Treatment by Twelves

A model for a primary care orthodontic practice

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Abstract

Treatment by Twelves is a method to describe caring for patients with malocclusions of all ages with the express intention of treating to the new aesthetic demands. Based on recent published documents and summaries from American Association of Orthodontists (AAO)-sponsored symposia, Treatment by Twelves provides a way to communicate the proposed orthodontic treatment of patients to both colleagues and patients.

Educational Objectives

Upon completion of this course, participants should be able to achieve the following:

- Identify common goals of orthodontic and restorative dental practice
- Trace the history of arriving at an aesthetic dental and orthodontic practice
- List the four biological elements to orthodontic care
- List the three major time periods for orthodontic care
- Name the common malocclusions treated in each time period
- List the common reasons for relapse of orthodontic care

Introduction

Most orthodontists spend a good amount of time answering questions like "When is the best time to start orthodontic treatment?" or "Is it too early to begin care for my child?" Many feel like parents, patients and dentists have a differing view of the need for an orthodontic evaluation. The American Dental Association, as well as the AAO, encourages the first visit at age seven, but confusion still exists.

Furthermore, changes in delivery of orthodontic care have dramatically altered the way many orthodontists practice. For years, most were employed in a sole practitioner business model, depending on a solid referral base of dentists and professionals with satisfied patients referring their friends and relatives. Now, the landscape is filled with general dentists, clinics and other business entities offering to provide orthodontic care within their facility. Many young and seasoned orthodontists are hired by others not only improperly trained to understand the requirements of a viable orthodontic practice but ill prepared to invest the time and money to provide the finest in modern orthodontics to the patients. Most of these alternative business models do not understand that delivering orthodontic care, unlike other dental and medical specialties is more of a process than a procedure-based practice.

Adopting a philosophy about treatment timing can be the basis for building a successful practice. Not only does it address the issues mentioned, but it also provides the foundation for a successful career that is self-perpetuating. Additionally, it helps to dispel the notion that there is the precise right technique and time for undergoing orthodontic care.

A recent editorial by Robert Keim[1] emphasizes the need to adopt a new paradigm of orthodontic care based on the "dynamic nature of the changing face over time, rather than a static view, represented by plaster casts on the table." This new paradigm will require a clear understanding of the needs and basis for orthodontic intervention throughout a patients' lifetime.

The controversy surrounding the initiation and practice of orthodontic care is not new. An article published by Proffit[2] summarizing results of research presented at the AAO Symposium on Early Treatment outlines several guidelines for developing a philosophy of patient management. An interview with the late Anthony Gianelly[3] summarizes this program director and master clinicians thoughts on the timing of orthodontic

1. *Keim, Robert G, The Editors Corner, A Shift in Paradigm, JCO Vol 43 pp613*
2. *Proffit, William R, The timing of Early Treatment: An Overview, AJO/DO April 2006 pp s47*
3. *Gianelly, Anthony A, Current Topics and Controversies, PCSO Summer 2007, pp33*

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treatment and the need or lack of need for tooth removals in the permanent dentition to obtain a beautiful orthodontic result.

A philosophy of treatment timing encourages standardized mechanics and allows full utilization of the variety of quality orthodontic appliances available. Training of staff becomes routine and simplified. Patient education is routine and clearly understood.

As one adopts a philosophy regarding timing, you will notice the practice take on a primary care identity.

Patients have the ability to not only provide sources of income from their own specific needs, but from other sources as well. The orthodontic practice now becomes a referral source to other practitioners.

This growing primary care practice becomes much more valuable in the transition process as well. Imagine being able to show a prospective partner hundreds of recall and active patients that continue to multiply because your philosophy-driven recall and referral system keeps the patients coming back. With standardization, patients will easily be transferred to the new partner.

Restorative Dentistry

The basics behind an aesthetic and dynamic practice mentioned in the JCO are and have been present in general dentistry for more than a hundred years. Earl Pound,[4,5] in two classic articles, informed clinicians and urged them to view the patient in a dynamic rather than static or pure functional method. His articles stressed the importance of arranging maxillary teeth to the upper lip for aesthetics, arrangement of the lower teeth for phonetics and, finally, the setting of the posterior teeth for function. All of these principles were based on muscle function (Fig. 1).

Pound summarized this into the Aesthetics, Phonetics and Function system that is still utilized today to create a beautifully restored smile.

Other clinicians, such as Peter Dawson,[6] identify issues that are important to all when restoring missing or natural permanent teeth to function and aesthetics. For example, during lectures and in his classic textbook he outlines eight functional requirements for a healthy orthodontic occlusion.

The Marquette University School of Dentistry quite simply stated that the purpose of restorative dentistry was to "restore the curve of occlusion"

Orthodontics

Edward Angle,[7] one might recall, was first interested in prosthodontics. His challenge early in practice was to design an occlusion scheme that was healthiest for patients. This is what led him to the Class I, II and III molar philosophies. Initially, embracing a non-extraction approach, he believed that patients' first molars were the key to health and that a perfect Class I molar relationship would serve to deliver that goal. Astute clinicians these days are utilizing many factors in arriving at the decision on how to treat patients.

