

Survey of Iraqi Orthodontists on the Frequency, Periodontal Effects, and Clinical Management of Patients Receiving Systemic Isotretinoin Therapy

Alan Issa Saleem¹, Shaymaa Shaker Taha¹, Fudhla S. Al-Zubaydi², Samara Mowafaq Ali³

¹College of Dentistry, University of Baghdad, Baghdad, Iraq

²Health Division Al-Jadriya, University of Baghdad, Baghdad, Iraq

³College of Medicine, University of Baghdad, Baghdad, Iraq

Abstract

Isotretinoin is considered one of the major treatment options for resistant acne vulgaris. Concerns have been raised about its effect on periodontal health and orthodontic tooth movement since retinoids affect bone metabolism; however, evidence regarding this topic is still insufficient. To assess the knowledge, attitudes, perceptions and clinical practices of Iraqi orthodontists regarding the orthodontic management of patients receiving isotretinoin therapy. A cross-sectional questionnaire-based study that utilized a 44-item survey. Licensed Iraqi orthodontists were invited to complete the questionnaire within a certain timeline, and 110 valid responses were included in the final analysis. Knowledge varied considerably across individual items. The mean core knowledge score, derived from eight evidence-based items, was 4.44 ± 1.59 out of 8, corresponding to an overall accuracy of 55.5%. Knowledge scores did not differ significantly according to academic qualification, years of orthodontic practice, or previous clinical experience with isotretinoin-treated patients (all p -values > 0.05). Although 70.9% of respondents reported modifying orthodontic treatment on a case-by-case basis, only 0.9% routinely collaborated with dermatologists. The belief that isotretinoin adversely affects periodontal health was significantly associated with treatment modification ($\chi^2 = 35.46$, p -value < 0.001), and previous clinical experience with isotretinoin-treated patients was associated with modification of treatment strategies (p -value = 0.049). Iraqi orthodontists demonstrated moderate overall knowledge regarding isotretinoin therapy. There were no significant differences in knowledge according to professional qualification or clinical experience. The findings highlight the need for evidence-based guidelines and the development of recommendations to support the orthodontic management of patients receiving isotretinoin therapy.

Open Access

Citation: Saleem Al et al. (2026) Survey of Iraqi Orthodontists on the Frequency, Periodontal Effects, and Clinical Management of Patients Receiving Systemic Isotretinoin Therapy. Dentistry 3000. 1:a001
doi:10.5195/d3000.2026.1635
Received: October 4, 2026
Revised: October 12, 2026
Accepted: October 15, 2026
Published: October 20, 2026
Copyright: © 2026 Saleem Al et al. This is an open access article licensed under a Creative Commons Attribution Work 4.0 United States License
Email: dr_shaymaa77@codental.uobaghdad.edu.iq

Introduction

Isotretinoin is a systemic vitamin A-derived oral retinoid that is considered one of the major treatments for resistant nodular acne vulgaris that does not respond to conventional therapeutic measures [1]. It primarily acts by reducing the sebaceous glands' size, reducing sebum secretions, indirectly eliminating the acne-causing bacteria in the skin, and exerting anti-inflammatory properties on the skin [2]. Isotretinoin is also used in many off-label indications, with most of them related to cancer prevention and management [2,3], and it is also associated with multiple adverse effects, including most commonly cheilitis, xerosis, and xerostomia [2]. Owing to this beneficial role in treating severe acne vulgaris, it remains one of the most prescribed therapies by dermatologists, especially among adolescents and young adults [4]. This age group of isotretinoin patients largely overlaps with the population seeking orthodontic treatment, making the concurrent use of isotretinoin and orthodontic therapy an increasingly common clinical scenario [5,6]. However, clinicians do not have a clear guideline to address such cases. Orthodontic tooth movement is a complex biological process that demands coordinated bone resorption and formation within the periodontal ligament-alveolar bone complex. This is achieved by a tightly regulated interplay between osteoclasts, osteoblasts, and multiple inflammatory signaling pathways, as well as an active extracellular remodeling process [7]. Retinoids have been shown to influence bone metabolism, collagen metabolism, and cellular differentiation with a dose-dependent pattern on multiple occasions, suggesting that they may alter the underlying biological processes affecting orthodontic tooth movement. Therefore, concerns have been raised about the clinical impact of isotretinoin on periodontal health and orthodontic outcomes [8]. Previous experimental studies have focused primarily on several aspects of Isotretinoin therapy, including its effect on the rate of orthodontic tooth movement. The findings of these predominantly laboratory rat-based studies have been inconclusive [9-11]. Some investigations have reported that isotretinoin alters certain phases of tooth movement; however, the observed effect was relatively small, suggesting that isotretinoin affects biological remodeling and bone cell activity more than the overall clinical rate of tooth movement [9,10].

Other studies found no significant effect on orthodontic tooth movement in rat models receiving isotretinoin, although they suggested that the drug may induce apical root resorption even in the absence of orthodontic force [11]. Moreover, while isotretinoin's well-documented adverse effects on the oral mucosa and periodontal tissue have been demonstrated in experimental studies, their influence on orthodontic tooth movement appeared to be relatively negligible, and further research is required to establish their clinical significance [12]. In the absence of significant clinical and experimental evidence, as well as clear clinical guidelines in the management of orthodontic patients on isotretinoin therapy, the orthodontists may rely solely on their clinical experience and individual interpretation of literature, resulting in substantial variation in making important decisions regarding treatment initiation, continuation, monitoring protocols, and communication with dermatologists. Despite the growing relevance of this issue, little is known about the orthodontists' knowledge, perception, and management strategies concerning patients on isotretinoin therapy, particularly within the Middle-Eastern population and the Iraqi orthodontic community. Therefore, the current study is designed to assess the knowledge, attitude, perception, and clinical practices of Iraqi orthodontists regarding the management of patients on Isotretinoin therapy. Specifically, the present study is designed to evaluate the frequency with which orthodontists encounter such cases, their knowledge of the periodontic and orthodontic effects, and the clinical strategies employed when providing orthodontic treatment to individuals undergoing isotretinoin therapy.

