

# **Patient awareness of orthodontic mobile phone apps**

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# **ABSTRACT**

## **Introduction**

Mobile phone applications (apps) can be engaging, accessible and versatile and have the potential to improve patient care. In 2017, 354 orthodontic apps were reported to be available, many of these are targeted at patients, however, the awareness and usage amongst orthodontic patients was unreported.

## **Aim**

The primary aim of this study was to assess patients' current awareness of the availability of orthodontic apps.

## **Methods**

One hundred orthodontic patients (50 new and 50 in treatment) completed a questionnaire designed to explore their awareness, access to and utilisation of orthodontic apps and social media to support orthodontic treatment. Furthermore, their willingness to engage with and use an app to aid with orthodontic treatment was explored. There were no age restrictions or exclusion criteria.

## **Results**

Ninety percent of patients had access to a smartphone, of which, 73% belonged to them (rather than a parent/relative). Apple was the most popular platform (56%) followed by Android (26%). Only 7% of patients were aware that apps were available to help with orthodontic treatment and no patients had previously used an app related to orthodontics. However, 87% of patients stated that they would be willing to use an app to support

treatment. Twenty one percent of patients had previously looked up information on social media, YouTube being the most popular platform.

## **Conclusion**

Current awareness of the availability of apps is poor, despite this finding, 87% of patients reported they would be willing to use an app to aid with orthodontic treatment. Given the availability of apps targeted at orthodontic patients, there is a need to assess the quality of these apps and if appropriate navigate patients towards high quality, effective apps.

## **INTRODUCTION**

Mobile phones are potentially an invaluable tool in improving patient care, they are readily available (with some sources reporting 100% penetrance in Western Europe) (Kornstien 2015) and are very versatile. For example, mobile phones can deliver treatment information in a variety of formats (visual, text, videos, etc.), at times accessible to the patient. They can also be effectively utilised to provide personalised treatment information such as appointment and toothbrushing reminders and treatment progress photographs. To this end, the availability of smartphones is having a significant impact in healthcare. In 2018, 2.53 billion smartphone devices were reported to be in use globally (Statista 2018) and this figure is increasing exponentially with 259,000 healthcare apps being available globally in 2016 (Adoriasoft 2017). The most popular platforms for accessing apps in the UK are 'App Store' on Apple phones and 'Google Play' on Android devices. Fifty percent of smartphone owners are reported to use at least one health related app (Krebs and Duncan 2015).

In 2014, a paper summarising the availability of orthodontic-related apps found that 70 apps were available (Baheti and Toshniwal 2014). In 2017 this number had increased to 354

(Gupta and Vaid 2017), 62 apps were aimed directly at patients and focused on a variety of areas including: education, reminders for elastic and aligner wear, dealing with orthodontic emergencies and progress trackers. There is emerging evidence to suggest that apps utilised to support orthodontic treatment are effective in improving appointment attendance, reducing appliance breakages (Li et al. 2016), improving oral health and minimising the risks of treatment (Zotti et al. 2015).

The primary aim of this study was to assess patients' current awareness of the availability of orthodontic apps.

## **METHODS**

A prospective survey was conducted at the University College London Hospitals Foundation Trust Eastman Dental Hospital (UCLH EDH) orthodontic department in February 2018. One hundred orthodontic patients were asked to complete a pre-piloted 8 item data collection form designed to explore their awareness, access to and utilisation of orthodontic apps and social media to support orthodontic treatment (Figure 1). Furthermore, their willingness to engage with and use an app to aid with orthodontic treatment was explored.

Fifty consecutive patients undertaking orthodontic treatment and fifty consecutive patients attending orthodontic new patient assessment appointments were asked to complete the questionnaire and place it in an opaque box in their own time away from clinicians/data collectors after their appointment. The responses were thus anonymous. There were no age restrictions and parents of young patients were asked to complete the questionnaire with their children.

## RESULTS

All data collection forms were returned and analysed using descriptive statistics. The age range of participants was 8-52 years old, the majority (71 participants) were aged between 11-18 years old (figure 2). The questionnaire was completed by an equal number of males and females (figure 3).

Ninety per cent of participants had access to a smartphone, of this population 73 participants (81%) reported owning the smartphone. Twelve participants (13%) reported that their phone belonged to their parents or relatives (figures 4 and 5). Participants who did not have access to a smartphone were of varying ages (range 10-45 years old). The patients who had access to a parent or relatives' phone were a younger cohort of patients (range 8-15 years old, mean 9.9). Apple was the most popular platform (56 participants) followed by Android (26 participants). No other platforms were reported, however, 8 participants did not respond to this question.

