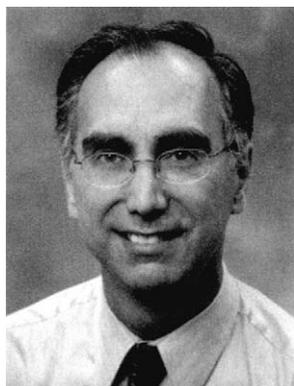


## The timing of Class II treatment

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**I**n our presentation at the Early Treatment Symposium, we attempted to summarize results from prospective randomized clinical trials at the Universities of North Carolina and Florida that examined the timing of treatment for Class II malocclusions. However, the actual presentation became a live example of randomiza-

tion: an untimely Trojan horse virus randomly distributed figures generated from data tables during the PowerPoint presentation. I hope this summary will clarify the results that were supposed to be clarified at the Early Treatment Symposium.

The main goal of both trials was to determine whether growth can be modified during the early treatment of children with Class II malocclusions and, if so, would this modification affect the subsequent care and treatment outcomes. Details on the designs of those studies are published elsewhere,<sup>1,2</sup> so I will just highlight the key differences here. In selecting subjects for their respective trials, the University of North Carolina (UNC) used overjet, whereas the University of Florida (UF) used molar class. Both studies had an observation group and early treatment groups treated with either bionator or headgear. However, the UF study used an anterior biteplane to disclude the posterior occlusion. In addition, the UNC trial used a combi-headgear, whereas the UF trial used either high-pull or cervical-pull headgear based on mandibular plane angle. Data

collection to examine early treatment effects occurred at different time intervals. The UNC trial examined phase 1 outcomes after 15 months of treatment, and the UF trial examined phase 1 outcomes after correction of the Class II molar relationship or 24 months, whichever occurred first. Finally, in the UNC trial, phase 2 treatment plans were determined by 1 of 4 participating orthodontists, whereas the UF trial attempted to formulate a “consensus” treatment plan from records sent to randomly selected orthodontists throughout the US. Therefore, although the issue examined was similar in the studies, there were some differences in their designs.

Many outcomes were examined at the end of phases 1 and 2 of the clinical trial including skeletal and dental changes, incisor trauma, and physical maturation, and these will be discussed here.

At both UNC and UF, at the end of phase 1 treatment, skeletal changes as measured by both angular (ANB angle) and linear anteroposterior changes (Johnston analysis) showed significant improvement in children who had received phase 1 treatment (Fig 1).<sup>3</sup> However, by the end of phase 2, the differences between those who had received phase 1 treatment and those who had not was indistinguishable (Tables I and II).<sup>2</sup> Furthermore, the range of changes in each group was similar, and each group had extremes—from great improvement to severe worsening of the Class II relationship (Table I).

Traditionally, an important reason to consider phase 1 treatment has been to reduce the incidence of incisor trauma in children. UNC found that, after 15 months, there were no significant differences between those who had phase 1 treatment and those who had not for new maxillary incisor trauma.<sup>4</sup> Likewise at UF, after 3 years, there were no significant correlations with new incisal injury and age, overjet, change in overjet, or years in treatment.

Examining the length of phase 2 treatment, the researchers at UF found that those who had phase 1 treatment finished phase 2 about 6 months faster than those treated in a single phase. At UNC, there were no noticeable differences in the phase 2 treatment time (Fig 2).<sup>2</sup> When the total treatment time for phases 1 and 2 was examined at UF, 2-phase treatment took signif-