Material and Methods

Study Design

This cross-sectional questionnaire-based study was conducted among licensed orthodontists across Iraq. The electronic survey was distributed among orthodontists through their official registered emails. Participants were invited to complete the questionnaire within the specified data collection period from the 1st of January to the 1st of June 2026. Consent was obtained from the participants to share their responses and use their provided data as a part of the current studies. A total of 110 completed questionnaires were included in the final analysis, and the obtained data were analyzed to assess the knowledge, attitudes, perceptions, and clinical practices of Iraqi orthodontists regarding the orthodontic management of patients receiving Isotretinoin therapy.

Questionnaire on Isotretinoin Use in Orthodontic Patients

The main instrument used in the current study was a 44-item structured, self-administered questionnaire organized into five sections. This questionnaire was developed based on a thorough review of the available literature on Isotretinoin therapy, orthodontic tooth movement, periodontal and alveolar bone remodeling, orthodontic management of patients receiving Isotretinoin therapy, and several relevant medical and dental knowledge, attitudes, and practices (KAP) studies [1,13-16]. Where possible, the questionnaire adapted items from previous studies' tools; however, additional items were developed to address clinical practices that were insufficiently represented in the literature but relevant to Iraqi orthodontic settings.

The questionnaire included five sections. The first section assessed the demographic and professional background using nine items. The second section consisted of four items to evaluate the respondents' clinical expertise with patients receiving isotretinoin therapy, including the frequency and previous encounters of such cases, methods of identifying isotretinoin use, as well as history-taking procedures. The third section consisted of 13 True/False/Don't Know statements to assess respondents' knowledge on basic Isotretinoin pharmacology, bone and periodontal ligament remodeling, orthodontic tooth movement, root resorption and systemic adverse effects. The knowledge score ranged from 0 to 13, with a greater score indicating higher knowledge, as correct answers were assigned one point and both false answers and "don't know" received zero points. Eight knowledge items that were backed by solid evidence were used to create a composite core knowledge score; items that dealt with open scientific questions were not included in the score computation. The fourth section was used to evaluate attitudes and perceptions by three categorical items and seven statements rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The higher the score, the greater the perception towards evidence-based clinical management. The fifth section consisted of eight items used to assess clinical practices related to the orthodontic management of patients receiving isotretinoin, including treatment modifications, radiographic monitoring, interdisciplinary communication, and observed adverse effects.

Validity and reliability of the questionnaire

An expert team made up of orthodontists, dermatologists, oral medicine professionals, and biostatisticians evaluated the preliminary questionnaire's face and content validity. Clarity, readability, grammar, ambiguity, clinical relevance, professional appropriateness, and cultural suitability were used to assess face

validity; minor wording changes were made in accordance with expert consensus. A four-point relevance scale was used to independently evaluate content validity. Both the scale-level Content Validity Index based on the average technique (S-CVI/Ave) and the item-level Content Validity Index (I-CVI) were computed. The S-CVI/Ave was 0.96, whereas the I-CVI values varied from 0.83 to 1.0. Each item retained satisfied the suggested content validity thresholds (I-CVI ≥ 0.78 and S-CVI/Ave ≥ 0.8). After meeting the eligibility requirements, 25 licensed Iraqi orthodontists participated in a pilot study and were later removed from the final analysis. After gathering participant input on the questionnaire's readability and clarity, no significant changes were needed. The average time to finish was between ten and fifteen minutes. Cronbach's alpha was used to evaluate internal consistency, and the results showed satisfactory reliability with coefficients of ($\alpha=0.82$) for the knowledge domain and ($\alpha=0.85$) for the attitude domain. The questionnaire was given to the pilot participants again after 2 weeks to measure temporal stability. The Intraclass Correlation Coefficient (ICC = 0.9) was used to evaluate test-retest reliability, and the results showed satisfactory reproducibility. Jamovi software (Version 2.6.25.0) was used for all psychometric studies.

Participants

Inclusion criteria

Orthodontists of either sex who were officially registered with the Iraqi Dental Association, held a post-graduate orthodontics degree or certificate, and were actively practicing in Iraq during the study period.

Exclusion criteria

Orthodontists who did not provide informed consent to participate, questionnaires submitted after the specified date, or those who participated in the preliminary pilot study were excluded.

Sampling and Sample size

A convenience sampling approach was employed in the current study. According to the Iraqi dental association, approximately 180 licensed orthodontists were actively practicing in Iraq during the study period. As the targeted population was small, all eligible orthodontists were invited to participate either in the pilot study or the main study, constituting a census of the acceptable population.

Ethical considerations

The study protocol was approved by the Research Ethics Committee of the College of Dentistry / University of Baghdad (approval number: 1100 on the 20th of November 2025).

Statistical Analysis

Data were entered into Microsoft Excel (Microsoft Corp., Redmond, WA, USA) and analyzed using Jamovi software (Version 2.6.25.0).

Descriptive statistics were used to summarize the study variables. Categorical variables were presented as frequencies and percentages, whereas continuous variables were expressed as mean $\pm$ standard deviation (SD) or median and range, as appropriate. A composite core knowledge score was calculated by assigning one point for each correct response to eight evidence-based knowledge items, resulting in a total score ranging from 0 to 8. The overall accuracy rate was calculated by dividing the mean knowledge score by the maximum attainable score and expressing the result as a percentage. One-way analysis of variance (ANOVA) was used to compare the differences between continuous and categorical variables. Assumptions of normality were evaluated using the Shapiro–Wilk. When applicable, Tukey's post hoc test was performed for pairwise comparisons. Associations between categorical variables were assessed using the Pearson's chi-square (χ^2) / Fisher's exact tests. A two-tailed p-value of <0.05 was considered statistically significant for all analyses.

Results

Participant Characteristics

A total of 110 completed questionnaires were included in the final analysis. The demographic and professional characteristics of the participants are summarized in Table 1.

Female respondents represent 59.1% of the sample. The most common mean age group was those between 30 and 39 years, which represent 47.3%. Participants were predominantly practicing in urban regions (95.5%), with the majority practicing in Baghdad (85.4%), followed by Erbil (4.5%), while the remainder represented several other Iraqi governorates.

Regarding professional qualifications, diploma holders constituted the largest group (60.9%), followed by MSc/MDS degree (24.5%), and those with PhD or Fellowship qualifications (14.5%). More than half of the participants (54.5%) had orthodontic experience between 11 and 20 years, whereas 21.8% had practiced for fewer than five years.

Most respondents (68.2%) worked in mixed practice settings (combining private and public or academic practice), while 17.3% practiced exclusively in private clinics.