Interestingly, only 7% of patients were aware that apps are available to help with orthodontic treatment and no patients had utilised app related orthodontics (figure 6). Eighty seven per cent of patients stated that they would be willing to use an app to support orthodontic treatment if it was available.

Twenty one per cent of patients had previously utilised social media to obtain information related to orthodontic treatment (figure 7). The following resources were reported to have been used:

- Google (n=9)

- YouTube (n=7)
- Facebook (n=5)
- Blogs (n=5)
- NHS website (n=2)
- Instagram (n=2)
- Twitter (n=1)
- Pinterest (n=1).

However, it was noted that Google and the NHS website are not social media sites.

## **DISCUSSION**

Despite the availability of mobile phone apps aimed at orthodontic patients, only 7% of participants reported being aware of the availability of apps. Furthermore, none had previously used an orthodontic app. Although patients' current awareness of orthodontic apps is poor, the majority of participants reported that they would be willing to use an app to aid with orthodontic treatment (87%). It appears that individuals in treatment are more engaged with orthodontic apps and social media than new patients (Figures 6 and 7), with twice the number of patients in treatment being aware that apps were available and almost three times as many of these patients had utilised social media to glean information related to orthodontics.

Although there is no published literature available in orthodontics to compare these findings to, there is growing evidence to support the effectiveness of apps to support patients with orthodontic treatment. Apps have been shown to be effective in improving appointment attendance, reducing treatment length, reducing appliance breakages, improving oral health and reducing risks of treatment (Zotti et al. 2015, Li et al. 2016, Alkadhi et al. 2017, Lima et

al. 2018). However, there is significant heterogeneity in the intervention and outcome measures utilised in these studies and therefore further high quality research in this area would help strengthen the evidence. Additionally, there are currently no published randomised controlled trials assessing the effectiveness of apps delivering personalised information provision in orthodontics. This is despite evidence that personalised communication in healthcare is more effective than non-personalised communication in changing health-related behaviours (Kreuter and Holt 2001).

Despite the many potential advantages of apps to support treatment, there are a number of potential challenges. Firstly, there is a rapid proliferation of apps making it increasingly difficult for patients and health professionals to identify high quality apps (Cummings et al. 2013). Furthermore, there is no published data related to the quality of available orthodontic apps. In contrast, the quality of YouTube videos as a method of information provision in orthodontics has been assessed and reported to be of a low standard, with Lena and Dindaroglu and Knösel et al. reporting that the majority of YouTube videos contained low content, possibly due to the fact that they were largely created by patients rather than professionals (Knösel et al. 2011, Lena and Dindaroğlu 2017). The NHS does publish a library of apps meeting NHS quality standards, however, to date no orthodontic apps are listed.

#### Implications for future research

As smart phone use and the availability of apps targeted at orthodontic patients increases, there is a need to assess the quality of these apps. This should include an assessment of knowledge, accuracy and usability.

## CONCLUSION

Current awareness of apps is poor, despite this finding, 87% of participants in this study reported that they would be willing to use an app to aid with treatment. A number of studies (Zotti et al. 2015, Li et al. 2016, Alkadhi et al. 2017, Lima et al. 2018) have shown apps to be effective in orthodontics, however, there are a number of limitations of apps. Given the availability of apps targeted at orthodontic patients, there is a need to assess the quality of these apps and if appropriate navigate patients towards high quality, effective apps.

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**Figure 1: Data collection form**

# Questionnaire for patients about orthodontic apps

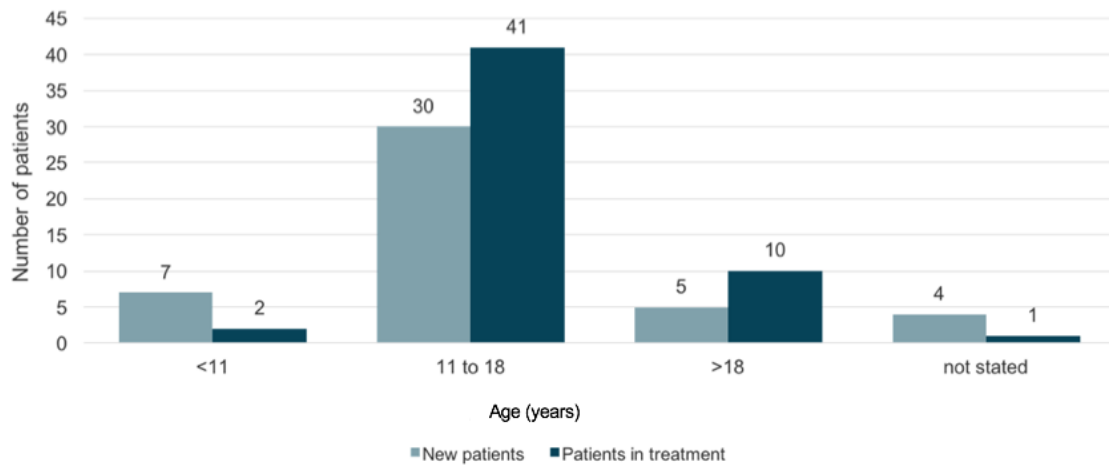


We are interested in finding out what you know about orthodontic apps and if you have ever used one. This questionnaire will help us assess and if appropriate address the needs of our patients.

