The Fallacy of "Extraction Regret Syndrome"

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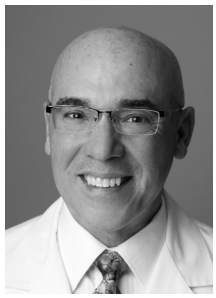
"Extraction regret syndrome" (ERS), though not a formally recognized condition, is a cultural and psychological phenomenon in which patients experience dissatisfaction with their smiles, facial appearance, or function after dental extractions. ERS arises from a belief that premolar extractions inevitably worsen facial esthetics, narrow the dental arches, or contribute to TMD or obstructive sleep apnea (OSA). Patients influenced by this narrative may report their regret years after orthodontic treatment, attributing perceived shortcomings in facial appearance to past extractions rather than to the underlying anatomy, mismatched expectations, or inappropriate treatment planning.

The psychological impact of ERS can be significant. Patients who internalize the belief that extractions have "ruined" their faces may develop a form of body dysmorphia,[1,2] becoming preoccupied with the idea that reopening extraction spaces will restore beauty, health, or vitality. As a re-

KRAVITZ KEYS

- ERS is a cultural and psychological phenomenon in which patients attribute dissatisfaction with their facial appearance, smile, or function to premolar extractions performed during orthodontic treatment.
- ERS stems from persistent false online claims that extractions cause facial collapse, airway problems, or esthetic harm. Influenced by these narratives, some patients develop regret or even body-image concerns and may seek unnecessary retreatment or "extraction reversal" procedures.
- To avoid extractions, many practitioners attempt to expand the arch outside the cortical plate, resulting in dehiscences, fenestrations, and recession.
- Attempts to reopen extraction spaces, re-expand the arches, or use devices such as the Anterior Growth Guidance Appliance (AGGA) ignore the adaptive resorption that occurs after extractions and risk substantial iatrogenic harm.



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sult, some patients now seek retreatment to "reverse" the effect of extractions, despite the lack of robust scientific evidence supporting such interventions.

Some practitioners may hesitate to prescribe extractions even when clearly indicated. To equip orthodontists to recognize the trends that may inform patient preferences and help them provide compassionate (but evidence-based) counsel in response, this article discusses the claims underlying ERS and describes current research informing the choice between extraction and nonextraction treatment.

Justifications for Avoiding Extractions

The ideas behind ERS can be traced back to controversial orthodontist John Mew's theory that extraction therapy contributes to "facial collapse" by restricting maxillary growth and diminishing airway volume[3] (see "The Mewing Trend" in this issue). In recent decades, such claims have gained traction in lay circles through social media and other online sources; they have also been disseminated by certain general dentists and practitioners aligned with the "airway orthodontics" movement. Financial pressures may reinforce this trend: because patients and their proxies tend to favor nonextraction protocols, orthodontists who are willing to accommodate such preferences will probably increase their case numbers.

Advocates for nonextraction treatment contend that premolar extractions contribute to concerns such as TMD, overwidened buccal corridors, adverse smile changes, a flattened facial profile, and compromised airway function or OSA. Although these claims have spread widely online, they lack peer-reviewed support.[4-10] Reviews of the orthodontic literature have found no increase in joint sounds or other TMD symptoms in patients treated with premolar extractions, compared to those who received nonextraction treatment or no treatment.[9,10] Similarly, studies have reported no significant differences in common measures of smile esthetics[4] or buccal corridor size[5] in patients treated with or without extractions; one investigation found that extraction treatment may even increase smile width.[5] Landmark studies by Boley and colleagues[11] and Stephens and colleagues[12] demonstrated that extraction and nonextraction patients exhibit no clinically meaningful differences in profile esthetics or TMD prevalence. A scoping review comparing the results of extraction and nonextraction treatment found some modest differences in post-treatment profiles, but no significant effects on esthetic outcomes.[10] Minor facial changes associated with extractions are dependent on the soft tissue and heavily outbalanced by natural aging, weight fluctuations, and inherent skeletal patterns.[12]

In recent years, the concern that premolar extractions may reduce airway volume or increase

the incidence of OSA has become the leading objection to extractions. As with other concerns, however, the literature reveals no significant differences in airway size after extraction or nonextraction treatment for dental crowding[6,7]; nor have premolar extractions been found to be a significant factor in OSA development.[8]

Risks of Avoiding Extractions

Conventionally, cases presenting with less than 3mm of lower anterior crowding have been managed without extractions, while those with more than 6mm of crowding are treated with extractions. In the intermediate 3-6mm range, the decision is typically based on which approach will yield the most stable outcome. Following these general guidelines, most orthodontists adopt a middle ground between extraction and nonextraction approaches, preferring nonextraction treatment when feasible but extracting teeth when necessary.

