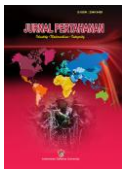

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# Aviation Dentistry: Preflight Dental Check on the Fighter Pilots

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**Abstract**

Aviation dentistry is a specialized field that addresses oral and maxillofacial health in environments subject to significant changes in atmospheric pressure, particularly during flight. Barodontalgia, a form of dental pain triggered by such pressure fluctuations, can adversely affect pilots' performance, potentially impairing mission success. This narrative review critically assesses the necessity of preflight dental evaluations for military fighter pilots as a preventive measure against barodontalgia-related in-flight complications. A comprehensive literature search covered PubMed, Web of Science, and Google Scholar and included studies published between 2020 and 2025. A total of 55 records were identified, and 23 studies were included in the final qualitative analysis. Findings indicate that barodontalgia is often precipitated by pre-existing dental conditions, such as untreated caries, pulpitis, and unstable restorations, which become exacerbated under high-altitude pressure changes. Fighter aircraft commonly operate at altitudes between 45,000 and 51,000 feet, with rapid pressure fluctuations that can significantly worsen dental symptoms. Despite the recognition of barodontalgia's operational impact, preflight dental assessments are not routinely integrated into current aeromedical protocols. The review recommends formalizing a Dental Requirements Document as part of military preflight checks, which should include comprehensive dental health evaluations and history assessments. Such a protocol could mitigate the risk of dental emergencies during flights and enhance operational safety by ensuring dental readiness before missions.

## INTRODUCTION

Aviation medicine is the practice of preventive medicine, including screening, healthcare provision, and the maintenance of flight crew health and performance (Doshi & Tamgadge, 2024). High-altitude flight exposes pilots and crews to atmospheric pressure changes that may aggravate undetected oral and maxillofacial conditions. Issues such as barodontalgia, pain associated with defective restorations, or latent dental pathology can become clinically significant during flight and potentially compromise comfort, concentration, and operational performance. In this context, aviation dentistry addresses the diagnosis and management of oral and maxillofacial abnormalities that may affect individuals operating at high altitudes, particularly above 18,000 feet, where atmospheric pressure differs substantially from ground level (Topbaş et al., 2024). While the definition of aviation dentistry varies in the literature, this study focuses specifically on dental issues related to high altitude. However, broader definitions may encompass comprehensive preventive care and oral health management across various aviation settings.

Research on pathological phenomena in aviation, including dental-related issues, began with the innovations of the early 20th century. Studies have demonstrated that dental and oral health problems can cause severe pain and vertigo, which may impact aircraft operations (Shetty et al., 2020; Zhou et al., 2021).

Over the past 60 years, experts have identified several dental conditions that pose risks during flight. Barodontalgia, specifically, is triggered by changes in environmental pressure at high altitudes. While symptoms can occur at altitudes as low as 2,000–5,000 feet due to pressure affecting underlying dental conditions, they become increasingly critical at higher elevations (Topbaş et al., 2024). Commercial flights typically cruise at 35,000-36,000 feet, where dramatic pressure differences can exacerbate latent dental issues (Ashour, 2020). Consequently, barodontalgia remains a significant concern in commercial aviation, as pressure-induced discomfort can potentially interfere with both flight performance and passenger well-being.

Meanwhile, fighter aircraft usually operate at altitudes between 45,000 and 51,000 feet. With the latest developments in military aircraft, some F-22 Raptors can even reach altitudes of around 65,000 feet (Topbaş et al., 2024). Military aviation, particularly in fighter operations, involves rapid pressure changes and intense acceleration forces; these factors increase susceptibility to sudden pressure changes, especially in the presence of preexisting pathological conditions.

Previous studies have mainly focused on the physiological and aeromedical aspects of barodontalgia, such as pressure tolerance, altitude adaptation, and general oral health among aircrew. However, research on the prevalence and occupational implications of pressure-induced dental pain has expanded recently, demonstrating that barodontalgia poses a significant operational concern for military pilots and may impair flight performance if left untreated. Studies among Malaysian military pilots have identified associations between barodontalgia and specific risk factors, highlighting the critical need for preventive dental care and regular check-ups to maintain operational readiness (Abidin et al., 2025). Similarly, Bayar et al. (2023) emphasize the importance of periodic

oral and dental examinations for aviation personnel to mitigate the risk of in-flight dental symptoms.

