

# Experiences and Challenges faced by Orthodontists while Treating Epileptic Orthodontic Patients: A Qualitative Study

Sadia Naureen, Huma Ghazanfar Kiani

## ABSTRACT

**Objective:** This study aimed to explore the experiences and challenges faced by orthodontists in treating patients with epilepsy.

**Study Design and Setting:** This was a qualitative study conducted in the Orthodontic Department at Rawal Institute of Health Sciences, Islamabad.

**Methodology:** The study period was almost three months from 4<sup>th</sup> August 2023 to 30<sup>th</sup> October 2023. Purposive sampling was done and 11 orthodontists with a minimum of 10 years of clinical experience, who had treated at least one patient with epilepsy in the past 5 years, were selected for an interview. Interviews were conducted in person or virtually, and a topic guide was used. Verbatim transcripts were analyzed using framework methodology, with triangulation techniques to minimize bias.

**Results:** All orthodontists were aware of their patients' epilepsy diagnoses, but none knew the specific type. The implementation of the orthodontic treatment strategy was less than optimal. Ceramic brackets were not used in any case. Limited single-arch treatments were preferred by orthodontists in some cases. Seizure and medicine intake history were not taken at every appointment. The emergency anti-epileptic drug was not available in the dental office. The primary challenges reported were patient motivation, poor oral hygiene, gingival hyperplasia, and bracket breakage.

**Conclusion:** Orthodontic treatment of epileptic patients is highly challenging. Modified treatment strategies should be adopted to ensure optimal care for such patients.

**Keywords:** Epilepsy, Gingival hyperplasia, Orthodontist, Seizure.

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## INTRODUCTION:

Epilepsy is a severe neurological condition impacting over 70 million individuals worldwide. Its occurrence follows a bimodal pattern, with the highest risk in infants and older age groups. It is a complex disease with many risk factors and a strong genetic predisposition.<sup>1</sup> According to a recent study by Todaro and Giuliano, the prevalence of epilepsy increases very sharply between 20-29 years of age without any gender predisposition. They also claimed that epileptic patients can be screened for epidemiological research with the help of video consultation.<sup>2</sup> Recent advancements, such as precision medicine coupled with medication, surgery, and the ketogenic diet, have shown promise in managing the disease. The ideal precision treatment would cure the

disease and its comorbidities in the context of individualized genetic factors, of each patient.<sup>3</sup> That is why a significant portion of individuals with epilepsy now seek dental treatment. A comprehensive survey conducted by Schöpfer and Ludolph on 82 epileptic patients revealed that 84% of them regularly visited a dentist (once or twice a year), 79% disclosed their epilepsy to the dentist, 6% faced refusal of treatment due to their epilepsy, and 10% had experienced a seizure while at a dental office.<sup>4</sup> Epilepsy treatment gap according to the latest systematic review was reported to be 5.6% in Norway to 100% in parts of Tibet, Togo, and Uganda. The underlying cause of this treatment gap was found to be the differences in the provision and utilization of treatment care in different regions.<sup>5</sup> Furthermore, a survey conducted in 2023 revealed that epilepsy poses a significant health challenge in low and middle-income countries, regarding availability and accessibility to treatment.<sup>6</sup> Awareness among pre-clinical medical students in Saudi Arabia indicated lesser knowledge and a negative disposition towards epileptic patients, as compared to clinical patients (92% versus 99.0%,  $P$ -value = 0.000). Pre-clinical students although having good awareness, showed a negative attitude towards epilepsy.<sup>7</sup> In another survey in Saudi Arabia, medical students showed better awareness of epilepsy than other health specialty

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students. However, they had less knowledge about the surgical treatment of epilepsy.<sup>8</sup> Dentists often harbor concerns about emergency preparedness, practical skills, availability of life-saving equipment, and staff readiness. A considerable number of dentists do not feel adequately proficient in handling medical emergencies.<sup>9</sup> Dentistry, like many clinical specialties, involves invasive procedures, putting patients at risk of medical emergencies. Thus, heightened attention and emphasis on preventing and managing such incidents is warranted.<sup>10</sup>