Most nonextraction advocates—practitioners who avoid extractions in almost all situations—instead employ treatment modalities that purport to bend or modify the alveolar bone to accommodate arch expansion beyond the boundaries of the alveolar process. Histological evidence shows, however, that the potential amount of buccolingual expansion and constriction is limited by the alveolar anatomy. Osteoblastic and osteoclastic activity resulting in bone remodeling is generally bounded by the buccal and lingual cortical plates (Fig. 1).[13] Growing evidence indicates that moving teeth beyond these boundaries will result in damage such as dehiscences and fenestrations, regardless of the method or appliance used.[14] Although typically camouflaged on two-dimensional lateral cephalograms, these defects are visible on cone-beam computed tomography (CBCT) scans (Fig. 2). Such orthodontically induced dehiscences increase the risk of long-term periodontal issues such as gingival recession, particularly in patients with thin gingival biotypes.[14,15]

Careful treatment planning that considers the patient's particular anatomy is therefore essential. Less than 1% of patients have sufficient maxillary anterior buccal bone to support buccal ex-

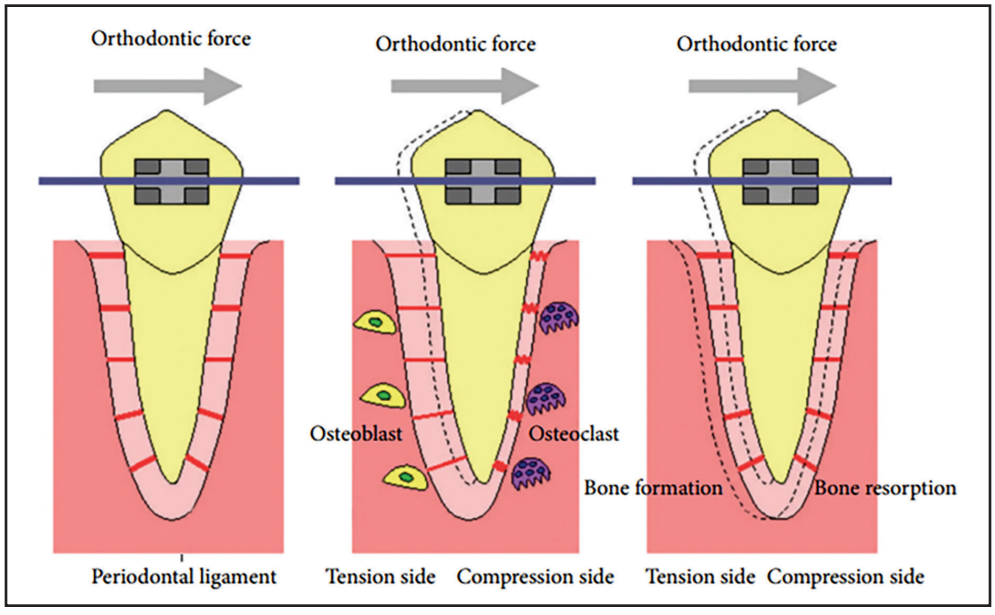

Fig. 1 Histology of oral bone remodeling (reprinted with permission from Kitaura and colleagues[13]).

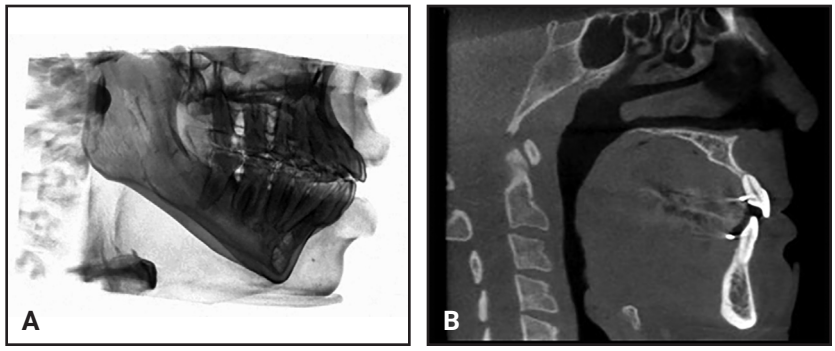

Fig. 2 A. Lateral cephalogram obscures view of individual tooth and its alveolar housing. B. Cone-beam computed tomography (CBCT) sagittal view with .5mm slice width enables visualization of lower incisor dehiscence.

pansion,[16] for example. While dehiscences and fenestrations cannot be avoided entirely, CBCT assessment of the relationships between dental roots and cortical bone margins can help determine safe boundaries for tooth movement. Orthodontists can thus reduce the occurrence of larger defects that might compromise periodontal health and tooth longevity.

Some nonextraction advocates recognize that the safe limitations of orthodontic tooth movement are determined by the natural boundaries of the buccal and lingual cortical plates. Yet no evidence is available to demonstrate that these boundaries are not violated when the arch is expanded. By contrast, some orthodontists use surgically facilitated orthodontic treatment (SFOT), including bone grafts (Fig. 3) and regenerative biologics, to expand the perimeter of the alveolar housing and thus allow for arch-expansion decrowding.[17,18]

Extraction "Reversal" Treatments

In extreme cases, ERS-related dissatisfaction has led to aggressive interventions in an effort to reverse extraction treatment. Orthodontists and general dentists who believe premolar extractions are correlated with OSA or other airway issues may also recommend reopening extraction spaces.

