

# Patient Attitudes towards DentalMonitoring: A global study

**Results from a Survey of 2248 Patients in 12 countries**

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## Abstract

### Aim

The purpose of this study was to analyze the attitude of orthodontic patients of different ages and in different countries towards the use of an AI-powered remote monitoring solution, DentalMonitoring™ (DM), which consists of a Doctor's dashboard, patient's smartphone application, and patented algorithms to analyze clinical situations and automate the communication process.

Seventeen orthodontists from ten countries (USA, Australia, France, Ireland, United Kingdom, Poland, Hungary, Spain, Italy, and Germany) were enrolled in this private practice-based cross-sectional study. The vast majority of patients expressed a very positive attitude toward the different aspects of their remote monitoring experience.

### Results

86% said that they were globally satisfied with their experience, 89% said it was very beneficial to be able to communicate with their orthodontist via the DM app, 86% felt more reassured and 88% found it easy to use.

In addition, most patients (76%) felt more engaged and compliant with a more positive impact on hygiene. The most mentioned benefits, when asked about their favorite part of their experience, were "more convenience due to fewer visits", "better communication" and "reassurance".

### Conclusions

The patients in this study showed a very positive attitude towards all aspects of their remote monitoring experience regardless of their age or geographical location. The majority of patients found this approach to treatment very convenient. We also saw a positive impact on compliance and hygiene.

This study proves that AI-powered remote monitoring can provide orthodontists with a big leap toward building a true patient-centric practice that would result in more satisfied, cooperative, and loyal patients.

## Introduction

Innovative technologies are creating a paradigm shift in customer experience and relationship management in the business environment.

Healthcare is no exception. What used to be a doctor-centric profession is now shifting to becoming a patient-centered one to ensure the creation of an optimized ecosystem for patient care, one in which patients are more engaged, motivated, and compliant. The pandemic accelerated this shift. Telehealth popularity has significantly risen after the pandemic, with a 38 times increase from the pre-covid baseline indicating the emergence of a new norm<sup>[1]</sup>. Today's patients are more demanding of instant digital communication channels to interact with their healthcare providers and better understand their treatments' progression<sup>[2]</sup>. A survey of more than 2,000 patients showed that younger consumers, Millennials, and Generation Z, were more likely to be dissatisfied with the status quo and are more willing to try non-traditional services such as remote monitoring<sup>[3]</sup>.

Orthodontics is a specialty that could benefit from this approach as treatments are often long-lasting, and even more so when undesired side effects occur without being recognized immediately due to the lack of visibility in-between appointments<sup>[4]</sup>. In that same vein, remote monitoring can help orthodontists gain more control over the treatment progression by avoiding unexpected complications and acting swiftly when they occur, eventually resulting in a more efficient treatment<sup>[5]</sup>. However, the question that arises from this is the following: How do patients perceive this approach to treatment in orthodontics? Does it help move towards a patient-centric approach rather than an orthodontist-centered one?

The limited existing literature shows a positive attitude of patients toward this technology. In one study 97.5% of patients judged remote monitoring positively after using DentalMonitoring™(DM) for one month, and 81.25% felt that it was a sign of high-tech treatment and expressed their interest in reducing the number of physical appointments<sup>[6]</sup>. Another study found a similar pattern, where patients rated the use of DM 4.25 on the 5-point Likert scale, and expressed that their favorite things about it were better communication, fewer appointments, and more convenience<sup>[7]</sup>.

The aim of this study was to analyze patients' perception of DM in more depth and on a larger scale, including all ages and treatment phases in various countries, by filling out a survey.

## Enrollment of study participants & statistical analysis

Seventeen orthodontists from ten countries (USA, Australia, France, Ireland, United Kingdom, Poland, Hungary, Spain, Italy and Germany) were enrolled in this private practice-based cross-sectional study.

The inclusion criteria for these doctors were: specialist orthodontists practicing in private practices, had implemented the DentalMonitoring solution in their practices and had been using it for more than a year. The surveys were administered to 10,601 patients between August and October 2022 via the DM chat feature. 2,248 patients responded, which equates to a 21% response rate.

This study included patients of all ages (Table 1) undergoing various orthodontic treatments such as aligners, braces, phase 1 treatments, and even retention monitoring.

TABLE 1 - Categories according to age ranges

Category	Age range
<b>Under 13</b>	Children
<b>Between 13 and 25</b>	Gen Z
<b>Between 25 and 40</b>	Millennials
<b>Between 40 and 55</b>	Gen X
<b>Older than 55</b>	Baby boomers



# Results

## General results

The patients involved in this study were mostly Gen Z (42.1%) and Millennials (29.9%) followed by Gen X (13.8%), Children (13.7%), and lastly Baby Boomers who represent a very small portion (0.5%) (Fig 1).