Over the past two decades, there has been a notable surge in adult patients seeking orthodontic treatment, many of whom are suffering from chronic diseases. Advances in the management of these conditions have enabled these patients to pursue elective orthodontic procedures that were once considered impossible. One such condition is epilepsy or seizure disorder. While numerous papers and case reports have been written to update orthodontists on the etiology, types, and management of epilepsy in dental settings, the specific problems and challenges faced in a Pakistani context have not been documented. This qualitative study aims to delve into the personal experiences and hurdles encountered by orthodontists when treating epileptic patients. It is anticipated that this research will uncover novel aspects of the disease and patient behavior in the context of orthodontic treatment. This, in turn, will provide valuable insights for future needs and precautionary measures when dealing with epileptic orthodontic patients.

#### **METHODOLOGY:**

A qualitative research project was carried out by two researchers from the Rawal Institute of Health Sciences Islamabad. The study duration was almost three months from 4<sup>th</sup> August 2023 to 30<sup>th</sup> October 2023 after approval from the ethical committee. Ethical permission for the current study was taken by the Ethical Review Committee of Rawal Institute of Health Sciences (RIHS) Islamabad. (Reference no. RIHS/IRB/D/23100). The sample size was attained by scheduling interviews with the practicing orthodontists until no new information about epilepsy was gained for three consecutive interviews. This finally led us to arrange a total of 11 interviews. The researchers initially enlisted 15 orthodontists, who fit the inclusion criteria. The inclusion criteria for orthodontists in the study were a postgraduate qualification and a minimum of 10 years of clinical experience, in the field of orthodontics. All of them had treated at least one patient with epilepsy in the previous 5 years. General dentists and orthodontists having clinical experience of less than 10 years were excluded from the study. Orthodontists were identified through professional networks and academic institutions. Initially, orthodontists were contacted via phone and invited to take part in the study. Face-to-face interviews occurred in a quiet setting, facilitated by an experienced qualitative researcher. Due to geographical constraints, two orthodontists were interviewed

virtually through Zoom. Before the interviews, every orthodontist was fully briefed about the study's purpose, potential risks, benefits, and their right to withdraw at any stage. An informed consent statement that I agree to participate in this study was taken from each orthodontist verbally. During the interview, orthodontists were instructed to draw information solely from their personal experiences and not rely on their academic knowledge of epilepsy.

Interviews were recorded on an iPhone 10 for accurate transcription. To safeguard orthodontist confidentiality, pseudonyms were used, and identifying information was omitted. A Ph.D. scholar, well-versed in qualitative data analysis, assisted with transcribing the recorded files and resolving any discrepancies through discussion and consensus. Researchers also maintained field notes to capture physical gestures not captured by the recorder. Audit trails were conducted to ensure the validity, applicability, reliability, and confirmability of the findings.

The research report, utilizing framework methodology,<sup>11</sup> comprehensively documented the results. This methodology is shown in Figure I. Researchers listened to the interview content transcripts repeatedly, labeling topics identified from each interview as categories and codes, grouping similar codes into themes. Each code was assigned a number for easy identification as in Table II and so the full names of the codes were not written each time onto the transcripts. Any Computer Assisted Qualitative Data Analysis Software (CAQDAS) was not used in our study. Data was charted into a framework table with columns of codes and themes, and rows of participants, and then integrated into the framework matrix. Interpretation of data was effectively carried out by mutual consensus of the researchers. As data analysis is influenced by researchers' knowledge and interests, a triangulation technique<sup>12</sup> was used to minimize interpretation bias through member checking, where participants were allowed to review and confirm the accuracy of their statements.