After extractions, however, the alveolar process undergoes adaptive resorption to conform to the post-treatment archform, eliminating any excess alveolar bone that existed prior to treatment. Re-creating space by moving the teeth beyond the new limits of the alveolar process risks causing large dehiscences and fenestrations.

Among the devices introduced to "re-expand" dental arches is the AGGA, which purports to generate forward maxillary growth by means of palatal nerve stimulation.[19] Unfortunately, the use of these devices has been associated with harmful outcomes, including tooth loss, and has led to a number of lawsuits in the United States. (See "Detrimental Effects Associated with the Anterior Growth Guidance Appliance" in this issue.)

Case Report

The following case, shared by a colleague, is presented not to assign blame or disparage clinical decision-making, but rather to encourage reflection and contribute to clinical education. Most orthodontists seek to identify situations in their own practices that, in hindsight, could have benefited from a different therapeutic approach; we include ourselves among this group.

A 19-year-old male underwent nonsutural expansion to address maxillary and mandibular crowding (Fig. 4). The initial occlusion appeared well coordinated despite the crowding. Significant expansion was required for alignment, resulting in an increase of about 10mm in lower arch width from canine to canine.

After treatment, well-aligned clinical crowns with moderate gingival recession initially suggested a reasonably favorable outcome (Fig. 5), but CBCT scans taken three years later revealed extensive,

Fig. 3 Bone graft to facilitate nonextraction treatment. A. Before procedure. B. During surgery, showing alveolar dehiscences. C. 12 months after surgery, showing stable gingival condition.

generalized dehiscences and a loss of alveolar width (Fig. 6). The proximity of the lingual cortical plate to the lingual root surface indicated that adaptive resorption had occurred, whereas, in the absence of resorption, we would have expected the size of the alveolar housing to be unchanged. The CBCT scans were reviewed by an oral and maxillofacial radiologist, who concluded that about two-thirds of the buccal bone was missing in half the erupted teeth and determined that the findings were consistent with an orthodontically induced dehiscence pattern.

The loss of bone support limited options for retreatment, since periodontal grafting would have been required prior to any additional orthodontic movement.

Nine years after treatment, clinical photographs indicated a subtle increase in gingival recession (Fig. 7), although the CBCT scan showed

Fig. 4 19-year-old male patient with significant crowding but coordinated occlusion before treatment.

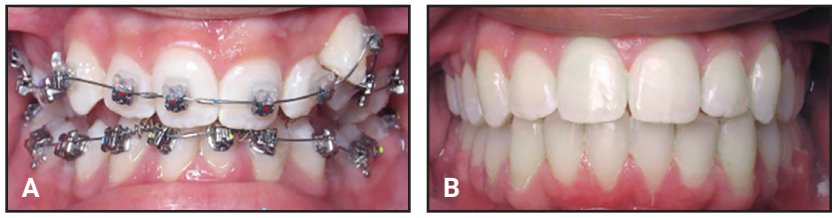

Fig. 5 A. Patient during treatment. B. Patient after treatment, showing good alignment and moderate gingival recession.

Fig. 6 CBCT scans taken three years after treatment, showing dehiscences on lower incisors and canines.

Fig. 7 Nine years after treatment, demonstrating minimal progression of gingival recession.

little change. The patient's favorable biotype had likely slowed the progression of gingival recession.

Discussion

This case demonstrates how expansion beyond the limits of the cortical plate can lead to the formation of dehiscences, which in turn predispose the gingiva to recession. Due to variation in patients' biological response, the timeline of recession may be inconsistent, with some complications appearing as late as 15 years after treatment.[20,21] Further research is required to determine the precise timing and biological response of tissue to dehiscence formation.

The boundaries of the alveolar process are therefore a critical consideration in the choice between extraction and nonextraction treatment plans for dental crowding. When resolution of the crowding would require moving teeth beyond the limits of the cortical bone, appropriate strategies may include extractions, expansion with bone

grafting, or acceptance of imperfect alignment to preserve gingival health. The treatment plan should be designed to obtain the best possible outcome in terms of stability, esthetics, occlusion, and periodontal health.

Common justifications for avoiding extractions—including TMD, airway concerns, and facial attractiveness—have no demonstrated correlation with either an extraction or a nonextraction approach. In fact, far from causing harm, properly indicated premolar extractions can relieve crowding and enhance occlusal function while protecting periodontal health by avoiding overexpansion.

Although the symptoms reported by patients with ERS cause real distress, no evidence supports linking them to extractions. Avoiding extractions unnecessarily or attempting to reverse them decades later disregards the stability of the periodontium, the limits of alveolar bone, and the absence of long-term data supporting such approaches. While orthodontists must respond with compassion to the psychological vulnerabilities that drive patients toward unsupported treatment or retreatment options, it is essential to base treatment on the current evidence.

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