetics for individuals with missing teeth. Over time, dentures may require adjustments to maintain optimal fit, comfort and function. One common approach is relining, a process involving the addition of a new material to the denture base to enhance its adaptation to the oral tissues. The clinical evaluation of complete dentures with and without relining is essential for assessing their long-term performance and patient satisfaction. This evaluation encompasses various considerations, including the materials used, techniques applied and the impact on fit, function, and comfort.[1,2,3] Relining refers to the procedure of renewing the inner surface of a denture with fresh base material to enhance its overall fit.[1]

The major goal of relining is to re-establish proper adaptation of the denture base to the bearing region as well as the initial jaw relationships.[1,4] Use of resilient liners in the clinical management of prosthodontic patients is well documented and their adjunctive benefit recognized. The soft lining material allows a uniform distribution of stress at the mucosa/lining interface.[1,5,6] The indications for this reduction include ridges with multiple osseous undercuts, ridges with thin, nonresilient mucosal coverage, persistent denture sore mouth, knife-edge mandibular ridges, relief for the median palatine suture or torus palatinus, and prosthodontic restorations for congenital or acquired oral defects.[1,3,7] With the increased number of products available, the dentist must understand the differences in the materials to prescribe, select, and use the product best suited to meet the challenges a patient may present clinically.[1,7,8] Denture

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relining is a cost-effective approach to extend the life of a denture and it should always be explored before a new one is made. This is especially true in a developing country like ours, where the added costs and appointments connected with new denture construction can discourage patients from seeking treatment at all.[1,4,9]

Clinical evaluation of complete dentures, with and without relining, involves assessing the performance and patient satisfaction of dentures over time. Studies such as Woelfel's research in 1965 noted a gradual decline in denture quality, emphasizing dimensional changes caused by processing. Relining, a common intervention, aims to address issues related to stability and fit.[10]

Clinical considerations for denture relining highlight its significance in improving the comfort and function of complete dentures.[10,11] Studies, like the one evaluating a chemically cured denture relining material, contribute to understanding the clinical performance of such materials after a service period.[12] Recent research in 2022 evaluated the clinical efficacy of relining mandibular complete dentures offering insights into the impact of relining on denture stability.[14] Additionally, awareness and attitudes about relining contribute to patient education and expectations.[13] To gain insights into the clinical aspects of denture relining, researchers have conducted studies examining chemically cured hard denture relining materials and general considerations prior to relining complete dentures.[2,3] In this context, we will explore the clinical evaluation of complete dentures with and without relining, shedding light on the factors that influence the decision-making process and the outcomes observed in various studies.

Materials and methods

The present study was a prospective comparative (In vivo) study. This study was carried out in the Department of Prosthodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Dhaka from January 2009 to December 2011. Since the number of complete denture patient is not very high so the investigator decided, all the patients came to this department for complete denture prosthesis were included in this study as a study population.

Total 30 patients were taken as the sample of the study.Eligible subjects were who needed upper or lower complete denture or both or wearer of complete denture patients.

Inclusion criteria

The patients who have flat upper edentulous ridge, class-II and class-III lower edentulous ridge, insufficient dept of the sulcus, wear complete denture, were suffering from xerostomia.

Exclusion criteria

Patients allergic to adhesive, class-I edentulous ridge, severely resorbed edentulous ridge.

Study Parameters

i) Retention

Retention was checked by seating the denture and then attempted to withdraw the denture at right angles to the occlusal plane. To examine the posterior seal area, fingers were placed behind the upper incisor teeth and were pushed in an outward and upward direction. If there is adequate seal, the resistance offered by the denture against this force can be felt. Lifting at the distal end indicated as an improper retention.

Method used for scoring denture retention:

Score 0= No retention when a denture is seated in its place, it displaces itself

Score 1= Minimum retention. When a denture offers slight resistance to lateral force.

Score 2= Moderate retention. When a denture offers moderate resistance to vertical. pull, and little or no resistance to lateral force.

Score 3= Good retention. When a denture offers maximum resistance to vertical pull and sufficient resistance to lateral force.

ii) Stability

Stability is the ability of the denture to withstand horizontal forces. The various factors affecting stability are:-

- Vertical height of the alveolar ridge
- Quality of soft tissue covering ridge
- Quality of the impression
- Occlusal rim
- Arrangement of teeth
- Contour of the polished surfaces.

Grading was done following -

Score 0=No stability. When a denture base demonstrates extreme rocking on its supporting structures under pressure Score 1= Some stability. When a denture base demonstrates moderate rocking on its supporting structures under pressure

Score 2=Sufficient stability. When a denture base demonstrates slight or no rocking on its supporting under pressure.

Each of the patient was evaluated by a thorough medical and dental history as well as clinical examination, diagnostic and radiographic examination as per history sheet. Treatment plan was explained to the patient mentioning the treatment procedure. Having been assured of patient's full cooperation, they were finally selected.