#### **RESULTS:**

Eleven orthodontists including 5 males and 6 females, with a clinical experience of more than 10 years participated in the study. Table I shows their working experience and gender. Twenty-seven codes (a1-a7, b1-b4, c1-c7, d1-d6, e1-e3) were constructed and grouped under 5 themes (Table 2). All orthodontists were interviewed about their overall experience, and problems faced during treatment of epileptic patients. We will quote the responses of some orthodontists here. None of the orthodontist knew about the type of epilepsy except orthodontist no 1 and 8. I treated two epileptic patients and asked them about the type of epilepsy. One patient showed me his neurologist report. I don't remember his diagnosis now. Orthodontist 1. All others never saw the neurologist's report or communicated with him. There was no need to communicate with the neurologist because the

disease was under control and the patient was willing for orthodontic treatment. I always made sure that the patient brought his medicine along at every appointment. Orthodontist 5

All orthodontists knew that the patient was under medication and had not experienced a seizure since one year as told by the patient, but they never saw the prescription. Three orthodontists (4, and 7) were requested to remove the braces for MRI because of disease relapse or sudden diagnosis of epilepsy during orthodontic treatment. None of the orthodontists used to take a history of any recent seizure at every orthodontic appointment. I just took history at the start of treatment and the patient told me that my disease is controlled. I never thought of taking a seizure or medication history at every appointment. Orthodontist 4

Patient and parent motivation was reported to be extremely compromised by three orthodontists (3,4 and 7) whose patients were newly diagnosed with epilepsy during orthodontic treatment. They requested immediate removal of braces for MRI. Two of them restarted the orthodontic treatment after one year. My patient and his parents were extremely stressed and frightened. They wanted to get rid of braces. I did not use the ceramic brackets, otherwise, the removal of braces in that case could be deferred. Orthodontist 7. Ceramic brackets are tooth colored and do not need removal before MRI unlike metallic brackets.

All the other participants reported the average motivation level of their patients, however, parents' motivation was high which helped a lot in continuing treatment. My patients' disease was controlled, and did not have seizures for the last two years. She was confident, doing a job, and highly motivated to align her teeth. Orthodontist 11

All orthodontists remembered their patients and shared their personal experiences. Orthodontists no 6 and 10 reported that they planned limited single arch treatment with extraction of labially blocked out canine and finished the case in one and a half years. In my epileptic patient, I preferred limited treatment, because the moment we placed the braces, the gingiva became hyperplastic. Orthodontist 3 All others carried out a comprehensive orthodontic treatment for two to three years. Participant no 2 experienced the seizure and said, my patient was jerking and I just timed and observed the seizure to end. I did not call the patient for the next 3 months for an orthodontic appointment. Orthodontist 11 also experienced the seizure and stated, He was my colleague patient and it was a private clinic around 7.00 pm. The seizure was extremely severe and his body was stiff. We removed all the instruments around him and waited for the seizure to end. We did not remember at that time to turn the patient to his side. We related it to the evening appointment and started calling him in the morning. I think it triggers in the evening with fear and anxiety. Orthodontist 11. Orthodontist 3 also experienced the seizure once and said.

I checked the time of the seizure, and unfortunately, buccal /nasal midazolam or any other anti-epileptic drug was not available in the office. The patient hands were tightly closed, and saliva came out of his mouth. The seizure ended after almost a minute or so. The patient had a short-term memory loss after the seizure. He did not remember where he was. I remember that patient later gave history of irregular medicine intake.

All orthodontists except 10 and 11 declared that the biggest challenge was poor oral hygiene. They remembered repeated referrals to the periodontist for scaling, mouthwash prescription, and modified brushing techniques. Patient cooperation was compromised. I as an orthodontist was disappointed to see the oral hygiene and every time counseled the patient, and his parents but it was of no use. Orthodontist 2.

Seven orthodontists reported gingival hyperplasia after the insertion of braces. It was even more so with orthodontic bands, which made it difficult to execute mechanics. I used to refer the patient to the periodontist frequently. My patient could not afford an aligner, but it could be a good option for him. Orthodontist 3.

