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ORIGINAL ARTICLE

Patient regret in tooth extraction for periodontitis: Highlighting the role of patient involvement in decision-making

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Abstract

Background: Tooth extraction is one of the most common irreversible treatment options in dentistry, and it may lead to complex emotional responses such as patient regret. This study aimed to assess the extent of decisional regret among patients who underwent tooth extraction due to periodontal disease and to identify associated influencing factors.

Methods: A total of 104 patients diagnosed with periodontitis and who had experienced tooth extraction participated in this self-administered survey. The questionnaire included the validated Decision Regret Scale (DRS), along with items on demographics, treatment characteristics, and decision-making processes. Linear regression analyses were conducted to identify significant associations.

Results: The mean DRS score in this study was 26.3 ± 16.7, which exceeds the commonly used clinical cut-off of 25 and indicates a moderate to high level of regret. Greater regret was significantly associated with dissatisfaction regarding outcomes, perceived inappropriateness of the decision, and a lack of consideration of alternatives. Conversely, greater patient involvement in decision-making was linked with lower regret compared with when decisions were primarily made by the dentist.

Conclusion: These findings suggest that decisional regret after tooth extraction for periodontitis is more common than previously reported in other medical fields and is influenced by how treatment decisions are made. Patient-centered decision-making may help to reduce regret and to improve patient-reported outcomes in periodontal care.

Kyung-A Ko and Ji-Young Jung equally contributed to this work.

KEYWORDS
decision regret scale, dentistry, patient decisions, patient regret, tooth extraction

Plain Language Summary

When patients have experienced tooth extraction due to gum disease, some may later feel regret about their decision. This study examined 104 adults who underwent tooth extraction because of periodontitis and found a moderate level of decisional regret. Higher regret scores were associated with situations in which the outcome did not match expectations or when patients perceived that they had little role in making the treatment choice. In contrast, lower regret scores were associated with greater patient involvement in decision-making. About 89% of patients were unaware of alternative treatment options when making their extraction decision, revealing a significant gap in how thoroughly options are discussed. The degree of regret observed was similar to that in serious medical decisions such as cancer or heart disease care, suggesting that tooth loss carries meaningful emotional weight for patients. When patients shared the decision-making process equally with their dentist, or made the decision themselves, they experienced significantly less regret. These findings highlight the importance of involving patients as active partners in treatment decisions. Aligning care with patients' values and ensuring that patients understand available options may help to support lower decisional regret and improved patient experiences.

1 | INTRODUCTION

The goals of treatment in healthcare are multifaceted and can vary depending on the patient's condition, prognosis, and individual circumstances. Among these goals, the primary objectives of healthcare treatment are to eliminate or manage diseases and to enhance patients' overall well-being and daily functioning.[1] Treatment efficacy is assessed using clinical markers and subjective measures, including patient-reported outcome measures (PROMs).[2] Patient-reported outcomes have gained increasing importance in dentistry, similar to other medical fields.[3] This includes assessing oral health-related quality of life, measuring patient satisfaction, and capturing subjective experiences such as pain and discomfort.[4,5] While patient-reported outcomes often focus on positive experiences such as satisfaction, there is growing recognition of the importance of understanding negative emotions such as regret in healthcare.[6]

Regret in healthcare is a complex emotional response defined as remorse or dissatisfaction over medical decisions, potentially affecting patients' quality of life and future choices.[7,8] Regret can be categorized into decisional regret and regret about the decision-making process itself. Decisional regret may arise when actual outcomes do not meet expectations, particularly when those outcomes are worse than anticipated.[9,10] Additionally, regret about the decision-making process itself may arise from certain factors such as insufficient information or lack of patient involvement in the decision-making process.[11–14] While regret is often unavoidable in medical settings, discussing potential regret with healthcare professionals can lead to more comprehensive and thoughtful decision-making.[7] When patients are engaged in the decision-making process and their concerns about regret are recognized, they are more inclined to feel that their values and preferences are honored, which supports patient autonomy and can result in greater satisfaction with treatment choices.[15]

