

# Oral mucosal ulceration during orthodontic treatment: The perception of patients and knowledge and attitude of the orthodontic practitioners

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## ABSTRACT

**Background:** As both orthodontist and patient should play a role hand in hand for the better outcomes of the treatment their knowledge and perceptions regarding problems are important. Hence, the present study was undertaken to evaluate the perception of patients and knowledge and attitude of the Orthodontist with regards to oral mucosal ulceration during the treatment. **Material and Methods:** For this cross-sectional questionnaire study was two questionnaires were distributed. The first questionnaire was given to orthodontic practitioners (n = 103) to obtain demographic details, measure their knowledge, attitude and practices toward oral mucosal ulcers encountered during orthodontic treatment and the second questionnaire was given to orthodontic patients (n = 190) to record demographics, and experience and perceptions regarding mucosal ulcerations caused by orthodontic treatment and pain severity. Data analysis was done by using SPSS version 22. Cross tabulation was achieved using Chi-square tests and Fisher's exact test. **Results:** Over half of the patient 63% had oral ulcers during orthodontic treatment. More than half of the orthodontic practitioners 55.3% in this study reported that orthodontic treatment is the cause of oral ulcerations. The majority of orthodontic practitioners 70% participating in this study educated their patients about oral ulcerations by using verbal means of education. **Conclusion:** Although patients rarely visit their orthodontic practitioner with the complaint of ulcers it may be due to the fact that they seek physician or implement various home remedies rather than seek their orthodontic practitioner. Further studies are needed to elucidate the correlation between ulcers and orthodontic treatment clinically.

**Keywords:** Opinions, oral ulcers, orthodontists

## Introduction

In the patient who undergoes orthodontic management there is improvement in the dental and facial aesthetics and development of self-confidence.<sup>[1,2]</sup> The primary objective of this care is improving dental occlusion and correct alignment of teeth, which

eventually leads to superior functioning of dentition.<sup>[3]</sup> In spite of numerous advantages of the orthodontic treatment, these patients also have to face certain treatment complications. There are evidence of food accumulation under brackets, pain and discomfort and even greater occurrence of temporo-mandibular disorders (TMD) that may occur during treatment.<sup>[4,5]</sup>

Incidence of various levels of pain has been reported by around 95% of the patients while undergoing orthodontic procedures.<sup>[6]</sup> Data also supports prevalence of traumatic ulcers in oral cavity

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and periodontal diseases.<sup>[7]</sup> Ulcerations can happen due to brackets, bands, arch wires and long unsupported stretches of wire resting against the lips.<sup>[8]</sup> In addition, they can also be triggered by unwarranted muscular movements of the cheek or tongue.<sup>[9]</sup> Although, these problems are temporary and might look trivial to the dentist, they can hamper the patient adherence to the treatment. Persons who are not pleased with treatment and do not voluntarily seek treatment display greater observation of the psychosocial characteristic of pain.<sup>[10]</sup> And for the orthodontic care to be successful, active collaboration from the patient all the way through the obligatory extensive orthodontic procedures is required.<sup>[11]</sup>

Previous researches have proven that in the orthodontist-patient relationship, orthodontist need to play role of psychologist/counsellor. This relationship could enhance quality of care on the whole by having a considerable impact on treatment result and patient contentment.<sup>[12]</sup> The feeling of comfort amongst the patients is augmented by providing sufficient information regarding the problem and procedures by the doctor.<sup>[13,14]</sup> It is very important to have effective communication but regrettably in a hectic clinical practice it is frequently taken too lightly.<sup>[12]</sup>

The subject of patient compliance is intricate, wide ranging and multifactorial.<sup>[15]</sup> Apart from doctor controlled factors, pessimistic feelings of patients towards orthodontic treatment also have affect on treatment outcomes.<sup>[16]</sup>

As both orthodontist and patient should play a role hand in hand for the better outcomes of the treatment their knowledge and perceptions regarding problems are important. Literature search shows that not much is explored in these arenas. Hence, the present study was undertaken to evaluate the perception of patients and knowledge and attitude of the Orthodontist with regards to oral mucosal ulceration during the treatment.