Orthodontist 10 stated that I avoided using cotton palettes and intense dental chair light in my epileptic patient. Another problem claimed by all participants was bracket breakage which resulted in treatment delays. Premolar brackets were the most frequent to dislodge. I was so annoyed by repeated bracket breakage that I stopped replacing the premolar brackets because bands further aggravated hyperplasia. Ceramic brackets are expensive and not user-friendly, otherwise, I would have preferred them for my epileptic patient. Orthodontist 10.

Nine orthodontists reported increased appointment time and workload because of breakages and poor oral condition. Placing ligatures was a tedious job. I had to remove calculus around brackets at every appointment. Orthodontist 5. Orthodontist no 6 and 9 also reported bad mouth odour and staining of the teeth. All orthodontists recommended frequent workshops, mock exercises, and staff training about treating medically compromised patients.

#### **DISCUSSION:**

This study presents a distinctive opportunity to delve into the challenges and experiences faced by orthodontists in the context of employing fixed mechanotherapy for epileptic patients. While many of the findings align with existing literature, there are noteworthy discrepancies. Here, we will exclusively discuss the shortcomings observed in orthodontic practice that emerged during interviews. The majority of orthodontists employed a standard consent form, however, in cases involving epilepsy, it is imperative to obtain a consent form that expressly highlights the potential for injury associated with intraoral appliances during a seizure episode. Every orthodontist must know the classification and exact

Figure 1: Hierarchy of Framework Methodology

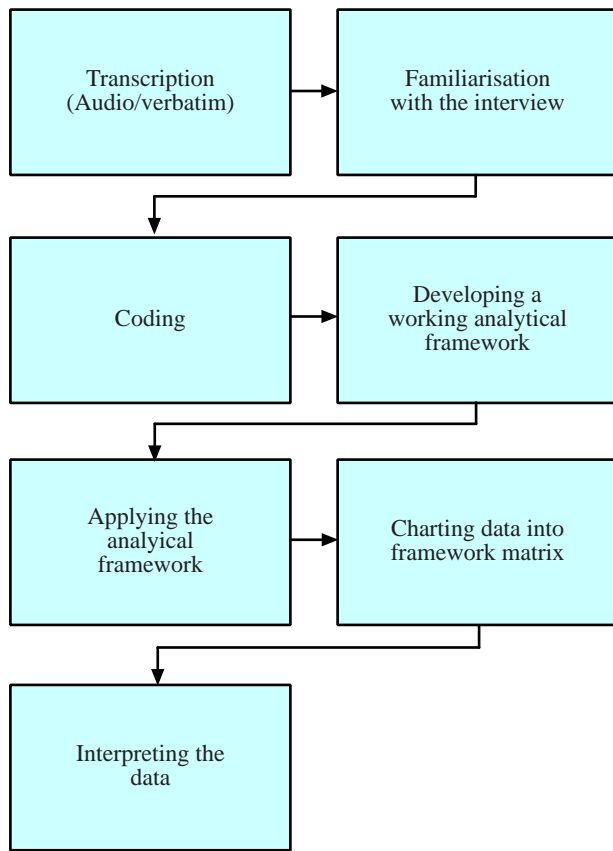


Table 1. List of interviewed orthodontists

No of orthodontist	Gender	Work experience
1	male	11 years
2	male	15 years
3	male	20 years
4	female	10.5 years
5	male	13 years
6	female	11 years
7	female	25 years
8	female	10 years
9	female	13 years
10	male	11 years
11	female	11 years

type of epilepsy, the patient has. For instance, a tonic/clonic seizure or episode of status epilepticus is critical and regarded as a medical emergency if it persists beyond a five-minute threshold.<sup>13</sup> Not all orthodontists uniformly insisted on obtaining a prescription and diagnostic report from the treating neurologist. Previously medicine taken by the patient was mostly phenytoin sodium or Tegretol, however, with advancements in the medical field many other options are available now and neurologists can be communicated regarding change of medication to handle problems like gingival hyperplasia.<sup>14,15</sup>