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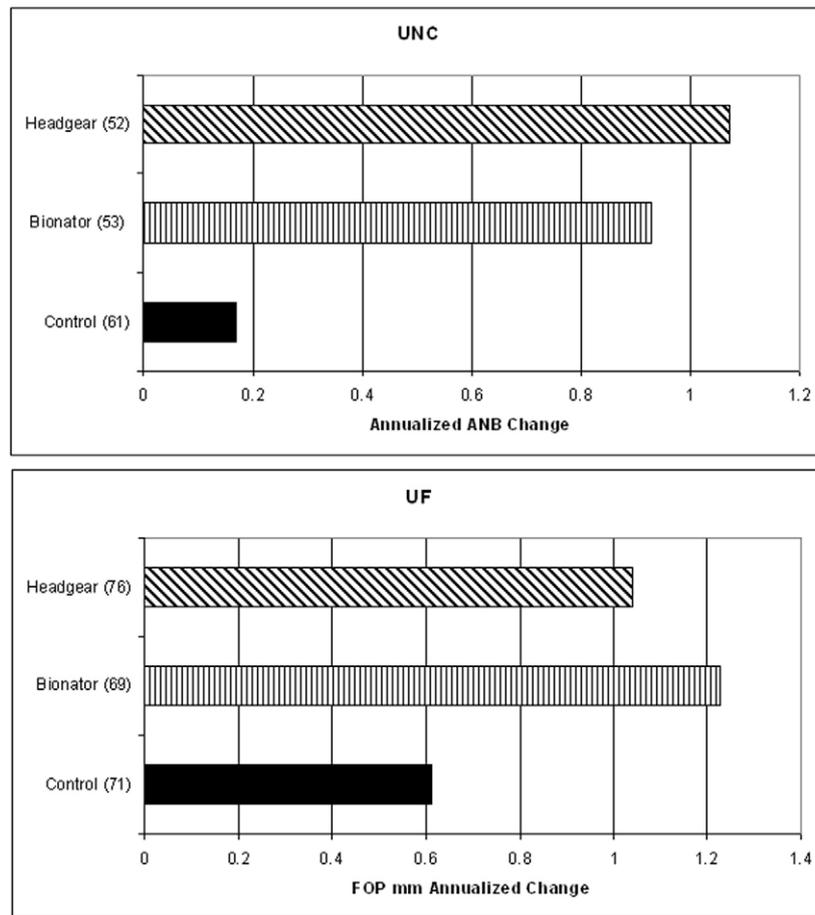
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**Fig 1.** Phase 1 changes in relation to apical base expressed at UNC as ANB change per year<sup>3</sup> and at UF as millimeter change per year in relation to functional occlusal plane. Numbers of subjects listed in parentheses.

**Table I.** Mean (range) phase 1 and phase 2 skeletal changes in UF groups

Skeletal measure	Control n = 47	Bionator n = 60	Headgear n = 59
Maxilla (mm)	-0.94 (-1.7 to -0.14)	-0.85 (-1.8 to -0.07)	-0.88 (-2.4 to 0.18)
Mandible (mm)	1.59 (-0.42 to 3.21)	1.55 (-0.36 to 3.68)	1.49 (-0.73 to 3.84)
Apical base change (mm)	0.65 (-0.76 to 2.17)	0.70 (-1.19 to 2.15)	0.61 (-0.92 to 1.82)

Negative value indicates negative impact on Class II correction.

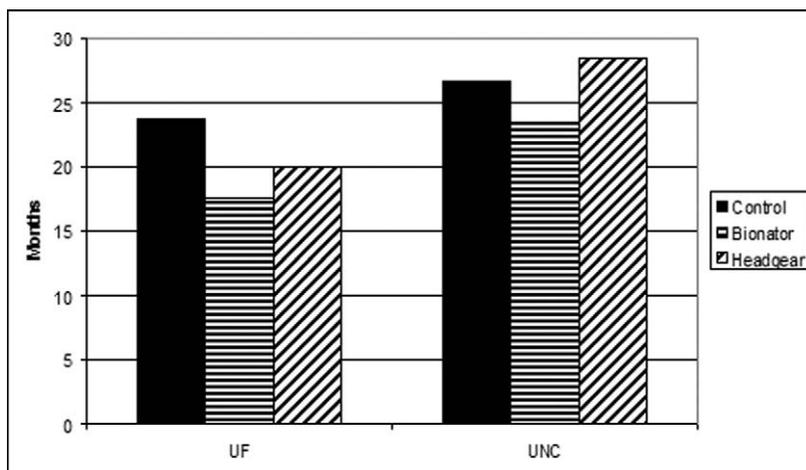
icantly longer than 1 phase. However, this might have been caused by the protocol, which allowed for a maximum treatment time in phase 1 of 24 months regardless of cooperation.