The distribution of patients according to their geographical location (Fig2) was as follows: UK (24,2%), France (17,4%), Australia (12,6%), Ireland (11,1%), USA (10,9%), Italy (10,9%), Poland (4,4%), Germany (3%), Spain (2,8%) and Hungary (2,7%).

The vast majority of the respondents expressed a positive experience towards their remote monitoring experience, with 86% stating that they were satisfied or very satisfied and only 4% had a negative experience (Fig 3).

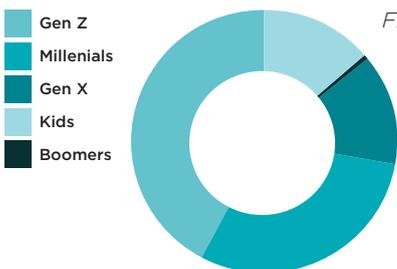


Fig. 1 - Distribution of patients according to different generations

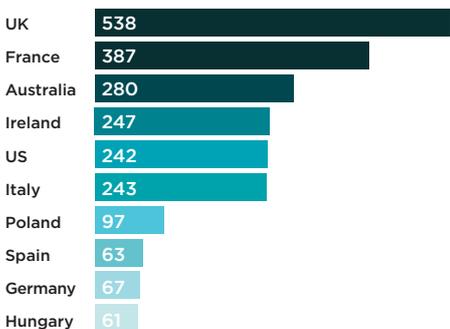


Fig. 2 - Distribution of patients according to country of origin

### How satisfied are you with your remote monitoring experience?

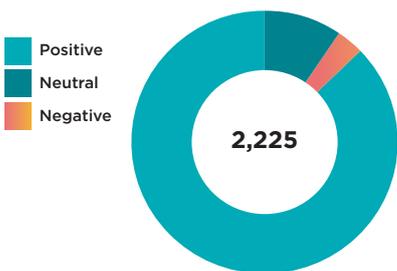


Fig. 3 - Overall satisfaction

### How useful do you feel it is to be able to communicate with the practice through the DentalMonitoring app?

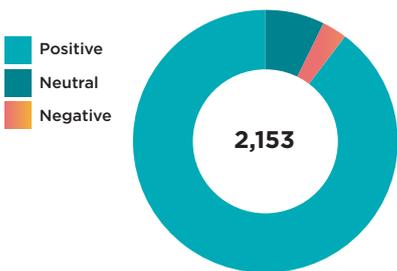


Fig. 4 - Satisfaction with communication via the app

89% felt it was useful to be able to communicate with the practice through the app (Fig 4).

### How likely do you feel that the remote monitoring experience made you more engaged in the treatment?

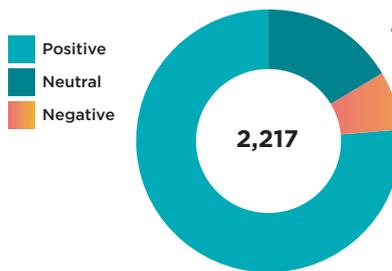


Fig. 5 - Impact on motivation, engagement & hygiene

76% of respondents said they felt more engaged in the treatment because of DM.

### How much did you feel reassured by the fact that you were constantly monitored by your doctor throughout the treatment?

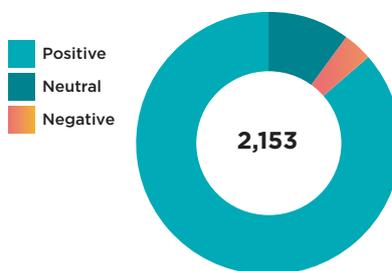


Fig. 6 - Reassurance level

86% of patients felt more reassured throughout the treatment by being monitored by their orthodontist (Fig 6).

### How easy was the scanning process?

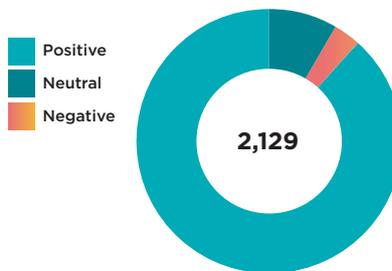


Fig. 7 - Ease of use

88% of patients found DM easy to use (Fig 7).

### Do you think it would be interesting to use DentalMonitoring for post-treatment purposes?

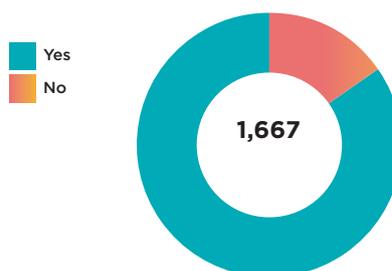


Fig. 8 - Post-treatment monitoring

85% said it would be beneficial to use DM in the post-treatment phase (Fig 8).