Table 2. List of Themes and Codes

Themes	Codes
Diagnosis	a1. past medical history a2. the patient had a pre-treatment epilepsy or it started during orthodontic treatment a3 type and frequency of the seizure. a4. When did the last seizure occur? a5. which medicine he is taking a6.MRI done or not, will need removal of braces for MRI. a7. neurologist report studied or not.
Behavior and motivation	b1. Parents and patients interest in treatment. b2. The patient is internally or externally motivated. b3. pretreatment oral hygiene status. b4. overall self-esteem and behavior of the patient.
Treatment Planning	c1. consent of parents and patient about intra-oral injury risks c2. repeated referral to a periodontist c3. medicine and seizure history at every appointment. c4. need for medical emergency help c5. limited treatment goals. c6. more treatment time in extraction cases c7.use aligners and ceramic brackets c8. arrange antiepileptic drugs for emergencies.
Challenges and concerns of the orthodontist.	d1. oral hygiene maintenance. d2. bleeding gums and increased calculus deposits around brackets d3. bracket breakage. d4. gingival hyperplasia. d5. increased treatment time. d6.bad mouth odour and staining of teeth.
Recommendations and Advice	e1. workshops e2. mock exercises for dentists and staff

Echoing prior research, orthodontists in our study exhibited a commendable awareness of precautions pertinent to epileptic patients. However, full-fledged implementation of these precautions was not uniformly evident. Only one orthodontist mentioned that I never use cotton pallets for saliva control in epileptic patients. Insertion of rubber mouthpieces is considered to be a favorable method to cope with the occurrence of epileptic seizures during the bonding of braces.<sup>16</sup> Within our study, prominent challenges in orthodontic treatment encompassed a lack of patient

motivation, gingival hyperplasia, suboptimal oral hygiene, and recurrent bracket breakage. Tiwari and Verma found a strong association between dental caries, gingival enlargement, periodontal disease, injuries of the oral cavity, and seizure-related trauma.<sup>17</sup> However, Alqahtani identified orthodontic facial fractures, dental trauma, gingival hyperplasia stemming from anticonvulsant medications, facial asymmetry, and temporomandibular joint subluxation as primary concerns. It is pertinent to emphasize that patients with poorly managed seizures, particularly those prone to falls or uncontrolled bodily movements, are contraindicated for orthodontic intervention.<sup>18</sup> Notably, while orthodontists in our study acknowledged stress, evening appointments, and missed medication as potential seizure triggers, only 3 of them mentioned that the intense illumination from dental chair lights can also serve as a trigger. It is imperative to utilize dark goggles for all patients in this context.<sup>19</sup> A recent local study by Qasim et al, highlighted a substantial need for enhanced knowledge among Pakistani dentists concerning epilepsy. Notably, 48.2% of respondents erroneously believed that epileptic patients could safely undergo in-office treatment.<sup>20</sup> We posit that such confidence may be misleading, given that seizures can recur even in cases where the condition is well-controlled, particularly in the presence of exacerbating factors so dental procedure should be done in a separate room that is free from loud noises and bright lights. A sphygmomanometer and a portable oxygen cylinder should be kept ready in the dental office.<sup>21</sup> Last but not least, none of the orthodontists mentioned dental drug interaction with anti-epileptic medication. For example, metronidazole, fluconazole, and antibiotics (such as erythromycin) are known to interfere with the metabolism of certain anti-epileptic drugs. Newly introduced drugs like cenobamate and fenfluramine have lesser pharmacokinetic interactions.<sup>22</sup>

While there were variations in the experiences of orthodontists with epileptic patients, the underlying implications are remarkably similar. It is imperative to conduct a comprehensive history, inquire about the current state of the disease and medication, and carefully consider suitable appliances and techniques for orthodontic treatment. Buccal/nasal midazolam should be available in the dental office. Future recommendations are that practical courses for dental professionals and support staff should be frequently arranged.

