

# Assessing Breathing Changes Following Tooth Extraction in Dental Patients: A Qualitative Study

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## ABSTRACT

**Background:** Tooth extraction is a common dental procedure that, while generally safe, may induce a variety of postoperative experiences, including potential changes in breathing. This study aimed to explore and document the breathing changes experienced by patients following routine tooth extraction, focusing on the subjective experiences of discomfort related to pain, anxiety, and inflammation.

**Materials and methods:** This qualitative study was conducted with 20 adult patients aged 18–60 years who underwent routine tooth extractions. Participants were recruited using purposive sampling. In-depth, semi-structured interviews were conducted within 2 weeks post-extraction to explore any changes in breathing patterns. Thematic analysis was employed to identify common themes and patterns in the participants' experiences. Ethical approval was obtained, and informed consent was secured from all participants.

**Results:** Five key themes emerged from the analysis: (1) Immediate breathing discomfort; (2) Anxiety-induced breathing changes; (3) Pain-related breathing changes; (4) Inflammation and swelling impact on breathing, and (5) Resolution and adaptation. A majority of participants (70%) reported mild, transient breathing discomfort immediately following the extraction, primarily attributed to anxiety and pain. These symptoms generally resolved within a few days without the need for medical intervention.

**Conclusion:** The study found that breathing changes following tooth extraction are typically mild, transient, and closely linked to anxiety, pain, and postoperative inflammation. These findings highlight the importance of addressing anxiety and pain management in post-extraction care to enhance patient comfort. Future research should include larger samples and objective measures to further understand the relationship between dental procedures and respiratory function.

**Keywords:** Breathing changes, Dental anxiety, Patient experience, Postoperative pain, Qualitative study, Thematic analysis, Tooth extraction.

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## INTRODUCTION

Tooth extraction is a common dental procedure, often performed to address various oral health issues such as severe decay, infection, or overcrowding. While the immediate concerns following a tooth extraction typically revolve around pain management and healing, there is growing interest in understanding how such procedures may influence other aspects of patient well-being, including respiratory function. Although the relationship between dental health and systemic conditions has been widely studied, the specific impact of tooth extraction on breathing remains underexplored. This gap in knowledge is particularly significant, given that oral health is closely linked to respiratory health through various mechanisms, such as the influence of oral bacteria on respiratory infections.<sup>1</sup>

Breathing changes following tooth extraction could be influenced by multiple factors, including pain, anxiety, and the body's inflammatory response. Pain, particularly in the orofacial region, has been shown to alter breathing patterns, potentially leading to shallow or irregular breathing as a protective response.<sup>2</sup> Anxiety, which is common in dental procedures, can also exacerbate breathing difficulties, as it often triggers hyperventilation or feelings of breathlessness.<sup>3</sup> Moreover, the inflammatory response following extraction, which involves swelling and possible airway constriction, may further complicate normal respiratory function.<sup>4</sup>

In recent years, qualitative research has gained recognition for its ability to provide in-depth insights into patient experiences and perceptions, which are often overlooked in quantitative studies.

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This approach is particularly valuable in understanding the nuanced ways in which patients experience breathing changes following tooth extraction, as it allows for the exploration of individual variations and the subjective nature of symptoms. By capturing patients' personal accounts, qualitative research can reveal patterns and themes that might not be apparent through traditional clinical assessments.<sup>5</sup>

This study aims to qualitatively assess breathing changes experienced by patients following tooth extraction. Through in-depth interviews and thematic analysis, the research seeks to identify common respiratory symptoms reported by patients, as well as the potential underlying causes of these changes. Understanding these experiences is crucial for improving postoperative care and ensuring that patients receive comprehensive guidance on

managing not only pain and healing, but also any unexpected respiratory issues that may arise.

