

Original Research

A Clinical Audit: Examining the Proficiency in Orthodontic Record Keeping - Knowledge and Practice Perspectives

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ABSTRACT:

Background: Maintaining comprehensive records is a crucial aspect, especially in the field of Orthodontics, where the accuracy and reliability of records play a pivotal role in diagnosis. Not only does proper record-keeping contribute to effective diagnosis and treatment planning, but it also holds significance in various other aspects such as medico-legal matters, publications, self-assessment, and patient education. The essential toolkit for Orthodontic record-keeping encompasses components like case history, consent forms, plaster models, panoramic radiographs, lateral cephalograms, and intra and extraoral photographs. This study aims to assess the knowledge and practice patterns of Orthodontic record-keeping among dental practitioners. **Methods:** A cross-sectional investigation was undertaken across multiple dental clinics. The selection of dental clinics was carried out using the lottery method, resulting in the inclusion of a total of 80 clinics chosen from the registered dental clinic list. Specifically tailored questionnaires were employed to assess the knowledge, awareness, and practice trends regarding Orthodontic record-keeping among dental practitioners. **Results:** The significance of study parameters on a categorical scale between two or more groups was determined using the Chi-square/Fisher Exact test, while the Student t-test was employed for intergroup analysis on a continuous scale between two groups concerning metric parameters. It was observed that 60% of practitioners did not participate in any Continuing Dental Education (CDE) program related to maintaining health records, whereas 40% had attended such programs. While the majority of general practitioners demonstrated knowledge and awareness of Orthodontic record-keeping, the actual practice did not entirely align with established norms. **Conclusion:** The current investigation revealed a commendable level of knowledge and awareness regarding orthodontic record-keeping. However, the actual practice of record-keeping was assessed to be only average, primarily attributed to insufficient infrastructure in clinics and the limited utilization of digital technology in the majority of the surveyed clinics. In light of these findings, the study recommends the implementation of more awareness programs emphasizing the significance of orthodontic record-taking. Additionally, workshops focusing on the integration of digital technology for the storage and preservation of orthodontic records are suggested to enhance overall record-keeping practices in dental clinics.

Keywords: implementation, Orthodontic, practitioners.

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INTRODUCTION

Maintaining health records stands as a cornerstone in delivering effective and comprehensive patient care within the realm of orthodontics. The very initiation of orthodontic practice underscores the importance of establishing and adhering to standardized orthodontic records.¹ These records, meticulously crafted, serve as

a foundational tool with the primary objective of facilitating accurate diagnoses and addressing the specific concerns of individual patients. Through the systematic documentation of patient information, orthodontists can formulate precise and tailored treatment plans, ensuring optimal outcomes for those under their care. Central to orthodontic record-keeping

is the regular updating of dental charts, capturing a detailed examination of the oral and perioral hard and soft tissues.² This comprehensive approach allows for the documentation of transformations that unfold throughout the course of treatment. The evolution of these records encapsulates a dynamic interplay between orthodontists and patients, fostering effective communication and shared understanding. Beyond the immediate clinical context, orthodontic records play a pivotal role in protecting the legal interests of all parties involved. These records serve as a robust foundation for establishing a clear and transparent communication history, ensuring accountability and adherence to ethical standards. They provide a tangible and documented trail of the treatment journey, safeguarding against potential legal implications.³ A comprehensive study on record-taking has underscored the integral role of various elements, including radiographs, photographs, and casts. These components enrich the orthodontic record by providing a nuanced and multi-dimensional perspective, aiding in more accurate diagnoses and informed treatment planning. In essence, orthodontic record-keeping transcends mere documentation; it is a dynamic and integral aspect of the patient-practitioner relationship, promoting precision in diagnoses, personalized treatment strategies, and the overall enhancement of orthodontic care. As advancements continue to shape the field, the incorporation of these records, complete with technological innovations, ensures that orthodontic practice remains at the forefront of patient-centric and legally sound healthcare delivery.