Despite these data, the systematic integration of dental evaluations into pre-flight medical protocols remains limited and inconsistently applied across military air forces, with oral health monitoring practices varying widely between units. This study provides a new perspective by emphasizing the inclusion of comprehensive dental and maxillofacial examinations as a standard component of pre-flight medical assessments for fighter pilots. Unlike previous works, it critically examines the operational risks of barodontalgia from a preventive dental perspective and proposes developing structured pre-flight dental screening protocols. These protocols include routine dental history assessment, clinical examination of dental pain, radiographic evaluation, and screening for unstable restorations or untreated dental conditions, all aimed at preventing in-flight complications. The objective of this study is to highlight the importance of integrating dental health assessments into pre-flight protocols and to propose actionable recommendations to enhance dental readiness and prevent flight-related dental issues among fighter pilots.

## METHODS

This study is a narrative literature review sourced from PubMed, Web of Science, and Google Scholar using keywords such as aviation dentistry, aerospace dentistry, fighter aircraft, preflight check, altitude sickness, and barodontalgia. The articles were initially screened based on their titles and abstracts, with full-text availability considered for further assessment. Two independent reviewers screened the studies to ensure objectivity and resolved disagreements through consensus. Inclusion criteria focused on articles that discussed barodontalgia, flight-related dental complications, and preventive medical measures in military aviation. Conversely, exclusion criteria encompassed articles not directly related to the focus, such as non-dental aviation health issues and non-English publications.

The review included only articles published between 2020 and 2025 to ensure relevance and currency. The full-text articles were assessed for methodological rigor and evidence quality, with priority given to peer-reviewed publications and clinical reports within military aviation contexts. To ensure transparency and reproducibility, a PRISMA flow diagram is included to outline the number of articles at each stage of the selection process. The Boolean search strings used in the database searches are provided as follows:

- PubMed: ("aviation dentistry" OR "aerospace dentistry") AND ("fighter aircraft" OR "preflight check" OR "altitude sickness" OR "barodontalgia")
- Web of Science: ("aviation dentistry" AND "fighter aircraft") AND ("altitude sickness" OR "barodontalgia")
- Google Scholar: ("aviation dentistry" AND "barodontalgia")

The articles were appraised for quality using the CASP (Critical Appraisal Skills Program) tool, and only those that met a predetermined quality threshold were included in the review.

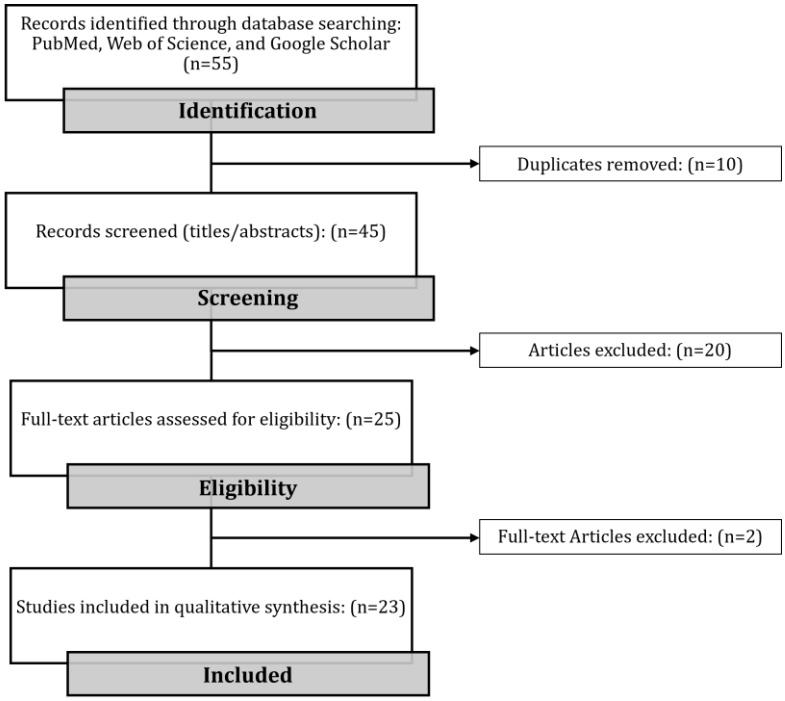


**Figure 1.** PRISMA Flow Diagram

## RESULT AND DISCUSSION

### Barometric Pressure

Barometric pressure, also known as atmospheric pressure, represents the weight of the air surrounding the body. Decompression occurs when air pressure decreases, a phenomenon characteristic of high altitudes (Kutz et al., 2023). Medically, decompression sickness is a condition characterized by various pathological symptoms arising from exposure to low barometric pressure, especially when the body experiences rapid altitude changes that preclude adaptation to declining pressure and oxygen levels (Shaw et al., 2021).