Monthly-scaled orthodontic workload varied between respondents, with 31.8% of them treating fewer than 10 orthodontic patients per month and 26.4% managing more than 50 patients monthly. Specifically, adult orthodontic caseloads were lower, with 46.4% of the respondents reporting treating fewer than 10 adult patients per month.

Clinical Exposure to Patients Receiving Isotretinoin

Clinical exposure with Isotretinoin-treated patients is summarized in Table 2. Clinical exposure to orthodontic patients receiving isotretinoin therapy was limited with 33 respondents (30%) confirmed having previously treated patients undergoing isotretinoin therapy, whereas 45.5% were uncertain whether they had encountered such patients and 24.5% reported no previous experience.

Among all participants, the frequency of encountering isotretinoin-treated patients was as follows: 62.7% of respondents indicated that such encounters occurred rarely; 26.4% reported never encountering such patients; 9.1% reported occasional encounters; and two respondents (1.8%) stated that they managed such patients frequently (≥ 1 /month).

When isotretinoin-treated patients were encountered, the information about isotretinoin was more commonly disclosed voluntarily by patients themselves (24.5%) or their parents/companion (27.3%). Only 45.5% of participants reported routinely asking about isotretinoin use during the initial orthodontic assessment, whereas the majority (54.5%) did not inquire about isotretinoin use.

Knowledge Assessment

Knowledge regarding isotretinoin therapy was evaluated using thirteen statements addressing its pharmacology, skeletal and periodontal effects, oral manifestations, and current evidence related to orthodontic treatment. The distribution of responses for each knowledge item is presented in Table 3.

Response rates varied considerably across individual items, ranging from 19.1% to 66.4%, indicating substantial variability in participants' understanding of different aspects of isotretinoin therapy. The highest proportion of correct responses was observed for recognition of the effect on tooth movement is dose-dependent (66.4%), followed by knowledge about the cheilitis and oral mucosal dryness as common adverse effects of isotretinoin (64.5%), awareness of sun-exposure precautions (63.6%), and its influence on bone remodeling (61.8%).

Conversely, knowledge was poorest regarding the association between isotretinoin and temporomandibular or myofascial symptoms, with only 16.4% answering correctly.

To provide an overall estimate of factual knowledge, a composite core knowledge score was calculated using eight items supported by well-established evidence, while excluding questions addressing areas where the current literature remains inconclusive. The mean core knowledge score was 4.44 ± 1.59 with range from 0 to 8; corresponding to an overall accuracy of approximately 55.5% ($4.44/8$). Individual scores ranged from 0 to 8, with a score of 5 representing the median and mode.

One-way analysis of variance (ANOVA) demonstrated no statistically significant differences in knowledge scores according to respondents' highest academic qualification (p -value = 0.798), years of orthodontic practice (p -value = 0.815), or previous experience treating patients receiving isotretinoin (p -value = 0.897). Table 4 summarizes key findings.

Perceptions and Attitudes

Participants' responses to perceptions and attitudes toward isotretinoin-related orthodontic care were summarized in table 5. Most respondents (84.5%) were uncertain whether isotretinoin adversely affects periodontal health during orthodontic treatment, while only 13.6% believed that it has a negative effect. Nearly all participants (97.3%) indicated that formal guidelines would be helpful, with 17.3% responding "yes" and a further 80% answering "maybe." By contrast, only 2.7% considered such guidelines unnecessary.

Slightly more than half of the respondents (51.8%) agreed that information regarding isotretinoin use should always be obtained during orthodontic history-taking and similarly believed that isotretinoin could compromise orthodontic treatment outcomes if not appropriately managed. Self-reported confidence was reported by 50% of participants.

Respondents perceived their education to have adequately prepared them for managing isotretinoin-related issues, as 64.5% agreed or strongly agreed with this statement. However, more than half (55.5%) also believed that orthodontists, in general, are insufficiently informed about the orthodontic implications of isotretinoin therapy. Likewise, 49.1% of the participants agreed that orthodontists should routinely communicate with the prescribing dermatologist and that orthodontic treatment should be postponed during active isotretinoin therapy (54.5%).

Clinical Practice Patterns

The reported clinical practice among participants was summarized in Tables 6 and 7. Thirty-nine participants (35.5%) reported observing no clinically significant oral changes in patients receiving isotretinoin. Among those reporting adverse findings, gingival dryness and gingival bleeding were the most frequently mentioned (49.1%), followed by mucosal ulceration (10%), and gingival recession (5.5%).

Seventy-eight respondents (70.9%) indicated that treatment modifications were performed on a case-by-case basis, with 8.2% reporting consistently modified treatment for all patients receiving isotretinoin, whereas 20.9% reported that they never altered their treatment approach. When participants were asked specifically about the modification in management strategies they did, increasing the frequency of periodontal monitoring and oral hygiene

reinforcement was the most reported modification, with 32.7% of participants adopted this approach. Similarly, equal proportions of respondents (16.4% each) reported applying lighter forces or selecting alternative appliance types such as aligners. Moreover, 10% of participant reported collaboration with dermatologist.

In contrast, 61.8% of respondents reported that they never consulted the prescribing dermatologist, while one participant (0.9%) reported collaborating with dermatologists during patient management. Routine screening for isotretinoin use during the initial orthodontic assessment was reported by 48.2% of the participants.

Associations Between Knowledge, Perceptions, and Clinical Practice

Associations between selected demographic, knowledge, perception, and clinical practice variables are presented in Table 8. Participants who believed that isotretinoin negatively affects periodontal health were significantly more likely to modify orthodontic treatment for patients receiving isotretinoin than those who were uncertain or did not share this belief (p -value < 0.001). Nearly half of respondents (7/15; 46.6%) perceiving periodontal risk reported always modifying treatment, whereas this practice was not reported among participants who did not perceive such a risk.

Previous clinical experience treating patients receiving isotretinoin was also significantly associated with treatment modification frequency (p -value = 0.049). No statistically significant associations were identified between previous clinical experience and routine screening for isotretinoin use during history-taking (p -value = 0.802), and professional qualification and self-reported confidence (p -value = 0.668).

