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Phantom bite syndrome: Revelation from clinically focused review

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Introduction

General dentists often see patients reporting uncomfortable bite sensations, commonly due to new crowns, restorations, orthodontic treatment, or TMJ disorders. Dentists typically perform occlusal adjustments if abnormalities are found. However, some patients experience persistent, unverifiable occlusal discrepancies and insist on bite correction.

This condition, known as "phantom bite syndrome" (PBS)—first described by Marbach in 1976—refers to ongoing perceived bite discomfort without any physical cause, similar to phantom limb pain. Posselt earlier referred to this as a "positive occlusal sense," noting that certain individuals become overly aware of their bite after dental adjustments. In 1997, Clark et al. proposed the term "occlusal dysesthesia" to describe bite discomfort lasting over six months with no identifiable physical basis, often leading to significant impairment. PBS patients rarely find relief from dental treatments, tend to seek multiple opinions ("dental shopping"), and usually reject psychiatric help, believing in an ideal bite correction. To date, there is no official classification or treatment standard for PBS. This article examines its demographics, manifestations, possible causes, and management strategies.

Demographic and the typical manifestations of PBS

Epidemiology

Uncomfortable occlusal sensations are common in dental patients, but phantom bite syndrome (PBS) is rare. An email survey found that 75% of US orthodontists had seen at least one patient with PBS-like symptoms, despite nearly half being unfamiliar with the term. Gerstner et al. reported that 20.5% of 127 TMD clinic patients experienced constant bite discomfort, though PBS criteria were not assessed. Watanabe et al. found that PBS represented less than 10% of outpatients at an oral psychosomatic clinic. The higher rate reported by orthodontists may relate to patients' focus on "ideal bite correction." No studies have estimated PBS incidence in the general population.

Demographic characteristics

Hara et al. published the first systematic review of PBS in 2012, combining data from 37 case reports. Subsequent Japanese studies found consistent trends: female predominance (72%-84%), mean age at first visit (51.7-53.1 years), and symptom duration, with 39.5% experiencing abnormal bite for over 5 years. Most patients developed symptoms around age 45, except for two adolescent cases.

Initial mild discomfort in PBS often follows dental procedures, worsening after additional interventions. Yet, 26.2% of cases occur spontaneously or are linked to non-dental triggers. Patients typically seek correction at about 4.4 ± 3.4 clinics, with one extreme case visiting 20 dentists and attending 200 appointments over six years. PBS patients are generally believed to have moderate-to-high socioeconomic status, though variations depend on healthcare systems and policies.

Comorbid psychiatric disorders

Initially, Marbach suggested PBS patients exhibited delusion and paranoia, advocating for psychiatric research in dental care. However, Greene and Gelb later found that most patients did not meet criteria for mental disorders. A Japanese study reported 46.2% neuroticism and 53.8% anxiety among those with occlusal disharmony, consistent with other findings showing psychiatric comorbidities in 45.9–59.51% of cases. Schizophrenia and severe personality disorders were uncommon. Since PBS patients mainly report occlusal discomfort without severe psychiatric issues, they rarely receive psychiatric treatment.

Typical manifestations of PBS

Although there are no official classifications or guidelines, many authors agree that a recognisable pattern exists for PBS, which clinicians should be aware of.

Patients typically focus their complaints on their bite or occlusion, expressed in various ways. This distinguishes PBS from other oral conditions with unexplained sensations or pain, like burning mouth syndrome, oral cenesthopathy, and atypical odontalgia. PBS may co-occur with TMD and is sometimes classified as a TMD subgroup.

Another aspect, rarely noted in literature, is patients' belief that occlusal issues cause symptoms elsewhere in the body (e.g., headaches, musculoskeletal pain). Patients often insist all somatic dysfunctions would resolve if their bites were corrected.

There is no official record of triggers besides dental interventions. However, some patients report symptom onset after trauma or stress (e.g., divorce, job changes), with or without dental treatment. Absence of a dental trigger may predict psychiatric comorbidity, influencing outcomes.

Patients often use dental terminology despite limited understanding of their conditions. They frequently arrive with arguments, self-researched information, and evidence such as diagnostic casts, splints, photos, radiographs, or extensive records from previous unsuccessful treatments. Some confidently blame prior dentists for worsening symptoms. Clinically, some patients are more focused on achieving occlusal equilibrium than addressing an actual bite issue. Many direct their dentists' actions and reject alternative treatment if their requests aren't met, often dropping out after one or two visits. When dentists explain normal exam results and suggest specialist or psychiatric referral, patients usually respond with prolonged denial and discussion. Even if demands are fulfilled but results are unsatisfactory, this only reinforces their belief that the occlusal issue persists. Dental interventions often worsen outcomes for these patients, perpetuating a cycle of "dental shopping."