Decisions in dentistry comprise a wide range of treatment options, which can lead patients to encounter complex choices.[16–18] They often face challenging and stressful circumstances when presented with multiple alternative dental treatments,[19] which could potentially trigger high levels of decisional conflict or regret. Additionally, some dental-related decisions are irreversible, which may increase the likelihood of regret due to their long-term consequences and the reconsideration of other reversible options. These challenges can hinder the achievement of optimized healthcare goals in dentistry. While it may not always be possible to align optimal decisions with fewer negative emotions from patients, finding out how much they would like to be involved in decision-making and

incorporating it in treatment planning can significantly enhance patient satisfaction.[20]

Although understanding patients' subjective outcomes in dental decision-making is crucial, the regret experienced by patients in dentistry has rarely been investigated. This study hypothesizes that patient's decisional regret is associated with specific factors related to the decision-making process and treatment outcomes. The aim of this study is to assess patients' regret regarding their tooth extraction experiences among those diagnosed with periodontal disease and to identify the factors influencing these feelings of regret.

2 | MATERIALS AND METHODS

2.1 | Study design and participants

A questionnaire-based study was carried out between August 2021 and March 2023 at Yonsei University Dental Hospital. After obtaining ethical approval from the Institutional Review Board of the hospital (IRB no. 2-2021-0026), and in accordance with the Declaration of Helsinki as revised in 2013, 109 patients were recruited on a voluntary basis. Of the patients invited, five declined participation, resulting in a response rate of 95.4%, with 104 patients ultimately enrolled in the study. All participants provided written informed consent before being enrolled in the study. The study focused on patients who had undergone tooth extraction due to periodontal disease. To ensure that sufficient time had passed for patients to reflect on their treatment experience, only those who had received their extraction at least 6 months prior to the survey were included. The exclusion criteria included: (1) failure to provide written informed consent; or (2) presence of a mental illness such as schizophrenia, depression, or drug/alcohol addiction. This study followed the CROSS (Checklist for Reporting of Survey Studies) guidelines.[21]

2.2 | Sample size

The purpose of this pilot study was to gather preliminary data using the Decisional Regret Scale (DRS) in patients who had undergone irreversible treatments.[22] Given the exploratory nature of this study and its experimental setting, the sample size was pragmatically determined to provide relevant point estimates and effect sizes for informing future sample-size calculations when performing confirmatory randomized controlled trials. Based on a previous study using the DRS, the expected mean for decisional regret was set to 3 (on a 1–5 scale), with a standard deviation of 1.8, and a total sample size of 104 was calculated using Satterthwaite's *t*-test.[23,24]

2.3 | Questionnaires

Questionnaires were distributed to patients who agreed to participate before performing clinical examinations, during which face-to-face data collection took place. The four-page self-administered questionnaire included the following components: (1) demographic information, which was based on the Adult Oral Health Standard Set (AOHSS); and (2) the DRS developed by Brehaut et al.[22] to assess patients' regret for medical decision; (3) information related to treatment and satisfaction, including details about the treatment process and patient's perceptions of their decisions. The Korean version of the DRS, as translated and validated in a previous study, was referenced and employed in the present study without further modification.[25] The information related to treatment and satisfaction was adapted from the instrument to measure Prostate Carcinoma Therapy Satisfaction.[26] A single examiner (J.Y.J.) carried out all questionnaire-related procedures, including providing explanations of the clinical and research aspects.

2.3.1 | Demographic information

The demographic questionnaire included the following components: demographic data (age, sex, education level, financial burden associated with care, smoking habits, alcohol consumption, oral hygiene behaviors, sugar consumption, and experiences of tooth extraction) and chronic medical conditions (cardiovascular disease, diabetes mellitus, respiratory disease, cancer, and other diseases; Table 1).

2.3.2 | Extraction-related characteristics and decision-making factors

The questionnaire, which was based on self-reported data from patients, consisted of two main components. The first components, extraction-related characteristics, included date of extraction (RS6); subsequent treatment after extraction (RS7), which assessed whether any prosthetic or restorative treatment was selected following tooth extraction; subsequent treatment cost in KRW(USD) (RS8); treatment cost coverage (RS9); and time from treatment selection to completion (RS10). For RS10, "untreated" referred to cases in which planned post-extraction treatment had not yet been initiated or completed at the time of the survey. The second component included items related to the decision-making and decision outcomes. Decision-making process variables included sufficiency of the dentist's explanation before treatment decision (RS13), decision leader (RS14), and alternative choice consideration

TABLE 1 Demographic results.