Some utilize simple cephalometric analysis, basing their treatment decisions on the lower incisor tooth. Some have created complex formulas yielding many treatment options, oftentimes resulting in a combination of surgical and orthodontic intervention for treatment. Most of these various philosophies, however, stress initial diagnosis, treatment and completion at one point in time. Rarely does any analysis or philosophy purport to propose a method of treating the patient throughout their lifetime. The common goal is to create a great looking smile that functions well and will withstand the test of time. In other words, it pays to realize that we are working with faces that are Class I, II and III rather than molars that are Class I, II and III (Fig. 2).

4. *Pound, Earl, Lost Fine arts in the Fallacy of the Ridges, JPD Vol4 pp6 Jan 1954*
5. *Pound, Earl Esthetic Dentures and their Phonetic Values JPD Vol1 March 1951*
6. *Dawson, Peter, Functional Occlusion Mosby 2007*
7. *Proffit William R, Contemporary Orthodontics 4th Edition, Mosby 2007*

Fig. 1

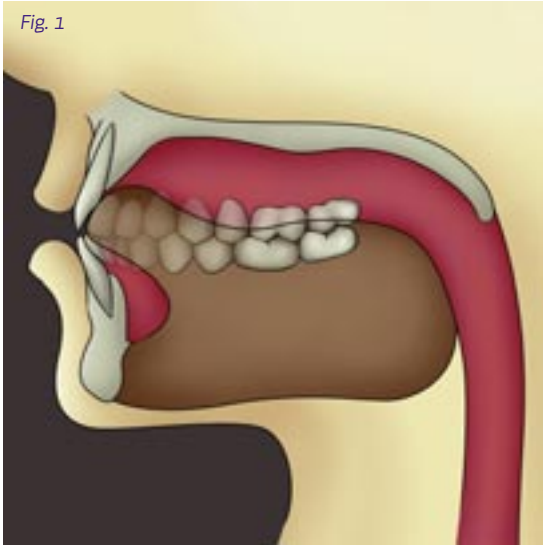

Fig. 2

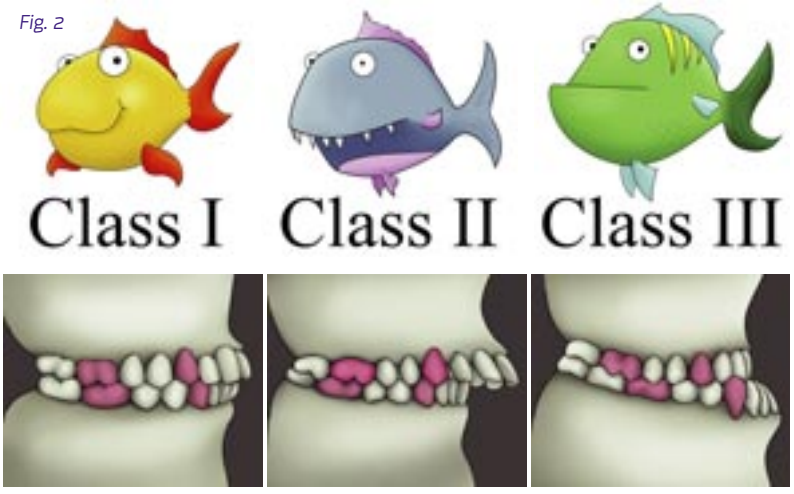

Fig. 1: Facial and tongue muscles are important when positioning the teeth.
Fig. 2: Restorative dentists think facial relationships rather than molar relationships.

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Biology of Orthodontics

Drawing from the previously mentioned clinicians and years of practical experience, it appears that four factors are important in making the decision on when and how to treat patients. They are eruption of the teeth, growth of the skeleton, function of the temporomandibular joint, and influence of the airway and musculature surrounding the teeth.

Eruption

There is much variability in the eruption of the teeth into the oral cavity. Young orthodontists might likely begin to straighten teeth when he or she first notices a malocclusion. One learns quickly that only when all the teeth erupt into the mouth may one complete care. It is this fact that will alter treatment timing to a degree. Even Proffit in his summary states that growth and eruption are not always on the same line or path. Adjustments need to be made (Fig. 3).

Growth

An important factor in growth recognizes that we are only treating in a small time frame in the continuum. The vast majority of facial growth occurs early in life before most patients receive orthodontic care. After that, all patient go through three growth spurts culminating in the large adolescent spurt. As much as we would like to believe that early treatment could eliminate the need for more extensive care at a later date, we must still remember that all patients will have growth spurts and for most of them this is during adolescence, and for some males even later than that (Fig. 4).