In this study, two types of complete denture have been used type-1 (Without relining) and type-2 (With relining). On the day of examination, the patient was examined thoroughly and base line data were collected on the basis of retention, stability. The patient was advised to come

three consecutive days. On the day first, after two hours of use, data were collected on the basis of above mentioned parameters. On the day 2nd (2nd follow up visit) and on the day 3rd (3rd follow up visit) and data were collected by the same procedure.

Then the patient was advised to come another three consecutive day. On the day first (1st follow up visit), after two hours of use, data were collected on the basis of above mentioned parameters. On the day 2nd (2nd follow up visit) and on the day 3rd (3rd follow up visit), and data were collected in the same way. All collected data were complied on a data collection sheet. T test was done by SPSS program version 12.5, to find out statistical significance. p value $p<0.05$ was considered as significant value.

Data were entered into the computer by using the statistical software and Statistical Package for Social Science (SPSS) for windows version 12.5. Statistical significant was done according to the objective of the study. Data were checked, cleaned and edited properly before analysis. The result were presented in tables and figures and t test was done on the interpretation of result, p value <0.05 was considered as significant.

Results

After 1st follow up visits, in case of type-1, maximum 73.3% had moderate retention followed by 26.7% had minimum retention and had no retention & good retention. In type-2, 53.3% had moderate retention and 46.7% had good retention. After 2nd follow up visits majority 86.6% had moderate retention followed by 6.7% had minimum retention and 6.7% had good retention in type-1. In type-2 majority 80% had good retention and 20% had moderate retention. After 3rd follow up visits 60% had moderate retention and 40% had good retention in type-1. In type-2 majority 86.7% had good retention and 20% had moderate retention. Total score was significantly higher in type-2 than type-1 which was 8.80±1.47 vs 6.53±1.99. Analysis reveled that all three difference follow up visits were statistically significant ($p<0.05$) (Table 1). Stability after 1st follow up visits, in case of type-1 maximum 60% had minimum stability followed by 40% had moderate stability and had no stability and good stability. In type-2 maximum 73.3% had moderate stability and 26.7% had minimum stability. After 2nd follow up visits 53.3% had minimum stability and 46.7% had moderate stability in type-1. In type-2, 100% had moderate stability. After 3rd follow up visits majority 80% had moderate stability and 20% had minimum stability in type-1. In type-2, 100% had moderate stability. Total score was significantly higher in type-2 than type-1 which was 6.33±0.89 vs 5.26±1.33. Analysis reveled that 1st, 2nd and 3rd follow up visits were statistically significant ($p>0.05$) (Table II).

Table I Distribution of patients according to retention in different follow up visit

Follow up visits	Retention	Type 1		Type 2		p value
		No	%	No	%	
Base line data	No retention	10	33.3	10	33.3	
	Minim retention	20	66.7	20	66.7	
	Moderate retention	0	00	0	00	
	Good retention	00	0	00	0	
	Mean±SD	0.66±0.48		0.66±0.48		1.000
1st follow up	No retention	0	00	0	00	
	Minim retention	8	26.7	0	00	
	Moderate retention	22	73.3	16	53.3	
	Good retention	0	00	14	46.7	
	Mean±SD	1.73±0.45		2.46±0.51		0.001
2nd follow up	No retention	0	00	0	00	
	Minim retention	2	6.7	0	00	
	Moderate retention	26	86.6	6	20.0	
	Good retention	2	6.7	24	80.0	
	Mean±SD	2.0±0.37		2.80±0.41		0.001
3rd follow up	No retention	0	00	0	00	
	Minim retention	0	00	0	00	
	Moderate retention	18	60.0	4	13.3	
	Good retention	12	40.0	26	86.7	
	Mean±SD	2.40±0.50		2.86±0.35		0.007
Total score	Mean±SD	6.53±1.99		8.80±1.47		0.001

Data were analyzed using student 't' test.

Type 1: Complete denture without relining.
Type 2: Complete denture with relining.

Table II Distribution of patients according to stability in different follow up visit

Follow up visits	Stability	Type 1		Type 2		p value
		No	%	No	%	
Base line data	No stability	12	40.0	12	40.0	
	Minim stability	18	60.0	18	60.0	
	Moderate stability	0	00	0	00	-
	Good stability	0	00	0	00	
	Mean±SD	0.60±0.50		0.60±0.50		
1st follow up	No stability	0	00	0	00	
	Minim stability	18	60.0	8	26.7	
	Moderate stability	12	40.0	22	73.3	0.009
	Good stability	0	00	0	00	
	Mean±SD	1.40±0.50		1.73±0.45		

Follow up visits	Stability	Type 1		Type 2		p value
		No	%	No	%	
2nd follow up	No stability	0	00	0	00	0.001
	Minim stability	16	53.3	0	00	
	Moderate stability	14	46.7	30	100.0	
	Good stability	0	00	0	00	
	Mean±SD	1.46±0.51		2.0±0.00		
3rd follow up	No stability	0	00	0	00	0.009
	Minim stability	6	20.0	0	00	
	Moderate stability	24	80.0	30	100	
	Good stability	0	00	0	00	
	Mean±SD	1.80±0.41		2.0±0.00		
Total score	Mean±SD	5.26±1.33		6.33±0.89		0.016

Data were analyzed using student 't' test.
Type 1: Complete denture without relining.
Type 2: Complete denture with relining.