The pervasive influence of technological transformation has reverberated across diverse sectors, leaving an indelible mark on Orthodontic practices as well. The integration of technology solutions has not only addressed concerns associated with Orthodontic practices but has also elevated the overall efficiency, comfort, and precision in maintaining patient records. This transformative shift, marked by integrated technology solutions, has emerged as a catalyst in optimizing Orthodontic procedures.^[5] Technology assumes a pivotal role in reshaping and influencing every facet of Orthodontic practices. Numerous studies have delved into the realm of Orthodontics, evaluating the application of computer technology in various tools and processes. Notably, digital photographs have become integral in capturing detailed images, providing a nuanced perspective for diagnosis and treatment planning. Cone-beam computed tomography (CBCT) has emerged as a powerful diagnostic tool, offering three-dimensional views that significantly enhance the orthodontic assessment.^{4,5} The advent of virtual study models has further streamlined Orthodontic practices, offering a digital representation of dental structures for comprehensive analysis. Communication within the orthodontic team and with patients has been greatly enhanced through the utilization of advanced

technologies. Virtual reality software has not only improved patient education but has also become a valuable tool for training practitioners. The integration of network-attached storage devices has revolutionized data management, ensuring secure and accessible storage of patient records. This not only facilitates efficient record-keeping but also enables seamless collaboration and information sharing among members of the orthodontic team. In essence, the application of technology in Orthodontic practices represents a paradigm shift, bringing about a heightened level of precision, efficiency, and convenience. As these technological advancements continue to evolve, the landscape of Orthodontics is poised to witness further enhancements, offering both practitioners and patients a more sophisticated and streamlined experience in the realm of oral healthcare.^{6,7}

The integration of 3D technology has emerged as a valuable asset in the maintenance of diagnostic records, offering practitioners a dynamic tool to reproduce patient datasets in secondary environments. This advanced technology empowers practitioners with the capability to create and manipulate records through a 3D virtual representation of the patient. One notable technology contributing to this advancement is the 3dMD system, which employs stereophotogrammetry to generate comprehensive full-face images using an active stereo approach. This cutting-edge system captures intricate facial details and allows for a three-dimensional reconstruction of the patient's features, providing a more comprehensive and accurate representation than traditional methods.⁸ A recent study in the field highlighted that practitioners are increasingly recommending the digitalization of orthodontic records due to the advantages of cost-effectiveness and speed associated with acquiring and reproducing images. The transition from manual methods to digital record-keeping in the orthodontic sector has been fueled by the recognition of the efficiency gains offered by 3D technology. The ability to work with 3D virtual patient datasets not only enhances precision in diagnostics and treatment planning but also streamlines the overall record-keeping process. This technological shift aligns with the broader trend in healthcare towards digitalization, offering practitioners an innovative approach to record management that not only improves accuracy but also enhances the overall efficiency of orthodontic practices.⁹ As the capabilities of 3D technology continue to evolve, its integration is poised to redefine standards in orthodontic diagnostics and contribute to the ongoing transformation of patient care in the field.

MATERIALS AND METHODS

To ensure the integrity and ethical conduct of the study, all requisite permissions were obtained, and the study protocol received formal approval. The sampling methodology employed was non-probability

sampling, specifically adopting a convenience sampling approach. From the pool of registered dental clinics, a total of 80 clinics were selected for inclusion in the study. Each participating dentist, operating within these clinics, was handed a meticulously designed and validated questionnaire. The questionnaire aimed to assess their level of knowledge, awareness, and the practices they employed in the context of orthodontic record-keeping. This comprehensive questionnaire was carefully crafted and validated by three senior orthodontists of the Professor Cadre, ensuring the robustness and relevance of the study instrument. Dentists were allotted a designated timeframe of 10 minutes to complete the questionnaire, and the collected responses were manually gathered for subsequent analysis. Prior informed consent was secured from the participating dental specialists, assuring them of the confidentiality of their identities and clinic details. This ethical consideration was paramount in fostering a sense of trust and willingness to contribute to the study. The collected data were meticulously tabulated using an Excel spreadsheet, and a thorough analysis ensued, involving various statistical tests to derive meaningful insights from the gathered information. The inclusion criteria for the study were carefully outlined, encompassing registered clinics, those managing a substantial volume of ongoing orthodontic cases (more than 60), clinics with a commendable operational history of five years or more, and dental practitioners possessing recognized dental degrees sanctioned by the Government of India. Conversely, exclusion criteria were defined to exclude clinics where orthodontic treatments were not offered, those lacking orthodontic specialists, and clinics promoting do-it-yourself (DIY) orthodontic appliances. By adhering to these rigorous criteria and ethical considerations, the study aimed not only to contribute valuable insights into the knowledge, awareness, and practices of orthodontic record-keeping but also to uphold the highest standards of research integrity and participant confidentiality. The findings of this study are anticipated to make significant contributions to the enhancement of orthodontic care practices.