## Material and Methods

The review proposal for this cross-sectional questionnaire study was submitted to the research center of Riyadh Elm University, and the Institutional Review Board approval was obtained. [RC/IRB/2018/1147] 02-10-2018. The instruments for data collection were two questionnaires that were distributed among orthodontic patients and orthodontic practitioners using random sampling technique. The data was collected by a single investigator who first explained the purpose of the study and then willing participants were given the study proforma and asked to fill and return with-in 10–15 minutes. In case the dental practitioners were busy at that time the investigator paid a second visit and asked to fill the proforma.

The inclusion criteria for orthodontics patients were patients wearing fixed appliance between age group 17–35 years. Patients with systemic diseases, patients with removable orthodontic appliance and patients using medications as some ulcers maybe caused by drug adverse reactions were excluded. Orthodontists

working in government/private clinics or dental institutions were considered for the study.

The first questionnaire was given to orthodontic practitioners to obtain demographic details, measure their knowledge, attitude and practices toward oral mucosal ulcers encountered during orthodontic treatment and the second questionnaire was given to orthodontic patients to record demographics, and experience and perceptions regarding mucosal ulcerations caused by orthodontic treatment and pain severity.

Before the commencement of the study both questionnaires were ensured about reliability by conducting a pilot study 20 participants in each group (Cronbach's alpha = 0.80) which is in the range of acceptable value.<sup>[17]</sup>

## Statistical analysis

Data analysis was done by using SPSS version 22. Descriptive data for categorical variables were expressed in numbers and percentages. Cross tabulation was also achieved using Chi-square tests and Fisher's exact test. Value of significance was kept under 0.05.

## Results

The study comprised of 103 orthodontic practitioner and 262 orthodontic patient, of which 72 had given incompletely filled questionnaire and were excluded making the final sample of 190 orthodontic patients.

Out of 103 orthodontic practitioners, there were 55 females and 48 males, working in different Medical facilities in the Kingdom of Saudi Arabia. Most of the participants (n = 81; 78.6%) were Saudi nationals, with maximum having less than five years of experience (n = 40; 38.8%) and the most common age group (n = 45; 43.7%) was 31-36 years old and most of them were working in the public sector (n = 57; 55.3%).

The study found that (59.2%) of the participants educate their patient regarding the oral ulcers before starting the orthodontic treatment. However, (68%) of the participants do not ask their patients whether they have experienced ulceration before starting their orthodontic treatment. Traumatic ulcer (54.4%) was reported as the most common type of ulcer you have encountered by the participants [Table 1].

Participants aged 25–36 years are more likely to ask patients whether they have experienced ulceration before commencing with their orthodontic treatment. Participants who are Saudi nationals as well as those working in public sector are more likely to respond towards emergency calls regarding oral ulceration by giving appointment at the next day. Participants under five years of experience are more likely to think that oral ulcers are because of the orthodontic treatment. These associations were statistically significant (p < 0.05) [Table 2].

Among the 190 patient participants, majority were females (76.5%) and Saudi nationals (85%). Over half the participants reported

**Table 1: Insights of orthodontists towards oral ulceration**

| Item with responses  |                           | Frequency | %    |
|--|---------------------------|-----------|------|
| Educate your patient about the oral ulcers before starting the orthodontic treatment?      | Yes                       | 61        | 59.2 |
|  | No                        | 42        | 40.8 |
| Ask patients previous experience of ulceration before commencing treatment?                | Yes                       | 33        | 32.0 |
|  | No                        | 70        | 68.0 |
| What are the means by which you educate your patients?                                     | Verbal                    | 72        | 69.9 |
|  | Leaflet                   | 10        | 9.7  |
|  | Audio-visual              | 21        | 20.4 |
| How many patients complains of oral ulceration during the orthodontic treatment per month? | <5                        | 61        | 59.8 |
|  | 5-20                      | 32        | 31.4 |
|  | 21-40                     | 9         | 8.8  |
| What is usually the most common type of ulcer you have encountered?                        | Aphthous ulcer            | 12        | 11.7 |
|  | Traumatic ulcer           | 56        | 54.4 |
|  | Both                      | 34        | 33.0 |
|  | Others                    | 1         | 1.0  |
| What type of management method do you use?   | Supportive                | 13        | 12.6 |
|  | Definitive medication     | 15        | 14.6 |
|  | Appliance modification    | 27        | 26.2 |
|  | Combination therapy       | 48        | 46.6 |
| What is your response towards emergency calls regarding oral ulceration?                   | Call immediately          | 23        | 22.3 |
|  | Telephonic conversation   | 29        | 28.2 |
|  | Give next day appointment | 51        | 49.5 |
| In your experience best management of oral ulceration?                                     | Mouthwash                 | 10        | 9.7  |
|  | Topical gel               | 24        | 23.3 |
|  | Wax                       | 63        | 61.2 |
|  | Others                    | 6         | 5.8  |
| Reason for oral ulcers according to you?   | Orthodontic treatment     | 57        | 55.3 |
|  | Other factors             | 46        | 44.7 |