Henry's Law states that as the partial pressure of a gas above a liquid decreases, the amount of dissolved gas within the liquid decreases proportionally. This mechanism is analogous to opening a carbonated drink. When the cap is removed, the audible escape of gas and the formation of bubbles in the liquid indicate that carbon dioxide is leaving the solution due to the sudden drop in barometric pressure. Similarly, nitrogen is an inert gas present in tissues and fluids throughout the human body. When the body is exposed to low barometric pressure, such as during high-altitude flight or sudden decompression, dissolved nitrogen is released. If this release occurs too quickly, bubbles can form in various anatomical regions, leading to a range of symptoms, most commonly joint pain and headaches (Brent, 2022; Low & How, 2021).

The effect of barometric pressure on dental health is well-documented. Several studies, including those by Kutz et al. (2023) and Shaw et al. (2021), indicate that pressure

changes can trigger the release of gases trapped within the oral cavity, thereby contributing to barodontalgia symptoms. Literature consistently supports the premise that rapid pressure fluctuations during flight may exacerbate pre-existing dental conditions, such as untreated caries or periapical lesions. However, Doshi & Tamgadge (2024) argue that although barometric pressure acts as a trigger, barodontalgia is more strongly linked to underlying dental pathology than to pressure alone. This divergence in the literature suggests that further research is needed to clarify the exact interplay between barometric pressure and the onset of dental pain during flight.

**The Fighter Flight Conditions**

Fighter flight conditions, characterized by extreme altitude fluctuations and rapid pressure changes, have been identified as a significant risk factor for barodontalgia among aviation personnel. Zhou et al. (2021) and Shaw et al. (2021) report that the rapid decompression experienced by fighter pilots increases the likelihood of in-flight dental pain, particularly for pilots with untreated dental conditions. Conversely, Arshad et al (2021) suggest that barodontalgia may not always be exacerbated by pressure changes but may result from long-standing dental issues that are triggered by these flight conditions. The evidence supports the notion that regular dental health assessments could reduce the risk of dental emergencies during flight, but further studies are needed to quantify the exact impact of flight conditions on dental health.

When flying, the environment's characteristics differ from those on the ground. Oxygen partial pressure decreases, and humidity is lower during the flight. This hypobaric exposure happens when the cabin pressure on commercial aircraft flights is around 2438.4 meters (8,000 feet). However, professional pilots, especially military personnel, are exposed to much more extreme conditions (Zubac et al., 2020).

Hypobaric conditions occur when the air pressure in the lungs decreases, leading to an inadequate oxygen supply to all body tissues. To counteract this decrease in air pressure, aircraft have a pressurized cabin system that tries to maintain equal pressure inside and outside the cabin (Kutz et al., 2023).

Air Force aviation employs an isobaric differential pressure system for cabin pressurization. The system initiates cabin pressurization as the aircraft ascends from 5,000 to 8,000 feet. Then, an isobaric function maintains this pressure until the pressure differential (psid) between the cabin and the outside air reaches a preset level. This psid is then maintained as the aircraft climbs to higher altitudes. The resulting cabin pressure can be calculated as the outside air pressure plus the psid, which gives the cabin pressure in psi. Essentially, fighter aircraft can be divided into two basic types (Kutz et al., 2023; Shaw et al., 2021) (see Figure 2).

*Fighter-Attack-Reconnaissance (FAR)*

This aircraft is a fighter used for attack and reconnaissance purposes. The cabin of such aircraft is usually not pressurized until they reach a height of 8,000 feet (10.9 psi). The cabin pressure is then maintained at this altitude until the preset differential pressure reaches 5.0 psid at 23,000 feet (5.9 psi). This 5.0 psid is then maintained as the aircraft

continues to climb. For instance, at 30,000 feet (4.4 psi), the cabin FAR is 12,000 feet (9.4 psi); at 39,000 feet (3.0 psi), it is approximately 16,000 feet (8.0 psi).