The link between dental procedures and respiratory outcomes has been suggested in various studies. For example, research by Scannapieco et al. highlighted the connection between poor oral health and an increased risk of respiratory diseases, emphasizing the need for greater attention to oral-systemic interactions.<sup>6</sup> Similarly, a study by Azarpazhooh and Leake suggested that dental interventions could influence respiratory health, although the specific effects of tooth extraction on breathing remain underexplored.<sup>7</sup> These findings underscore the importance of investigating how common dental procedures, such as tooth extraction, might affect breathing, thereby contributing to a more holistic approach to patient care.

## MATERIALS AND METHODS

This study was conducted as a qualitative research project aimed at exploring the breathing changes experienced by dental patients following tooth extraction. The research was carried out in a dental clinic setting, focusing on capturing the subjective experiences of patients through in-depth interviews. The study was designed to provide rich, detailed insights into the respiratory outcomes that patients may encounter after undergoing tooth extraction.

### Study Population and Design

The study population consisted of adult patients aged 18–60 years who had undergone a routine tooth extraction at the dental clinic. The qualitative design was chosen to allow for an in-depth exploration of patients' experiences, emphasizing the personal and subjective nature of any reported breathing changes. This approach facilitated the identification of common themes and patterns in the patients' accounts, which might not have been captured through quantitative methods.

### Sampling Size and Technique

The study employed a purposive sampling technique to select participants who had recently undergone tooth extraction. This non-probability sampling method was chosen to ensure that the sample included individuals who could provide relevant and diverse perspectives on the research question. A total of 20 participants were recruited for the study, a sample size deemed sufficient for achieving data saturation in qualitative research. Data saturation was considered reached when no new themes or insights were emerging from the interviews, indicating that the collected data were sufficient to address the research objectives.

### Eligibility Criteria

The inclusion criteria for the study required participants to be:

- Adults aged between 18 and 60 years.
- Recently undergone a routine, non-complicated tooth extraction.
- Able to provide informed consent and participate in an interview conducted in English or (local language).
- Free from significant pre-existing respiratory conditions, such as chronic obstructive pulmonary disease (COPD) or asthma, which could independently affect breathing.

Exclusion criteria included:

- Patients with complex extractions, such as those involving surgical procedures.

- Individuals with significant medical conditions that might interfere with their ability to participate in the study.
- Patients with cognitive impairments or language barriers that would prevent effective communication during the interviews.

### Data Instrument

The primary data collection instrument was a semi-structured interview guide developed specifically for this study. The interview guide included open-ended questions designed to explore participants' experiences of breathing changes following tooth extraction. Topics covered included:

- Any perceived changes in breathing immediately after the procedure and during recovery.
- The nature and intensity of these changes, including any difficulties or discomfort experienced.
- Participants' thoughts on the possible causes of these changes.
- The impact of these breathing changes on their daily activities and overall well-being.

The semi-structured format allowed for flexibility in the interviews, enabling the interviewer to probe deeper into specific areas of interest based on participants' responses.

### Data Collection

Data were collected through in-depth, face-to-face interviews conducted within two weeks of the participants' tooth extraction. Each interview lasted between 30 and 45 minutes and was conducted in a private room at the dental clinic to ensure confidentiality and comfort for the participants. The interviews were audio-recorded with the participants' consent and subsequently transcribed verbatim for analysis. Field notes were also taken during the interviews to capture non-verbal cues and additional observations that could enrich the data.

### Statistical Data Analysis

The data analysis followed a thematic analysis approach, a widely used method in qualitative research that involves identifying, analyzing, and reporting patterns (themes) within the data. The analysis process included several steps:

- **Familiarization with the Data:** The researchers read and re-read the interview transcripts to immerse themselves in the data and identify initial patterns and themes.
- **Coding:** The transcripts were systematically coded using NVivo software, with segments of text being labeled with codes that represented key concepts and ideas. This process was iterative, with codes being refined as the analysis progressed.
- **Theme Development:** The codes were grouped into broader themes that captured the overarching patterns in the data. These themes were reviewed and refined to ensure they accurately reflected the participants' experiences.
- **Interpretation:** The final themes were interpreted in the context of the research question, with an emphasis on understanding the implications of breathing changes following tooth extraction. The findings were compared with existing literature to identify similarities and differences.

