RELATIONSHIP BETWEEN VIRTUAL ALIGNER PLANNING SOFTWARE HANDLING AND ACHIEVING RESULTS CONSISTENT WITH THE PLAN: A PILOT STUDY

Alessah Carolyna de Andrade Fernandes[1]
Milena Moraes de Oliveira Lenza[2]
Maurício Guilherme Lenza[3]
Fernanda Paula Yamamoto Silva[4]

Nome da instituição: Universidade Federal de Goiás - UFG [124]
Centro Universitário Goyazes – UniGOYAZES[3]

ABSTRACT
In recent years, the use of orthodontic aligners has increased significantly, driven by technological advancements such as virtual planning software. These tools enable detailed planning of tooth movement, providing greater clinical precision. However, treatment success directly depends on the knowledge, attitudes, and practical experience of professionals using these technologies. The aim of this pilot study was to investigate the relationship between the use of these software programs and achieving results consistent with orthodontists' treatment plans. Through a cross-sectional study, 14 orthodontists participated in an online questionnaire regarding their knowledge and practices with aligner planning software. Among respondents, 78.6% reported moderate difficulty handling the programs, and approximately 80% took more than 20 minutes to review and adjust a treatment plan. Additionally, 65.3% of professionals made at least four modifications to treatment plans before final approval. Regarding clinical outcomes, 64.28% stated that results frequently matched the initial plan. Despite the advantages of these technologies in increasing precision and confidence, challenges in efficiently using digital tools remain, affecting full implementation in clinical practice. The study highlights the importance of continuous training for orthodontists working with aligners to optimize outcomes and treatment predictability.

Keywords: Removable Orthodontic Appliances; Orthodontic Aligners; Cross-sectional Study

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INTRODUCTION

Technological evolution has transformed orthodontics, with the increasing use of digital planning software. Orthodontists generally perceive these tools positively, emphasizing their efficiency and precision, especially with technologies such as intraoral scanning and cone-beam computed tomography (CBCT), although cost remains a barrier.[12]

Digital simulations enhance professionals' confidence, often leading to frequent adjustments in treatment plans to improve predictability.[3] Orthodontic residents also consider these technologies essential for their training.[4] This article

explores whether proficiency in these software programs impacts treatment outcomes with aligners.

METHODOLOGY

This cross-sectional study, approved by the Ethics Committee (CAAE: 67933323.3.0000.5083), involved 14 Brazilian orthodontists accredited by aligner companies, who completed an electronic questionnaire in October 2023. The questionnaire was specifically developed for this research and covered sociodemographic characteristics, as well as practices and attitudes regarding the use of virtual aligner planning software.

Orthodontists with varying levels of clinical experience with aligners were included. Variables analyzed included software handling difficulty, time spent on planning, and the consistency between results and the treatment plan. To avoid bias, responses were mandatory and could not be edited. As a pilot study, the results are partial and cannot be generalized to other contexts.

RESULTS

The questionnaire was sent to a group of orthodontists, yielding 14 responses. All participants met eligibility criteria, and all responses were included in the analysis.

Regarding knowledge, attitude, and practice with the software, most respondents (78.6%) reported moderate difficulty in handling and mastering the tools. The average time spent making adjustments and reviewing treatment plans exceeded twenty minutes for the majority (78.57%). No professional approved a treatment plan without making at least two modifications. Moreover, refinements were employed by all orthodontists (“Frequently” – 71.43% and “Always” – 28.57%). Table 1 presents these results**.**

Tabela 1. Conhecimento, atitude e prática acerca do software de planejamento digital (n=14)

Variáveis	**n**	**%**
Dificuldade de manuseio do software		
Extremamente difícil	0	0,00%
Muito difícil	0	0,00%

Moderado	11	78,57%
Fácil	2	14,29%
Muito Fácil	1	7,14%
Tempo gasto estimado para revisar e alterar plano de tratamento		
Aprovo sem alterações mais de 50% dos casos	0	0,00%
01 - 15 minutos	0	0,00%
16 - 20 minutos	3	21,43%
21 -30 minutos	4	28,57%
31 - 45 minutos	5	35,71%
mais de 45 minutos	2	14,29%
Quantidade de planos de tratamento realizados antes da aprovação final		
Aprovo sem alterações mais de 50% dos casos	0	0,00%
Apenas 1	0	0,00%
2	4	28,57%
3	1	7,14%
4 - 5	7	50,00%
6 - 10	2	14,29%
mais de 10	0	0,00%
Frequência de realização de refinamentos		
Nunca	0	0,00%
Quase nunca	0	0,00%
Às vezes	0	0,00%
Frequentemente	10	71,43%
Sempre	4	28,57%

When asked about confidence in virtual planning, 50% of participants reported feeling “frequently” confident. Regarding the consistency of outcomes with the treatment plan, 64.28% stated that their results were “frequently” or “always” consistent with the virtual plan. Table 2 illustrates these results.

Tabela 2. Resultados semelhantes ao planejamento (n=14)

Variáveis	**n**	**%**
Frequência de segurança com o planejamento virtual		
Nunca	0	0,00%

Quase nunca	0	0,00%
Às Vezes	5	35,71%
Frequentemente	7	50,00%
Sempre	2	14,29%
Resultado condizente com o planejamento		
Nunca	0	0,00%
Quase nunca	0	0,00%
Às Vezes	3	21,43%
Frequentemente	4	28,57%
Sempre	5	35,71%

CONCLUSION

- The majority of participants (78.6%) reported moderate difficulty in using digital planning tools.
- For 78.57% of orthodontists, the average time required to review and make adjustments to the treatment plan exceeded 20 minutes.
- Half of the participants (50%) reported feeling “frequently” confident when performing virtual planning.
- Most participants stated that the outcomes were “frequently” or “always” consistent with the digital plan.
- Although orthodontists perceived moderate difficulty in handling the software, they dedicate considerable time to planning and always make adjustments and refinements to achieve satisfactory results.
- Additional hours spent on planning and reviewing treatment plans may influence orthodontists’ perception of the consistency between their planning and the outcomes.

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