In the statistical analysis of this study, both Chi-square/Fisher Exact tests and Student t-tests were employed to examine the significance of study parameters across different scales.

1. Chi-square/Fisher Exact Test:

- Purpose: This test was utilized to assess the significance of study parameters on a categorical scale when comparing two or more groups.
- Methodology: It is particularly suitable for analyzing categorical data and determining if there are significant associations or differences between groups.

- Application: The Chi-square test is well-suited for scenarios where data is categorical, and the Fisher Exact test is applied when dealing with small sample sizes.

2. Student t-Test (Two-Tailed, Independent):

- Purpose: This test was used to evaluate the significance of study parameters on a continuous scale when comparing two groups in an intergroup analysis.
- Methodology: The two-tailed, independent Student t-test assesses whether there are statistically significant differences in the means of two independent groups.
- Application: It is particularly effective when dealing with metric parameters and continuous data, providing insights into the significance of differences observed between two distinct groups.

By employing these statistical tests, the study aimed to rigorously assess the significance of various study parameters, both in terms of categorical and continuous scales. These tests are foundational in drawing meaningful conclusions about the relationships, associations, or differences observed within the collected data, contributing to the robustness and reliability of the study findings.

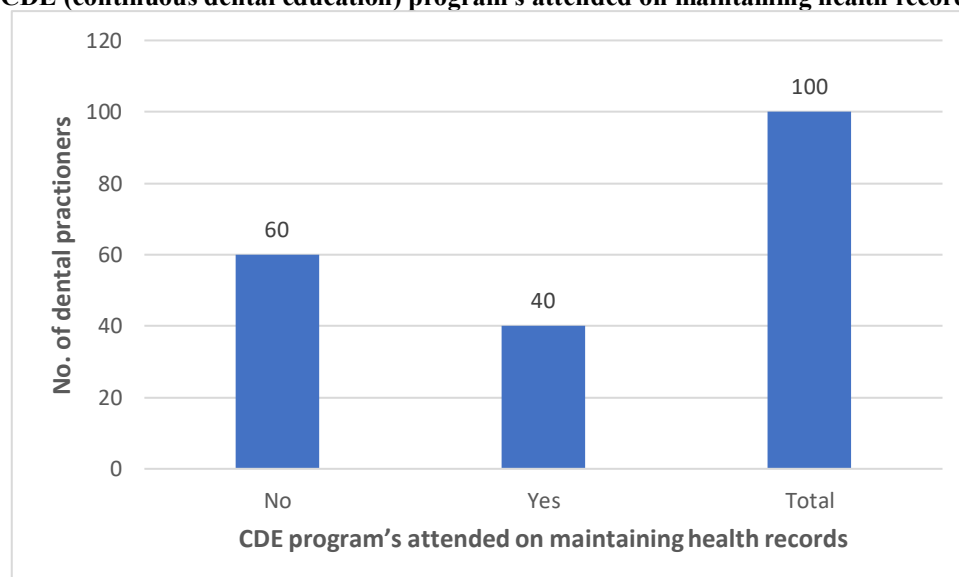
RESULTS

The data reveals a unanimous acknowledgment among respondents regarding the importance of consistently documenting patient details during clinic visits, with all respondents (100%) expressing its significance. In terms of the informed consent form, 5% stated 'never,' 35% 'sometimes,' and a majority of 60% indicated 'always,' underlining the perceived importance of this document as an agreement between patients and clinics. Concerning medical history, 30% considered it necessary, while a substantial majority of 70% stated that it was always documented, emphasizing its relevance in orthodontic record-keeping. All respondents (100%) affirmed the necessity of documenting oral health status. For skeletal orthodontic charting, 25% considered it necessary 'sometimes,' while a significant majority of 75% emphasized its importance by stating 'always.' The survey revealed that 85% of respondents considered the classification of malocclusion in orthodontic charts as necessary, with 10% indicating 'sometimes' and 5% expressing no need. Regarding the documentation of overjet and overbite, 45% expressed the need 'always,' 50% 'sometimes,' and 5% did not require it. In terms of the degree of crowding, 55% considered it important, 40% 'sometimes,' and 5% expressed no interest. Responses varied for different radiographs, with diverse opinions on their necessity for record-keeping, reflecting a nuanced perspective among respondents.