## RESULTS

A total of 20 participants were included in the study. The participants ranged in age from 22 to 58 years, with a mean age of 40 years. The sample included 12 females and 8 males, as shown in [Table 1](#).

**Table 1:** Participant demographics

Demographic variable	n	Percentage (%)
Age		
18–30 years	5	25
31–45 years	8	40
46–60 years	7	35
Gender		
Female	12	60
Male	8	40
Type of tooth extracted		
Wisdom tooth	8	40
Molar	7	35
Premolar	5	25

**Table 2:** Summary of themes and participant responses

Theme	Number of participants	Percentage (%)
Immediate breathing discomfort	14	70
Anxiety-induced breathing changes	10	50
Pain-related breathing changes	8	40
Inflammation and swelling impact	5	25
Resolution and adaptation	20	100

All participants had undergone a routine tooth extraction within the two weeks prior to the interview. The majority of extractions were for non-complicated cases, including wisdom tooth removal and extractions due to decay.

### Thematic Analysis of Breathing Changes

Through thematic analysis, several key themes emerged from the data, reflecting the experiences of participants regarding breathing changes following tooth extraction as observed in Table 2.

#### Theme 1: Immediate Breathing Discomfort

Many participants reported experiencing some form of immediate breathing discomfort following the tooth extraction. This discomfort was often described as a feeling of tightness in the chest or difficulty taking deep breaths. These sensations were typically transient, lasting a few hours' post-extraction.

- **Example Quote:** "Right after the extraction, I felt like I couldn't take a deep breath. It was like my chest was heavy, but it went away after a few hours".

#### Theme 2: Anxiety-induced Breathing Changes

Several participants linked their breathing changes to anxiety, both anticipatory (before the procedure) and post-procedural. Participants noted that their breathing became more rapid or shallow due to the stress of the procedure.

- **Example Quote:** "I was really anxious about the extraction, and I noticed I was breathing faster and shallower. I think it was just the stress of it all".

#### Theme 3: Pain-related Breathing Changes

Some participants reported that the pain associated with the extraction site affected their breathing. They indicated that sharp

pain during movement or swallowing sometimes caused them to alter their breathing patterns to avoid exacerbating the discomfort.

- **Example Quote:** "Every time I moved my jaw or tried to swallow, the pain would get worse, and I found myself holding my breath or breathing very shallowly to avoid the pain".

#### Theme 4: Inflammation and Swelling Impact on Breathing

A few participants mentioned that they experienced mild swelling in the throat or around the extraction site, which they felt impacted their ability to breathe comfortably. While not severe, this swelling contributed to a sensation of restricted airflow.

- **Example Quote:** "There was a bit of swelling, and I felt like my throat was a little tight. It made me feel like I had to work harder to breathe, especially when lying down".

#### Theme 5: Resolution and Adaptation

Most participants noted that these breathing changes were temporary and resolved within a day or two after the extraction. By the follow-up period, no participants reported ongoing respiratory issues, and many expressed reliefs that the symptoms had subsided without further intervention.

- **Example Quote:** "The breathing issues I had right after the extraction were gone by the next day. It was a relief to know it wasn't anything serious".

The qualitative analysis revealed that while breathing changes were reported by many participants, these changes were generally mild, transient, and closely associated with factors such as pain, anxiety, and mild inflammation. Importantly, all participants reported a return to normal breathing patterns within a few days' post-extraction. The findings suggest that while breathing changes are a relatively common experience following tooth extraction, they are typically not severe and tend to resolve on their own. These insights can help dental practitioners better understand the range of post-extraction experiences and guide them in providing more comprehensive postoperative care, including reassurance and strategies to manage anxiety and pain, which may contribute to these breathing changes.