**Table 2: Association between demographics and insights of orthodontists towards oral ulceration**

|   | P      |        |             |            |                     |
|---|--------|--------|-------------|------------|---------------------|
|   | Gender | Age    | Nationality | Work place | Years of experience |
| Do you educate your patient about the oral ulcers before starting the orthodontic treatment?                    | 0.553  | 0.593  | 0.633       | 0.841      | 0.838               |
| Do you ask patients whether they have experienced ulceration before commencing with your orthodontic treatment? | 0.059  | 0.046* | 0.196       | 0.754      | 0.112               |
| Do you think that oral ulcers are because of the orthodontic treatment or other factors?                        | 0.845  | 0.253  | 0.055       | 0.232      | 0.044*              |

that they had oral ulcerations with orthodontic treatment before (63.6%) and most of them lasted for less than 2 weeks (77.2%). The majority never went to the dentist for this problem specifically (80.2%) [Table 3].

Females were more likely to have had oral ulcerations with orthodontic treatment before and have had more than one ulceration at a time. Patient aged 29–34 years are more likely to have visited the dentist for this problem of oral ulcerations specifically and these associations were statistically significant ( $p < 0.05$ ) [Table 4].

## Discussion

Development of ulcers is the final manifestation of epithelial damage. One of the local factors that may induce mucosal damage is orthodontic treatment.<sup>[18]</sup> The mechanical injury on the oral mucosa could lead to ulceration and aphthous stomatitis.

Generally, girls more susceptible for recurrent ulceration this may be due to physiological factors.<sup>[19]</sup> Even before orthodontic treatment females had more experienced oral ulcerations which are also supported by.<sup>[20]</sup>

In this study over half of the patients reported experiencing oral ulcers during orthodontic treatment, and orthodontic practitioners (55.3%) also think that oral ulcers are because of the orthodontic treatment, and this agrees with the previous study done by.<sup>[2,21,22]</sup>

This study shows that only 21.9% experienced ulcers before commencing orthodontic treatment. This maybe explained that these patients were experiencing recurrent minor aphthae which become aggravated by local factors because recurrent aphthous stomatitis is known to develop at the site of trauma in a subset of patients.<sup>[23]</sup>

**Table 3: Perceptions of patients regarding oral ulcerations during orthodontic treatment**

|  |            | Frequency (%) | Percent (%) |
|--|------------|---------------|-------------|
| Have you ever had oral ulcerations with orthodontic treatment before?  | Yes        | 119           | 63.6        |
|  | No         | 68            | 36.4        |
| If yes, how long did it last?  | <2 weeks   | 95            | 77.2        |
|  | >2 weeks   | 21            | 17.1        |
|  | ≥1 month   | 7             | 5.7         |
| Have you ever had any ulcerations before orthodontic treatment?  | Yes        | 41            | 21.9        |
|  | No         | 146           | 78.1        |
| If yes, did they get worse with received orthodontic treatment?  | Yes        | 15            | 12.9        |
|  | No         | 101           | 87.1        |
| Have you ever taken any medication topical or systemic, mouth wash or placed wax on brackets for management? | Yes        | 120           | 64.2        |
|  | No         | 67            | 35.8        |
| Have you ever gone to the dentist for this problem specifically?   | Yes        | 37            | 19.8        |
|  | No         | 150           | 80.2        |
| How many ulcerations did you get since you've been receiving orthodontic treatment?                          | 1-5        | 96            | 71.6        |
|  | 6-10       | 28            | 20.9        |
|  | 11-20      | 5             | 3.7         |
|  | >20        | 5             | 3.7         |
| Have you ever had more than one ulceration at a time?  | Yes        | 51            | 27.3        |
|  | No         | 136           | 72.7        |
| When did you start your orthodontic treatment?   | 1-3 weeks  | 6             | 3.2         |
|  | 1-2 months | 40            | 21.4        |
|  | 1-2 years  | 83            | 44.4        |
|  | >2 years   | 58            | 31.0        |