TMJ

The controversies regarding the TMJ continue. However, I think it is safe to say that the TMJ is comprised of a condyle residing in a fossa lined with fibrous connective tissue held in place by four key ligaments. These ligaments, when supported and surrounded by healthy musculature, are responsible for allowing a repeatable position of the joint in the socket. It is from this repeatable position that dental reconstruction or orthodontics may take place. Over time, this socket and fossa are capable of remodeling from wear tear and trauma (Fig. 5).

Muscles and Airway

The muscles of the face and tongue provide the basis for what many have called the neutral zone. Not only is the neutral zone important in complete denture construction, but many orthodontists speak also of the importance of respecting the muscles when arranging teeth. Promotional literature for the leading self-ligating appliance system stresses the influence of healthy facial muscles on the ability to arrange teeth satisfactorily. Factors that play an important role in development of this neutral zone are the mode or respiration, possible allergies, digit and other oral habits (Fig. 6).

Fig. 3

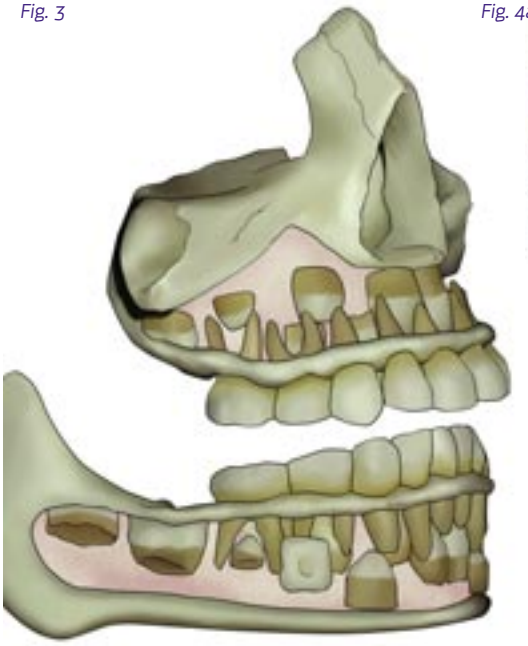


Fig. 4a

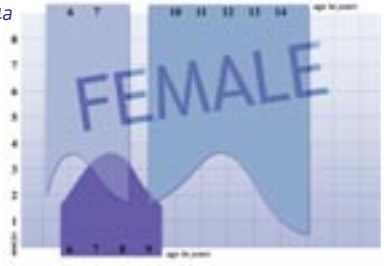


Fig. 4b

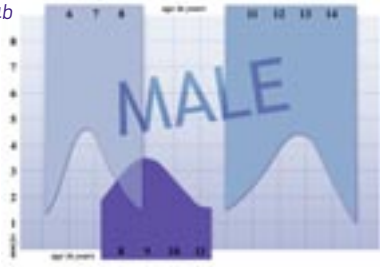


Fig. 5

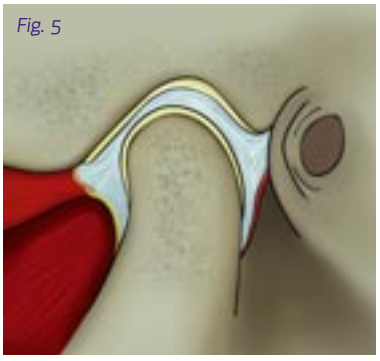


Fig. 6

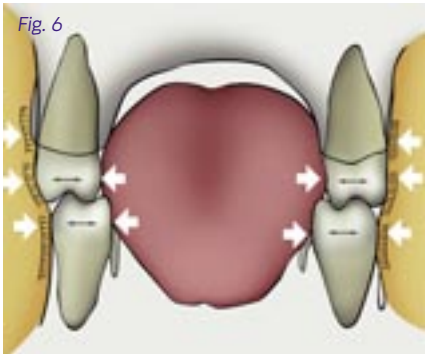


Fig. 3: The process of eruption adds bone and teeth to the distal portion of the jaws. This process continues into adolescence allowing for the 6, 12 and 18 year (third) molars.

Figs. 4a&b:. Note that mandibular growth extends for many years into adolescence. The female chart is on the left with the male graph on the right. In many situations, this late growth influences the final result.

Fig. 5: The TMJ is capable of remodeling and is supported and surrounded by several key ligaments.

Fig. 6: The muscles of facial expression and the tongue serve to create what many have called the Neutral Zone helping to position the teeth.

Diagnosis of the Orthodontic Patient for Aesthetics

Nothing more clearly summarizes the four preceding factors better than complete diagnostic records, which have been the cornerstone of the orthodontic profession. In addition to a medical and dental history, the specifics of the diagnostic records serve to register the patients' four biological factors mentioned with standardized precision. Orthodontists' attention to complete record gathering at many time-points supports the treatment for a lifetime approach to care. Complete diagnostic records may include photos, X-rays with various views, and casts of the teeth many times mounted with the use of a face bow.

What's Next?

So what is the point of all this history and review of elementary orthodontics? How can this seemingly basic information change the way that one practices going forward and more importantly, now? The answer is in developing a specific philosophy around which one builds his or her practice. Let's call it Treatment by Twelves.