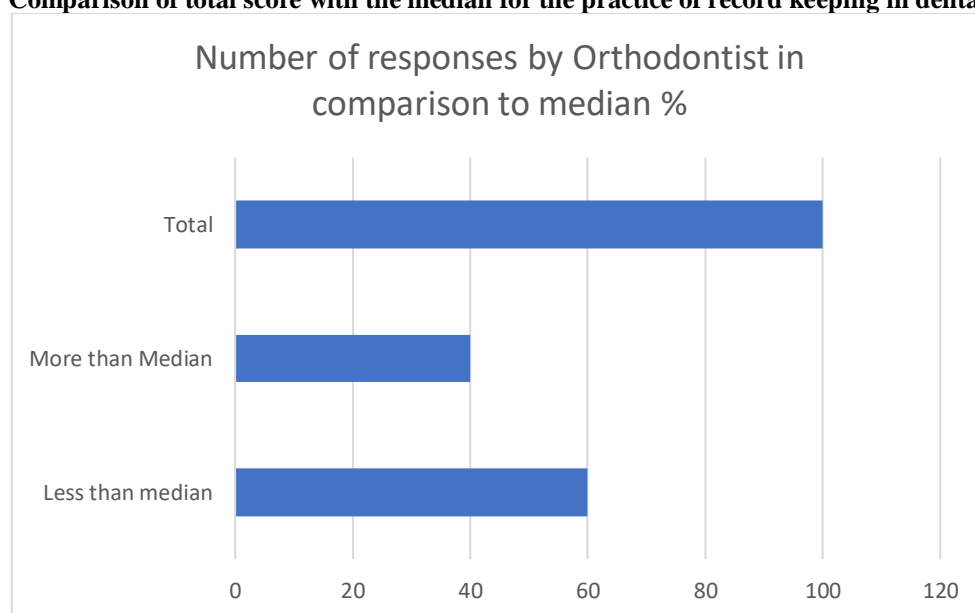
Table 1: CDE (continuous dental education) program's attended on maintaining health records

CDE program's attended on maintaining health records	No. of dental practioners %
No	60.0
Yes	40.0
Total	100

The table provides a breakdown of individuals based on their attendance or non-attendance in the Continuing Dental Education (CDE) program, and the percentages show the distribution among those categories. The total percentage is 100%, reflecting the entire population considered in the table

Figure 1: CDE (continuous dental education) program's attended on maintaining health records**Table 2: Comparison of total score with the median for the practice of record keeping in dental practice**

Total Score of Protocol of practice	Number of responses by Orthodontist in comparison to median %
Less than median	60.0
More than Median	40.0
Total	100.0

Figure 2: Comparison of total score with the median for the practice of record keeping in dental practice

DISCUSSION

Ensuring the privacy and security of patient information is not just a legal obligation but a crucial ethical responsibility for healthcare practitioners. Adhering to medico-legal, commercial, and governmental regulations, including the consumer act, is paramount to safeguarding the confidentiality of individuals seeking orthodontic treatment. The process of recording and managing patient data is particularly meticulous in orthodontics, where the comprehensive documentation of a patient's journey is vital. The initial diagnostic records are a detailed compilation, encompassing a thorough patient history, both medical and dental, along with clinical findings, TMJ (Temporomandibular Joint) examination, intra and extra oral photographs, panorex images, cephalometric analysis, and study models. This foundational information serves as the baseline for the entire treatment process. As the treatment progresses, the maintenance of progress records becomes equally critical. These records go beyond clinical details to capture a holistic view of the patient's journey. This includes a meticulous account of treatment procedures, financial transactions, communication logs, and a comprehensive appointment history.^{10,11} The latter is particularly important, noting not only scheduled visits but also any missed or cancelled appointments. Additionally, progress records may involve supplementary materials such as models, photographs, panorex images for detailed root examination, and thorough TMJ assessments. The importance of such detailed documentation becomes evident in the clinician's perspective. Discovering post-treatment that further adjustments could have optimized the results can be a challenging realization. Therefore, maintaining thorough and organized records not only ensures compliance with regulatory standards but also allows for ongoing evaluation, learning, and improvement in the delivery of orthodontic care. It transforms what could be a clinician's nightmare into a valuable tool for continuous refinement and enhancement of patient outcomes.