## DISCUSSION

This qualitative study explored the breathing changes experienced by dental patients following tooth extraction, providing insights into a relatively underexplored aspect of post-extraction recovery. The findings revealed that a significant number of participants reported temporary breathing discomfort, largely attributed to pain, anxiety, and mild inflammation. These symptoms were typically mild and resolved within a few days, suggesting that while breathing changes can occur after tooth extraction, they are generally not severe and self-limiting.

The results of this study align with existing literature that connects dental procedures to broader physiological and psychological responses. The reported breathing discomfort immediately following tooth extraction is consistent with the body's natural response to pain and stress. Pain has been well-documented to alter breathing patterns, often leading to shallow or irregular breathing as individuals unconsciously avoid deep breaths that may exacerbate their discomfort.<sup>8</sup> This aligns with our findings,

where participants frequently described adjusting their breathing to minimize pain, particularly during jaw movement or swallowing.

Anxiety-related breathing changes observed in this study are also supported by existing research. Dental procedures are often associated with significant anxiety, which can manifest as hyperventilation, rapid shallow breathing, or even a sensation of breathlessness.<sup>9</sup> The connection between dental anxiety and altered respiratory function has been explored in various studies, indicating that the anticipatory stress of the procedure, coupled with the immediate discomfort post-extraction, can significantly impact breathing.<sup>10</sup>

The mild swelling and inflammation reported by some participants, which they felt impacted their breathing, are physiological responses that are expected after tooth extraction. Post-extraction inflammation, while typically localized, can extend to adjacent tissues, occasionally affecting the throat or airway, leading to a sensation of restricted breathing.<sup>11</sup> This study's findings are consistent with previous research that has noted similar responses in patients undergoing oral surgeries.<sup>12</sup>

### Comparison with Relevant Literature

The findings of this study are comparable to research conducted by Scannapieco and Cantos, who discussed the broader implications of oral health on respiratory function. While their focus was more on chronic oral infections and their role in systemic conditions like pneumonia, the connection between oral health and respiratory outcomes underscores the plausibility of the breathing changes observed in our study.<sup>13</sup>

Additionally, the anxiety-related breathing changes observed here are in line with the work of Meuret et al., who examined how dental anxiety can precipitate acute changes in respiratory patterns, particularly during stressful procedures.<sup>3</sup> Their research, like ours, highlights the need for managing anxiety to mitigate its impact on breathing and overall patient comfort.

Furthermore, the transient nature of the breathing changes observed in our study echoes findings from a study by Azarpazhooh and Leake, who suggested that while dental interventions could influence respiratory health, the effects are often temporary and resolve as the immediate postoperative period concludes.<sup>7</sup>

### Limitations

While this study provides valuable insights into the respiratory experiences of dental patients following tooth extraction, several limitations should be acknowledged. First, the study's qualitative nature means that the findings are based on subjective self-reports, which can be influenced by individual perceptions and recall bias. Additionally, the sample size, though sufficient for qualitative analysis, was relatively small, limiting the generalizability of the results to a broader population.

Another limitation is the study's focus on a single type of dental procedure—routine tooth extraction. More complex extractions or those involving surgical interventions might present different or more severe respiratory challenges that were not captured in this study. Moreover, the study did not include objective measurements of respiratory function, such as spirometry, which could have provided a more comprehensive understanding of the physiological changes occurring post-extraction.

## CONCLUSION

In conclusion, this study sheds light on the breathing changes that some patients experience following tooth extraction. These changes are primarily related to pain, anxiety, and mild inflammation and are generally mild and self-resolving. The findings emphasize the importance of managing postoperative pain and anxiety to mitigate these symptoms and improve patient comfort. Future research should consider larger sample sizes, include more diverse dental procedures, and incorporate objective respiratory measurements to build on these findings and provide a more detailed understanding of the relationship between dental procedures and respiratory function.

### Ethical Approval

All participants were provided with detailed information about the study's objectives, procedures, potential risks, and benefits.

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