Discussion

The present study represents one of the first investigations to evaluate the knowledge, perceptions, and clinical practices of Iraqi orthodontists providing orthodontic care regarding patients concurrently taking isotretinoin therapy. Overall, the findings of the current study revealed three major noteworthy trends. First, the frequency of clinical exposure to patients receiving isotretinoin was relatively limited and unrecognized. Second, respondents demonstrated only moderate knowledge regarding the pharmacological and orthodontic implications of isotretinoin, with knowledge deficits observed irrespective of professional qualification or years of clinical experience. Finally, although participants generally expressed cautious attitudes and acknowledged the potential importance of isotretinoin during orthodontic treatment, these attitudes were not

consistently translated into clinical practice. One of the most clinically relevant findings of this study was the limited recognition of patients undergoing isotretinoin therapy. Only 30% of respondents reported having treated orthodontic patients receiving isotretinoin, while more than half did not routinely inquire about isotretinoin use during medical history taking.

Considering that isotretinoin remains the treatment of choice for moderate-to-severe acne vulgaris, which predominantly affects adolescents and young adults, who are the same age group frequently seeking orthodontic treatment [17,18]. This finding likely reflects under-recognition rather than the true rarity of concurrent treatment. Equally important was the observation that information regarding isotretinoin therapy was more frequently revealed by patients or parents than actively acquired by clinicians. This finding suggests that current medical history may inadequately capture medication use that could potentially influence orthodontic treatment planning, one of which is isotretinoin. These findings suggest that although concurrent orthodontic treatment and isotretinoin therapy is encountered in clinical practice, systematic identification of affected patients remains inconsistent. Although definitive evidence regarding the orthodontic consequences of isotretinoin remains limited, routine screening for systemic retinoid therapy represents a simple and inexpensive intervention that may improve patient safety and facilitate interdisciplinary communication [19].

The overall knowledge indicated only moderate understanding of isotretinoin-related orthodontic considerations, with an average accuracy of approximately 55.5%. Correct response rates varied considerably across individual items, ranging from 19.1% to 66.4%, indicating substantial variability in participants' understanding of different aspects of isotretinoin therapy. More importantly, the current study revealed that knowledge was not significantly associated with postgraduate qualification, years of clinical practice, or previous experience managing patients receiving isotretinoin. These findings indicate that knowledge deficiencies were consistently observed across different levels of education and clinical experience, rather than confined to junior clinicians or those without specialist training, and also not related to previous exposure to isotretinoin-treated patients.

Several misconceptions identified in the present study deserve particular attention. Although approximately two-thirds of respondents recognized that isotretinoin affects bone remodeling, uncertainty increased substantially when questions addressed orthodontic

tooth movement, periodontal remodeling, and root resorption. This uncertainty likely reflects the evolving nature of the available evidence rather than inadequate education alone. Experimental studies have demonstrated that retinoic acid influences osteoblast and osteoclast activity through modulation of bone remodeling pathways, suggesting a biologically plausible effect on orthodontic tooth movement [20]. However, the available preclinical literature remains inconsistent. A recent rat study by Ferreira MF et al. [9] in 2024 reported that isotretinoin reduced orthodontic tooth displacement over 14-21 days. However, Nishio et al. in a previous rat study in 2017 reported little or no effect of isotretinoin on tooth movement, bone volume, or healing following extraction [21].

Furthermore, recent studies evaluating bone repair after rapid palatal expansion reported no significant impairment associated with conventional isotretinoin doses. A study by Parreira et al. [22] in 2025 similarly found that standard-dose isotretinoin produced no significant alteration in bone repair after fourteen days. On the contrary, a recent systematic review by Ferreira et al. [23] in 2026 reported that isotretinoin has dose-dependent effects on bone remodeling. Higher doses enhance bone formation but increase root resorption and alter bone morphology, while lower doses slow bone healing. Collectively, these findings suggest that the biological effects of isotretinoin are likely influenced by dosage, treatment duration, and experimental conditions, making it difficult to generalize directly to routine orthodontic practice.

Consequently, respondents' uncertainty regarding these topics may accurately reflect the current limitations of the scientific evidence. Rather than indicating poor professional knowledge, these findings emphasize the need for well-designed prospective clinical studies capable of establishing evidence-based orthodontic recommendations. The present study identified several clinically important gaps regarding isotretinoin therapy. Although cheilitis represents the most consistently reported adverse effect of isotretinoin and affects most treated patients [24], approximately two-thirds of respondents correctly identified this association. Because orthodontists routinely examine the lips and oral mucosa during treatment appointments, recognition of cheilitis may provide an important clinical clue to ongoing isotretinoin therapy, particularly when medication history is not comprehensive [25]. Likewise, considerable uncertainty existed regarding periodontal effects. More than 80% of participants were unsure whether isotretinoin negatively affects periodontal health during orthodontic treatment. This finding also mirrors

the conflicting evidence currently available in the literature [16]. While some clinical studies have reported increased gingival inflammation among isotretinoin users, others have suggested potential antimicrobial effects against periodontal pathogens and no clinically significant deterioration of periodontal health [26,27]. Therefore, clinicians' uncertainty appears understandable given the absence of high-quality evidence and highlights the need for longitudinal clinical studies specifically evaluating periodontal outcomes during orthodontic treatment in patients taking isotretinoin therapy.

Knowledge regarding skeletal complications also remained modest. Although respondents generally recognized the potential for skeletal adverse effects, many failed to appreciate that clinically significant skeletal hyperostosis has primarily been associated with high-dose, long-duration regimens of retinoid therapy for keratinization disorders rather than the lower, time-limited doses used for acne [28,29]. This distinction is important because overestimation of skeletal risks may unnecessarily influence orthodontic treatment decisions. One of the most notable findings was the persistence of traditional beliefs regarding impaired wound healing during isotretinoin therapy. Approximately 60% of participants believed that isotretinoin adversely affects soft-tissue healing following dental procedures.

Historically, clinicians have delayed surgical procedures because of concerns regarding abnormal scarring and impaired healing. However, more recent systematic reviews and multidisciplinary consensus statements have concluded that much of this concern is based on limited evidence derived from older studies and that many procedures may be safely performed without discontinuing isotretinoin therapy [15]. An equally important misconception involved the belief that established orthodontic guidelines currently exist regarding treatment timing during isotretinoin therapy. Nearly two-thirds of respondents in the current study incorrectly believed that formal recommendations were available despite the absence of orthodontic-specific consensus guidelines [15]. This misconception represents one of the most important knowledge gaps identified in the present study and has direct implications for clinical decision-making.

