1633 **Temporomandibular function following Class II early treatment with bionators and headgears.** SD KEELING*, CW GARVAN, TT WHEELER, GJ KING (Department of Orthodontics, University of Florida, Gainesville).

Temporomandibular (TM) function was assessed in children enrolled in a clinical trial of early treatment for Class II malocclusion. Children were assigned to a treatment protocol (bionator, n=50; observation, n=53; headgear/bite plane, n=64) using randomized block stratification. TMJ sounds (S), joint capsule tenderness to palpation (J), and muscle pain to palpation (M) were scored as present/absent; range of motion was determined in millimeters. Determinations were made by blinded, calibrated examiners initially (DC1) and after molar correction was achieved or 2 years had elapsed (DC3). At DC1, group differences did not exist for age, sex, molar Class severity, mandibular plane angle, or any functional measure. Change in presence of S, J, and M was classified as none, improved (present DC1, absent DC3), and worsened (absent DC1, present DC3); treatment group differences for the improved and worsened subjects were examined using the chi-square statistic. 85% of the subjects displayed no change in presence/absence of S, 62% no change in J, and 61% no change in M. Changes in subjects who initially displayed S or M were not different among the treatment groups. Subjects with joint tenderness at DC1 showed improvement, if treated with a bionator versus observation ($p<0.001$) and headgear/bite plane ($p<0.01$). Group differences did not occur in the percentage of subjects, who were free of S, J, M at DC1 and developed these signs by DC3. A larger increase in maximum opening was observed in bionator subjects versus the other groups (ANOVA, $p<0.03$) We conclude that an immediate benefit or risk for the majority of children receiving early Class II treatment with bionators and headgear/bite planes with respect to TM function does not exist with the prospect that Class II children with TMJ capsule tenderness may benefit from bionator therapy. Supported by NIH DE08715.

1634 **Assessment of facial profile following Class II early treatment with bionators and headgears.** AR OSSI*, SD KEELING, TT WHEELER, GJ KING (Department of Orthodontics, University of Florida, Gainesville).

The facial profile was assessed in grade schoolchildren enrolled in a randomized clinical trial of early treatment for Class II malocclusion. Children were assigned to a treatment protocol (bionator, n=35; observation, n=35; headgear/bite plane, n=35) using randomized block stratification. The profile was scored from least acceptable (1) to most acceptable (9) by viewing tracings of only the soft tissue profile obtained from lateral cephalometric radiographs. Two independent assessments by 3 orthodontists, blinded to group and time, were made on two films of each subject: initial (DC1) and after molar correction was achieved or 2 years had elapsed (DC3). Average orthodontist score for each tracing was used. Scores were collapsed to represent three acceptability grades: acceptable (≥5), unacceptable (≤2) and ambivalent. Pairwise percent agreement in acceptability grade were determined; treatment group differences for severity, mandibular plane angle, and acceptability grades (by orthodontist) were examined at DC1 and DC3 using the chi-square statistic. The pairwise percentage agreements in acceptability grades among the three orthodontists (51, 56, and 67) indicated significant agreement ($p<0.01$) in judging profile acceptability. At DC1, group differences did not exist for molar Class severity, mandibular plane angle and no orthodontist detected group differences in profile acceptability. At DC3, each orthodontist detected profile differences among the groups with each identifying more headgear subjects as having acceptable profiles (p values 0.01, 0.05, and 0.02). We conclude that uncalibrated orthodontists have individual standards for profile acceptability, but reached similar conclusions about esthetic outcome of early treatment with bionators and headgear/bite plane with greater acceptability of post-treatment subjects treated with a headgear/bite plane. Supported by NIH DE08715.

1635 Growth Changes after Maxillary Protraction in Class III Patients. A. HU*, P. NGAN, U. HAGG, C. YIU, S.H.Y. WEI (West Virginia Univ. and Univ. of Hong Kong).

The objectives of this study was to determine the growth changes after treatment with protraction headgear (PH). Ten Chinese patients, ages 6 to 10, with Class III malocclusion and retrusive maxilla were treated with 6 months of PH and followed for two years after correction of anterior crossbite. Lateral cephalometric radiographs taken before treatment (T1), immediately following treatment (T2) and two years after removal of appliances (T3) were traced and digitized. The occlusal plane and a line perpendicular to this plane through Sella was constructed on T1 radiograph as a reference grid for horizontal measurements. Subsequent radiographs were superimposed on mid-sagittal structures. Data were analyzed using Anova and F-test. Significant skeletal and dental changes were found between T1 and T2 ($p<.01$) but not T2 and T3. A positive overjet was maintained in 9 out of 10 patients. Overjet was changed from -2.2 mm to 3.2 mm with treatment and was maintained at 2.1 mm two years post treatment.