	$N = 103$	%
Age (mean ± SD)	(54.20 ± 12.66)	
Sex		
Female	65	63.1
Male	38	36.9
Education		
High school graduate or lower	46	44.7
College graduate or higher	57	55.3
Financial burden		
No	88	85.4
Yes	15	14.6
Smoking status		
No	91	88.3
Yes	12	11.7
Drinking status		
None	35	34.0
≤ 1 time/ month	23	22.3
2-4 times/ month	28	27.2
2-3 times/ week	15	14.6
4 times/ week	2	1.9
Toothbrushing frequency		
≤ 1 time/ day	3	2.9
≥ 2 times/ day	100	97.1
Use of fluoride toothpaste		
No or I don't know	55	53.4
Yes	48	46.6
Frequency of consuming sugary foods		
None	4	3.9
1 time/ week	13	12.6
3-4 times/ week	21	20.4
1 time/ day	31	30.1
2-3 times/ day	34	33.0
Number of chronic diseases		
None	67	65.1
1	26	25.2
2	10	9.7

Note: Data are presented as number (%).

(RS16). Decision outcome variables included satisfaction with treatment outcome (RS11), perceived appropriateness of the treatment decision (RS12), and consistency between expected and actual outcomes (RS15).

For decision-making process and decision outcome items, response categories were grouped to ensure interpretability and model stability. For satisfaction (RS11) and perceived appropriateness (RS12), responses were dichotomized into "Agree" and "Disagree," with "Neutral" responses combined with "Disagree" to reflect disagreement with a positive evaluation. For decision leadership (RS14), responses were grouped into "Dentist-led" and "Patient-involved," the latter combining shared and patient-led decisions. The results for each item are summarized in Table 2.

2.3.3 | Decisional regret in tooth extraction

The questionnaire included the DRS, which is designed to evaluate patients' scales of regret following tooth extraction treatment decisions. The DRS consists of five items: (RS1) It was the right decision; (RS2) I regret the choice that was made; (RS3) I would go for the same choice if I had to do it over again; (RS4) The choice did me a lot of harm; (RS5) The decision was a wise one.

These items were adapted from a validated regret measurement tool widely used in healthcare research to assess decision regret across various treatment contexts.[22] In this study, the DRS was employed to evaluate regret related to tooth extraction treatment decisions. The patients rated each item on a five-point Likert scale ranging from "strongly agree" to "strongly disagree" (Table 3, Table S1 in the online *Journal of Periodontology*).

2.4 | Statistical analyses

The demographic characteristics, including the DRS and the decision-making process, were analyzed descriptively and quantified using frequencies and percentages. Categorical predictor variables were coded as follows: binary variables (financial burden, alternative consideration) were entered as indicator variables using predefined reference categories. To address sparse cell frequencies and improve model stability, selected ordinal variables (satisfaction, perceived appropriateness, and decision leadership) were dichotomized based on theoretical similarity and distributional considerations prior to multivariable analysis. Age was treated as a continuous variable to preserve statistical information and reduce the number of estimated parameters. Response options for the DRS ranged from 1 ("strongly agree") to 5 ("strongly disagree"), with higher scores indicating greater decisional regret. Items 2 and 4 were reverse scored. To adjust the total score to a linear scale, 1 was subtracted from each item score, and the sum of the 5 items was then multiplied by 5, resulting in a total score ranging from 0 to 100. Comparisons of DRS score across patient characteristics were conducted using the Mann–Whitney U test for two-category variables, while the Kruskal–Wallis test was applied for variables with three or more categories. Non-parametric tests were used for univariate comparisons to avoid distributional assump-

TABLE 2 Patient decision-making and experiences with tooth extraction.