**Table 4: Association between demographics and perceptions of patients regarding oral ulcerations during orthodontic treatment**

|  | P      |        |             |
|--|--------|--------|-------------|
|  | Gender | Age    | Nationality |
| Have you ever had oral ulcerations with orthodontic treatment before?  | 0.048* | 0.582  | 1.000       |
| Have you ever had any ulceration before orthodontic treatment?   | 0.404  | 0.836  | 0.629       |
| If yes, did they get worse with received orthodontic treatment?  | 0.186  | 0.711  | 1.000       |
| Have you ever taken any medication topical or systemic, mouth wash or placed wax on brackets for management? | 0.151  | 0.580  | 0.113       |
| Have you ever went to the dentist for this problem specifically?   | 0.285  | 0.043* | 0.800       |
| Have you ever had more than one ulceration at a time?  | 0.006* | 0.937  | 0.259       |

Previous study<sup>[8]</sup> reported that about 47% patients reported that ulcers were the most annoying part of the orthodontic treatment. Whereas in this study about 80% patients never went to the dentist seeking treatment of oral ulcers even majority of practitioners reported that less than five patients per month reported with complains of ulcers. There is a possibility that patients who suffer from oral ulcerations are more in number than actually reported but they didn't follow up with their appointments.

On the other hand, it was shown that patients aged 29–34 years were significantly more likely to have visited their dentist for this problem. This is probably due to that this age group are more aware of their oral health and place a priority on their health in general. Hence seek professional care more frequently than other age groups.

Only about 32% of orthodontic practitioners were asking their patients about experience of oral ulceration before the commencement of orthodontic treatment. Furthermore,

practitioners aged 25–36 were more likely to ask this question indicating they are more prone to take a careful history before the treatment. Approximately 59% of the orthodontic practitioners educated the patient about the oral ulcers before starting the treatment which is in accord to the findings of previous research<sup>[22]</sup> Part of the practitioners' responsibility towards their patients is educating them in every aspect concerning their orthodontic treatment as well as manage any complications that may arise such as ulcers. Moreover, it shows that most of the orthodontic practitioners educatd via verbal means. Most probably the justification behind this might be the convenience nature and less time consumption of this method. The other means which enhances the understanding among patients towards oral ulceration occurrence during their treatment must be encouraged among orthodontic practitioners.

There was a statistical difference when enquired about response towards emergency calls regarding oral ulceration showing that

all public sectors practitioners were more likely to respond by giving an appointment of the next day rather than call the patient immediately to the clinic. This probably may be due to the lack of available time slots for short notice visits with long waiting lists. Whereas in the private sector it would most probably be the opposite where clinicians tend to accommodate such situations. There is always an established communication and ease of getting an appointment the next day unlike public hospitals and this agrees with a previous study.<sup>[24]</sup> The practice of attending patients immediately is the ideal approach to provide a better service. For halting the progression of oral problems and enhancing the quality of life of patient the early detection and prevention plays a vital part. Timely use of health services by improving the access to health services aids in achieving the excellent health results.<sup>[25]</sup>

### Limitations

Due to time constraints relatively less number of orthodontic practitioners participated in the study. The cross-sectional nature of study also affects the outcomes and the inability of questionnaire studies to always reveal the exact relation of the variables should be considered while interpreting the results.

### Conclusion

Although patients rarely visit their orthodontic practitioner with the complaint of ulcers it may be due to the fact that they seek physician or implement various home remedies rather than seek their orthodontic practitioner. It is also of importance to consider whether primary care practitioners provide adequate supportive management to oral ulceration caused by orthodontic fixed appliances. Further studies are needed to elucidate the correlation between ulcers and orthodontic treatment clinically.

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### Conflicts of interest

There are no conflicts of interest.

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