

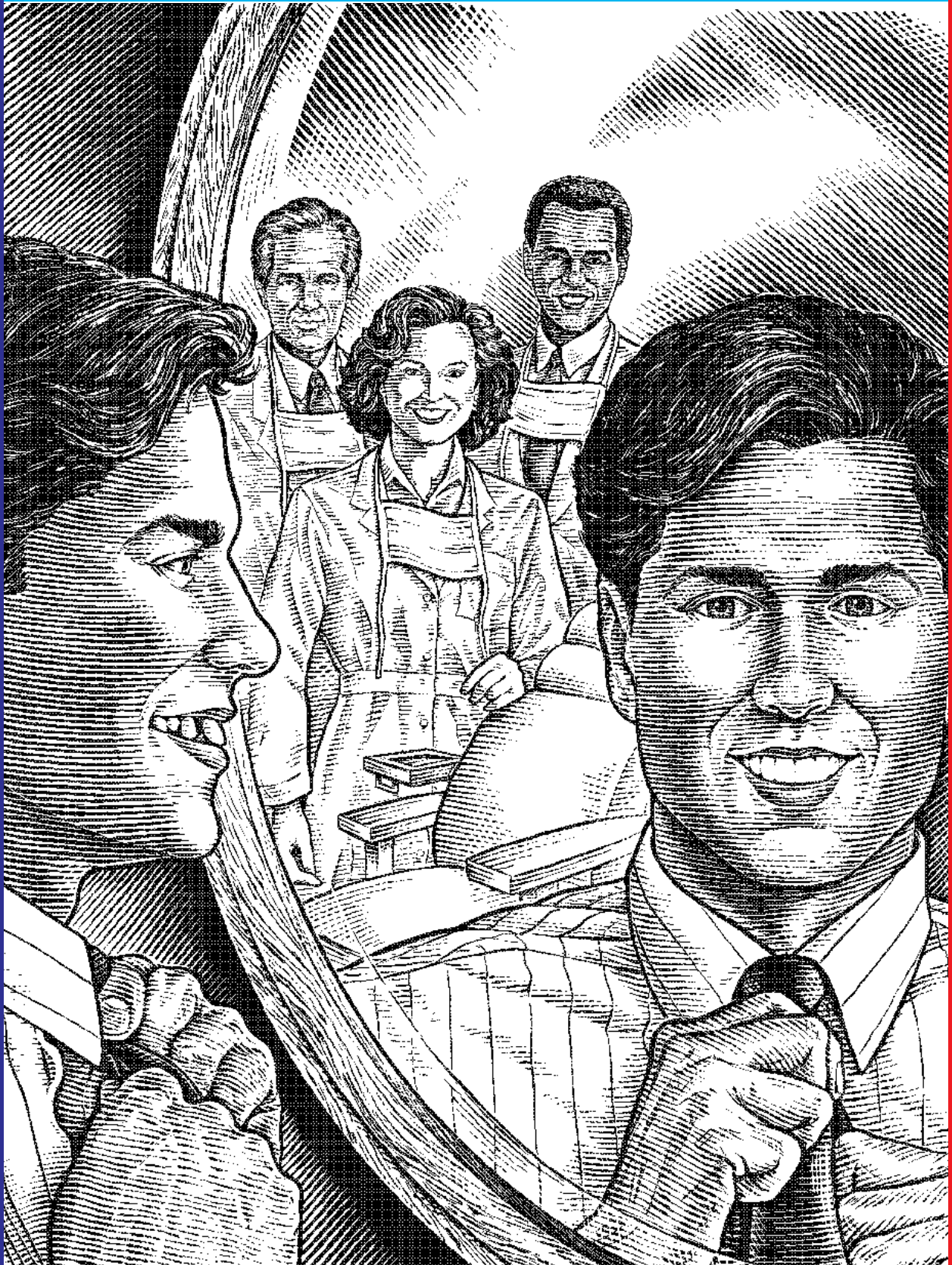


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ETIOLOGY AND TREATMENT OF MAXILLARY ANTERIOR SPACING

Etiology and Treatment of Maxillary Anterior Spacing

“Hey doc! I’ve had this space between my front teeth for years, and it drives me crazy . . . Can you close it?” Sound familiar? You’re at a party, school meeting, restaurant, or most any inconvenient place, and a total stranger with finger-in-mouth approaches you with this question. Realizing that the solution may not be that simple, you politely suggest that he or she stop by your office for a consultation. A comprehensive history combined with proper documentation will be critical to the formation of a sound treatment plan.