A particularly interesting finding was the discrepancy between respondents' objective knowledge and subjective confidence. Despite achieving only moderate knowledge, nearly two-thirds believed that their education had adequately prepared them to manage patients receiving isotretinoin, and half reported confidence in their clinical management. Simultaneously, more than half believed that

orthodontists in general were inadequately informed regarding isotretinoin.

The observed discrepancy in the present study suggests that although orthodontists acknowledge the need for additional education, they may overestimate their own level of knowledge regarding the management of patients receiving isotretinoin therapy. Similar inconsistencies between objectively measured knowledge and self-perceived competence have been reported in studies evaluating antibiotic prescribing, the management of medically compromised patients, and pharmacological decision-making among dental practitioners [30-33]. This phenomenon is commonly described as the Dunning-Kruger effect [34], whereby individuals with limited knowledge or competence tend to overestimate their abilities. These findings highlight the importance of continuing professional education that not only delivers updated scientific evidence but also promotes reflective practice and critical self-assessment of clinical competence.

Although respondents generally demonstrated favorable attitudes toward interdisciplinary management, these attitudes were inconsistently reflected in daily clinical practice. Nearly half agreed that orthodontists should routinely consult dermatologists when managing patients receiving isotretinoin, yet fewer than 1% reported consistently doing so, while almost two-thirds never communicated with the prescribing physician. This discrepancy likely reflects organizational rather than professional barriers, including fragmented healthcare systems, the absence of standardized referral pathways, and uncertainty regarding the necessity of consultation. Nevertheless, the significant association observed between perceived periodontal risk and treatment modification demonstrates that clinicians do alter management when they believe a clinically meaningful risk exists. Therefore, improving awareness through evidence-based education may ultimately have a greater impact than simply recommending interdisciplinary communication.

Limitations of the study

This study has several limitations. Its cross-sectional design precludes establishing causal relationships between knowledge, attitudes, and clinical practices. Moreover, the findings were based on self-reported questionnaire data and may therefore be subject to recall and social desirability biases.

Conclusion

Based on the findings of the present study, Iraqi orthodontists demonstrated moderate overall knowledge regarding isotretinoin therapy, with important gaps in areas where clinical evidence remains limited or evolving.

Despite the absence of significant differences in knowledge according to professional qualification or clinical experience, substantial variability existed in clinical decision-making, and interdisciplinary collaboration with dermatologists was uncommon. The findings highlight the need for evidence-based guidelines and the development of recommendations to support the orthodontic management of patients receiving isotretinoin therapy.

Conflict of Interest

The authors declare no conflict of interest.

Funding

This current study received no external funding.

Data Availability

Underlying data

Zenodo: Questionnaire on Isotretinoin Use in Orthodontic Patients: Knowledge, Perception, and Clinical Practice Among Orthodontists DOI: <https://doi.org/10.5281/zenodo.21276968>

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/) (CC-BY 4.0).