*Tanker-Transport-Bomber (TTB)*

The TTB aircraft is versatile, serving as a tanker, cargo carrier, and bomber. The cabin pressure is maintained near sea level until it reaches the preset differential pressure, usually 8.6 psid, which is reached at 23,000 feet. By the time it reaches 43,000 feet, the cabin altitude is approximately 8,000 feet, equivalent to 10.9 psi.

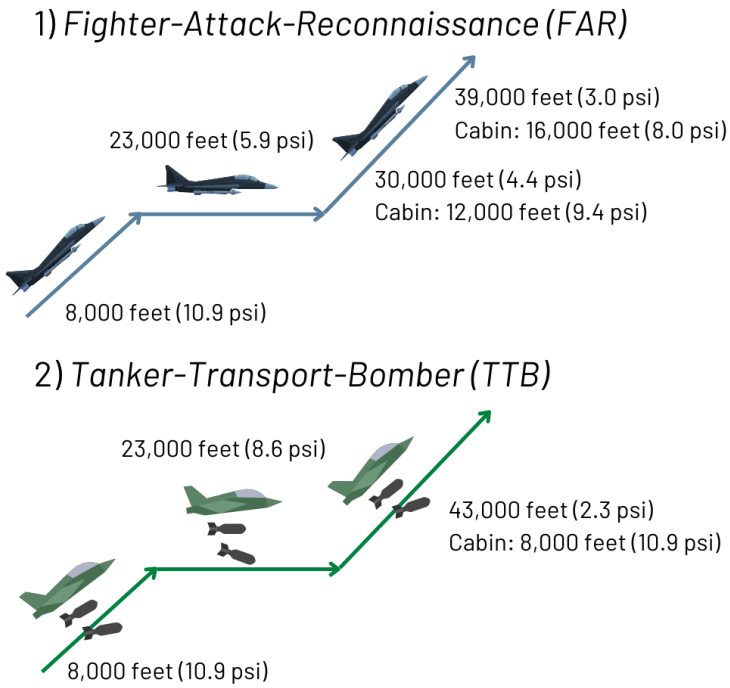


**Figure 2.** Illustration of military aircraft pressure differential 1) Fighter-Attack-Reconnaissance (FAR) 2) Tanker-Transport-Bomber (TTB) (Kutz et al., 2023)

Military aircraft routinely fly at altitudes between 30,000 and 45,000 feet. This means the cabin altitude can range from 8,000 feet (565 mmHg) to 16,000 feet (412 mmHg), which can increase the risk of barodontalgia and decompression sickness during flights (Zhou et al., 2021). Additionally, fighter planes' cockpits have limited space, which can make it challenging to handle dental emergencies on board.

**Barodontalgia**

Barodontalgia is a widely recognized dental condition that occurs due to pressure changes during flight. Multiple studies, including Ashour (2020) and Topbaş et al. (2024), indicate that barodontalgia is primarily linked to pre-existing dental pathologies, such as untreated caries, pulpitis, or periapical disease. However, Sahu et al (2020) highlight that symptoms may also occur in healthy teeth when dental restorations fail due to pressure-induced expansion of trapped air.

The pain usually subsides once the person returns to their initial altitude or reaches ground level. However, if the cause is periapical disease or facial barotrauma, it may last

longer (Ashour, 2020). Studies suggest that barodontalgia may result from increased pulp pressure caused by variations in dentinal tubule permeability. It can also be caused by the expansion of air bubbles trapped beneath restorations or against dentin, thereby activating pain receptors (Topbaş et al., 2024). Additionally, it may be due to stimulation of nerve endings in the inflamed pulp or of nociceptors in the maxillary sinus, with referred pain to the tooth (BabuN et al., 2020). An illustration of barodontalgia caused by caries and periapical lesions is shown in Figure 3.

**Figure 3.** Illustration of Barodontalgia (Kenny & Ponichtera, 2022)

Strohaver in 1972 classified barodontalgia into two types: direct and indirect. Table 1 outlines the differences between the two.