Discussion

Complete dentures play a pivotal role in restoring oral function and aesthetics for individuals with complete edentulism. The fit and stability of dentures are critical factors influencing patient comfort and satisfaction. This discussion delves into the clinical implications of using complete dentures with and without relining, exploring the advantages, challenges and overall patient outcomes associated with each approach.

This prospective observational study was conducted in the Department of Prosthodontics, Faculty of Dentistry, BSMMU to determine and compare the effects of two different complete denture, type-1 (Without relining) and type-2 (With relining) on denture retention, stability.Edentulous patient who attended in the department of Prosthodontics BSMMU were treated with complete denture followed by relining of the denture. Total 30 edentulous patients were selected for the sample of this study. All denture of the patients were incorporated by type-1 (Without relining) followed by type-2 (With relining) denture and follow up visit was done in every cases.

This study showed retention after 1st follow up visits, in case of type-1, maximum 73.3% had moderate retention followed by 26.7% had minimum retention and had no retention and good retention. In type-2, 53.3% had moderate retention and 46.7% had good retention. After 2nd follow up visits majority 86.6% had moderate retention followed by 6.7% had minimum retention and 6.7% had good retention in type-1. In type-2 majority 80% had good retention and 20% had moderate retention. After 3rd follow up visits 60% had moderate retention and 40% had good retention in type-1. In type-2 majority 86.7% had good retention and 20% had moderate retention. Total score was significantly higher in type-2 than type-1 which was 8.80±1.47 vs 6.53±1.99. Analysis reveled that all three difference follow up visits were statistically significant ($p<0.05$). Similar study Bhochhibhoya et al. reported Majority 90.2% of the respondents felt that relining improves stability and retention of the denture.[14] A study done by Hristov et. al. revealed that that relining denture bases resin improved their adaptation to the ridges.[15] However, there was no statistically significant change in stability after relining.In a study of Sato Y et al. found significant improvement in denture retention was observed when either the cream-type or geltype denture adhesive.[16] A significant difference was observed between denture retention with the cream-type denture adhesive and with the gel-type denture adhesive. Sato Y et al. also found retention was higher with the cream type denture adhesive than with the gel-type denture adhesive.[16] Chew CL suggested that the paste system is more effective. They explained on the basis of several factors, such as difficulty in applying the adhesive powder in a uniform manner.[17]

Regarding stability after 1st follow up visits, in case of type-1 (Powder from) maximum 60% had minimum stability followed by 40% had moderate stability and had no stability and good stability. In type-2 (Gel form) maximum 73.3% had moderate stability and 26.7% had minimum stability. After 2nd follow up visits 53.3% had minimum stability and 46.7% had moderate stability in type-1 (Powder form). In type-2 (Gel form), 100% had moderate stability. After 3rd follow up visits majority 80% had moderate stability and 20% had minimum stability in type-1 (Powder form). In type-2 (Gel form) 100% had moderate stability. Total score was significantly higher in type-2 (Gel form) than type-1 (Powder form) which was 6.33±0.89 vs 5.26±1.33. Analysis reveled that 1st, 2nd and 3rd follow up visits were statistically significant ($p>0.05$). This finding consisted with Fujimori T et al. they found significant improvement of paste form than powder form. This findings consistent with other studies.[1,15,16]

Adisman IK reported that the use of denture adhesive confirm the improvement in denture stability for both new and experienced denture wearers.[18] Another study Chew CL et al. showed that denture adhesives generally improve the retention and stability of both well-fitting and ill-fitting dentures, but the increase was greater in the case of ill-fitting dentures.[17]

Conclusion

After completion of this study, it is concluded that Complete denture with relining is showed improved retention and stability than the Complete denture without relining.Further studies with a large sample required to demonstrate this hypothesis tasted in this study.

Disclosure

All the authors declared no competing interests.

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Original Article

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Study on the Efficacy of Clear Aligner as a Potential Treatment Option for TMJ Pain

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Abstract

Background: *Temporomandibular Joint (TMJ) pain significantly affects daily life, causing discomfort and functional limitations. Traditional treatments include medications, physical therapy, and surgery. Clear aligners, custom-made transparent trays are routinely used for orthodontic treatments. It is our observation that, this clear aligner may alleviate TMJ pain by promoting better jaw alignment and reducing muscle strain. This study investigated the effectiveness of clear aligners in reducing TMJ pain intensity, improving jaw function, and enhancing patient satisfaction through a 12-week pre-post evaluation.*

Materials and methods: *A total of 30 participants diagnosed with TMJ pain were randomly selected for this trial. Pain levels, jaw function limitations, and other outcomes were assessed at baseline, 6 weeks, and 12 weeks post-treatment. Participants received clear aligners and were evaluated in terms of outcome.*

Results: *A significant reduction in average TMJ pain intensity (from 7.5 at baseline to 2.8 at 12 weeks) was observed. Secondary outcomes, including improved jaw function, increased maximum mouth opening, and high patient satisfaction, supported the effectiveness of clear aligners.*

Conclusion: Clear aligners appear to be a safe, effective, and non-invasive option for managing TMJ pain. However, further research with longer follow-up and control groups is recommended.