Proffit[8] outlined some key elements in summarizing early treatment during a recent AAO-sponsored symposium on care. He arrived at six important points that can be utilized in making a decision to treat a young patient with orthodontics.

1. Early cross-bite treatment is universally suggested.
2. Late mixed or early permanent dentition is the gold standard for initiating care.
3. Growth modification is desirable.
4. Eruption and growth don't coincide.
5. Eruption varies.
6. Class III treatment success is based on growth of mandible.

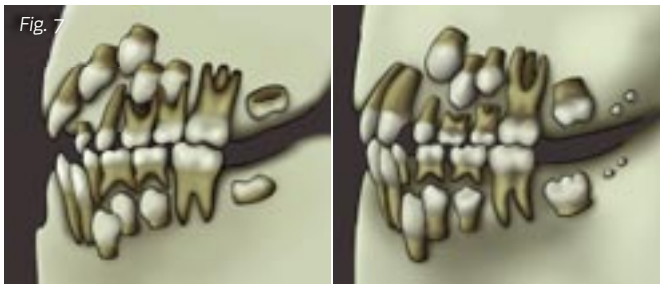
Gianelly[9] concludes the following when discussing his thoughts in a recent PCSO interview regarding controversies on early care:

- Cross-bites should be treated early.
- Late mixed dentition is the best time to initiate care.
- Start after eruption of first bicuspids and before second molars erupt.
- Use upper lip for determining aesthetics.
- Extraction doesn't necessarily narrow smiles.

Gianelly,[10] in a separate article based on two research studies, concludes:

- Non-extraction care can be utilized in the mandibular arch about 75 percent of the time with the use of a lingual arch appliance.
- Third molars might in fact become impacted as a result of this device.

8. *Proffit, William R, The Timing of Early Treatment: An Overview, AJO/DO April 2006 pp s47*
9. *Gianelly, Anthony A Current Topics and Controversies PCSO Summer 2007 pp33*
10. *Gianelly, Anthony A, Treatment of Crowding in the Mixed Dentition, AJO/DO June 2002 pp 569*



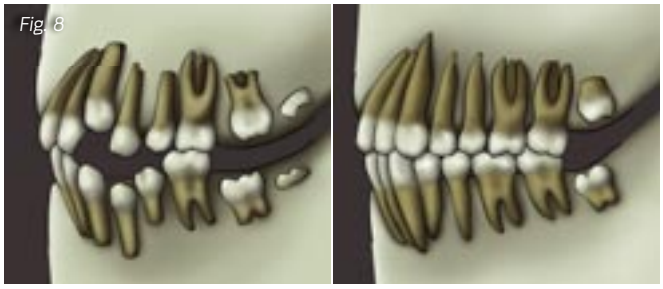
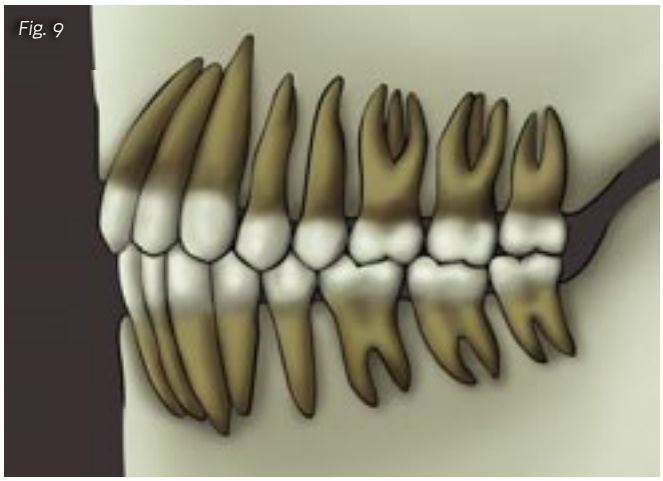


Fig. 7: The First Twelve Permanent Teeth.
Fig. 8: The Next Twelve Permanent Teeth.
Fig. 9: The Four Twelve Year Molars and beyond.



Treatment by Twelves

Synthesizing the results of the preceding three articles, we arrive at the Treatment by Twelves philosophy that includes the following three groupings based on the authors suggestions and observations.

- The first twelve permanent teeth (Fig. 7)
- The next twelve permanent teeth (Fig. 8)
- The four twelve year molars (Fig. 9)

Common Issues

Common among these groups are the usual problems that orthodontists must contend with on a daily basis. However, each particular treatment group has a variation based on which teeth are present in the mouth. Also, each group allows for the opportunity to evaluate the four biological categories and determine how they influence treatment and outcome.

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The basic philosophy behind TBT is to first bring the patient into the practice at a young age and perform age-appropriate treatment where indicated. This process is similar to that employed in business systems where many options for sales and delivery of products or services are placed into the system and gradually many options are eliminated until the desired product, device or service emerges at the completion of the development cycle (Fig. 10).