## Would you recommend this experience?



Fig. 9 - How would you rate your remote monitoring experience on a scale of 1 to 10

Respondents rated their experience 8.57 on a scale of 1 to 10, with Millenials and Gen X groups giving out the highest ratings (Fig 9). The responses to this question were also used to calculate the Net Promoter Score (NPS) of DM - NPS is a widely used market research metric that measures customers' loyalty to a product or a service [8]. It takes the form of a single question asking respondents to rate the likelihood that they would recommend a company, product, or service to a friend or colleague (on a scale of 1 to 10). Respondents are divided into 3 categories: "promoters" who provide ratings of 9 or 10, "passives" who provide ratings of 7 or 8, and "detractors" who provide ratings of 6 or lower. A calculation is then applied that involves subtracting the percentage of detractors from the percentage of promoters collected by the survey (Fig 10).

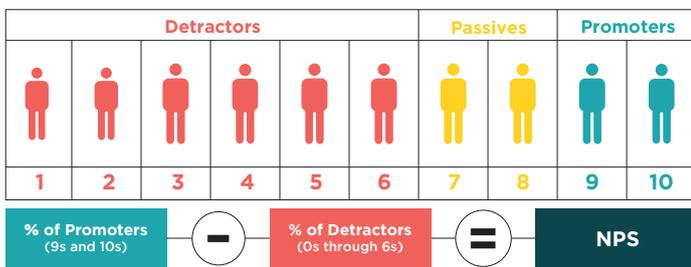


Fig. 10 - NPS calculation

DM obtained an NPS of 51.5 in this study. According to Bain & co [12], the source of the NPS system, any NPS score above 0 is "good", above 20 is "favorable", and above 50 is "excellent". This confirms that patients were highly satisfied with their remote monitoring experience with DM. To put this further into perspective, according to recent surveys, the average NPS of dental practices today is 1 and in healthcare is 27. [12] [13] We could also notice that Millenials and Gen X rated the use of DM slightly higher than the younger generations or the Baby Boomers.

When asked "what was your favorite thing about your remote monitoring experience" the most mentioned benefits were the following (from most to least mentioned): "Convenience/fewer practice visits", "Ease of use", "Progress visualization through the app", "Reassurance", "Easy communication through the app" and "Personalized feedback". On the other hand, when asked "what was your least favorite thing about your remote monitoring experience" some of the common answers were the following: "Forgetting to take scans", "the frequency of scans", "Feeling more accountable", and "Connection issues make it hard to upload scans".

## Discussion

The existing studies found in the literature on this topic were limited in terms of sample size, stage of treatment, treatment type, age range, and geographical distribution. The sample in this study is the largest to date and the most representative of the orthodontic patient population on a global scale in regard to their attitude towards remote monitoring, minimizing the potential biases.

The results of this study are in line with the results of other studies found in the literature of healthcare and orthodontics showing a very high level of acceptance towards telehealth and tele-orthodontics. Patients seem to particularly appreciate the convenience that this technology can provide as the most mentioned benefit in this study was "less unnecessary office visits". For example, Hansa I et al. found in their study that 88% of patients preferred as few office visits as possible even when they lived close to the office.

Dalessandri D et al. found a similar pattern where 82.5% of respondents said they prefer fewer in-office visits, regardless of their age range.

Another observation in terms of convenience that was apparent was the ability to communicate with their orthodontist via their smartphone application which confirms the data found by Nayak P et al. about the perception of patients toward digital interactive healthcare. A major reason why patients like this digital communication channel is that in addition to convenience it provides reassurance.

Another benefit of digital communication is increasing motivation and improving oral hygiene habits, especially in orthodontics as most orthodontists often have difficulty providing their patients with adequate and efficient oral hygiene instructions [10]. A survey in dentistry found that 89% of dental patients strongly agree that interactive healthcare through an app can improve their oral health [11]. In orthodontics specifically, another study found that smartphone apps, as motivators and reminders, can greatly help in improving orthodontic patients' oral hygiene compliance, especially in adolescents [12].

The last thing that we can observe is that even though statistically significant differences exist when correlating answers with different generations, they were still all very positive, which indicates that this approach suits everyone.

## Conclusions

The patients in this study showed a very positive attitude towards all aspects of their remote monitoring experience regardless of their age or geographical location. The majority of patients found this approach to treatment very convenient. We also saw a positive impact on compliance and hygiene.

This study proves that AI-powered remote monitoring can provide orthodontists with a big leap toward building a true patient-centric practice that would result in more satisfied, cooperative, and loyal patients.

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