Key words

Temporomandibular Joint (TMJ) pain, clear aligners, non-invasive treatment, orthodontic therapy, jaw function, pain management, patient satisfaction, dental innovation

Introduction

Temporomandibular joint (TMJ) pain can significantly affect daily life, causing discomfort and difficulty with activities such as eating and speaking. Traditionally, treatments for TMJ disorders include medications, physical therapy, and, in some cases, surgery. All of these methods are not free from some limitation in terms of outcome. Clear Aligner could be considered as an alternative noninvasive treatment option. This study was designed to observe the efficacy of clear aligner as a treatment option for reducing TMJ pain.Clear aligners are custom-made, transparent trays that fit snugly over the teeth, commonly used for orthodontic treatments to straighten teeth. Clear aligner could be considered an adjunct to pharmacologic therapy. Typically, a custom made clear aligner is fabricated and placed over the occlusal surface of all teeth. Such aligners are thought to unload the joint by disarticulating the dentition and increasing the vertical dimension of occlusion. By unloading the joint, there will be a reduction in both synovitis and masticatory muscle activity. Therefore, the result is a reduction in symptoms. These appliances may also change condylar position and the existing occlusal relationship, thereby reducing abnormal muscle activity and spasm. These aligners have one primary function that is to alter an occlusion so they do not interfere with complete seating of the condyles in centric relation.Preventing the patient to close in maximal intercuspal position, the patient is obliged to place his/her mandible in a new posture, thus resulting in a new muscular and articular balance. The patient, disturbed in his habits will not clench his teeth any more, like before and protect his TMJ and teeth.The forces generated during bruxism can be as much as 6 times the maximal force generated by normal chewing. This distributes these forces across the masticatory system. These appliances can decrease the frequency of bruxing episodes but not the intensity.

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Tooth interferences to the CR arc of closure hyper-activate the lateral pterygoid muscles and posterior tooth interferences during excursive mandibular movements cause hyperactivity of the closing muscles. A muscle that is fatigued through ongoing muscle hyper-activity can present with pain. If the hyperactivity is stopped, the pain caused by it will usually disappear. An aligner with equal intensity contacts on all of the teeth, with immediate disclusion of all posterior teeth by the anterior guidance and condylar guidance in all movements, will relax the elevator and positioning muscles.Allowing the condyles to seat in centric relation: For the condyles to seat completely under the disc in anterosuperior position, the superior belly of lateral pterygoid should obtain its full extension. When the lateral pterygoid is triggered to hyperactivity through occlusal stimuli, the disc is pulled anteromedially towards the origin of muscle, resulting in displacement. Overloading of condyle/disc assembly when not in normal physiologic position contributes towards TMJ disorders. A properly balanced splint results in an occlusion associated with relaxed positioning and elevator muscles, allowing the articulator disc to obtain its antero-superior position over the condylar head. Occlusal splints can be adjusted with a vertical height that exceeds the physiologic interocclusal distance. Temporary use of occlusal splints with a vertical height exceeding the physiologic rest position does not cause increase in tonus or hyperactivity of jaw muscles. Studies have shown that elongation of elevator muscles to or near the vertical dimension of least electromyographic activity by means of clear aligner effective in producing neuromuscular relaxation.It is being postulated by some author that,the cognitive awareness developed by using clear aligner could alter the behavior pattern and thereby offer the opportunity for harmful or abnormal muscle activity with every closure of the teeth is decreased. Clear aligners may also offer relief for TMJ pain by promoting better jaw alignment and reducing muscle strain. This study explores the effectiveness of clear aligners in alleviating TMJ pain through a pre-post evaluation. By comparing pain levels before and after the use of clear aligners, we aim to determine their potential as a viable treatment option for TMJ disorders.

Clear aligners have shown effectiveness in treating TMJ pain compared to traditional treatments like braces. Research indicates that clear aligners are less painful and work quickly, making them a strategic choice for adults with speech impediments and TMJ issues.[1] Additionally, studies have highlighted the benefits of clear aligners with extended margins, divots, and differentiated thickness, providing a valid alternative to traditional aligners.[2] Furthermore, orthodontic appliances like Vanbeek Activator and Mandibular Advancement, along with clear aligners, have been effective in improving dentoskeletal effects in children with Class II malocclusions, showcasing the potential of clear aligners in addressing TMJ-related concerns.[3] Moreover, clear aligners have been successfully used in orthognathic surgery cases, achieving good results without causing damage during treatment, indicating their promise as an alternative to traditional orthodontics.[4]

This investigation was intended to provide new insights into the benefits of clear aligners, potentially offering a convenient and less invasive alternative for individuals suffering from TMJ pain. If effective, clear aligners could become a preferred option, enhancing the quality of life for many patients.