Fig. 10

The First Twelve Permanent Teeth

Early evaluation with an emphasis on eliminating habits and shaping a healthy oral environment is one of the best practice builders available. Our practice regularly encourages early visits with frequent referrals to pediatricians and ear, nose and throat doctors for airway evaluation (Fig 11). Correction of harmful facial muscle habits, including myofunctional therapy and devices, conveys a holistic attitude to parents that they appreciate (Fig. 12). Following this habit cessation, myofunctional therapy to balance the facial musculature is suggested (Fig. 13) and may be performed by trained hygienists in the office.

Fig. 11

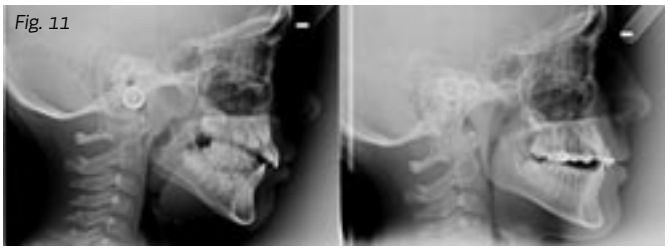


Fig. 12

Fig. 13

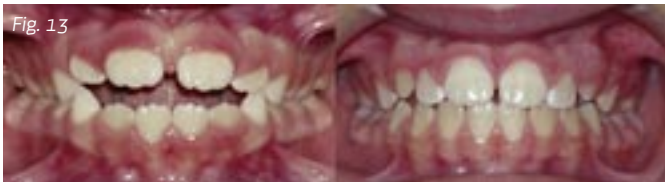


Fig. 14

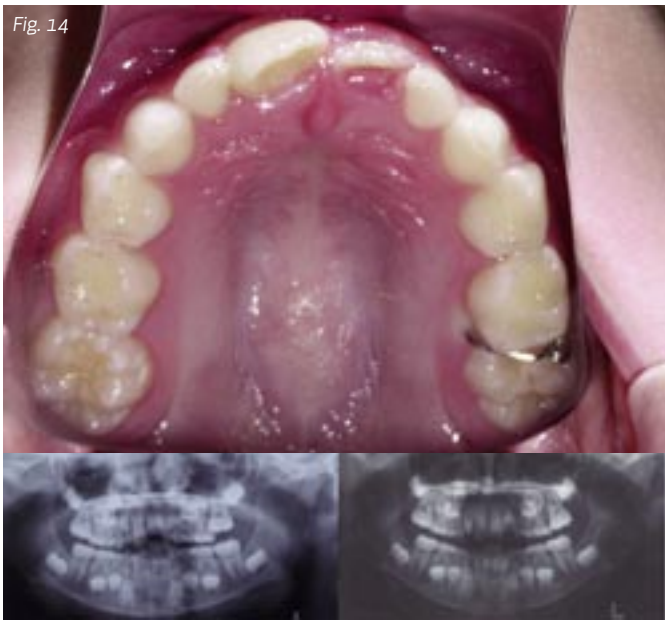


Fig. 15

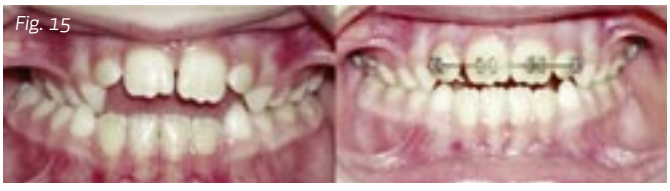


Fig. 16

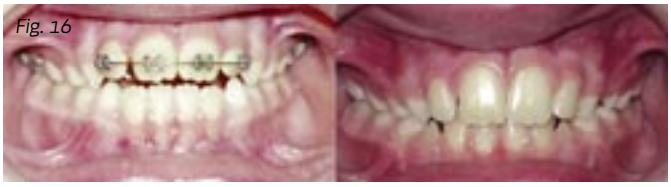


Fig. 17

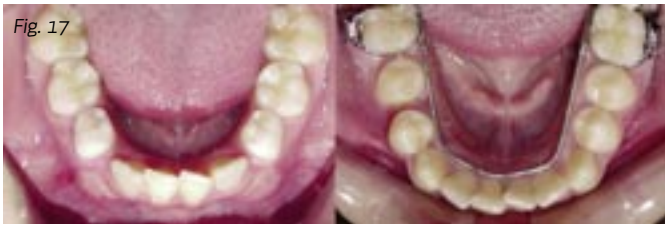


Fig. 11: Often times following a clinical examination, a referral for airway evaluation results in adenoid tissue being removed to help with nasal breathing and the resultant improvement in muscle function and hopefully mandibular growth direction.

Fig. 12: Habit correction is essential

Fig. 13: Myofunctional Therapy can help to correct the anterior tooth relationship without appliances at a young age.

Fig. 14: Impacted teeth are some of the earliest issues to be discovered while the First Twelve Teeth are erupting.