	Maxilla	Mx Inc	Mandible	Md Inc	Overjet A
Tx (mm)	2.4 ±1.1	1.7 ±1.5	-1.3 ±2.5	-0.1 ±2.6	5.5 ±2.3
Post Tx	2.9 ±1.6	2.2 ±2.8	7.0 ±3.2	-0.3 ±3.0	-1.3 ±2.0

These results suggest that significant dental and skeletal changes can be obtained with 6 months of PH treatment. Overjet correction can be maintained by continuous forward growth of the maxilla and dental compensation via incisal changes.

1636 Changes in oral health during Class II growth modification. L ROGERS*, JFC TULLOCH, CL PHILLIPS. Dept of Orthodontics, UNC School of Dentistry, Chapel Hill, NC.

The impact of malocclusion and orthodontic treatment on oral health is not well categorized. Two groups of children, 158 with Class II malocclusion (mean OJ 8.3 mm; mean age 9.9yrs) in a randomized clinical trial (RCT) of early treatment, and 162 children with a spectrum of malocclusions types (mean OJ 6.1 mm; mean age 13.5), in a prospective, observational study, were compared across plaque index (PI), gingival index (GI), CPITN scores, prevalence of white spots (WS), incisor trauma and TMD symptoms. Statistically significant differences ($p < 0.01$) were seen only for PI and WS. Using the two patient groups combined, Spearman correlations indicated statistically significant ($p < 0.5$) but low negative associations between age and PI, GI, and WS, and low positive association between CPITN and both age and OJ. Wilcoxon Ranks sum test showed no difference ($p > 0.01$) in the change in any oral health measure for the three RCT sub-groups, (Control 56, Headgear 52, Functional appliance 48) during the first 15 months of the trial. We conclude that while the oral health of young children with increased overjet is only slightly different from that of older children with less severe malocclusions, neither early treatment, nor delaying treatment has any short term effect on oral health. Supported by NIH grant DE08708.

1637 Mucogingival Changes Associated With Early Orthodontic Intervention. C.M. TRENTINI*, J.F.C. TULLOCH and C. PHILLIPS (UNC, School of Dentistry, Chapel Hill, NC)

Early orthodontic treatment may place patients at risk for loss of keratinized gingiva(KG). Initial and 15 month records from 158 children, mean age 9.9(7.3-12.2yrs) enrolled in a randomized clinical trial of growth modification(51 headgear[HG], 49 functional appliance[FA], and 58 control[C]), were used to assess the change in KG facial to the lower incisors. No other appliances were used during this trial. The error of the method was 0.32 mm. Two patients receiving gingival grafts before enrollment and 6 patients(5 FA and 1 C) requiring gingival grafts during the trial, are excluded from the analysis. The KG width decreased on average for all teeth in the FA group(-0.56mm) and HG(-0.28mm) groups, with essentially no change(.02mm) for the C group. KG changes for each tooth are presented in mm[mean(sd)].

Tooth #	23	24	25	26
C	-0.05(0.78)	0.16(0.68)	0.02(0.61)	-0.06(0.75)
FA	-0.60(0.83)	-0.49(1.30)	-0.66(0.98)	-0.62(0.60)
HG	-0.30(0.65)	-0.28(0.57)	-0.24(1.06)	-0.03(0.62)

Wilcoxon matched pairs signed rank tests indicated statistically significant changes($p<.05$) for all incisors in the FA group, and #'s 23 and 24 in the HG group. These changes suggest that, in untreated patients, the width of the KG facial to the mandibular incisors should not be expected to increase during the late mixed dentition. Early intervention, particularly with functional appliances, may produce a reduction in KG width. Whether or not these changes are sufficient to merit gingival grafting, or will result in any long term oral health problems, remains to be assessed. Supported by NIH grant DE-08708.

1638 Long-Term Changes Following Orthodontic Treatment. E. F. HARRIS*, R. L. ZEIGLER and J. L. VADEN (Department of Orthodontics, University of Tennessee, Memphis).