References

1. R. V. Reynolds, H. Yeung, C. E. Cheng, F. Cook-Bolden, S. R. Desai, K. M. Druby, E. E. Freeman, J. E. Keri, L. F. Stein Gold, J. K. L. Tan, M. M. Tollefson, J. S. Weiss, P. A. Wu, A. L. Zaenglein, J. M. Han and J. S. Barbieri. Guidelines of care for the management of acne vulgaris. *J Am Acad Dermatol* 2024; 90: 1006.e1-06.e30. 20240130. DOI: 10.1016/j.jaad.2023.12.017.
2. H. D. Pile and P. Patel. Isotretinoin. *StatPearls*. Treasure Island (FL): StatPearls Publishing Copyright © 2026, StatPearls Publishing LLC., 2026.
3. P. Sarkar, N. Sultana, P. K. Debnath, R. Rouf, M. S. Mubarak, S. J. Uddin, D. Popa, D. Calina and J. Sharifi-Rad. Isotretinoin as a Multifunctional Anticancer Agent: Molecular Mechanisms, Pharmacological Insights and Therapeutic Potential. *Arch Pharm (Weinheim)* 2025; 358: e70084. DOI: 10.1002/ardp.70084.
4. A. Paichitrojjana and A. Paichitrojjana. Oral Isotretinoin and Its Uses in Dermatology: A Review. *Drug Des Devel Ther* 2023; 17: 2573-91. 20230825. DOI: 10.2147/dddt.S427530.
5. T. Fernandes and S. Magina. Oral isotretinoin in the treatment of juvenile acne and psychiatric adverse effects - a systematic review. *Cutan Ocul Toxicol* 2023; 42: 83-90. 20230705. DOI: 10.1080/15569527.2023.2227889.
6. L. De Ridder, A. Aleksieva, G. Willems, D. Declerck and M. Cadenas de Llano-Pérula. Prevalence of Orthodontic Malocclusions in Healthy Children and Adolescents: A Systematic Review. *International Journal of Environmental Research and Public Health* 2022; 19: 7446.
7. J. C. Maltha and A. M. Kuijpers-Jagtman. Mechanobiology of orthodontic tooth movement: An update. *Journal of the World Federation of Orthodontists* 2023; 12: 156-60. DOI: <https://doi.org/10.1016/j.ejwf.2023.05.001>.
8. U. H. Lerner. Vitamin A – discovery, metabolism, receptor signaling and effects on bone mass and fracture susceptibility. *Frontiers in Endocrinology* 2024; Volume 15 - 2024. Review. DOI: 10.3389/fendo.2024.1298851.
9. M. F. Ferreira, A. C. Botazzo Delbem, E. Ervolino, L. de Abreu Costa, C. Antoniali Silva, J. R. Prando Dos Santos and M. R. de Mendonça. Therapeutic dosage of isotretinoin in rats may influence orthodontic tooth movement. *Bone Rep* 2024; 21: 101775. 20240517. DOI: 10.1016/j.bonr.2024.101775.
10. A. X. Graciano Parra, A. C. Batista Rodrigues Johann, A. M. Trindade Grégio Hardy, L. R. Oppitz, C. M. Araujo, O. M. Tanaka, O. Guariza Filho and E. S. Camargo. Effect of isotretinoin on induced tooth movement in rats. *American Journal of Orthodontics and Dentofacial Orthopedics* 2021; 159: 193-201. DOI: <https://doi.org/10.1016/j.ajodo.2019.12.022>.
11. G. D. Gok, K. Halicioglu, A. Keles, N. V. Olgac, D. Kayali and O. T. C. Kaya. Effects of isotretinoin on tooth movement, orthodontically induced and non-orthodontic root resorption: A micro-CT study. *Orthodontics & Craniofacial Research* 2024; 27: 974-84. DOI: <https://doi.org/10.1111/ocr.12840>.
12. M. A. R, M. A. Ahmad Farhan, M. A. S, A. A. Fajr Ehab, F. A. Abdulmohsen Abdulkarim, A. Zwiri, M. G. Sghaireen and M. K. Alam. Oral side effects of dermatologic therapies: A systematic review and meta-analysis. *Bioinformation* 2025; 21: 2833-40. 20250831. DOI: 10.6026/973206300212833.
13. N. Duran, C. G. C and J. L. Borke. Isotretinoin and Orthodontic Tooth Movement- A Review of the Literature. *Oral Health and Dental science* 2024.
14. A. Nast, B. Dréno, V. Bettoli, Z. Bukvic Mokos, K. Degitz, C. Dressler, A. Y. Finlay, M. Haedersdal, J. Lambert, A. Layton, H. B. Lomholt, J. L. López-Estebarez, F. Ochsendorf, C. Oprica, S. Rosumeck, T. Simonart, R. N. Werner and H. Gollnick. European evidence-based (S3) guideline for the treatment of acne - update 2016 - short version. *J Eur Acad Dermatol Venereol* 2016; 30: 1261-8. DOI: 10.1111/jdv.13776.
15. L. K. Spring, A. C. Krakowski, M. Alam, A. Bhatia, J. Brauer, J. Cohen, J. Q. Del Rosso, L. Diaz, J. Dover, L. F. Eichenfield, G. C. Gurtner, C. W. Hanke, M. N. Jahnke, K. M. Kelly, S. Khetarpal, M. A. Kinney, M. L. Levy, J. Leyden, M. T. Longaker, G. S. Munavalli, D. M. Ozog, H. Prather, P. R. Shumaker, E. Tanzi, A. Torres, M. W. Velez, A. B. Waldman, A. C. Yan and A. L. Zaenglein. Isotretinoin and Timing of Procedural Interventions: A Systematic Review With Consensus Recommendations. *JAMA Dermatol* 2017; 153: 802-09. DOI: 10.1001/jamadermatol.2017.2077.
16. F. Erduran, M. D. Çoşlu, S. Karaaslan and S. Emre. Isotretinoin Beyond the Skin: A Prospective Study on Its Impact on Periodontal Health. *Dermatol Pract Concept* 2023; 16 20260401. DOI: 10.5826/dpc.1602a6739.
17. A. Nast, B. Dréno, V. Bettoli, K. Degitz, R. Erdmann, A. Y. Finlay, R. Ganceviciene, M. Haedersdal, A. Layton, J. L. López-Estebarez, F. Ochsendorf, C. Oprica, S. Rosumeck, B. Rzyany, A. Sammain, T. Simonart, N. K. Veien, M. V. Zivković, C. C. Zouboulis and H. Gollnick. European evidence-based (S3) guidelines for the treatment of acne. *J Eur Acad Dermatol Venereol* 2012; 26 Suppl 1: 1-29. DOI: 10.1111/j.1468-3083.2011.04374.x.
18. G. Zhao and F. Zhu. Age matters in orthodontics: divergent motivations, perfectionism, and patient-clinician discord in treatment need assessment. *Front Med (Lausanne)* 2025; 12: 1714237. 20260121. DOI: 10.3389/fmed.2025.1714237.
19. N. Duran, C. Gage and J. Borke. Isotretinoin and Orthodontic Tooth Movement- A Review of the Literature. *Oral Heal Dent Sci* 2024; 8: 1-4.
20. L. Hu, T. Lind, A. Sundqvist, A. Jacobson and H. Melhus. Retinoic acid increases proliferation of human osteoclast progenitors and inhibits RANKL-stimulated osteoclast differentiation by suppressing RANK. *PLoS One* 2010; 5: e13305. 20101011. DOI: 10.1371/journal.pone.0013305.
21. C. Nishio, P. Rompré and F. Moldovan. Effect of exogenous retinoic acid on tooth movement and periodontium healing following tooth extraction in a rat model. *Orthod Craniofac Res* 2017; 20 Suppl 1: 77-82. DOI: 10.1111/ocr.12151.
22. M. Parreira, D. V. Buchaim, A. C. C. Bighetti, M. A. Giroto, M. de Marchi, D. M. B. Nogueira, A. A. Foggiano, J. Z. Coléte, A. Fuziy and R. L. Buchaim. Microtomographic, Histomorphological, and Histomorphometric Analysis of Bone Healing in the Midpalatal Suture After Treatment with Isotretinoin. *Dent*