At the end of phase 2 treatment in both studies, there were no significant differences in the distribution of peer assessment rating (PAR) scores between those who had phase 1 treatment and those who had not (Fig 3).<sup>5</sup>

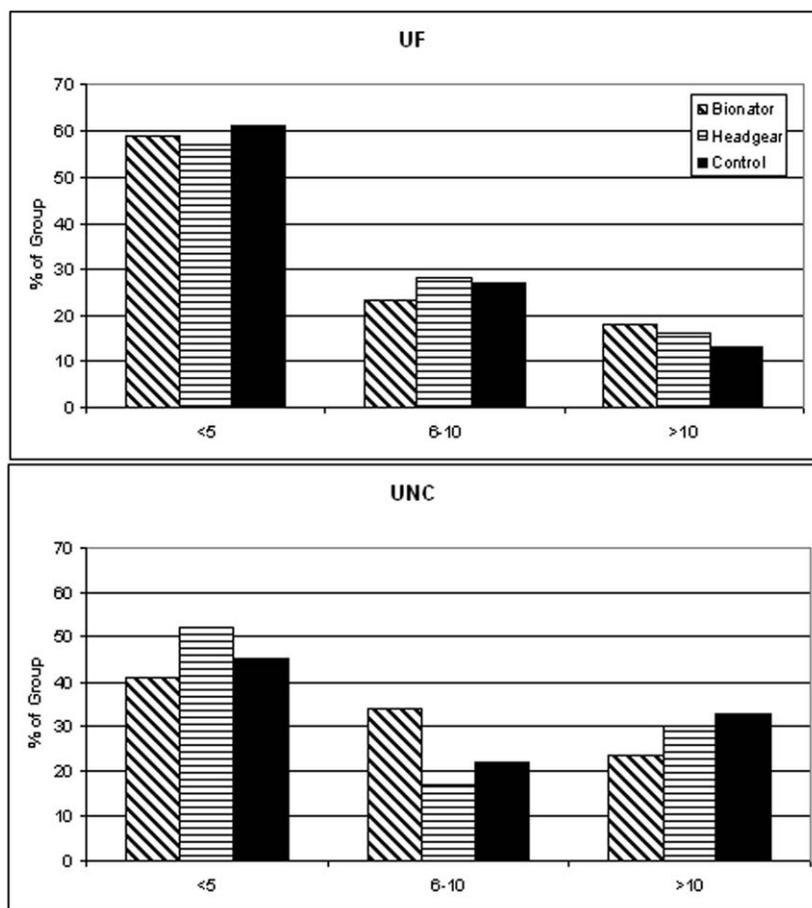
At UF, transverse changes during treatment were examined. There was significantly more expansion at

**Table II.** Mean phase 1 and phase 2 skeletal changes in UNC groups<sup>2</sup>

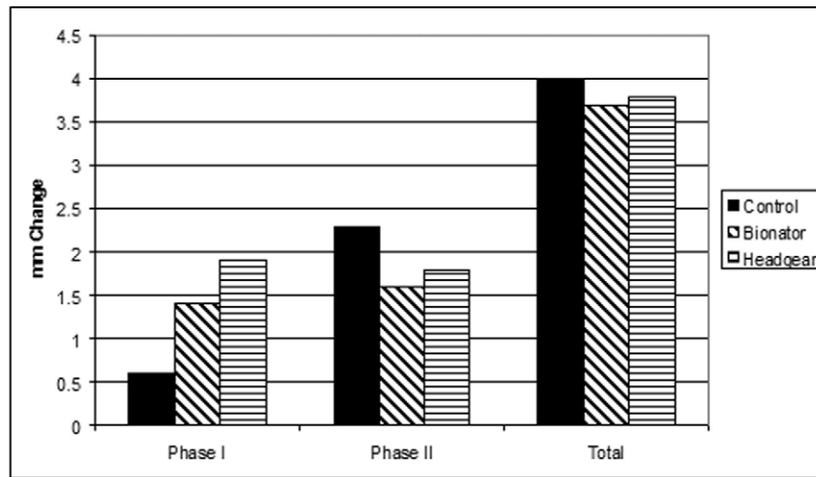
Skeletal measure	Control n = 51	Bionator n = 39	Headgear n = 47
SNA (°)	82.41	81.59	81.59
SNB (°)	78.06	77.84	77.60
ANB (°)	4.36	3.79	4.0



