Impact of Time on the Treatment Efficacy of Mandibular Repositioning Devices

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Introduction: A limited number of studies have measured changes in sleep-disordered-breathing subsequent to treatment with mandibular repositioning devices (MRD). This pilot study assesses changes in efficacy and/or need for routine adjustment to optimize outcomes.

Methods: A prospective, longitudinal study design included nine females and 11 males who underwent ARES in-home sleep studies at baseline, and one-, two-, three- and six-months subsequent to MRD insertion. Sixty-five percent (13/20) maintained the same MRD-advancement beginning with Month 2, 20% maintained the same advancement for Months 3 and 6, two increased advancement by less than 1 mm and one decreased advancement by one mm between months 3 and 6. The Tap III MRD (Airway Management, Inc., Dallas, TX) was used in 15 patients and the Herbst MRD (Great Lakes Orthodontics, Tonawanda, NY) was used in 5 patients. Eleven of the 20 patients were treated by a dentist with no prior experience with MRD therapy but who followed a strict treatment protocol. Repeated-measures ANOVA and t-tests were used to assess changes across the five time-points. AHI and RDI values were derived using the previously validated ARES auto-scoring algorithms.

Results: Pre-treatment the group mean AHI was 21 and the RDI was 34 events/hr. Of the six patients (30%) with an AHI < 10 at baseline, five had an RDI > 15 suggesting important sleep disordered breathing was recognized (Figure 2.a.). There was no effect of treating dentist on outcome. There were no significant changes in weight, neck size, BMI, %-time-Supine, level of MRD adjustment, or valid recording time that could have contributed to outcomes. The overall, supine or non-supine AHI (Figure 3.a.) and RDI values (Figure 3.b.) as well as Epworth scores (Figure 1) were significantly higher pre-treatment vs. all other time points, but once treatment was initiated, no significant changes were observed between months one, three and six. The mean and standard error estimates at Month 6 for all AHI and RDI values were the lowest of any post-treatment time-point. In three cases there was less than a 3 event/hr AHI change from base at Month 6. Of the balance, 15 of 17 obtained/maintained at least a 50% reduction in AHI at six-months while only 11 of 17 satisfied the same outcome threshold using the RDI criteria (Figure 2.b.). No significant differences in %-time snoring >30dB or >40dB before and during the treatment was likely a result of between-subject variability.

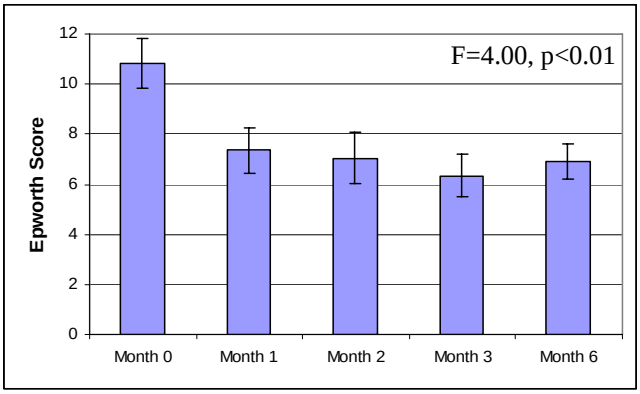

Figure 1: Changes in Epworth score at baseline and up to six months subsequent to treatment.

Conclusions: These results suggest that once an MRD is properly adjusted, it provided consistent efficacy across the first six-months of therapy. Outcome success is dependent, in part, on the criteria used to assess sleep disordered breathing (i.e., AHI vs. RDI). A reduction in snoring alone does not appear to be a reliable measure for assessing efficacious MRD outcomes.

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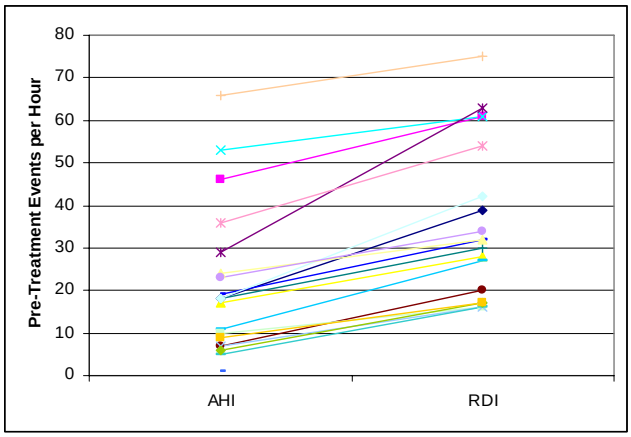