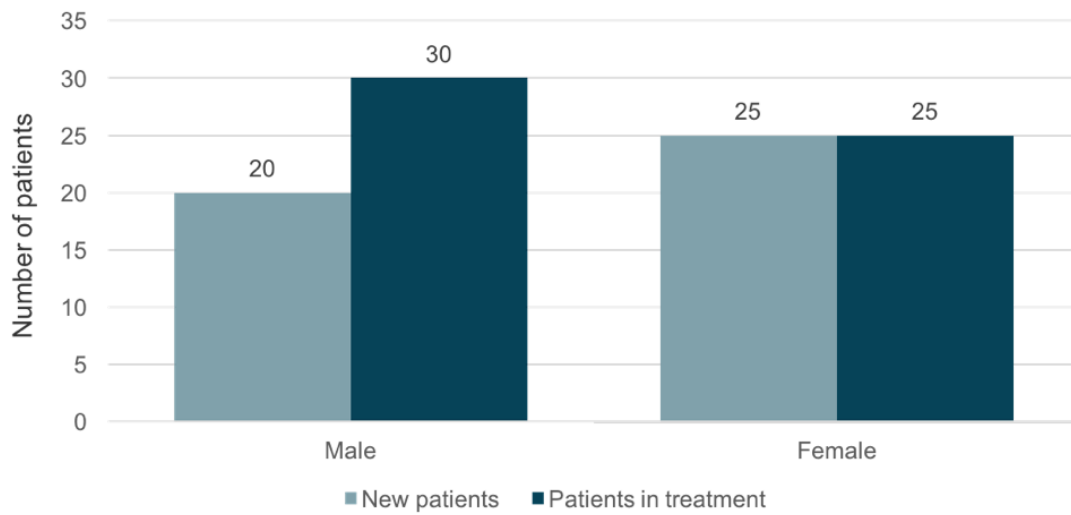
|   |                              |                                      |
|---|------------------------------|--------------------------------------|
| 1. How old are you (patient receiving orthodontic treatment)?   |                              |                                      |
| 2. Are you male or female?  | Male                         | Female                               |
| 3. Have you started treatment?  | Yes                          | No                                   |
| If yes, please state approximately how long ago you started   | Approximate date:            |                                      |
| 4. Do you have access to a smartphone/tablet to use apps?<br>(Smartphones are mobile phones that perform many functions of a computer ie. have internet access and run downloaded apps)         | Yes                          | No                                   |
| If yes,   |                              |                                      |
| • Does the smartphone/tablet belong to you or your parents/relative?  | Belongs to me                | Belongs to my parents/relative       |
| • What make is it?  | Apple    Android ie Samsung  | Windows    Other, please state _____ |
| 5. Before today, were you aware apps were available to help with brace treatment?   | Yes                          | No                                   |
| 6. Have you ever used an app related to braces?   | Yes                          | No                                   |
| If yes,   |                              |                                      |
| • What was the name of the app?   | Name:                        |                                      |
| • Did you pay for it or was it free?  | Free                         | Paid (cost £_____)                   |
| • Please give us some details on what the app was for (ie. information about braces, reminders for adjusting/wearing braces, a game about braces, an app from your dental/orthodontic practice) | Details of app:              |                                      |
| 7. Have you ever looked up information about braces using other forms of social media?  | Yes                          | No                                   |
| If yes, please select which type  | Facebook    Twitter    Blogs | Other, please state _____            |
| 8. If an Eastman Dental Hospital App to support orthodontic treatment was available would you use it?   | Yes                          | No                                   |

Thank you for filling out the questionnaire. Please feel free to leave any other comments below