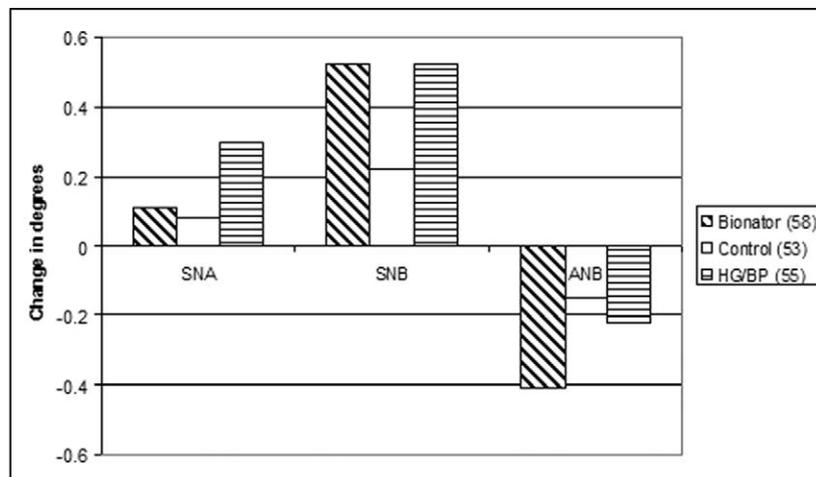
**Fig 2.** Length of time in phase 2 treatment for patients treated with bionator or headgear during phase 1 or not treated during that time (control) at UF and UNC.<sup>2</sup>



**Fig 3.** Distribution of PAR scores at end of phase 2 treatment for those who had phase 1 treatment and those who did not (control). PAR scores: < 5, very good finish; 6-10, good finish; and > 10, could have been finished better.



**Fig 4.** Maxillary canine transverse change during phase 1, phase 2, and total change.



**Fig 5.** Change in SNA, SNB, and ANB angles posttreatment. Numbers of subjects in parentheses. Mean posttreatment times were 3.6 years for bionator group and 3.2 years for headgear/biteplane and control groups.

the canines in those treated at the end of phase 1 compared with those who had no treatment (Fig 4). This expansion was passive and not as the result of any active force to expand the arch. These effects were reversed during phase 2 treatment, when those who had not received phase 1 treatment showed a greater increase in the transverse dimension, and, by the end of phase 2, there was no difference in transverse changes between the groups (Fig 4). These changes were similar for the transverse dimension at the molars as well as in the mandibular arch (data not shown).

The researchers at UF continued to collect data on their subjects after phase 2 to examine stability. Approximately 3 years posttreatment, there were no signif-

icant differences between those who received phase 1 treatment and those who had not, for either angular (Fig 5) or linear changes. Similarly, changes in PAR scores after phase 2 treatment were not significantly different.

Although patients receiving phase 1 treatment can have better skeletal and dental changes than those who do not receive treatment, there are no differences in skeletal and dental outcomes at the end of phase 2 treatment between those treated in a single phase and those treated in 2 phases. Furthermore, there is no difference in postphase 2 skeletal or dental stability. Although there are certainly other reasons to consider phase 1 treatment for a Class II malocclusion, an improved skeletal or dental outcome is not one.

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