Fig. 15: Expansion needs to be done to reverse the harmful effects of thumb habits, and compensatory muscle imbalance.

Fig. 16: Prior to removal of early treatment appliances, a 2 by 4 is used to make the anterior teeth look cosmetically pleasing until further treatment is accomplished in the permanent dentition stage.

Fig. 17: The use of a lingual arch helps to treat the mandibular arch without permanent tooth removals.

Probably nothing is more necessary about the first twelve teeth than getting them into the mouth. The most common eruption or impaction issue is the six-year molars (Fig. 14). Other issues include blocked out lateral incisors due to crowding and rarely an impacted incisor or supernumerary tooth.

A single tooth, unilateral or bilateral crossbite affects the function of the jaw and future eruption of teeth and is almost universally suggested that this situation be corrected at this stage. More commonly, unilateral crossbites with shifting and poor tongue posture are the common finding (Figs. 15 and 16). Numerous authors suggest retracting protruding teeth out of the fracture zone, however, Gianelly feels that this can wait and he claims that rarely has he seen a significant benefit to this additional orthodontic procedure. His mainstay of early treatment is the lingual arch to treat non-extraction (Fig. 17).

The Next Twelve Permanent Teeth

The benefits of treating patients in the next twelve permanent tooth stage are numerous and confirmed by the previously noted authors. Almost universal agreement exists regarding treating during the adolescent growth stage and this is the best time or the "gold standard." Teeth are erupting and the TMJ is forming. Jaws are developing through apposition and resorption in the posterior area of the mouth so distalization is possible, if not easy with the least amount of friction or resistance. Of course, velocity, direction and amount of growth of the mandible are the variables responsible for success.

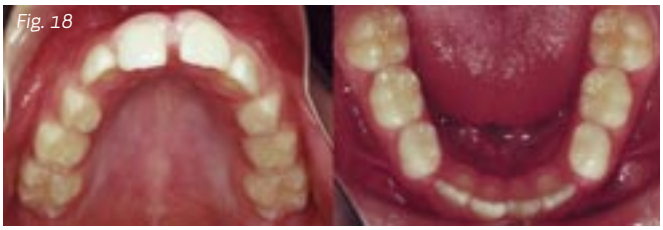
Care is initiated on the upper arch to develop the smile, bring in all the teeth and employ natural or assisted distalization and expansion. This upper arch treatment first allows lower teeth to erupt into the upper teeth without assistance, monitor skeletal growth, allow for the jaw to open, and close on its hinge and evaluate the influence of facial muscles and airway function. Numerous non-cooperation devices such as the Forsus Class II corrector are available to perfect the occlusion to the desired interdigitation if growth of the lower jaw is less than ideal. Muscles are monitored for function and myofunctional therapy is initiated or continued when indicated. This gradual banding approach provides the clinician the ability to monitor growth, muscles and eruption, and in most situations, treat to a non-extraction protocol (Figs. 18-21).

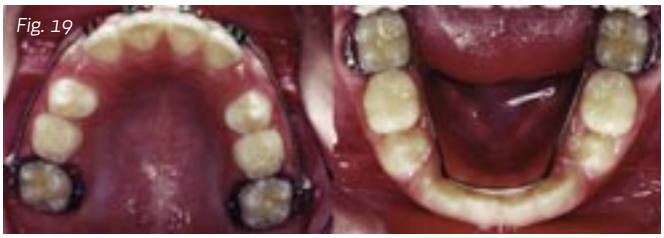
The Four Twelve Year Molars

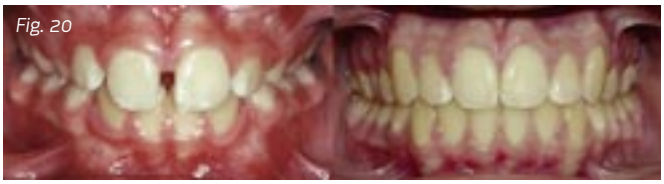
For various reasons, patients are treated when all or almost all of the permanent teeth are erupted including the four twelve-year molars. Whether it be the final stage of care following Phase I treatment or waiting for growth to stabilize, there are many reasons to complete treatment following eruption of all the permanent teeth. The new self-ligating appliances are designed to work well with all of the permanent teeth in place (Fig. 22).

A new trend is to employ initial alignment in the Phase I or first twelve stage to be followed by clear aligner therapy (Fig. 23). This is also a suggested time to treat the complex or multidisciplinary patient. Missing teeth, surgery or other major reconstructive efforts seem to move along in a more direct manner with all the permanent teeth in place.

Fig. 18: This patient was expected to have serial extraction accomplished to finish treatment.
Fig. 19: After initial buccal expansion and eruption, self ligating appliances can complete the treatment.
Fig. 20: The final result shows great occlusion without undue expansion or proclination for this patient's soft and hard tissue.
Fig. 21: Class II correction with intermaxillary devices requiring no cooperation are utilized with all the permanent teeth in place.







