The Three W’s of Early Treatment: Who, When, Why

Presented by Dr. Steven Dugoni.
Summarized by Dr. William Finnegan, Northern Region Editor

Dr. Steven Dugoni, who directs the Mixed Dentition Clinic in the Orthodontic Dept. at the Arthur Dugoni School of Dentistry, is conducting a study of early treatment of malocclusions in the clinic. In his presentation, he described treatment protocols developed at the school. Dr. Dugoni noted that the treatment protocols at the University of Pacific differ greatly from the treatment protocols reported in the randomized clinical trial studies at the University of North Carolina and University of Florida. These randomized clinical trials showed that, although there was some improvement in the malocclusion after Phase I treatment, most of this improvement was lost when the patient was reassessed to start Phase II. These studies used multiple practitioners with limited treatment goals, limited mechanics, and limited supervision while waiting to start Phase II treatment.

The Phase I treatment at University of the Pacific is in a single clinic. The protocol requires careful case selection and a goal of comprehensive correction. The retention phase after mixed dentition is carefully planned to hold all gains made in the active treatment. In the University of the Pacific study, cases were taken from one practice from an expert clinician.

TREATMENT TIMING

The ideal time to start a Phase I treatment would be in the early mixed dentition, as soon as the upper lateral incisors are erupted. Early treatment is not usually started in the primary dentition except for some crossbites and some Class II and Class III problems with crowding. Most of these primary dentition problems could be postponed, rather than be faced, with three phases of treatment: one in the primary dentition, another phase in the mixed dentition, and a final phase in the permanent dentition. This could result in a long-term involvement for the patient, which the family may not want. Pubertal growth is another concern. Some patients, especially girls, experience an early growth spurt. You might miss the spurt if you start treatment too late, making it difficult to reduce a Class II skeletal problem.

There are many orthodontic problems that need evaluation for treatment in the mixed dentition:

- Class II malocclusion and Class III malocclusions with midface discrepancies
- Anterior crossbites and posterior crossbites
- Midline discrepancies, especially when associated to early loss of a deciduous cuspid
- Overjet over 6-7mm
- Crowding up to 4mm
- Deep overbite associated with palatal impingement
- Ectopically erupting cuspids and molars
- Mucogingival problems
- Premature loss of deciduous molars
- Missing permanent teeth or supernumerary teeth

The treatment goals for Phase I are:

1. Attain a dental Class I
2. Reduce maxillary prognathia
3. Create ideal overbite/overjet
4. Treat toward accepted facial balance goals
5. Midlines that coincide with facial midline
6. Adequate arch length for the emerging teeth
7. Good incisor alignment

At the Mixed Dentition Clinic at the University of Pacific, the typical appliances for mixed dentition patients include bands on all first molars, upper incisor brackets, and a removable lower lingual arch. In cases of excess overjet, Dr. Dugoni will usually use a headgear during the active period and supervision.
period. This will not only hold the Class I molar result, but maintain upper arch length. The clinic protocol does not typically include lower arch expansion, since research shows that expansion is usually not maintained. If maxillary arch expansion is necessary, they will use a Quad-helix or a fixed rapid expander. The final 2X4 archwire is usually stainless steel to control anterior torque, and intrusion. The arch may need open coil spring in the buccal segments to maintain space for the bicuspids and cuspids. The average space in the upper arch for bicuspids and cuspids is 23mm to 25mm. It is critical that this space be maintained during the active supervision period. Otherwise you can guarantee a necessary second phase of treatment in the permanent dentition.

**ARCH LENGTH MANAGEMENT**

Steve recommends the Hixon-Oldfather or the Johnston Tanaka analysis. The UOP clinic also uses a computer generated analysis developed there, which you can ask for by calling the Orthodontic Department. This information, along with headfilm analysis and facial photographs, will help decide on early removal of deciduous teeth, expansion (very minimal at UOP), extraction of permanent teeth or just waiting for the permanent dentition. If there is moderate mandibular anterior crowding, Steve will recommend a protocol developed by him and his father: Place a lower removable arch, and remove the lower deciduous first molars. The removable lower lingual arch should contact the incisal one-third of the lower incisors. The lower incisors will self-align against the lower lingual arch, using some of the extraction space. This space will later be returned from the E space when the deciduous second molars are lost. They prefer removing the deciduous first molars to removing cuspids because the permanent cuspids are much more likely to grow into the arch in good position.

**UPPER CUSPID ERUPTION**

When using a maxillary 2x4 appliance, Dr. Dugoni has not experienced root resorption of the upper lateral incisors during treatment. Periodic x-rays should be taken to monitor the eruption of the upper cuspids. The space in the upper arch should be maintained during the supervision period, possibly with part-time headgear.

**CASE SELECTION**

Certain cases will not be considered for Phase I treatment at UOP:

- Late mixed dentition, where Phase I & II would blend together
- Cases requiring extraction of permanent teeth
- Cases that will require orthognathic surgery

**ACTIVE SUPERVISION PERIOD (RETENTION AFTER ACTIVE TREATMENT PERIOD)**

In the UOP study, all skeletal and dental corrections achieved during the mixed dentition treatment were maintained during the active supervision period. Phase II treatment was not required 42% of the time, and 82% of those requiring Phase II were treated non-extraction. For the patients not requiring Phase II treatment, there are fewer visits, shorter treatment time, less invasive treatment with less decalcification and root resorption, perhaps better stability and less cost. Proper diagnosis is necessary to choose cases successfully, and after active treatment in the mixed dentition, active supervision through the transition is most important to maintain dental and skeletal corrections.

Research on early treatment continues at UOP, including studies of long-term stability after Phase I treatment. There are case samples at the website: http://www.cril.org/ and the computer generated arch length analysis can be obtained from the Orthodontic Department at the University of the Pacific.