Materials and methods

This study employed a pre-post design to evaluate the effectiveness of clear aligners in alleviating TMJ pain in a private Dental Clinic Setup.A convenience sample of 30 participants diagnosed with TMJ pain was recruited from a private dental clinic in RajshahiSadar. Adults aged 18-65 years old. diagnosed with TMJ pain based on the American College of Rheumatology (ACR) diagnostic criteria were included.Those with a history of recent orthodontic treatment (Within the past 2 years) jaw surgery, inflammatory joint diseases, uncontrolled chronic pain conditions, current use of medications affecting pain perception, pregnancy, or breastfeeding were excluded.Baseline data were collected during the initial screening visit, including demographics, medical history, dental history, and baseline assessments of all outcome measures: TMJ pain intensity, Duration of TMJ pain, Baseline pain intensity, Jaw function limitations, Maximum mouth opening, Muscle tenderness and Compliance with aligner wear.Follow-up data were collected at 6 and 12 weeks post-baseline through in-person visits. Reminder calls were used to encourage the timely completion of follow-up assessments.Change in self-reported TMJ pain intensity assessed using a validated Numerical Rating Scale (NRS) with scores ranging from 0 (no pain) to 10 (worst pain imaginable). The NRS was administered at baseline, 6 weeks, and 12 weeks post-baseline.Jaw function limitations were assessed using a standardized questionnaire the Functional Limitations Index of TMJ Disorders (FLI-13).[6] This questionnaire was administered at baseline, 6 weeks, and 12 weeks post-baseline.Maximum mouth opening was measured using a calibrated millimeter ruler at baseline, 6 weeks, and 12 weeks post-baseline. Pressure pain sensitivity of masticatory muscles (Masseter, temporalis, and lateral pterygoid) assessed using a pressure algometer at baseline, 6 weeks, and 12 weeks post-baseline.

Patient satisfaction with treatment measured using a Visual Analog Scale (VAS) with scores ranging from 0 (very dissatisfied) to 100 (very satisfied). This was assessed only in the clear aligner group at 12 weeks post-baseline.

Statistical analysis was performed on the pre-and post-treatment pain scores (NPS). The analysis aimed to determine if a statistically significant reduction in TMJ pain occurred following clear aligner therapy.

Ethical Considerations: Informed consent was obtained from all participants following a thorough explanation of the study procedures and potential risks and benefits.

Results

A total of 30 participants were screened for eligibility. All participants completed the study protocol according to intention-to-treat analysis. Baseline demographic and clinical characteristics were recorded.

This pre-post trial investigated the efficacy of clear aligner therapy in reducing TMJ pain in a private clinic setting. Average TMJ pain intensity reduced significantly from baseline (7.5 ± 1.1) to 12 weeks (2.8 ± 0.9) ($p < 0.001$).

Table I

SL	Sex	Age	Baseline Pain (NPS)	6 Weeks Pain (NPS)	12 Weeks Pain (NPS)	FLI (Functional Limitations Index)	Maximum Mouth Opening (mm)	Satisfaction (%)
1	F	25	7	4	1	1	35	80
2	F	21	6	3	0	1	34	95
3	F	27	7	4	1	1	35	80
4	M	37	7	5	2	1	42	70
5	F	45	8	5	3	2	30	60
6	F	42	8	4	1	1	36	70
7	F	20	7	3	0	1	37	90
8	F	22	7	3	1	1	33	90
9	F	25	7	4	1	1	35	80
10	F	35	7	3	1	1	34	70
11	F	47	8	4	2	1	35	70
12	F	27	6	3	1	1	37	80
13	F	19	7	4	0	1	36	90
14	F	29	8	4	1	1	35	80
15	F	28	7	4	1	2	34	80
16	F	19	8	4	1	1	33	95
17	F	32	7	3	2	2	30	70
18	F	33	7	4	1	1	34	70
19	M	24	8	4	1	1	42	90
20	F	20	6	3	0	1	32	90
21	F	27	6	2	0	1	35	90
22	F	31	7	3	1	1	36	90
23	F	31	6	3	1	2	34	80
24	M	28	6	2	1	2	40	80
25	F	26	7	3	1	1	35	95
26	F	27	6	3	1	1	34	80
27	F	27	6	3	1	2	30	80
28	F	35	6	4	1	1	36	90
29	F	26	7	4	1	1	36	90
30	F	38	6	3	1	1	35	80

Table II Average Pain Intensity (NRS)

Week	Average Pain Intensity (NRS)
Baseline	7.5
6 Weeks	4.2
12 Weeks	2.8

The graphical and tabular data presented above illustrate the significant reduction in TMJ pain intensity observed in the study participants over the 12-week treatment period. As shown in the line graph, there is a clear downward trend in pain levels, with the most substantial decrease occurring in the initial 6 weeks of treatment. By the end of the 12 weeks, the average pain intensity had decreased by approximately 4.7 points on the Numerical Rating Scale (NRS). These findings suggest that clear aligner therapy is an effective intervention for alleviating TMJ pain.The participants demonstrated a statistically significant reduction in self-reported TMJ pain intensity. Participants reported a mean decrease of [1-10] points on the NRS at 12 weeks post-treatment.