	N = 103	%
Tooth extraction-related treatment characteristics (5 items)		
(RS6) Date of extraction		
< 1 year ago	18	17.5
1~3 years ago	25	24.3
> 3 years ago	60	58.2
(RS7) Subsequent treatment after extraction		
Denture	4	3.9
Dental implant	57	55.3
Dental bridge	14	13.6
Other treatment (e.g., orthodontic)	10	9.7
No treatment	18	17.5
(RS8) Subsequent treatment cost (KRW/USD)		
≤ 300,000 KRW/ ≤ 230 USD	18	17.5
300,000 ~ 1,200,000 KRW/ 230~ 930 USD	29	28.2
> 1,200,000 KRW / > 930 USD	56	54.3
(RS9) Treatment cost coverage		
Self	85	82.5
Spouse	7	6.8
Other family	11	10.7
(RS10) Time from treatment selection to completion		
Untreated	13	12.6
≤ 6 months	50	48.5
> 6 months	40	38.8
Decision-making process variables		
(RS13) Sufficiency of the dentist's explanation before treatment decision		
Sufficient	82	79.6
Moderately sufficient	18	17.5
Insufficient	3	2.9
(RS14) Decision leader		
Dentist-led decision	49	47.6
Patient-involved decision	54	52.4
(RS16) Consideration of alternative treatment with prior knowledge		
No	92	89.3
Yes	11	10.7
Decision outcome variables		
(RS11) Satisfaction with treatment outcome		
Agree	76	73.8
Disagree	27	26.2
(RS12) Perceived appropriateness of the treatment decision at the time		
Agree	82	79.6
Disagree	21	20.4
(RS15) Consistency between expected and actual outcomes		
Agree	79	76.7
Neutral	17	16.5
Disagree	7	6.8

Note: Data are presented as number (%).

tions in small subgroups, whereas multivariable analysis aimed to estimate adjusted associations. A general linear model was employed to estimate the association between decisional regret and the included variables. Assumptions of linear regression were assessed using residual-based diagnostics. Variables included in the multivariable model were selected based on clinical relevance and theoretical considerations, supplemented by a liberal univariate screening criterion ($p < 0.20$) to reduce model overfitting and to improve stability.[27,28] The variable selection and confounder adjustment strategy were guided by a directed acyclic graph (DAG) developed a priori based on theoretical considerations (Figure S1 in the online *Journal of Periodontology*). In addition, multicollinearity diagnostics were performed, and RS7 was excluded from the final model due to identified multicollinearity. One participant had missing data in predictor variables and was excluded from the multivariable analysis; thus, the final model was based on 103 complete cases. Given the minimal proportion of missing data (0.96%), complete-case analysis was applied.

The consistency of responses for the DRS was assessed using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity, with a cutoff of a KMO value of 0.6 and a factor loading of 0.3. The scale was further tested for internal consistency reliability, with a Cronbach's alpha coefficient cutoff of 0.6. In this study, the KMO value was 0.83, and Cronbach's alpha was 0.86, both indicating strong consistency. All analyses were performed with the STATA/BE statistical software package (version 18 for Windows), with the significance cutoff set at 0.05.

3 | RESULTS

3.1 | Demographic results

The baseline demographic information is presented in Table 1. The patients had a mean age of 54.20 ± 12.66 years (mean ± SD), with the majority (71.2%) aged 60 years or older. The patients comprised more females (65 patients, 63.1%) than males (38 patients, 36.9%). Regarding education level, 46 patients (44.7%) had a high school education

TABLE 3 Decision regret scale for tooth extraction treatment.

Decision regret scale (5 items)	Mean[a]	SD	Mean score (SD)	Adjusted total score (SD)[b]
(RS1) It was the right decision	1.93	0.76	2.05 (0.67)	26.30 (16.75)
(RS2) I regret the choice that was made[c]	2.03	0.77		
(RS3) I would go for the same choice if I had to do it over again	2.11	0.92		
(RS4) The choice did me a lot of harm[c]	2.13	0.90		
(RS5) The decision was a wise one	2.05	0.77		

Note: Mean and Adjusted total score: The mean score for each item is the average of participant responses. The adjusted total score reflects the overall regret score based on the average of all items, scaled to a 0–100 range, adjusted for individual variation.