A study by Tsukiyama et al. found that PBS patients scored higher on somatic symptoms and depression subscales than controls; however, this indicates possible psychiatric issues, not definitive mental disorders. Even without psychiatric comorbidities, PBS can cause significant psychological distress, leading to reduced quality of life, strained family relationships, financial loss, career disruption, or suicidal thoughts. Dentists managing these cases may face opposition to treatment and increasing difficulty, with the most severe outcomes involving potential litigation.

The debate on aetiopathogenesis

PBS was initially considered a rare psychotic disorder related to monosymptomatic hypochondriacal psychosis (MHP), as both involved persistent beliefs about body image or dental alignment. PBS was thought to be a form of MHP seen in dental settings, similar to how dermatologists encounter parasitosis, with equal gender distribution and onset in early adulthood. However, recent demographic data do not fully support this view.

Two decades later, Marbach revised his perspective, applying Melzack's neuromatrix theory to explain PBS alongside phantom tooth pain and atypical odontalgia. The theory suggests that each individual has a unique brain signature for their bite, shaped by lifelong dental contact patterns. In PBS patients, the neuromatrix struggles to adapt to even minor dental changes, making it hard for them to recognize their original bite.

Between 1993 and 2000, Toyofuku conducted a clinical study treating 16 severe PBS cases with psychosomatic methods during hospitalization. Fifteen patients responded positively to combined tricyclic antidepressant and supportive psychotherapy. Based on these results, the author proposed that PBS may involve biochemical neurotransmitter disorders and cognitive misprocessing in the brain, though this idea was not widely recognized due to language barriers. A five-year follow-up found that about one-third of patients again requested unnecessary dental treatment. A review of 130 PBS cases indicated that psychotic disorders are rarely linked to PBS, but low-dose central neuromodulators (antidepressants or antipsychotics) may be effective. These findings support the hypothesis of neurotransmitter involvement in PBS.

In 2003, Clark and Simmon suggested that altered oral kinaesthetic ability, possibly due to jaw muscle spindle dysfunction, could be a mechanism for PBS. They did not dismiss psychiatric theories but aligned with Green and Gelb, proposing that changes in proprioceptive input are the main cause, despite some psychological effects. However, subsequent studies found no significant differences in sensory or thickness discrimination between PBS patients and controls, though the tests' sensitivity may have been insufficient. Hara et al. proposed using brain imaging to assess whether cortical map representations align with patients' occlusal complaints. Umezaki et al. used single-photon emission computed tomography on a PBS patient, finding asymmetrical cerebral blood flow (CBF) patterns that diminished after a year of psychopharmacological treatment, suggesting central nervous system involvement in PBS. However, a subsequent case-control study by

the same group found no significant regional CBF (rCBF) differences between 44 PBS patients and 12 controls, attributing this result to the disorder's heterogeneity. Further analysis indicated that specific rCBF patterns correlate with clinical features like symptom laterality or behaviour towards dentists; for example, right-sided symptoms were linked to right parietal and left thalamic asymmetry. These findings suggest complex neural mechanisms underlying PBS symptoms, with parietal and thalamic disturbances playing a role. Frontal lobe asymmetry was also observed, consistent with experimentally induced occlusal discomfort.

These interpretations rely mainly on personal judgement and limited clinical observations, and none fully accounts for all cases. For instance, some PBS patients lack psychiatric conditions, challenging psychopathological theories, while others develop symptoms spontaneously without dental procedures. Until this controversy is resolved, specific diagnostic tests and effective treatments remain unattainable.

Recommended management strategies

While various authors suggest different strategies based on aetiology and pathogenesis, they agree that treatment should prioritise patient education and therapies to enhance function and well-being. This review also considers less-emphasised approaches such as professional education, psychopharmacotherapy, effective guidance, and building a reliable therapeutic relationship.

Professional education
Dental treatment is generally ineffective for PBS patients and should be avoided, as they are considered unresponsive to such intervention. While these patients often seek dental help believing it can resolve their issues, occlusal discrepancies found on examination rarely explain their symptoms. Even enhancing an already good occlusion may temporarily ease symptoms but tends to worsen the condition over time by further distorting the occlusion. To avoid unnecessary and irreversible treatment, it is essential for dental professionals to recognize this phenomenon. There is no strong evidence that achieving a theoretically ideal occlusion must be fulfilled for successful prosthodontic outcomes.