This study has a few limitations. The research relied on participants' memory during the interview so there may be a potential for recall bias, particularly among orthodontists who treated patients four or five years back. Furthermore, all orthodontists involved in the study were highly qualified, which could potentially influence them to rely more on theoretical knowledge rather than sharing personal experiences exclusively. Nevertheless, this approach's strength lies in the fact that orthodontists were interviewed based on

their direct patient interactions, potentially yielding fresh insights and recommendations for treating epileptic patients.

### CONCLUSION:

We concluded that orthodontic treatment of epileptic patients is highly challenging. Orthodontists experience a lot of problems like gingival hyperplasia, poor oral hygiene, and bracket breakages. Orthodontists should take care of special considerations while treating epileptic patients like use of ceramic brackets, avoiding intense dental lights and intra oral cotton palletes, taking medication history, availability of Buccal/nasal midazolam in the dental office and focus on enhancing the practical implications of their clinical knowledge about epilepsy.

### Authors Contributions:

**Sadia Naureen:** Conception, design, Introduction and discussion

**Huma Ghazanfar Kiani:** Data analysis, Results and conclusion

### REFERENCES:

1. Thijs RD, Surges R, O'Brien TJ, Sander JW. Epilepsy in adults. *Lancet*. 2019;393(10172):689-701. DOI: 10.1016/S0140-6736(18)32596-0.
2. Todaro V, Giuliano L, Cicero CE, Spina L, Colli C, Cuellar S, Cosmi F, Vilte E, Bartoloni A, Crespo Gómez EB, Nicoletti A. Prevalence of epilepsy in the rural area of the Bolivian Gran Chaco: Usefulness of telemedicine and impact of awareness campaigns. *Epilepsia Open*. 2023;8(1):125-33. DOI: 10.1002/epi4.12677.
3. Knowles JK, Helbig I, Metcalf CS, Lubbers LS, Isom LL, Demarest S, Goldberg EM, George AL Jr, Lerche H, Weckhuysen S, Whittemore V, Berkovic SF, Lowenstein DH. Precision medicine for genetic epilepsy on the horizon: Recent advances, present challenges, and suggestions for continued progress. *Epilepsia*. 2022;63(10):2461-75. DOI: 10.1111/epi.17332.
4. Schöpfer M, Ludolph AC, Fauser S. Dental care in patients with epilepsy: a survey of 82 patients and their attending dentists and neurologists in southern Germany. *Int Dent J*. 2016;66(6):366-74. DOI: 10.1111/idj.12251.
5. Kwon CS, Wagner RG, Carpio A, Jetté N, Newton CR, Thurman DJ. The worldwide epilepsy treatment gap: A systematic review and recommendations for revised definitions - A report from the ILAE Epidemiology Commission. *Epilepsia*. 2022;63(3):551-64. DOI: 10.1111/epi.17112.
6. Pironi V, Ciccone O, Beghi E, Paragua-Zuellig H, Patel AA, Giussani G, Bianchi E, Venegas V, Vigeveno F; ILAE Task Force on Access to Treatment. Survey on the worldwide availability and affordability of antiseizure medications: Report of the ILAE Task Force on Access to Treatment. *Epilepsia*. 2022;63(2):335-51. DOI: 10.1111/epi.17155.