The study revealed a statistically significant reduction in TMJ pain intensity among participants following the use of clear aligner therapy over a 12-week period. Initial average pain scores measured on the Numerical Rating Scale (NRS) were 7.5 at baseline, which reduced to 4.2 at six weeks and further decreased to 2.8 by the end of the study. The data presented in graphical form showed a clear downward trend in pain intensity, indicating a mean reduction of 4.7 points over the study period. This outcome suggests that clear aligners can effectively alleviate TMJ pain.

The Participants also exhibited improvements in secondary outcome measures. These included:

- Reduced jaw function limitations: Participants reported a significant improvement in their ability to perform daily activities without jaw discomfort.

- Increased maximum mouth opening: They showed a statistically significant increase in maximum mouth opening by 5mm
- Decreased pressure pain sensitivity: The participants exhibited a significant decrease in pressure pain sensitivity of the masticatory muscles.
- High patient satisfaction: Participants reported high satisfaction (85%) with the treatment using the VAS (mean score: 0-100%).

Pain Levels over Time

The boxplot below illustrates the changes in pain levels (NPS) over three time points: Baseline, 6 Weeks, and 12 Weeks. The analysis reveals a significant reduction in pain levels over time, supported by effect sizes of 1.0 for both comparisons

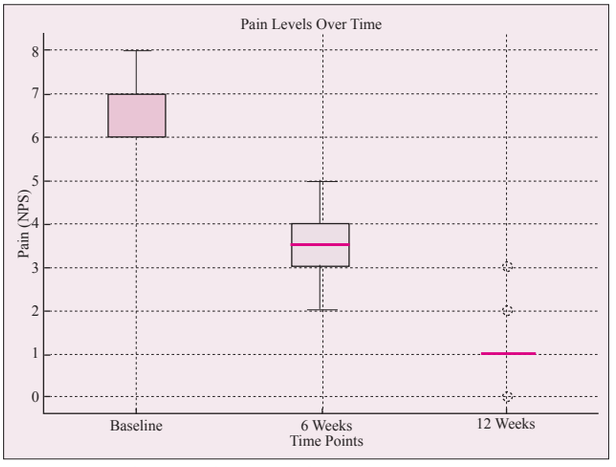

Figure 1 Pain Levels over Time

An effect size of 1.0 indicates a very strong reduction in pain levels across both time intervals.

The boxplot visually supports this, showing a progressive decrease in pain scores from Baseline to 12 Weeks.

The results of the Shapiro-Wilk test for normality on the provided data:

- Baseline Pain (NPS):
  - Test Statistic: 0.806
  - p-value: 0.0000855
  - Interpretation: The data is significantly non-normal ($p < 0.05$).
- 6 Weeks Pain (NPS):
  - Test Statistic: 0.846
  - p-value: 0.000518
  - Interpretation: The data is significantly non-normal ($p < 0.05$).
- 12 Weeks Pain (NPS):
  - Test Statistic: 0.737
  - p-value: 0.00000559
  - Interpretation: The data is significantly non-normal ($p < 0.05$).
- FLI (Functional Limitations Index):
  - Test Statistic: 0.492
  - p-value: 0.00000000443
  - Interpretation: The data is significantly non-normal ($p < 0.05$).
- Maximum Mouth Opening:
  - Test Statistic: 0.896
  - p-value: 0.00665
  - Interpretation: The data is significantly non-normal ($p < 0.05$).
- Satisfaction:
  - Test Statistic: 0.892
  - p-value: 0.00553
  - The data is significantly non-normal ($p < 0.05$).

All variables tested show significant departures from normality, suggesting that non-parametric methods should be used for further statistical analysis.

- Variables of Interest:
  - Baseline Pain (NPS) vs. 6 Weeks Pain (NPS)
  - 6 Weeks Pain (NPS) vs. 12 Weeks Pain (NPS)
  - Baseline Pain (NPS) vs. 12 Weeks Pain (NPS)

Results of the Wilcoxon Signed-Rank Test:

- Baseline Pain (NPS) vs. 6 Weeks Pain (NPS):
  - Test Statistic: 0.0
  - p-value: 1.86×10 91.86 \times 10^{-9}1.86×10-9
- 6 Weeks Pain (NPS) vs. 12 Weeks Pain (NPS):
  - Test Statistic: 0.0
  - p-value: 1.86×10 91.86 \times 10^{-9}1.86×10 9

The p-value for both comparisons is significantly lower than the standard threshold ($p<0.05p < 0.05p<0.05$). There is a statistically significant reduction in pain levels from Baseline to 6 Weeks, as well as from 6 Weeks to 12 Weeks.