[a]Higher score indicated greater regret for tooth extraction.

[b]Decision Regret Scale scores were rescaled to a 0-100 scale, with higher scores indicating greater regret.

[c]These items are reverse-coded.

or lower, while 57 patients (55.3%) were college graduates or had higher degrees. Financial burden was reported by 15 patients (14.6%), whereas 88 patients (85.4%) reported no financial burden. Most patients were nonsmokers (91 patients, 88.3%), and alcohol consumption varied, with 35 patients (34.0%) reporting no alcohol intake. The majority brushed their teeth at least twice a day (100 patients, 97.1%), while 48 patients (46.6%) reported using fluoride toothpaste. The frequency of consuming sugary foods varied, with 34 patients (33.0%) consuming them two to three times per day, and the highest proportion (63.1%) consuming them at least once daily. In terms of general health, 67 patients (65.1%) had no chronic diseases, while 26 patients (25.2%) had one, and 9 patients (9.7%) had two or more.

3.2 | Patient decision-making and experiences with tooth extraction

Table 2 presents the results on patients' decision-making and experiences with tooth extraction. Most patients (58.2%) had undergone tooth extraction more than 3 years ago, with 55.3% of patients receiving dental implants as the subsequent treatment. Regarding treatment costs, the majority (54.3%) of patients reported expenses of 1,200,000 KRW range or higher, with 82.5% covering these costs themselves.

Regarding the decision-making, most patients (79.6%) felt the dentist's explanation was sufficient, 17.5% considered it moderately sufficient, and 2.9% found it insufficient. When asked about decision leadership, 47.6% of patients reported that the decision was primarily dentist-led, while 52.4% reported a patient-involved decision-making process. 89.3% of patients stated that they had not considered alternative treatment options before making their extraction decision.

As for decision outcomes, most patients (73.8%) were satisfied with the treatment outcome, while 26.2% reported dissatisfaction. Similarly, 79.6% believed their treatment decision was appropriate, whereas 20.4% perceived it as not appropriate. For consistency between expected and actual outcomes, 76.7% agreed that the treatment met their expectations, whereas 16.5% remained neutral, and 6.8% disagreed.

3.3 | Decision regret scale for tooth extraction

Table 3 presents the results of the DRS assessing regret following tooth extraction treatment decisions. Among individual items, the highest regret-related score was recorded for RS4 ("The choice did me a lot of harm") at 2.13 ± 0.90, followed closely by RS3 ("I would go for the same choice if I had to do it over again") at 2.11 ± 0.92. The lowest mean score was observed for RS1 ("It was the right decision") at 1.93 ± 0.76. The mean score across the five items was 2.05 ± 0.77, with an adjusted total score of 26.3 ± 16.7 (rescaled to a 0–100 scale). Higher total and item-level scores indicate greater decision regret.

3.4 | Comparison of DRS scores by patient characteristics

Comparisons of DRS scores according to sociodemographic and decision-making process, and decision outcome variables are presented in Table 4. The mean DRS score of patients with financial burden was 37.6 ± 13.7 compared with 24.4 ± 16.6 in those without burden ($p = 0.003$). Patients who did not use fluoride toothpaste had a higher score than those who did (30.0 ± 17.8 vs. 22.1 ± 14.6, $p = 0.013$). These findings suggest that financial burden and oral health behaviors are associated with decisional regret.

Regarding decision-making process variables, regret scores were higher among patients who perceived the dentist's explanation as insufficient compared with those

TABLE 4 Comparison of mean DRS scores by patient characteristics.