The recent survey was designed to investigate the understanding and implementation of Orthodontic record-keeping practices among dental clinics.¹² The study focused on evaluating the awareness and application of record-keeping knowledge among dental practitioners. Notably, the survey results indicate that a substantial number of dental professionals possess knowledge and awareness regarding Orthodontic record-keeping within their clinics. However, a significant observation emerged from the study – despite the high level of awareness, there appears to be only an average frequency in the actual practice of systematic record-keeping among dental practitioners. This finding underscores a noteworthy gap between knowledge and implementation in the context of Orthodontic record-keeping. Efficient and accurate record-keeping is

integral to maintaining comprehensive patient histories and tracking treatment progress and outcomes in orthodontics. The survey outcomes suggest an opportunity for further emphasis on translating awareness into consistent and regular record-keeping practices among dental professionals. Addressing this gap has the potential not only to enhance the quality of patient care but also to improve the overall effectiveness and efficiency of orthodontic treatments in dental clinics. Consideration of strategies or educational initiatives that bridge this awareness-practice gap could significantly benefit the dental community and, by extension, the patients they serve.

The study highlights significant findings regarding dental practitioners and their practices in record-keeping and continuous dental education. Notably, only 35% of practitioners attended Continuous Dental Education programs and maintained records properly.^{13,14} This statistic underscores a potential area for improvement in ongoing professional development within the dental community. Patient record maintenance is underscored as crucial, aligning with the standards set by the American Dental Association (ADA). The study emphasizes that practitioners who uphold detailed patient records find it substantially easier to make informed decisions about treatment plans. This underscores the pivotal role that thorough record-keeping plays in facilitating comprehensive patient care. In the current investigation, it was notable that all respondents were maintaining patient details, with 60% of them obtaining informed consent from patients. While this is a positive observation, the room for improvement lies in increasing the percentage of practitioners obtaining informed consent. Comparative studies, such as one by Osbourne et al., suggest that perceptions of record documentation among dentists can vary. In this case, Minnesota Dentists were reported to have 85% adequacy in record documentation related to Orthodontic patients, aligning with ADA criteria. This insight reinforces the importance of standardizing record-keeping practices across dental communities.¹⁵ Contrastingly, a study found that only 71% of dentists acquired informed consent, indicating variations in obtaining patient consent among different dental practitioners. The diversity in practices is further highlighted in the context of dental practitioners in Chennai, where only 12% are reported to maintain complete records. This variance underscores the need for consistent standards and continuous education to improve record-keeping practices and ensure a high standard of care across the dental profession.

CONCLUSION

The present study reveals that dental practitioners exhibit commendable knowledge and awareness regarding orthodontic record-keeping. However, the actual practice of record-keeping was found to be average, primarily attributed to the insufficient

infrastructure in clinics and the limited utilization of digital technology. A noteworthy observation was the lack of adequate infrastructure in many clinics, hindering the effective implementation of systematic record-keeping practices. Additionally, the underutilization of digital technology in most clinics was identified as a significant factor contributing to the average record-keeping practices. The integration of digital technology in record-keeping processes can streamline and enhance the efficiency of managing orthodontic patient data. The study recommends the implementation of more Continuous Dental Education (CDE) programs and workshops focusing on the importance of record-taking in orthodontics, emphasizing the use of digital technology. These educational initiatives can bridge the gap between knowledge and practice, fostering improved record-keeping habits among dental practitioners. Furthermore, the study emphasizes the necessity of excellent clinical infrastructure, including a dedicated record room for the proper storage and preservation of orthodontic records over an extended period. The absence of such facilities in many clinics highlights a crucial area for improvement. In conclusion, the study suggests the adoption of comprehensive measures. This includes ensuring proper record-taking and storage, periodic auditing of records, and the incorporation of digital technology to make the record storage process more efficient and paperless. This not only facilitates easy review of orthodontic patient progress but also reduces the burden associated with physical storage, making the entire process more time-effective and infrastructure-friendly.

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