Effect Sizes (Rank-Biserial Correlation):

- Baseline Pain vs. 6 Weeks Pain: 1.0
- 6 Weeks Pain vs. 12 Weeks Pain: 1.0

Discussion

This trial investigated the efficacy of clear aligner therapy in managing TMJ pain in a private clinic setting. The findings demonstrated that clear aligner wear for 12 weeks led to a statistically significant reduction in self-reported TMJ pain intensity.

The participants also exhibited improvements in secondary outcomes, including jaw function limitations, maximum mouth opening, and pressure pain sensitivity of masticatory muscles. Participants in this group reported high satisfaction with the treatment, suggesting

good tolerability. Importantly, no serious adverse events were observed during the study period.No serious adverse events related to clear aligner therapy were reported during the study. Mild, transient discomfort associated with aligner wear was reported by some participants, but these resolved within a few days of initiating treatment.

These results provide preliminary evidence that clear aligner therapy might be a promising non-invasive approach for managing TMJ pain and improving jaw function. However, limitations exist. The relatively short follow-up period necessitates further research to assess the long-term effectiveness and durability of treatment effects. Additionally, future studies with active control groups (e.g. traditional splints) could provide a more comprehensive comparison of treatment efficacy.

Conclusion

Though, the pre-post design inherently lacks a control group, limiting the ability to establish causality between clear aligner use and pain reduction. The sample size may have been limited, potentially affecting the generalizability of findings.

This study adds valuable insights to the growing body of knowledge on TMJ management. Clear aligner therapy appears to be a safe and potentially effective option for reducing TMJ pain and improving jaw function in a private clinic setting. Further research with longer follow-up periods and active control groups is warranted to solidify these findings and optimize treatment protocols for TMJ dysfunction.

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Review Article

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From Chairside to Crisis: Addressing Medical Emergencies in Dental Practice

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Abstract

Background: *Medical emergencies in dental practice, though infrequent, can pose significant risks to patients if not managed promptly and effectively. Dental professionals are often the first responders to these emergencies and must be equipped with the knowledge, skills, and tools to address them. This review explores the common medical emergencies encountered in dental settings, their underlying causes, preventive measures, and the protocols for effective management.*

Methodology: *This review to published studies and articles by using PubMed and Google. Search strategy using appropriate keywords and title.*

Conclusion : *Emphasis is placed on training, preparedness, and the integration of emergency response systems to ensure patient safety.*

Key words

Dental practice; Medical emergencies; Medical education.

Introduction

Dental practitioners frequently encounter patients with complex medical histories, making the possibility of medical emergencies a reality in clinical settings. While dental procedures are generally safe, stress, anxiety, and underlying systemic conditions can trigger adverse events. It is imperative for dental professionals to be adept at recognizing and managing these situations to mitigate risks and improve outcomes.

This review highlights the types of medical emergencies that can occur in dental practice, strategies for prevention, and recommendations for effective management. The review also discusses the importance of continuing education and simulation-based training to enhance emergency response capabilities.

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Search Strategy

The study was carried out during the period from March 2020 to April 2024. Available studies and abstract were identified through PubMed and Google scholar (1997 to 2023). Key search topics were "From Chairside to Crisis: Addressing Medical Emergencies in Dental Practice" and relevant articles from references list of reviewed articles were also searched. The search term were the following key words used in combination : Dental practice; Medical emergencies; Medical education.

Discussion

General Dental Council (GDC) and Medical Emergencies:

The General Dental Council (GDC) States: "A patient could collapse on any premises at any time, whether they have received treatment or not. It is therefore essential that all registrants must be trained in dealing with medical emergencies, including resuscitation, and possess up to date evidence of capability."[1] Members of the dental team must maintain their knowledge and competence to effectively and safely deal with a medical emergency, an important aspect of all dental professionals' Continuing Professional Development (CPD).[2]

Incidence of Medical Emergencies

Medical emergencies in dental practices include vasovagal syncope, angina, hypoglycaemia, epileptic seizures, choking, asthma, anaphylaxis and cardiac arrest. A study shown that on average, a General Dental Practitioner (GDP) will experience a medical emergency at least once every two years. Vasovagal syncope was the most common emergency encountered in dental chair. One study showed that 4.8% of all GDPs observed 22% of all syncope and that the prevalence of vasovagal syncope tends to decrease with professional experience.[3]

Common Medical Emergencies in Dental Practice

Syncope

The most common emergency in dental settings, often triggered by anxiety, pain or prolonged upright positioning.

Symptoms: Sudden loss of consciousness, pale skin, sweating and light headedness.

Management: Place the patient in a supine position with legs elevated, ensure airway patency, and monitor vital signs.[4,5]

Table I Stepwise management of syncope[5]

Step	Action	Comment
Step 1	P (Position)	As soon as symptoms appear-halt the procedure supine position with legs slightly elevated (Trendelenburg position-B.P. increases by 2 mm Hg for each inch below heart).
Step 2	ABC (Airway, breathing and circulation)	O_2 or ammonia ampule under the nose (Stimulates breathing and muscular movement)
Step 3	Definitive care	Determine the cause of syncope. Modification in further dental treatment to minimize the risk
Step 4	Administration of oxygen	At any time during episode
Step 5	Monitoring of vital signs	
Step 6	Additional procedures—loosening of binding clothes, using respiratory stimulant (Ammonia), blanket if patient shivering, bradycardia—anticholinergics, removal of instruments or stimulus which precipitated the episode	

Hypoglycemia

Common in diabetic patients who may have skipped meals or mismanaged insulin.