Relapse of the orthodontic result following retention has been the subject of serious consideration for over a century. Purpose of the present study was to monitor the rate of change over the long term (*ca.* 18 yrs). Casts and cephalograms of a sample (n = 30) treated by one specialist were measured at pretreatment ($\bar{x}$ = 13 yrs), posttreatment (15 yrs), and at an earlier (22 yrs) and a later (31 yrs) recall examination. Most change—both in growth and relapse—occurred soon after treatment, but almost all measures of facial growth exhibited statistically significant growth through the third decade. Major dental changes were: overjet increased towards pretreatment values (22% of treatment change was lost); overbite deepened (85%), incisor irregularity remained about stable in the maxilla (3%) but relapsed appreciably (42%) in the mandible. Intercanine widths were expanded during treatment (*ca.* 2.5 mm); a fourth (27%) of this was lost after retention in the maxilla and 62% was lost in the mandible. Interpremolar and intermolar widths diminished during treatment and continued to narrow with time as did arch length. Changes were larger in the lower, contained arch. Facial growth significantly exceeded zero during the second and third decade, though it slowed markedly in adulthood. Several angular values showed that the mandible autorotated counterclockwise with time; FMA decreased 2° on average ($P<0.01$), but there was no evidence that continued growth contributed to relapse. Most relapse (*i.e.*, return towards pretreatment status) occurred soon after treatment. Orthodontic treatment should not be held accountable for continued change, due to normal growth and aging.

1639 THE EFFECT OF MAXILLARY INCISOR RETRACTION ON "A" POINT. S.SHANKER*, D.B.WADE, M.BECK (The Ohio State University College of Dentistry, Columbus, OH).

Orthodontic retraction of maxillary incisors results in the reduction of maxillary dento-alveolar protrusion and retraction of cephalometric "A" point. The term incisor retraction encompasses both bodily retraction and simple lingual tipping. The objective of this study was to determine any difference in effect on "A" point between the two types of retraction. Two groups of subjects, bodily retraction group (BR) n=20, and tipping group (TP) n=16, had pre and post treatment cephalograms (T1 and T2) analyzed. Intra-maxillary treatment changes between T1 and T2 were determined by performing a maxillary superimposition according to the Bjork and Skieller technique (Trans Eur Orthod Soc 1977;7:209-233). Horizontal and vertical changes between T1 and T2 for the incisal tip, incisal apex and "A" point were measured using a grid consisting of a horizontal and vertical axis. Between group effects (BR vs TP) for the measured variables were analyzed by MANOVA and independent "t" test. The relationships between the different variables were assessed using Bonferroni-adjusted Pearson coefficients. Retraction of the apex of the maxillary incisor and "A" point were significantly greater in the bodily retraction group than in the tipping group: apex, 2.25 ± 0.98 (BR) vs. -1.34 ± 1.29 (TP), $p<0.05$, where "-" indicates advancement; and "A" point, 1.68 ± 1.08 (BR) vs. 0.28 ± 1.03 (TP), $p<0.05$). The retraction of "A" point was significantly correlated with the retraction of the apex of the maxillary incisors in both groups (coef. 0.70, $p<0.05$), and showed no correlation to the retraction of the tip of the maxillary incisor, (coef.-0.05, $p=1.0$). These results demonstrated that "A" point retraction was significantly greater when the maxillary incisors are retracted bodily and that "A" point change was most dependant on the retraction of the apex of the maxillary incisor and is not dependant on the retraction of the maxillary incisal tip.

1640 FEA Form Change Evaluation of Extraction vs Nonextraction Orthodontic Treatment. T. J. CANGIALOSI, M.E. McALARNEY, J. KIM*, W. CHAEKAL, L. BOVINO (Columbia Univ, N.Y., N.Y.).

The purpose of this study was to evaluate growth changes and orthodontic treatment effect in extraction and nonextraction cases using finite element analysis. The sample consisted of 21 growing patients with Class I division I malocclusion. All patients were treated using the edgewise appliance with an .022 inch slot. The average treatment time for the sample was two years and six months. Of the 21 cases studied, 8 were treated without the extraction of permanent teeth and 13 were treated in conjunction with the extraction of four first premolars. Pretreatment and posttreatment lateral cephalograms were obtained, and the coordinates of 18 landmarks were discretized. A mesh of 12 triangular finite elements which represented different cranial and facial anatomical structures was developed. FEA parameters calculated include; 1) maximum extension ratio (max er), 2) minimum extension ratio (min er), 3) angle of max er to palatal plane (phi angle), 4) area ratio (max er x min er), and 5) form change (max er/ min er). A paired t-test was used to identify statistically significant differences at $p< 0.05$. The values of example element which is composed of prosthion, anterior nasal spine, and posterior nasal spine were;

	Extraction (N = 13)		Nonextraction (N = 8)			
	Mean	SD	Mean	SD	T value	Significance
Max er	1.21	0.19	1.16	0.09	0.97	NS
Min er	0.93	0.10	0.99	0.06	-1.51	NS
Phi angle	64.56	23.10	69.93	22.47	-0.53	NS
Area ratio	1.12	0.15	1.14	0.13	-027	NS
Form change	0.79	0.14	0.86	0.07	-1.53	NS

These preliminary results indicated that there are no significant differences in the amount of geometric changes between extraction and nonextraction cases. Supported by The Whitaker Foundation.