**Table 1.** Classification of Barodontalgia according to Strohaver (Tokarczuk et al., 2024)

| Variable | *Direct* Barodontalgia | *Indirect* Barodontalgia |
|---|---|---|
| Cause | The decrease in air pressure directly affects the affected tooth. | Tooth pain is often caused by the stimulation of the superior alveolar nerve during a condition called barosinusitis. |
| Pain Intensity | The pain is moderate to severe and tends to increase after takeoff. | Dull pain |
| Location of Pain | The patient can accurately pinpoint the painful tooth. | It is often difficult to determine the source of pain, but maxillary posterior teeth are typically affected, and the pain is exacerbated upon landing. |

Table 1 presents Strohaver's classification of barodontalgia into direct and indirect types. This classification is significant for understanding the different etiologies of dental pain associated with altitude changes during flight. Direct Barodontalgia occurs when a decrease in air pressure directly affects the tooth, causing moderate to severe pain that typically increases after take-off. The pain intensity in direct barodontalgia can be exacerbated as the aircraft ascends, with the patient able to pinpoint the painful tooth

accurately. This suggests that the condition is closely tied to localized dental pathologies, such as untreated caries or periapical lesions, that are triggered by sudden pressure changes during ascent or descent. The direct nature of the pain makes it easier for the patient to identify the affected tooth, thus aiding in diagnosis and treatment (Tokarczuk et al., 2024).

On the other hand, Indirect Barodontalgia is more complex. Pain in this category is typically caused by stimulation of the superior alveolar nerve in barosinusitis, a condition in which sinus cavities become inflamed due to changes in pressure. Unlike direct barodontalgia, the pain intensity in indirect barodontalgia is usually described as dull and often difficult to pinpoint. The pain is most felt in the maxillary posterior teeth. It is exacerbated during landing, further supporting the idea that pressure changes can induce discomfort in areas not directly affected by dental issues (Tokarczuk et al., 2024).

This classification not only helps differentiate the causes of dental pain during flight but also helps understand how certain pre-existing dental conditions or sinus-related issues can lead to operational disruptions. For instance, pilots experiencing direct barodontalgia might suffer from acute pain that impairs their ability to concentrate. In contrast, indirect barodontalgia could manifest as a chronic discomfort, potentially leading to cumulative distractions during flight. Therefore, understanding the distinctions between these two forms of barodontalgia can help develop more effective preflight dental screenings to address the underlying causes and reduce in-flight dental emergencies.

Boyle's law states that the volume of a fixed mass of gas is inversely proportional to the pressure at a constant temperature. This means that as pressure increases, the volume of gas decreases and vice versa (Kenny & Ponichtera, 2022). This law can explain the pathology of barodontalgia. In 1982, Ferjentsik and Aker classified barodontalgia according to its causes and clinical symptoms, as shown in Table 2.

**Table 2.** Classification of Barodontalgia according to Ferjentsik and Aker (BabuN et al., 2020)

| Class | Cause | Symptom |
|---|---|---|
| Class I | Pulpitis Irreversible | Sharp pain when ascending |
| Class II | Pulpitis Reversible | Dull pain when ascending |
| Class III | Pulp Necrosis | Dull pain when descending |
| Class IV | Periapical Pathology | Severe persistent pain when ascending and descending |

Barodontalgia is a symptom indicating an underlying pathological condition, generally an exacerbation of pre-existing oral disease or inappropriate dental treatment, such as chronic pulpitis, restored teeth, restoration failure, periapical abnormalities, maxillary sinusitis, and cysts (Sahu et al., 2020). Various types of barodontalgia may arise during flights, as 107summarized in Table 3, drawn from various literature sources.

## Preflight Dental Check

Before being cleared to fly, crew and pilots on military flights must undergo a medical check, known as a preflight check. This checkup usually consists of a basic examination to assess their vital signs and general health. Currently, dental checkups are not included in the preflight check. However, given the unique physical stresses of flying,

particularly changes in cabin pressure, dental health is a critical component of overall flight readiness.

Aviation dentistry regulations require individuals to undergo a comprehensive dental examination before being exposed to extreme pressure changes. In particular, pilots must address any carious lesions, replace damaged restorations, and treat existing inflammation before flying. Vitality tests are also performed on all teeth to detect any issues with tooth vitality and to address any asymptomatic pulp necrosis immediately. Teeth that are not functioning properly, such as those with deep decay or untreated infections, may be prone to exacerbation of symptoms with altitude changes, causing significant discomfort or pain during flight (Muhonen, 2025; Zhou et al., 2021). These issues can affect the pilot's ability to perform tasks effectively, thus compromising flight safety.