7. Bin Abdulrahman KA, Alharbi MG, Alzeer AM. Awareness and attitudes toward epilepsy among medical students and interns in Riyadh, Saudi Arabia. *Prim Health Care Res Dev.* 2022 ;23:e70. DOI: 10.1017/S1463423622000597.
8. Alomar S, Kadi M, Alabbas D, Aljeddawi M, Alsulaiman S, Baesa S, Sabbagh A. Awareness and attitudes toward epilepsy among medical and allied healthcare students - A survey study in a teaching hospital in Jeddah. *Epilepsy Behav.* 2020;102:106815. DOI: 10.1016/j.yebeh.2019.106815.
9. Smereka J, Aluchna M, Aluchna A, Szarpak Ł. Preparedness and attitudes towards medical emergencies in the dental office among Polish dentists. *Int Dent J.* 2019;69(4):321-28. DOI: 10.1111/idj.12473.
10. Al Ghanam MA, Khawalde M. Preparedness of Dentists and Dental Clinics for Medical Emergencies in Jordan. *Mater Sociomed.* 2022;34(1):60-65. DOI: 10.5455/msm.2022.33.60-65.
11. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol.* 2013; 18;13:117. DOI: 10.1186/1471-2288-13-117.
12. Denzin NK, Lincoln YS. *The sage handbook of qualitative research.* 5th ed. Sage Publications, Inc; 2017.
13. Kienitz R, Kay L, Beuchat I, Gelhard S, von Brauchitsch S, Mann C, Lucaciu A, Schäfer JH, Siebenbrodt K, Zöllner JP, Schubert-Bast S, Rosenow F, Strzelczyk A, Willems LM. Benzodiazepines in the Management of Seizures and Status Epilepticus: A Review of Routes of Delivery, Pharmacokinetics, Efficacy, and Tolerability. *CNS Drugs.* 2022;36(9):951-75. DOI: 10.1007/s40263-022-00940-2.
14. Knowles JK, Helbig I, Metcalf CS, Lubbers LS, Isom LL, Demarest S, Goldberg EM, George AL Jr, Lerche H, Weckhuysen S, Whittemore V, Berkovic SF, Lowenstein DH. Precision medicine for genetic epilepsy on the horizon: Recent advances, present challenges, and suggestions for continued progress. *Epilepsia.* 2022;63(10):2461-75. DOI: 10.1111/epi.17332.
15. Ghosh S, Sinha JK, Ghosh S, Sharma H, Bhaskar R, Narayanan KB. A Comprehensive Review of Emerging Trends and Innovative Therapies in Epilepsy Management. *Brain Sciences.* 2023;13(9):1305. DOI: <https://doi.org/10.3390/brainsci13091305>
16. Hassan A, Assim B, Mohammad B. Special Care Dentistry and Epilepsy. *King Khalid University Journal of Health Sciences.* 2023;8(1):6-11. DOI: 10.4103/ KKUJHS. KKUJHS\_37\_22
17. Tiwari S, Verma RK, Dhull KS, Suma G. Assessment of Oral Health Status in Epileptic Children and Healthy Children in Bengaluru City: A Comparative Study. *Int J Clin Pediatr Dent.* 2021;14(6):768. DOI: 10.5005/jp-journals-10005-2081.
18. Alqahtani H. Medically compromised patients in orthodontic practice: Review of evidence and recommendations. *Int Orthod.* 2019;17(4):776-88. DOI: 10.1016/j.ortho.2019.08.015.
19. Katyayan A, Diaz-Medina G. Epilepsy: Epileptic Syndromes and Treatment. *Neurol Clin.* 2021;39(3):779-95 DOI: 10.1016/j.ncl.2021.04.002.
20. Qasim M, Sufiyan A, Shaikat M, Rabbani S, Khan A N, Khan N R. Knowledge, Attitude and Practices of Dentists Towards the Dental Treatment of Epileptic Patients. *Pakistan Journal of Medical & Health Sciences.* 2022;16(4):1130-32. DOI: <https://doi.org/10.53350/pjmhs221641130>.
21. Goswami M, Johar S, Khokhar A. Oral Health Considerations and Dental Management for Epileptic Children in Pediatric Dental Care. *Int J Clin Pediatr Dent.* 2023;16(1):170-76. DOI: 10.5005/jp-journals-10005-2516.
22. Abou-Khalil B. W. Update on Antiseizure Medications 2022. *Continuum (Minneapolis, Minn).* 2022;28(2): 500–35 DOI: <https://doi.org/10.1212/CON.0000000000001104>.