Most original PBS research, including retrospective and case-control studies, originates from Japanese or German teams, indicating that licensed specialists treat the syndrome in dedicated clinics in these countries. Since the early 2000s, some Japanese dental schools have included oral psychosomatic disorders like PBS in their curricula, enabling general dentists to identify early cases and refer patients for specialized care.

Psychopharmacotherapy
Although not the primary choice, medication is the most commonly used treatment for PBS in clinical studies. Antidepressants and antipsychotics are prescribed most frequently; early examples include pimozide, haloperidol, and dothiepin. As understanding of PBS has grown, psychotropic drugs have been recommended for their effects on the central nervous system, particularly dopamine pathways. Clonazepam has also been suggested for mood stabilization and anxiety control. However, evidence is limited to case reports and small studies, highlighting the need for larger, prospective research and further investigation into the mechanisms of psychotherapeutic approaches for PBS.

Successful guidance and reliable therapeutic relations
Psychological assessment and consulting specialists are often recommended. Since dental professionals are not trained in psychological evaluation or therapy, referrals to psychiatric care are advised. However, both clinical experience and literature suggest referrals are rarely effective. In Kelleher's review of 12 PBS cases, none was successfully referred for psychological assessment; patients either immediately refused, declined help, or accepted with strong resentment. Other clinicians also report that many patients reject such referrals. Ideally, dentists, psychiatrists, and psychotherapists would work together, but this is rarely possible in current dental practice.

A major barrier to psychopharmacotherapy is convincing patients to accept treatment. It has been found that PBS patients, especially those with dental triggers, often refuse medication, believing only dental procedures can relieve their symptoms. Repeated dental interventions reinforce this belief. To change these perceptions and halt unnecessary dental treatment, a strong patient-doctor relationship based on trust, empathy, and clear communication is essential. Our clinical observations suggest that demonstrating how neuromodulators correct rCBF asymmetry in successful cases may help patients understand the need for medication.

Treating PBS in a dental setting is challenging but possible. Clear patient education, with neuroscience-based explanations and brain images, can encourage acceptance of pharmacotherapy over repeated dental work. However, side-effects and slow response may cause patients to stop medication early, usually due to reluctance to take drugs rather than adverse effects. Careful follow-up and precise dosing are crucial.

Conclusion

PBS is a rare and challenging dental condition that is often underreported. Recent studies show diverse clinical features and brain imaging patterns, suggesting multiple subtypes. More research is needed to clarify its causes and develop effective treatment.

Questions

1. Which of the following best describes phantom bite syndrome (PBS)?

a) Persistent bite discomfort with verifiable occlusal discrepancies
b) Ongoing perceived bite discomfort without physical cause
c) A subtype of burning mouth syndrome
d) An acute disorder that resolves within two weeks

2. Who first described phantom bite syndrome in 1976?

a) Posselt
b) Clark
c) Marbach
d) Greene

3. According to surveys, what percentage of U.S. orthodontists reported having seen at least one patient with PBS-like symptoms?

a) 20%
b) 35%
c) 50%
d) 75%

4. What percentage of patients in Japanese studies were reported as female in PBS cases?

a) 45-50%
b) 51-53%
c) 72–84%
d) 90–95%

5. What was the mean age at first visit for PBS patients in Japanese studies?

a) 25–30 years
b) 35–40 years
c) 51.7–53.1 years
d) 65–70 years

6. In reported cases, how many clinics do PBS patients typically visit on average?

a) 1.5
b) 2.0
c) 4.4
d) 10.2

7. What percentage of PBS patients experienced abnormal bite sensations for over 5 years?

a) 10%
b) 20%
c) 39.5%
d) 60%

8. Which psychiatric comorbidities were most common in PBS patients according to Japanese studies?

a) Schizophrenia and severe personality disorder
b) Neuroticism and anxiety
c) Bipolar disorder and psychosis
d) Obsessive-compulsive disorder

9. Which of the following treatment strategies is generally considered ineffective for PBS patients?

a) Patient education
b) Psychopharmacotherapy
c) Repeated dental occlusal adjustments
d) Building a strong therapeutic relationship

10. What did Toyofuku's study (1993–2000) find regarding treatment of severe PBS cases with antidepressants and psychotherapy?

a) No improvement was seen in any patient
b) 15 of 16 patients responded positively
c) Only half of patients improved slightly
d) All patients required surgical intervention