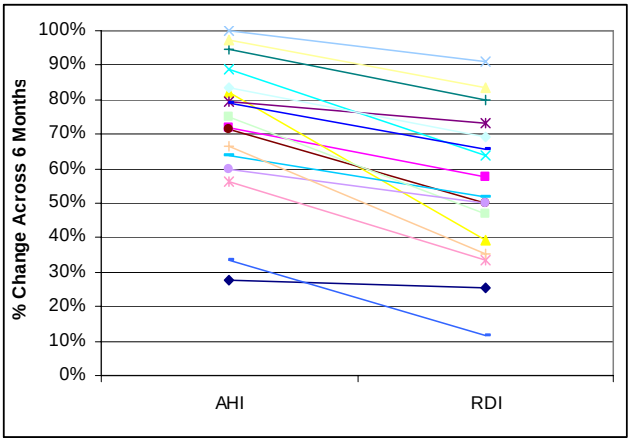
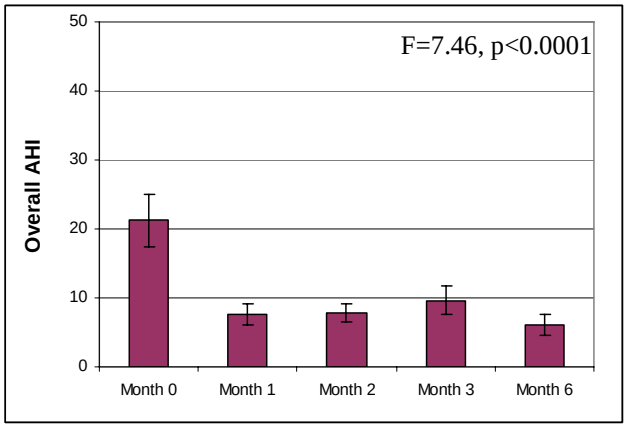
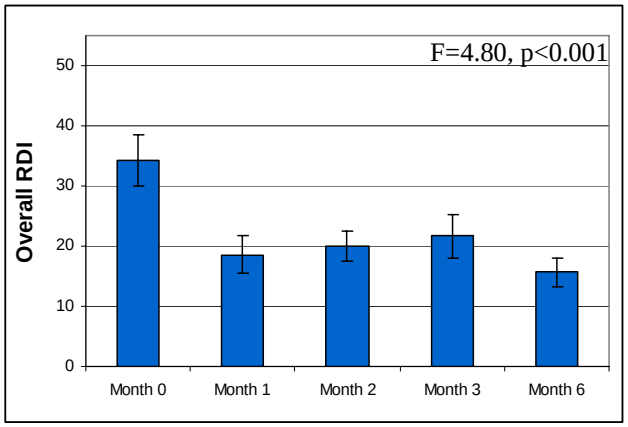
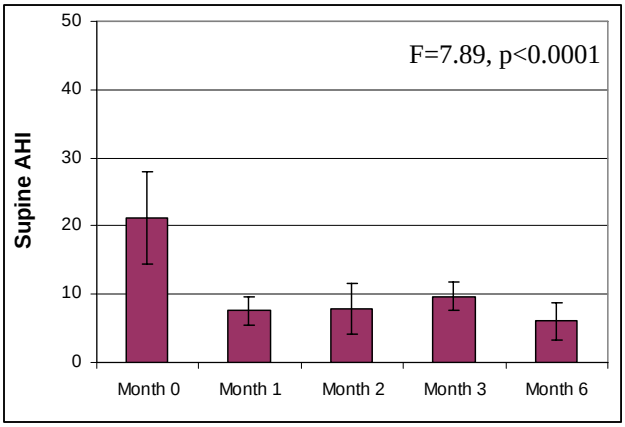
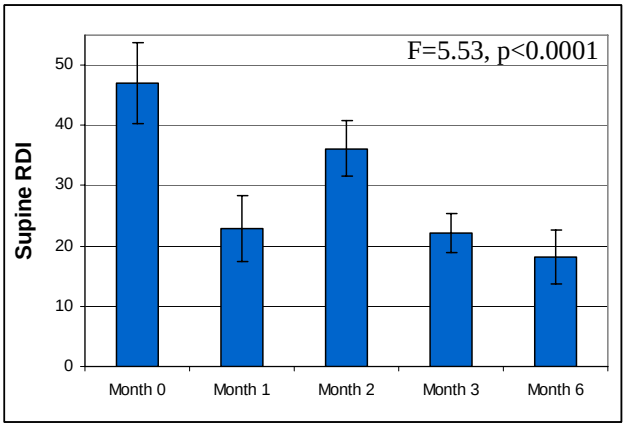


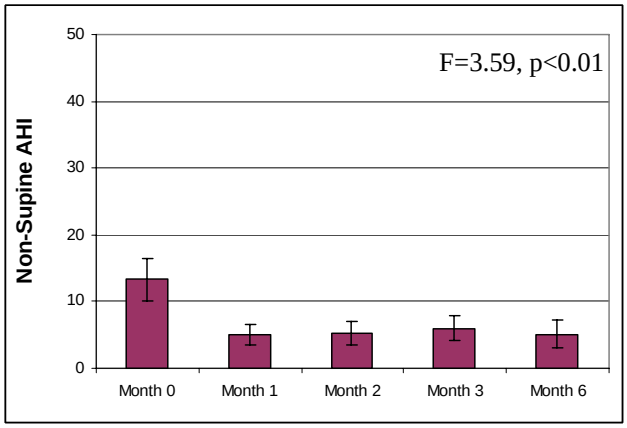
Figure 2: Comparison of a) pre-treatment AHI vs. RDI, and b) percent reduction in AHI and RDI after six months.











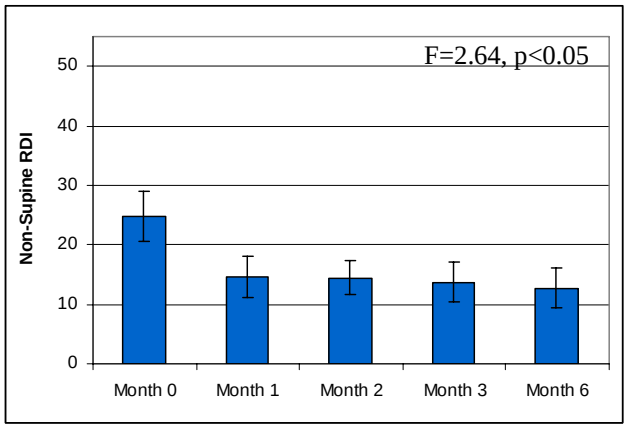


Figure 3: Changes in a) AHI and b) RDI overall and by position, at baseline and 1-, 2-, 3- and 6-months post-treatment.

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