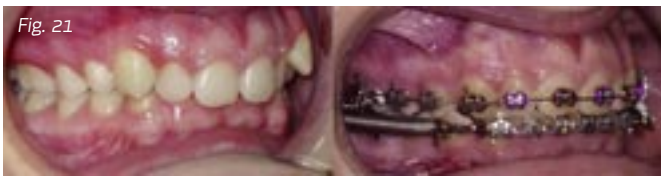
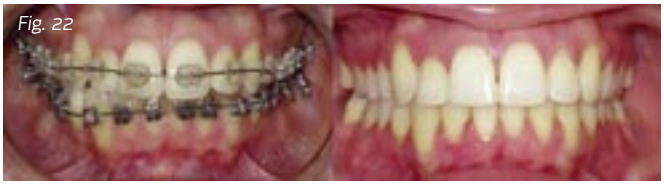
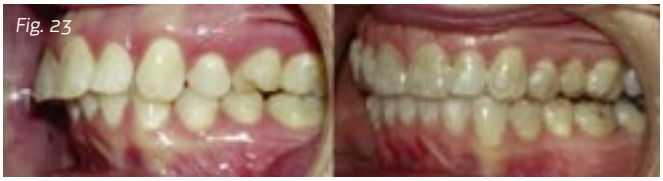


Fig. 22: Self ligating appliances can be utilized to minimize forces and reduce treatment time for those with all permanent teeth in place.
Fig. 23: Clear aligner therapy is particularly beneficial with adult tooth crossbites.





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There are, of course, some patients who are treated best during this phase. Namely, generalized spacing, missing teeth and the Class III skeletal grower (Fig. 24) are best managed with all the teeth erupted and growth stabilized.

Retention and Re-treatment

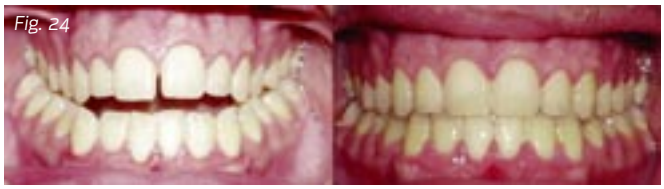
Patients are placed into retainers for full-time wear for two to three months. Half-time wear is requested forever after that. A complete discussion regarding retention philosophy is beyond the scope of this article. However, almost all relapse issues can be explained by returning to the four key elements of orthodontic biology. Namely, eruption (Fig. 25), skeletal growth (Fig. 26), TMJoint function (Fig. 27), and oral facial habits (Fig. 28) are usually to blame. Should something happen requiring retreatment, patients are educated about their options and retreatment is suggested for a very reasonable fee.

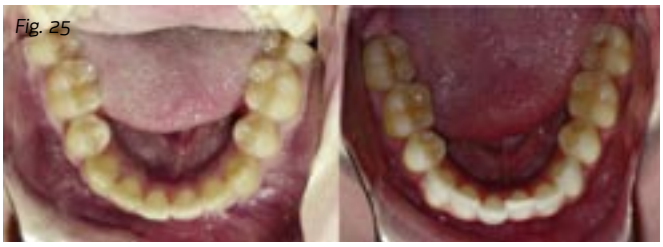
Expanded Function Assistants or Hygienists

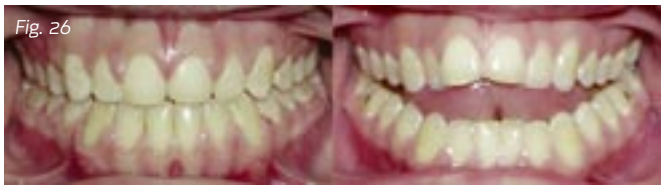
Expanded function can be utilized within the orthodontic practice just as well as the general dental practice. Without even venturing into the "turf" of the traditional dental hygienist employed by the general dentist, a hygienist can effectively help to deliver hygiene instructions, monitor periodontal health and help to coordinate other restorative services with the referring doctor or other dental professional.

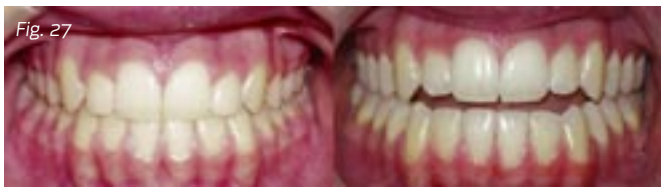
Summary

Adoption of the Treatment by Twelves philosophy can be a tremendous aid to the development, management and transition of an orthodontic practice While not a quick fix for a practitioner looking for the magic missing link, it provides all of the fundamentals to gradually grow a healthy moral and ethical practice based on sound fundamentals found in literature and practice. Immediately adopting these principles will provide the orthodontist with a steady source of referrals, patients and income for years. Creating a practice based on the Treatment by Twelves philosophy can transform a referral-only practice into a primary care practice for a lifetime. ■