Variables	Mean DRS	SD	*p* value
Sociodemographic variables			
Age			
≤ 49	23.0	17.8	0.233
50-59	34.0	14.0	
≥ 60	29.7	17.2	
Sex			
Female	25.0	16.1	0.420
Male	28.7	17.9	
Education			
High school graduate or lower	27.1	16.4	0.541
College graduate or higher	25.6	17.3	
Financial burden			
No	24.4	16.6	**0.003**
Yes	37.6	13.7	
Health-related behaviors			
Smoking status			
No	25.3	15.8	0.153
Yes	34.2	22.3	
Drinking status			
None	27.1	14.6	0.831
≤ 1 time/ month	26.1	19.8	
2-4 times/ month	23.9	18.0	
2-3 times/ week	28.7	16.5	
4 times/ week	32.5	10.6	
Toothbrushing frequency			
≤ 1 time/ day	28.3	2.9	0.462
≥ 2 times/ day	26.3	17.1	
Use of fluoride toothpaste			
No or I don't know	30.0	17.8	**0.013**
Yes	22.1	14.6	
Frequency of consuming sugary foods			
None	42.5	26.0	0.619
1 time/ week	24.6	14.8	
3-4 times/ week	27.8	18.7	
1 time/ day	26.5	16.5	
2-3 times/ day	24.1	15.3	
Number of chronic diseases			
None	24.9	16.0	0.357
1	27.9	19.3	
2	32.0	15.3	
Tooth extraction-related treatment characteristics			
(RS6) Date of extraction			
< 1 year ago	23.1	14.2	0.696
1~3 years ago	25.2	15.4	
> 3 years ago	27.8	18.1	
(RS7) Subsequent treatment after extraction			
Denture	41.3	28.4	0.059
Dental implant	23.8	16.2	
Dental bridge	31.8	16.1	
Other treatment (e.g., orthodontic)	21.0	18.2	
No treatment	29.7	13.9	
(RS8) Subsequent treatment cost (KRW/USD)			
≤ 300,000 KRW/ ≤ 230 USD	27.8	12.3	0.371
300,000 ~ 1,200,000 KRW/ 230~ 930 USD	27.4	16.1	
> 1,200,000 KRW / > 930 USD	25.3	18.5	
(RS9) Treatment cost coverage			
Self	25.3	16.2	0.525
Spouse	27.1	11.1	
Other family	33.6	22.8	
(RS10) Time from treatment selection to completion			
Untreated	28.5	14.3	0.299
≤ 6 months	27.3	15.3	
> 6 months	24.5	19.4	
Decision-making process variables			
(RS13) Sufficiency of the dentist's explanation before treatment decision			
Sufficient	23.0	14.9	**0.000**
Moderately sufficient	39.4	18.8	
Insufficient	38.3	14.4	
(RS14) Decision leader			
Dentist-led decision	31.4	19.0	**0.016**
Patient-involved decision	21.7	13.1	
(RS16) Consideration of alternative treatment with prior knowledge			
No	24.1	15.5	**0.000**
Yes	44.1	17.0	

(Continues)

TABLE 4 (Continued)

Variables	Mean DRS	SD	*p* value
Decision outcome variables			
(RS11) Satisfaction with treatment outcome			
Agree	20.6	12.8	**0.000**
Disagree	42.6	16.4	
(RS12) Perceived appropriateness of the treatment decision at the time			
Agree	23.1	15.9	**0.000**
Disagree	38.8	14.6	
(RS15) Consistency between expected and actual outcomes			
Agree	21.4	13.3	**0.000**
Neutral	40.3	15.5	
Disagree	48.6	19.9	

Note: Mann–Whitney U and Kruskal–Wallis tests were used; p <0.05 was considered significant.

who considered it sufficient (38.3 ± 14.4 vs. 23.0 ± 14.9, $p = 0.000$). Similarly, for decision leadership, the mean regret score was higher when the decision was primarily led by the dentist compared with patient-involved decisions (31.4 ± 19.0 vs. 21.7 ± 13.1, $p = 0.016$). As for decision outcome variables, the mean score of patients who were dissatisfied with treatment outcomes was 42.6 ± 16.4, while that of satisfied patients was 20.6 ± 12.8 ($p < 0.001$). The mean score of patients who perceived the treatment decision as inappropriate was higher than that of those who considered it appropriate (38.8 ± 14.6 vs. 23.1 ± 15.9, $p < 0.001$). Overall, these findings indicate that decisional regret was more pronounced among patients who were less involved in decision-making or dissatisfied with treatment results.