Maxillary anterior spacing is a major reason why adults are motivated to seek orthodontic or restorative treatment. Frequently, they hope a simple removable appliance or composite bonding will provide immediate and uncomplicated correction of their problem. In reality, the complexity of the treatment will depend upon the etiological factors that have resulted in this condition. Thorough diagnosis of these contributing factors is essential to the success of the treatment.^{1,2} The list of etiological factors include:

- pathologic migration,
- posterior bite collapse,
- discrepancy in the Bolton index,
- deep overbite,
- habits,
- tooth size/arch discrepancy,
- combination of above factors.

Multidisciplinary approach

Proper treatment of maxillary anterior spacing involves a multidisciplinary approach that uses treatment modalities combining the science, art and imagination of the orthodontist, periodontist, and general dentist. Often the treatment plan is tempered by the “wishes and tolerance” of the patient. It is not uncommon that the final solution may be a compromise approach that is patient-driven.

Pathologic migration

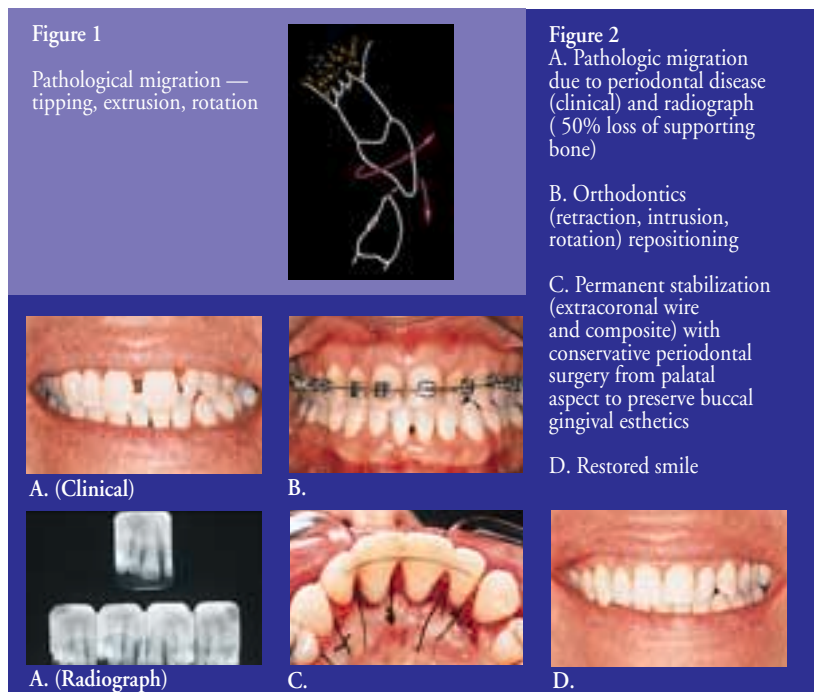
Pathologic migration may have its beginning in simple periodontal inflammation.³ It can progress insidiously to a level of periodontal destruction that eventually precipitates flaring, extrusion and rotation of the affected teeth (Fig. 1). At this

point, the patient becomes alarmed by the uncontrolled migration of teeth and seeks treatment (Fig. 2). A thorough periodontal evaluation of bone loss and pocket depth is essential in order to establish a baseline of the patient’s periodontal condition and to prepare a plan for eventual surgical intervention. Initial preparation through scaling and root planing is always rendered first in order to eliminate active inflammation. The sequencing of definitive periodontal and orthodontic care is critical for the proper resolution of the problem and for producing a successful esthetic and functional end result.⁴ Derotation, space closure and fixed stabilization prior to definitive periodontal pocket reduction may be the desired strategy. Orthodontic alignment and closure of interdental spaces before periodontal surgery enables

order to maintain proper esthetics.

Posterior bite collapse

Posterior bite collapse may result from missing posterior teeth, which then leads to drifting and tipping of teeth adjacent to the spaces. The migration and tipping of teeth can lead to a lost vertical dimension that results in overclosure and bite deepening. As the bite continues to deepen, the upper incisors may be driven forward as a result of lower incisor impingement against the palatal surfaces of the upper anterior teeth (Fig. 3). It is not uncommon that maxillary anterior spacing will occur as the incisors move labially, and the overjet increases. After initial periodontal preparation has been rendered, orthodontic treatment will involve uprighting abutment teeth adjacent to the areas of the lost dentition and consolidation of interdental spaces into the even-



the surgeon to evaluate the quantity of interproximal soft tissue reduction and pocket elimination that is esthetically appropriate for each individual patient. Frequently, complete pocket elimination may be undesirable in order to avoid unesthetic “black triangles” from forming between the anterior teeth. Surgical pocket reduction may be limited to a palatal approach procedure, thereby leaving a veil of labial interproximal soft tissue in

tual prosthetic area (Fig. 4). An effort is made to re-establish lost vertical dimension so that the maxillary anterior spaces can be orthodontically closed.

The orthodontic phase of treatment is followed by definitive periodontal care, endodontic therapy (if necessary), and prosthetic or implant replacement of missing dental elements.