- J (Basel) 2025; 13 20250325. DOI: 10.3390/dj13040142.
23. M. F. Ferreira, G. P. Nunes, A. H. Chaves-Neto, A. H. Reis-Prado, M. P. Justo, C. Ferreira-Baptista, N. A. Gomes, A. C. B. Delbem and M. R. de Mendonça. Effects of isotretinoin on bone dynamics in the craniomaxillofacial region: a systematic review of preclinical evidence. *Eur Arch Paediatr Dent* 2026; 27: 349-66. 20250908. DOI: 10.1007/s40368-025-01107-5.
24. J. Ornelas, L. Rosamilia, L. Larsen, N. Foolad, Q. Wang, C. S. Li and R. K. Sivamani. Objective assessment of isotretinoin-associated cheilitis: Isotretinoin Cheilitis Grading Scale. *J Dermatolog Treat* 2016; 27: 153-5. 20150923. DOI: 10.3109/09546634.2015.1086477.
25. U. Erdemir, G. Okan, S. Gungor, B. Tekin, S. O. Yildiz and E. Yildiz. The oral adverse effects of isotretinoin treatment in acne vulgaris patients: A prospective, case-control study. *Niger J Clin Pract* 2017; 20: 860-66. DOI: 10.4103/1119-3077.183248.
26. R. AlJasser, R. AlAqeely, A. AlZahrani, M. AlKenani, S. AlQahtani, M. AlSarhan, D. AlOtaibi and R. Lambarte. Antimicrobial Effect of Isotretinoin Therapy on Periodontal Pathogens: A Case-Control Study. *Antibiotics (Basel)* 2021; 10 20211021. DOI: 10.3390/antibiotics10111286.
27. G. Ustaoglu, S. Güler and M. Polat. Effect of isotretinoin on periodontal tissues and oxidative stress markers in the saliva. *Turkderm-Turkish Archives Of Dermatology And Venerology* 2020.
28. B. J. Doolan, A. Paolino, D. T. Greenblatt and J. E. Mellerio. Retinoid-induced skeletal hyperostosis in disorders of keratinization. *Clin Exp Dermatol* 2022; 47: 2273-76. 20220927. DOI: 10.1111/ced.15382.
29. S. W. Graf and S. L. Whittle. Isotretinoin-induced skeletal hyperostosis. *Springerplus* 2014; 3: 698. 20141127. DOI: 10.1186/2193-1801-3-698.
30. A. K. Giri, M. Chaudhary, A. K. Yadav, A. Shrestha, T. Bhagat, S. K. Agrawal and U. Gautam. Knowledge and perception of antibiotic prophylaxis for dental procedures among Nepali dental students: a questionnaire-based study. *BMC Oral Health* 2025; 25: 873. 20250602. DOI: 10.1186/s12903-025-06264-z.
31. M. J. A. Bitar, A. Alhebshi, A. I. Alsafran, I. E. M. Alchikhsuliman, R. O. A. Alzoubi, A. Alhabashi, I. Sula and M. A. Alreshidi. The Antibiotic Prescription Knowledge and Practice Among Dentists and Dental Students in Saudi Arabia: A Scoping Review. *Acta Microbiologica Hellenica* 2026; 71: 11.
32. T. Kenzaka, N. Mizutani, T. Hayashi and A. Kumabe. Antibiotic Prophylaxis Practices for the Prevention of Infective Endocarditis Among Japanese Dentists: A Questionnaire Survey of Members of the Hyogo Dental Association. *Healthcare (Basel)* 2026; 14 20260218. DOI: 10.3390/healthcare14040523.
33. S. Karaaslan, G. Acar and S. E. Meral. Evaluation of dental practitioners' knowledge and attitudes regarding drug interactions: a cross-sectional survey. *BMC Oral Health* 2026; 26 20260210. DOI: 10.1186/s12903-026-07832-7.
34. D. Dunning, K. Johnson, J. Ehrlinger and J. Kruger. Why people fail to recognize their own incompetence. *Current directions in psychological science* 2003; 12: 83-87.

Table 1. Sociodemographic and professional characteristics of respondents (N = 110).

Characteristic	Category	n	%
Age (years)	<30	15	13.6
	30–39	52	47.3
	40–49	29	26.4
	>50	14	12.7
Gender	Female	65	59.1
	Male	45	40.9
Residence	Urban	105	95.5
	Rural	5	4.5
Governorate of practice	Baghdad	94	85.4%
	Erbil	5	4.5%
	Diyala	4	3.6%
	Babil	2	1.8%
	Diwaniya	2	1.8%
	Karbala	1	0.9%
	Najaf	1	0.9%
	Muthanna	1	0.9%
Years in orthodontic practice	<5	24	21.8
	5–10	10	9.1
	11–20	60	54.5
	>20	16	14.5
Highest qualification	Diploma in Orthodontics	67	60.9
	MSc/MDS Orthodontics	27	24.5
	PhD/Fellowship Orthodontics	16	14.5
Type of practice	Private clinic	19	17.3
	Public dental centre	5	4.5
	Mixed	75	68.2
	Academic institution	11	10
Average orthodontic patients per month	<10	35	31.8
	10–25	17	15.5
	26–50	29	26.4
	>50	29	26.4
Average adult orthodontic patients per month	<10	51	46.4
	10–25	30	27.3
	26–50	27	24.5
	>50	2	1.8

Table 2. Clinical experience with isotretinoin patients.

Variables	Category	n	%
Have you ever treated a patient taking Isotretinoin?	Yes	33	30
	Unsure	50	45.5
	No	27	24.5
Number/Frequency of such patients encountered	Never	29	26.4
	Rarely	69	62.7
	Occasionally (few times/year)	10	9.1
	Frequently (≥ 1 /month)	2	1.8
Who usually informs you about the Isotretinoin?	Parent/companion	30	27.3
	Patient	27	24.5
	N/A	53	48.2
Do you routinely ask about Isotretinoin use?	No	60	54.5
	Yes	50	45.5

Table 3. Knowledge assessment; response distribution for items K1–K13 (N = 110).

Item	Statement (abbreviated)	True n (%)	False n (%)	Don't know n (%)
K1	Vitamin A derivative used for severe acne	63 (57.3)	21 (19.1)	26 (23.6)
K2	Affects bone remodeling via osteoblast/osteoclast activity	68 (61.8)	15 (13.6)	27 (24.5)
K3	Reduces rate of orthodontic tooth movement	21 (19.1)	67 (60.9)	22 (20)
K4	Increased risk of orthodontically induced root resorption	67 (60.9)	20 (18.2)	23 (20.9)
K5	Alters PDL remodeling / force response	23 (20.9)	66 (60)	21 (19.1)
K6	Skeletal effects (epiphyseal closure/ligament calcification)	63 (57.3)	24 (21.8)	23 (20.9)
K7	Causes cheilitis/oral mucosal dryness	71 (64.5)	16 (14.5)	23 (20.9)
K8	Effect on tooth movement is dose-dependent	73 (66.4)	21 (19.1)	16 (14.5)
K9	Published guidelines exist on timing of orthodontic tx*	62 (56.4)	21 (19.1)	27 (24.5)
K10	Effects may persist after drug discontinuation	66 (60)	23 (20.9)	21 (19.1)
K11	Associated with TMJ/myofascial symptoms	18 (16.4)	61 (55.5)	31 (28.2)
K12	Can impair soft-tissue/wound healing	66 (60)	19 (17.3)	25 (22.7)
K13	Requires sun-exposure precautions	70 (63.6)	26 (23.6)	14 (12.7)

*For K9, the currently correct answer is “False” — no consensus clinical guideline on orthodontic treatment timing relative to isotretinoin therapy has been published; 56.4% of respondents answered incorrectly. PDL: Periodontal ligament, tx: treatment, TMJ: temporomandibular joint

Table 4. One-way analysis of variance (ANOVA).