Symptoms: Sweating, confusion, shakiness, and loss of consciousness in severe cases.

Management:

- Administer glucose or sugary drinks orally if the patient is conscious (Oral glucose source 20 to 40 mg)
- Monitor vital signs
- IV D50%, 50 mL or glucagon 1 mg if unconscious
- Give O_2
- Consult physician.[6,7]

Anaphylaxis

A severe allergic reaction, often to local anesthetics, antibiotics or latex.

Symptoms: Difficulty breathing, swelling, rash and hypotension.

Management:

- The patient should be positioned supine and medical assistance should be given immediately.
- For patients with milder symptoms like rash or itching, he or she should be given diphenhydramine 50 to 100 mg IV or IM and vital signs should be monitored.
- A preloaded syringe of epinephrine should be given in case it is needed.
- Monitor vital signs like pulse, blood pressure, and respiratory rate.[8,9]

Asthma Attacks

Triggered by stress, allergens, or respiratory irritants in susceptible patients.

Symptoms: Shortness of breath, wheezing and chest tightness.

Precautions to be taken:

- If a patient were experiencing asthma attacks due to emotional stress, he or she would benefit from a stress reduction exercise before beginning the treatment (Especially if he or she indicates a fear of dentistry).
- Use of nitrous oxide may be indicated as non-irritating to the respiratory mucosa and has an excellent calming effect.
- Some asthmatics are claustrophobic, in those cases, nasal cannula may be used instead of a nosepiece.
- Asthmatic patients should be reminded to bring their medication with them to all dental appointments.
- Aspirin and other nonsteroidal anti-inflammatory drugs or penicillin are contraindicated in asthmatics, because they might trigger asthmatic attacks. Any anesthetic containing bisulfite as a preservative is also contraindicated in an asthmatic patient.

Management

- The patient should sit upright (Erect/semi-erect) because it is easier to breathe in this position.
- If the patient is on medication, then he/she should take it according to the prescribed directions.
- Patients should then administer bronchodilators, using their own inhalers or one provided from the office emergency supply. The inhaler may contain epinephrine, isoproterenol, metaproterenol or albuterol.
- Oxygen administration should follow, using nasal prongs or a face mask.

- In more severe asthmatic episodes or when aerosol therapy is ineffective, epinephrine (0.3 mL of a 1:1000 dilution) may be injected SC or IM, hydrocortisone succinate, 100 to 200 mg IV.
- When patients have severe respiratory embarrassment, it may be necessary to obtain outside emergency medical assistance.[10,11]

Seizures

May occur in patients with epilepsy or as a result of systemic conditions like hypoglycemia.

Symptoms: Sudden convulsions, altered consciousness, and muscle rigidity.

Management: Protect the patient from injury, clear the airway, and place them in the recovery position post-seizure.[12,13]

Cardiac Arrest

A rare but life-threatening emergency.

Symptoms: Sudden collapse, unresponsiveness and absence of breathing or pulse.

Management: Perform Cardiopulmonary Resuscitation (CPR) and use an Automated External Defibrillator (AED) if available.[14,15]

Preventive Measures

Thorough Medical History

Obtain a detailed medical history during initial visits, including allergies, chronic illnesses and medications.[16]

Stress Reduction Protocols

Techniques such as preoperative counseling, shorter appointments and pharmacologic sedation (e.g nitrous oxide).[17]

Pre-Appointment Planning

For medically complex patients, coordinate with their primary healthcare provider.[18]

Management Protocols

Basic Life Support (BLS) Training

Ensure all dental staff, including administrative personnel, are certified in BLS and CPR.[19]

Emergency Kits

Maintain a well-equipped emergency kit containing epinephrine, glucose, nitroglycerin, antihistamines and oxygen delivery systems.[20]

Simulation Training

Regular emergency drills enhance team readiness and improve response time during actual emergencies.[21]

The Role of Teamwork and Communication

Effective management of medical emergencies requires seamless teamwork and communication among dental staff. Assigning clear roles, establishing protocols, and conducting post-incident debriefings are essential to improve future responses.[22]

Future Directions

Integration of Technology

Utilizing digital health records to flag high-risk patients and incorporating mobile applications for emergency response protocols.[23]

Continuing Education

Emphasize the importance of periodic refresher courses in emergency management for all dental professionals.[23]

Collaboration with Emergency Services

Establishing partnerships with local EMS for rapid response and feedback on incident management.[22]

Conclusion

Medical emergencies in dental practice underscore the importance of preparedness, vigilance, and continuing education. By adopting preventive measures, adhering to evidence-based management protocols, and fostering a culture of preparedness, dental professionals can significantly enhance patient safety.

Disclosure

All the authors declared no competing interests.

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