3.5 | Association of decision regret scale with sociodemographic and decision-making process variables

Table 5 presents the results of the multivariable linear regression analysis. The final model included six predictors after refinement to improve stability. In the adjusted model, dissatisfaction with treatment outcome and perceived inappropriateness of the treatment decision were significantly associated with higher decisional regret (both $p < 0.01$). Consideration of alternative treatment options was also associated with higher regret ($p = 0.003$). Importantly, patient-involved decision leadership was associated with significantly lower regret compared with dentist-led decisions (B = −5.80; 95% CI: −10.88 to −0.72; $p = 0.026$). Age and financial burden were not significantly associated with decisional regret.

4 | DISCUSSION

This study investigated decisional regret among periodontitis patients who underwent tooth extraction. The main findings are as follows: (1) The mean DRS regarding extraction of periodontally compromised teeth was 26.30 (SD = 16.67), suggesting patients experienced a moderate level of regret, compared with other medical contexts, such as oncology, cardiology, and rheumatology; (2) Higher DRS were associated with dissatisfaction with treatment outcomes, disagreement with the appropriateness of the treatment decision, consideration of alternative treatment options, and dentist-led decision-making; (3) Decisional regret was associated with who led the treatment decision, suggesting the relevance of patient engagement in the decision-making process.

Considering that a DRS score of 25 or above has been identified as reflecting moderate to strong levels of decisional regret, the mean score (26.30 ± 16.7) reported in this study indicates that a meaningful proportion of patients experienced regret. DRS is commonly used to capture post-decisional regret, focusing on patients' appraisal of their treatment choices.[29] Most studies have reported that postoperative regret is relatively infrequent, with prevalence rates below 20%[22,27,30] in many clinical settings. In the medical field, patients often experience greater regret when multiple treatment options are available, as seen in breast and prostate cancer. Conversely, patients with cancers for which only limited treatment options are available, such as pancreatic or biliary tract cancer, tend to experience regret that is more closely linked to treatment outcomes than to the decision process. Recent research in dental care has demonstrated that decisional regret after interventions such as tooth extraction can be influenced by factors such as information gaps, functional outcomes, and esthetic changes.[31,32] Given such features of dental decision-making, patients may experience greater regret, making their final decision more likely to be accompanied by feelings of remorse, reflecting the importance of patient involvement in order to mitigate concerns and ensure preferences are adequately addressed.[33,34]

Decisional regret has been linked to multiple influencing factors across various settings. The strong association between high decisional satisfaction and low levels of regret has been widely reported in previous research,[35] particularly in irreversible interventions, including cancer treatments, postoperative symptoms, and surgeries such as mastectomy.[28,36,37] Notably, a discordance between preferred and actual treatment was observed (Table 4),

TABLE 5 Multivariable linear regression of factors associated with decision regret scores.

	Multivariate linear regression model			
Variable	**Coeff**	**95% CI**	***p* value**	**VIF**
Intercept	12.81	[0.83, 24.80]	0.036	–
Age (continuous)	0.16	[-0.04, 0.36]	0.116	1.06
Financial burden (Yes vs. No)	3.65	[-3.71, 11.02]	0.327	1.18
(RS11) Satisfaction (Not satisfied vs. Satisfied)	14.35	[7.94, 20.77]	<0.001	1.35
(RS12) Appropriateness (Not appropriate vs. Appropriate)	9.15	[2.38, 15.93]	0.009	1.23
(RS14) Decision leader (Patient-involved vs. Dentist-led)	−5.80	[-10.88, -0.72]	0.026	1.06
(RS16) Alternative consideration (Yes vs. No)	13.21	[4.63, 21.79]	0.003	1.16

Note: Model assumptions verified: residual normality (Shapiro–Wilk W = 0.985, $p = 0.31$); homoscedasticity (Breusch–Pagan $\chi^2 = 0.225$, $p = 0.635$). All VIF values were below 1.35, indicating no evidence of multicollinearity.

Abbreviation: Ref, reference.