**Table 3.** Barodontalgia in Flight

| Barodontalgia | Causes | References |
|---|---|---|
| Pulp/periapical disease pain | Asymptomatic caries, restoration leakage, periapical lesions | Abidin et al., 2025; Arshad et al., 2021; Lipisk et al., 2023; Muyawan et al., 2023 |
| Tooth fracture/odontecresis | Poor restoration, unrestored tooth | Mohandas & Mohapatra, 2023; Sajib et al., 2025; Shetty et al., 2020 |
| Complications of indirect pulp capping | Changes in pressure affect the regeneration of pulp tissue | Arshad et al., 2021b; BabuN et al., 2020; Mohandas & Mohapatra, 2023 |
| Decreased denture retention | Denture retention is based on atmospheric pressure, adhesion, and gravity | Abidin et al., 2025; Arshad et al., 2021 |
| Reduced retention of tooth crowns | Pressure changes in the microtubules of the cement layer cause microleakage | Lipisk et al., 2023; Muyawan et al., 2023; Sahu et al., 2020 |
| Periodontal defects | Xerostomia due to decreased oxygen is accompanied by fatigue during the flight and poor oral hygiene | Arshad et al., 2021b; Lipisk et al., 2023b; Tokarczuk et al., 2024 |
| Fractures in restorations | Thermal contraction of the restorative material and lower material temperature than the hard tissue of the tooth | Mohandas & Mohapatra, 2023; Sajib et al., 2025; Shetty et al., 2020 |

Furthermore, dentists are advised to thoroughly evaluate and treat any conditions that could result in dental emergencies during the flight. Conditions such as advanced periodontitis, fractured teeth, or untreated abscesses should be dealt with promptly. Even minor issues, such as loose restorations, may cause discomfort during pressure changes and could interfere with flight performance. Dentists should advise their patients to avoid exposure to pressure changes until all necessary surgical, conservative, and prosthetic procedures have been completed (Shetty et al., 2020). Research indicates that untreated dental conditions can have both direct and indirect effects on overall physical and mental

performance, which is crucial in high-stakes environments such as aviation (Zhou et al., 2021).

In the broader context, ensuring that dental health is addressed before flight is not only a regulatory matter but also a safety one, as dental emergencies during flight can complicate the crew's ability to respond to other urgent health issues. Therefore, incorporating dental evaluations into preflight checks could enhance aircrews' overall preparedness and safety, ensuring they are not only fit for duty but also protected against avoidable health risks in flight (Bayar et al., 2023).

**Dental Requirements Document**

At present, there are no guidelines or documents available for the dental and maxillofacial health check in the preflight procedure. However, it is crucial to ensure fighter pilots' oral and dental health. Hence, a guide sheet listing the medical and dental requirements is necessary to implement the preflight dental check. This is especially crucial as oral health issues can severely affect a pilot’s performance and safety during flight. Poor oral health may lead to discomfort, distraction, and even incapacitation during critical flight operations.

The need for a formalized Dental Requirements Document (Table 4) as part of preflight medical assessments for fighter pilots has been discussed in several studies. Polk et al (2024) suggest that such a document would provide clear guidelines for dental readiness and help prevent in-flight dental emergencies. However, the proposal for a standardized dental readiness framework remains underdeveloped. Arshad et al (2021) note that while some air forces have begun implementing basic dental assessments as part of their preflight procedures, there remains a lack of consistency across military aviation sectors. The literature reviewed here supports the idea that a Dental Requirements Document would enhance pilot readiness, but further validation from aviation medical authorities is needed to ensure its operational feasibility.

able 4 presents a proposed Dental Requirements Document for preflight dental screening, outlining measurement parameters to assess dental health and hygiene through a comprehensive dental history and periodontal evaluation. It emphasizes the importance of addressing potential dental issues such as pain, bleeding, and facial muscle/joint discomfort, which could affect flight performance. The document also includes specific guidelines for periodontal evaluation, such as probing depth and the detection of fistulas from necrotic teeth. It ensures that preventive dental care is integrated into the preflight medical assessment for aircrew.

The objective of this document is to identify potential dental conditions that could lead to in-flight dental emergencies and to ensure that pilots are physically prepared for flight. The dentist provides oral hygiene instructions to enhance dental readiness and performs complete dental examinations, including radiographs when necessary.

However, the Dental Requirements Document is not yet validated by any aviation medical authority or expert panel. It is a proposed framework based on the reviewed literature and expert recommendations. The document draws inspiration from existing standards, such as NASA’s Medical Requirements Integration Documents (MRID), but has

not undergone formal review or pilot implementation. Therefore, it is currently a draft proposal that requires further validation and adaptation for use across different military aviation units.