Bolton index discrepancy

A proper natural balance in the

Figure 3
A. Patient with posterior bite collapse
B. As the bite deepens, maxillary incisors are forced labially, and the risk of anterior spacing increases.



Figure 4
Molar uprighting - regaining arch form and vertical dimension



Figure 5
Bolton Index - Width of mandibular six anterior teeth is 77% of maxillary six anterior teeth when in Class I dental relationship.

sum of mesiodistal widths between the six maxillary anterior teeth to the six mandibular anterior teeth is a ratio of 100/77 (Fig. 5). Any deviation from this ideal ratio is referred to as a Bolton discrepancy.⁵ Patients often present with maxillary anterior spacing that partially or totally results from abnormally narrow upper anterior teeth relative to the lower anterior teeth. Closure of anterior spaces resulting from a Bolton discrepancy may involve a combination of orthodontic therapy and/or restorative treatment (Fig. 6). The narrow anterior teeth may be overangulated in an effort to consume arch length and achieve some space closure. Obviously, this comprehensive orthodontic approach has esthetic limitations. Restorative therapy may involve bonding or crowning the affected teeth so that their proper mesiodistal widths can be re-established, and the Bolton discrepancy can be corrected.⁶ The restorative contribution to space closure between narrow maxillary anterior teeth should not be overlooked. It must be remembered that undetected Bolton discrepancies may lead to extreme difficulty or an inability to achieve complete anterior space closure during orthodontic therapy.

Deep overbite condition

A naturally occurring deep overbite condition often leads to overclosure of the mandible and an undesirable impingement of the lower incisors into the thick cingula of the maxillary incisors.⁷ The results of this naturally occurring phenomenon are similar to the consequences of posterior bite collapse. Once again, the excessive deep bite can result in a forward labial movement of the upper incisors, thereby creating unesthetic spacing between these teeth. The patient may present with a classic Class I posterior occlusion in

combination with a deep bite and an anterior diastema (Fig. 7). Orthodontic closure of the anterior spacing cannot be affected until proper bite opening has occurred. Bite opening provides adequate “clearance” so that the upper incisors can be retracted, and the spacing can be closed (Fig. 8). The mechanotherapy involved in the bite-opening phase of treatment is determined by the nature of the malocclusion, the esthetic requirements of the case, and the philosophical approach of the practitioner. Bite-opening techniques may include orthodontic posterior extrusion and/or anterior intrusion.⁸ Orthognathic surgical intervention may be necessary in difficult deep bite cases involving adults or extreme esthetic problems.

Anterior spacing causes

It is not uncommon to see patients who display anterior spacing as a result of habits. Fingers, tongue thrusting, or occupational causes can displace teeth. These habits result in undesirable forces that move teeth vertically and laterally, thereby resulting in spaces between the affected teeth. It is critical that the habit is

eliminated as orthodontic therapy is rendered to align the teeth and close the spaces. A well-designed fixed or removable retention appliance will be essential in order to prevent relapse of the spacing. Frequently, the retention appliance is modified to aid in controlling the troublesome habit.

Unightly spacing can also be a consequence of a dento-alveolar discrepancy where the combined mesiodistal widths of the anterior teeth are significantly smaller than the alveolar bone supporting them. A limited discrepancy of this type can be resolved by orthodontic space closure followed by fixed retention. As the dento-alveolar discrepancy becomes more profound, it may necessitate bonding therapy in an effort to increase the mesiodistal widths of the teeth. A major discrepancy may require space consolidation followed by prosthetic treatment in order to “fill-in” the excessive space. Indiscriminate orthodontic closure of spaces resulting from a major discrepancy may result in relapse as a consequence of excessive retraction of the spaced teeth against the tongue. Well-designed anterior anchorage may be utilized in an effort to affect space closure through protract-



Figure 6
A. Bolton discrepancy with uneven space distribution



B. Orthodontic realignment
C. Final esthetic crown placement



Figure 7
Class I malocclusion, characterized by excessively deep bite, resulting in large diastema (anterior view)



Figure 8
Proper bite opening is necessary before maxillary anterior spacing can be closed.

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The AAO recommends that every child should have an orthodontic screening no later than age seven.

tion of posterior teeth, thereby avoiding or minimizing entrapment of the tongue.

In conclusion, the complexity of maxillary anterior spacing should not be underestimated. Determining the etiological factors contributing to the spacing problem and reversing these factors through therapy are the first steps in successful treatment. It is essential to have good communication among the orthodontist, periodontist and general dentist who are treating the patient. A comprehensive history, a thorough clinical examination and good radiographs are the foundation of a sound treatment plan. Successful treatment is measured not only by space closure but also by long-term stability. Frequently, stability may be dependent upon fixed stabilization and/or prosthetic intervention.

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