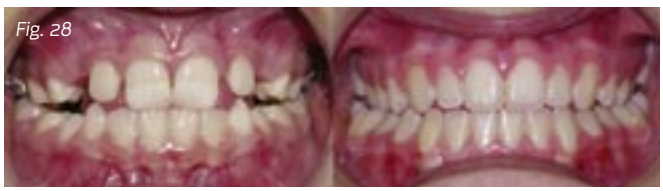


Fig. 24: Multidiciplinary and surgical care is usually managed with all permanent teeth in place and growth that has ceased.
Fig. 25: Relapse from tooth shifting.
Fig. 26: Relapse from growth in a downward and forward motion.
Fig. 27: Relapse from TMJ changes including the diagnosis of condylar change.
Fig. 28: Relapse from muscle habits following numerous expansion and other orthopedic devices.

Author's Bio

Dr. Daniel Grob is a university- and VA-trained prosthodontist who, after teaching and practicing for several years, returned to the Marquette University School of Dentistry to earn a master's degree in the specialty of orthodontics.

After practicing both specialties in Milwaukee, Wisconsin, for two years, he and his wife Nancy moved to Tucson, Arizona, in 1985 to care for patients and raise their three children. Grob treats conventional orthodontic patients as well as complex pre-restorative challenges referred by the dental community. Dr. Grob recently moved to Scottsdale, Arizona, where he continues to treat patients with a special emphasis on comprehensive care and educational interests.

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Post-test

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1. The primary goal of restorative dental care is to:
   a. Turn everything into porcelain
   b. Restore the curve or line of occlusion
   c. Make sure everyone has 32 functioning teeth
   d. Develop a straight spine

2. Dr. Earl Pound is credited with:
   a. Using phonetics for arranging teeth
   b. Bringing cosmetic concepts to denture construction
   c. Arranging upper teeth where they look good
   d. All of the above

3. Although known for his orthodontics, Dr. Edward Angle was a dentist particularly interested in:
   a. Oral Surgery
   b. Periodontics
   c. Ear Nose and Throat
   d. Prosthodontics

4. Which one of the following is not one of the four key biological elements to orthodontic therapy?
   a. Mental Health
   b. Temporomandibular Joint
   c. Facial Muscles
   d. Growth and Development

5. Which one of the following is not a part of the TREATMENT BY TWELVES philosophy?
   a. First Twelve permanent teeth
   b. Next Twelve permanent teeth
   c. Tooth number twelve
   d. Four twelve year molars

6. The gold standard in orthodontic treatment planning is to initiate care:
   a. As young as possible
   b. Prior to eruption of maxillary central incisors
   c. During the adolescent growth spurt
   d. After eruption of all permanent teeth

7. Ideally, it would be best to initiate care for non extraction class II therapy prior to eruption of:
   a. Third molars
   b. Second molars
   c. Lower central incisors
   d. Any permanent teeth

8. Almost universal agreement is present for the early correction of:
   a. A crossbite with a mandibular shift
   b. Class II molar malocclusion
   c. Class I crowding
   d. Class III skeletal problems

9. Which of the following is a theory for tooth relapse?
   a. Joint changes
   b. Growth changes
   c. Failure to wear retainers
   d. All of the above

10. Most patients who have treatment initiated in the next twelve permanent tooth stage have appliances first placed:
    a. On the lower arch
    b. On the upper arch
    c. On both arches at the same time
    d. It really doesn't matter

continued on page 32

continued from page 31

Continuing Education Answer Sheet

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Please circle your answers.

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d

Program Evaluation (required)

Please evaluate this program by circling the corresponding numbers: (5 = Strongly Agree to 1 = Strongly Disagree)

1. Course administration was efficient and friendly	5	4	3	2	1
2. Course objectives were consistent with the course as advertised	5	4	3	2	1
3. COURSE OBJECTIVE #1 was adequately addressed and achieved	5	4	3	2	1
4. COURSE OBJECTIVE #2 was adequately addressed and achieved	5	4	3	2	1
5. COURSE OBJECTIVE #3 was adequately addressed and achieved	5	4	3	2	1
6. COURSE OBJECTIVE #4 was adequately addressed and achieved	5	4	3	2	1
7. COURSE OBJECTIVE #5 was adequately addressed and achieved	5	4	3	2	1
8. Course material was up-to-date, well-organized, and presented in sufficient depth	5	4	3	2	1
9. Instructor demonstrated a comprehensive knowledge of the subject	5	4	3	2	1
10. Instructor appeared to be interested and enthusiastic about the subject	5	4	3	2	1
11. Audio-visual materials used were relevant and of high quality	5	4	3	2	1
12. Handout materials enhanced course content	5	4	3	2	1
13. Overall, I would rate this course:	5	4	3	2	1
14. Overall, I would rate this instructor:	5	4	3	2	1
15. Overall, this course met my expectations	5	4	3	2	1

Comments (positive or negative): _____

For questions, contact Director of Continuing Education Howard Goldstein at hogo@farranmedia.com