Variable	Category	n	Knowledge score (Mean ± SD)	Mean difference†	F	p-value
Overall	<i>All participants</i>	110	4.44 ± 1.59	—	—	—
Highest qualification	<i>Diploma Orthodontics</i>	67	4.36 ± 1.65	Reference	0.227	0.798
	<i>MSc/MDS Orthodontics</i>	27	4.52 ± 1.63	+0.16		
	<i>PhD/Fellowship Orthodontics</i>	16	4.63 ± 1.31	+0.27		
Years of orthodontic practice	<i><5 years</i>	24	4.38 ± 1.69	Reference	0.315	0.815
	<i>5–10 years</i>	10	4.80 ± 1.14	+0.43		
	<i>11–20 years</i>	60	4.35 ± 1.63	–0.03		
	<i>>20 years</i>	16	4.63 ± 1.59	+0.25		
Prior experience treating isotretinoin patients	<i>Yes</i>	33	4.33 ± 1.47	Reference	0.109	0.897
	<i>Unsure</i>	50	4.46 ± 1.69	+0.13		
	<i>No</i>	27	4.52 ± 1.58	+0.19		

* Mean difference is calculated relative to the first (reference) category for descriptive purposes. None of the pairwise comparisons were statistically significant on Tukey's post hoc analysis (all p-values>0.05).

Table 5. Perceptions and attitudes toward isotretinoin-related orthodontic care (N = 110).

Item	Statement (abbreviated)	Agree/Strongly agree n (%)	Neutral/Unsure n (%)	Disagree/Strongly disagree n (%)
P1	Believes isotretinoin negatively affects periodontal health during tx	15 (13.6)	93 (84.5)	2 (1.8)
P2	Official guidelines would be helpful	19 (17.3)†	88 (80)	3 (2.7)
P3	Would attend an educational workshop	25 (22.7)†	—	85 (77.3)
P4	Isotretinoin use should always be asked about in history-taking	57 (51.8)	38 (34.5)	15 (13.6)
P5	Can compromise orthodontic outcomes if not managed	57 (51.8)	27 (24.5)	26 (23.6)
P6	Feels confident managing these patients	55 (50)	32 (29.1)	23 (20.9)
P7	Orthodontists should routinely consult the dermatologist	54 (49.1)	37 (33.6)	19 (17.3)
P8	Education adequately prepared clinician for isotretinoin-related issues	71 (64.5)	29 (26.4)	10 (9.1)
P9	Treatment should be postponed during active therapy	60 (54.5)	34 (30.9)	16 (14.5)
P10	Believes most orthodontists are under-informed	61 (55.5)	32 (29.1)	17 (15.5)

* P2 and P3 were framed as three-/two-category items (Yes/Maybe/No and Yes/No, respectively) rather than five-point Likert scales; figures shown are the affirmative categories. Tx: treatment.

Table 6. Clinical practice patterns (CP1, CP3) (N = 110).

Item	Statement (abbreviated)	Category	n	%
CP1	What did you observe as effects of isotretinoin in your practice?	No noticeable changes	39	35.5%
		Gingival dryness, Gingival bleeding	25	22.7%
		Gingival dryness	16	14.5%
		Gingival bleeding	6	5.5%
		Ulceration / mucosal irritation	5	4.5%
		Gingival dryness, Ulceration / mucosal irritation	3	2.7%
		Gingival dryness, Gingival recession	2	1.8%
		Gingival recession	2	1.8%
		Gingival dryness, Gingival recession, Ulceration / mucosal irritation	1	0.9%
		Gingival dryness, Gingival bleeding, Ulceration / mucosal irritation	1	0.9%
		Gingival recession, Ulceration / mucosal irritation	1	0.9%
		Did not treat such patients	9	8.2%
CP3	What modification(s) you did?	Increase hygiene, follow-up frequency	36	32.7%
		Lighter forces	18	16.4%
		Use alternative appliance types (e.g., aligners)	18	16.4%
		Collaborate with dermatologist	11	10%
		Increase hygiene, follow-up frequency, Use alternative appliance types (e.g., aligners)	6	5.5%
		Lighter forces, Increase hygiene, follow-up frequency	4	3.6%
		Lighter forces, Increase hygiene, follow-up frequency, Collaborate with dermatologist	2	1.8%
		Delay treatment until isotretinoin ends	2	1.8%
		Increase hygiene, follow-up frequency, Use alternative appliance types (e.g., aligners), Collaborate with dermatologist	1	0.9%
		Lighter forces, Collaborate with dermatologist	1	0.9%
		Lighter forces, Delay treatment until isotretinoin ends, Increase hygiene, follow-up frequency	1	0.9%
		Delay treatment until isotretinoin ends, Increase hygiene, follow-up frequency	1	0.9%
		N/A	9	8.2%

Table 7. Clinical practice patterns (CP2, CP4-CP8) (N = 110).

Item	Statement (abbreviated)	Always/Often n (%)	Sometimes (case-dependent) n (%)	Rarely/Never n (%)
CP2	Modify orthodontic treatment in patients on isotretinoin	9 (8.2)	78 (70.9)	23 (20.9)
CP4	Collaborates with dermatologist	1 (0.9)	41 (37.3)	68 (61.8)
CP5	Routinely asks about isotretinoin use at assessment	53 (48.2)	37 (33.6)	20 (18.2)
CP6	Delays active treatment until therapy completed	61 (55.5)	31 (28.2)	18 (16.4)
CP7	Reduces orthodontic force levels	51 (46.4)	40 (36.4)	19 (17.3)
CP8	Appliance choice influenced by isotretinoin use	56 (50.9)	37 (33.6)	17 (15.5)

Table 8. Inferential statistics.

Association tested	Test statistic	df	p-value
Belief in periodontal risk (P1) × Treatment modification (CP2)	$\chi^2 = 35.46$	4	<0.001
Prior isotretinoin-patient experience × Modification frequency	-	-	0.049*
Prior experience × Routinely asks about isotretinoin use	$\chi^2 = 0.44$	2	0.802
Qualification × Confidence managing patients (P6)	-	-	0.668*

Statistical significance at $\alpha = 0.05$. χ^2 : chi-square test. *Fisher's exact test.