A review and summary of the presentation
"The Role of Treatment Timing in Dentofacial Orthopedics"
by Tiziano Buccetti, DDS, PhD
Review and Summary by: Rodney D. Hyduk DDS, MSD

Dr. Buccetti's presentation focused on the cervical vertebral maturation (cvm) method for the assessment of optimal treatment timing and dentofacial orthopedics. He reviewed the cervical vertebral maturation method to determine skeletal maturation at the ages of pre and post puberty.

Originally the changes in the vertebral bodies were studied in the 1970s by Dr. Lamparski and later by Dr. O'Reilly at the University of Pittsburgh. The continued studies have taken place under the direction of Dr. Buccetti to further refine our understanding of this method.

When delineating maturation we view the second, third, and fourth cervical vertebrae, which can be seen on an orthodontists lateral skull radiograph.

There are a total of six stages in development related to vertebral maturation. Three stages relate to the pre pubertal development, while the final three stages relate to puberty and post puberty.

Dr. Buccetti pointed out that our focus is examining the presence of a concavity at the lower border of the vertebral bodies of C2, C3, and C4. The shape of the vertebral bodies of C3 and C4 are trapezoid, rectangular horizontal, squared, and rectangular vertical. These shapes progress as the person matures. The rectangular vertical shape is characteristic of adult maturation.

During the first stage, CS1, all lower borders are flat (7% may show a concavity). C3 and C4 are trapezoid in shape. This indicates the peak of growth will not occur for at least 2 years and possibly 3-4 years in the future.

When CS2 occurs, which is determined by the lower border of C2 showing a concavity (80% of the subjects), C3 and C4 are trapezoid in shape. This stage indicates the peak interval will start 1 year after this stage. CS2 gives a better idea of when the peak growth will occur.

CS3 is delineated by the lower borders of C2 and C3 possibly showing a concavity and C3 or C4 may be trapezoid/rectangular horizontal in shape. This stage can be thought of as "the door to the peak". This stage indicates that the growth will be occurring during this year. C3 will show the concavity without C4 having this characteristic. The patient will show the greatest degree of growth the year following this cephalogram.

The application of this method on treatment timing in orthodontics and dentofacial orthopedics has revealed that:

a) Class II treatment is clinically effective when it includes the peak in mandibular growth; the same is true for orthopaedic approaches to increased vertical dimensions of the face;
b) Class III treatment with maxillary expansion and protraction is effective on the maxilla only when it is performed before the peak, whereas it is effective on the mandible during both pre-pubertal and pubertal stages;

c) Skeletal effects of rapid maxillary expansion for the correction of transverse maxillary deficiency are greater at pre-pubertal stages, while pubertal or post-pubertal use of the rapid maxillary expander entails more dentoalveolar effects.

Post lecture panel discussion should note that Dr. Dick Ridgley was concerned and questioned previous discussions by Dr. Buccetti concerning ideal timing for orthopedic treatment. Dr. Ridgley summarized Dr. Buccetti's presentation regarding timing for treatment as being most appropriate during the pubertal growth spurt or slightly after, whereas Dr. Ridgley pointed out, that the University of the Pacific Dugoni et. al. that the pre-pubertal growth spurt is ideal even though it is a shorter time frame.

Dr. Buccetti clarified that he is strictly referring to class II treatment, since class III treatment is handled better at an earlier time. He also felt the timing isn't important only for when treatment is to occur but it is significant when treatment is finished. In Dr. Buccetti's presentation it is directed that treatment would finish after stage 5 (CS5) the period after which minimal relapse would occur. Dr. Buccetti referred back to the Bjork Growth Studies, which can be referenced to 1966. It should be stressed that the class II peak is earlier and lasts for a shorter period than the class III peak, which occurs later and lasts longer.

He referred to the fact that the only other time that an increase in growth rate occurs is at the ages of 3-5, with growth rate stabilization until puberty.

During the same panel discussion, Dr. Samir Bishara questioned how many people actually have a pubertal growth spurt. He pointed out that Bjork's study in 1966 consisted of 45 subjects and only 11 subjects were able to show a discernable growth spurt. Dr. Bishara was concerned that only 1 quarter of patients show this characteristic therefore how will a clinician determine who will have it, the magnitude, direction, and timing of the spurt. He questioned how all of this could be used for clinical decisions. Dr. Buccetti's response related to discussions that he, Dr. Bishara, and Dr. Lorenzo Fronchi had previously. Dr. Buccetti stated that Dr. Fronchi's interpretation of Dr. Bjork's work showed 11 subjects had a discernable growth spurt but actually all the subjects had a growth spurt, some lesser in value. Dr. Buccetti invited all panel members and the audience to refer back to the paper to interpret individually.

In summary, the lecture showed that effects of therapies aimed to enhance/restrict mandibular growth are of greater magnitude at the growth spurt with respect to earlier intervention, while effects of therapies aimed to alter the maxilla orthopedically are greater at pre-pubertal stages. Adequate treatment timing as a part of orthodontic decision-making allows for an improvement of treatment outcomes in terms of both effectiveness and efficiency. This results in a favorable cost/benefit balance with an ultimate advantage in the relationship between clinicians and patients on an everyday basis.