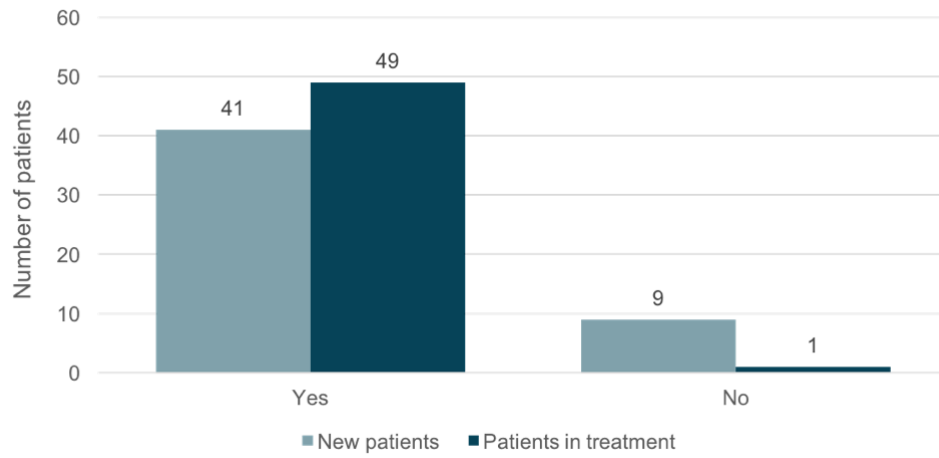
**Figure 2: Age of participants**



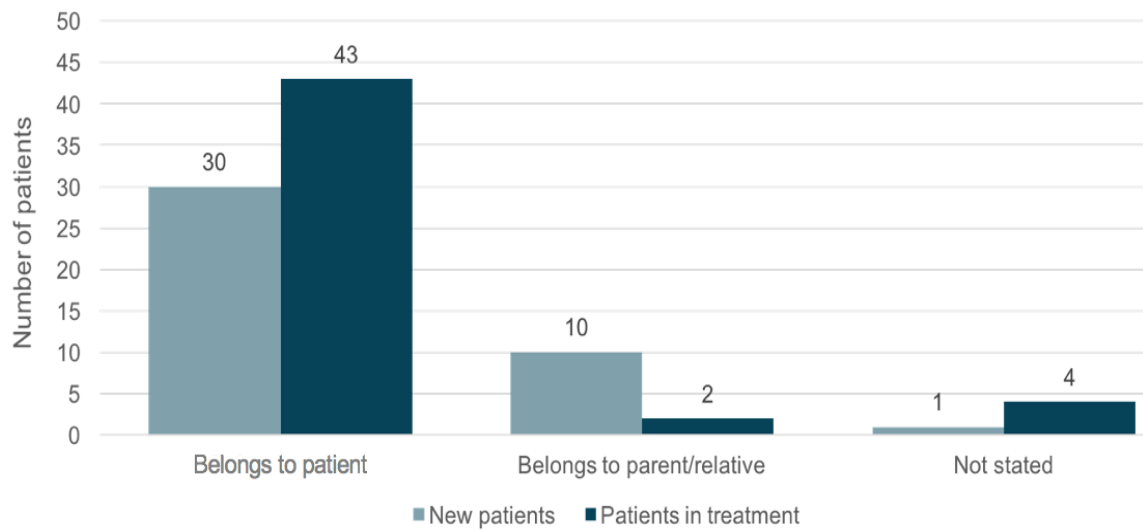
**Figure 3: Gender of participants**



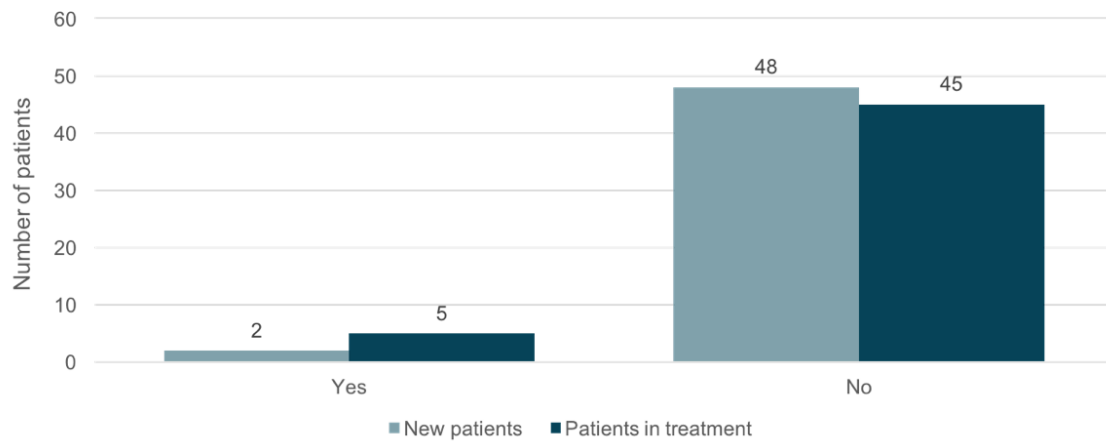
**Figure 4: Smartphone access**



**Figure 5: Smartphone ownership**



**Figure 6: Awareness of apps**



**Figure 7: Usage of social media to source information**