**Table 4.** Dental Requirements Document for Preflight Dental Checks

| *Dental Requirements Document* | |
|---|---|
| Operation Type | Aviation Dentistry |
| Category | *Dental Requirements* |
| Objective | To provide pre-flight dental health checks for pilots and crew members |
| Measurement Parameters | Brief Dental History (abnormal symptoms in the oral cavity)<br>1. Pain in the oral cavity<br>2. Bleeds when brushing<br>3. Facial muscle and/or joint pain<br>Periodontal Evaluation<br>1. Visually inspect for supragingival plaque, calculus, and soft tissue condition<br>2. Periodontal examination to determine:<br>a. Probing depth around each tooth<br>b. Amount of bleeding during probing<br>c. Detect the presence of fistulas from necrotic teeth that may not have been detected<br>d. Determine the amount of subgingival calculus<br>Oral Hygiene Instructions<br>Dentists give DHE |
| Results | The pre-flight dental examination report will be entered into the Electronic Medical Record (EMR) |
| Flight Duration | |
| Flight Number | |
| Preflight Activities | Complete dental examination and radiographs (if necessary) |
| Description | The dentist prepares the dental examination device |
| Timetable | H-14 days/according to clinical indications, ± 1 week flexibility |
| Required Facilities | EMR, radiography, and other tools deemed necessary |
| Personnel | Air Force Airman and Dentist |
| Location | Air Force Air Base/Hospital or other clinic approved by the Air Force |
| Document Delay Requirements | According to the request of the examining dentist |
| Data Delivery | The preflight dental report will be sent to personnel within 3 days and included in the EMR. |
| Notes: | |

For this document to become a standard practice, it will need to be reviewed by aviation medical authorities and expert panels. Additionally, researchers should conduct future pilot programs to assess the effectiveness of these measures in preventing barodontalgia and related dental issues during flight. Multinational collaboration could further enhance its applicability across different air forces and military settings.

Pilots are prohibited from flying aircraft if they have medical conditions that can affect their ability to fly, such as taking drugs that cause side effects like headaches, nausea, and dizziness. Blood clots that occur in the mouth after surgery can also lead to intraoral bleeding due to changes in pressure. Additionally, newly placed dental restorations are more likely to break than older ones (Sahu et al., 2020). For example, dental fillings, crowns, or bridges that are not fully cured or have weak bonds might detach during altitude changes, causing pain or further complications for the pilot (Zhou et al., 2021).

In dentistry, facial swelling can make it difficult for fighter pilots to wear a helmet comfortably, leading to a flight ban. Swelling due to conditions such as abscesses, infections, or post-surgical inflammation may interfere with the pilot's safety during flight. Another issue is that pressure changes can hinder wound healing in cases of oroantral communication, where a connection forms between the oral cavity and the sinus following a dental procedure or trauma. This can exacerbate pain and inflammation and even cause infections (Sahu et al., 2020). Therefore, dentists must inform pilots of the consequences and the prohibition of flying in such conditions. Once the symptoms subside and the oral health condition is stable, the pilot can return to duty. Proper documentation and communication between the dental and aviation medical teams ensure the pilot's safe return to flight.

Implementing such a document will help ensure that all potential dental issues are identified and treated before flight, maintaining the pilot's health and enhancing operational safety.

## CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS

Barodontalgia is a dental-specific condition that results from pressure fluctuations during flight and remains a critical yet underrecognized factor affecting flight safety and mission success. Previous studies emphasize that untreated dental conditions, such as caries, periapical disease, and unstable restorations, can become symptomatic under high-altitude conditions.

The reviewed literature supports incorporating dental health assessments into preflight aeromedical readiness protocols. The principal contribution of this study is the proposal of a structured preventive framework for preflight dental screening, including a draft Dental Requirements Document intended to assist the early identification of oral conditions that may become symptomatic during flight.

This study is limited by the scarcity of empirical data, with most sources being narrative reviews and expert opinions. Additionally, publication bias may be a concern, as studies from certain regions or sources may be underrepresented. Reliance on only three databases, without a defined date range, also limits the review's comprehensiveness and may exclude more recent or diverse studies. The heterogeneity of the studies reviewed, including variations in study design and population characteristics, may affect the clarity and generalizability of the findings. Future research should therefore include prospective, simulation-based studies to quantify the impact of preventive dental screening on flight safety and pilot performance. Additionally, multinational collaboration

is essential to harmonize dental readiness standards across military aviation systems and better understand the global variation in barodontalgia prevalence and its effects.

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