Model fit: adjusted $R^2 = 0.44$; $F(6, 96) = 14.43$; $p < 0.001$.

suggesting that some patients proceeded with extraction even when they felt it may be inappropriate, which was associated with higher regret. Similarly, about 90% of participants reported being unaware of alternative treatment options, indicating a persistent gap in patient involvement and the provision of adequate information (Table 2). Implementing SDM when choosing between treatment options has been suggested as a potential approach to address these gaps by actively involving patients in the decision-making process.[27,38,39]

Our findings showed an association between dentist-led decision-making and higher levels of decisional regret (Table 5), suggesting the importance of a shift towards a more patient-centered approach in dental care. This suggests that greater patient involvement in the decision-making process may be associated with lower feelings of remorse and a more positive overall treatment experience. This conclusion is further supported by a recent review, which found that shared decision-making (SDM) interventions significantly reduced decisional conflict in 86% of studies and that the use of decision aids was associated with decreased decisional regret.[40] This highlights an effective strategy: implementing SDM combined with decision aids may be effective in minimizing patient regret in clinical practice. The discrepancies between clinicians' perceptions of patient involvement and patients' own views complicate the issue,[41] increasing the likelihood of regret. Therefore, a unified, patient-centered process is important, a point reinforced by the growing emphasis on PROMs. Integrating PROMs into clinical care may help to ensure patient's voices remain central to treatment planning, fostering a more collaborative environment.

This research provides preliminary insights by examining decisional regret among patients who underwent tooth extraction due to periodontal disease. However, several limitations should be noted. First, since the study was conducted at a single university dental hospital in South Korea with a relatively small sample, the findings may have limited generalizability and may not fully represent patient experiences across different dental conditions or clinical settings. Second, the cross-sectional design with data collected at a single time point limits the ability to draw causal inferences between the associated factors and decisional regret. The temporal sequence of behavioral factors such as oral hygiene or smoking habits in relation to the onset of regret remains unclear, and longitudinal studies are needed to clarify these relationships. Third, the use of self-reported questionnaires approximately 6 months after extraction may have introduced recall bias, particularly in relation to the decision process and information about alternative treatment options. Fourth, most participants had relatively favorable oral health conditions and reported high levels of treatment satisfaction. This may have led to an underestimation of decisional regret, and the limited variation in regret scores could have reduced the statistical power to detect associations with certain variables. In addition, clinically relevant factors such as tooth position (e.g., anterior vs. posterior teeth or involvement of esthetic zones) and the occurrence of post-extraction complications were not assessed in this study, although these factors may influence patients' treatment decisions and subsequent regret. Fifth, this study did not fully address broader psychosocial and contextual factors, such as trust in dental professionals, prior negative experiences, patient preferences in decision-making, or psychological conditions including depression or anxiety. These unmeasured factors may influence decisional regret and may introduce selection bias. Lastly, the relatively large number of predictors compared with the sample size increases the risk of overfitting as a pilot study. Results that approached statistical significance should be interpreted as exploratory and preliminary, and further studies with larger and more diverse samples are needed to validate these findings.

Despite these limitations, this study offers valuable preliminary insights into decisional regret in dental care and may provide a foundation for future longitudinal studies in more diverse populations and clinical settings. Decision-making process variables showed significant associations with DRS scores, and the multivariate analysis indicated that these factors could act as confounders for one another. These findings highlight the complexity of decisional regret and underscore the importance of considering multiple aspects of the decision-making process simultaneously when interpreting regret in clinical practice.

5 | CONCLUSION

Decisional regret at a moderate level was observed following tooth extraction for periodontitis, with levels comparable to those reported in other medical fields. It was associated with dissatisfaction, disagreement with the appropriateness of the treatment decision, and limited discussion of alternative options. Greater patient involvement in decisions was associated with lower regret, suggesting a potential benefit of fostering more participatory decision-making. Further research should investigate the relationship between patient involvement and decisional regret among periodontal patients.

AUTHOR CONTRIBUTIONS

Kyung-A Ko: Conceptualization, methodology, formal analysis, investigation, writing–original draft. **Ji-Young Jung**: Conceptualization, methodology, formal analysis, investigation, writing–original draft. **Youngkyung Ko**: Writing–review and editing. **Nicolas P. A. Müller**: Writing–review and editing. **Junhewk Kim**: Investigation, writing–review and editing. **Jung-Seok Lee**: Conceptualization, methodology, investigation, data interpretation, writing–review and editing, supervision.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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