

Factors Impacting Mandibular-Repositioning-Device Therapy at One-month

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Introduction: There are a limited number of studies which have directly compared differences in efficacy between two mandibular repositioning devices (MRD), or validated procedures which can be provided to a novice dentist to improve the likelihood of successful MRD outcomes. The goals of this prospective study were to: a) determine if there were differences in outcomes between two commercially available MRD appliances, and 2) assess differences in outcomes between an expert and novice dental office using standardized protocols.

Methods: Prior to the start of this prospective study, a dentist with 18-years of dental sleep medicine experience (expert) developed a protocol/training manual. The novice dentist attended a two-day advanced MRD training seminar in which details of the manual were reviewed. The manual included instructions not normally provided in a dental training program, including detailed sections on titration troubleshooting, long term patient management, general considerations for MRD selection and background on issues that impact MRD retention. Forty-six patients were recruited and treated by the expert, 20 with the Tap III (Airway Management, Dallas, TX)(MRD-T) and 26 with the Herbst (Great Lakes Orthodontics, Tonawanda, NY)(MRD-H) oral appliance. During the initial part of the subjects were randomly assigned to each arm. After the study was two-thirds complete, subjects were assigned to better match the distribution of AHI severities. Thirty-four patients were recruited and treated by the novice using the Tap III with dental sleep medicine complications managed according to the training manual. Two-night in-home sleep studies were conducted prior to and one-month subsequent to insertion using the ARES Unicorder (Advanced Brain Monitoring, Carlsbad CA). The degree of advancement achieved at the one-month point was based solely on instructions provided at the insertion and coaching provided by auxiliaries at the one-week telephone follow-up.

Results: MRD-T vs. MRD-H: The two groups treated by the expert were similar with respect to pre-treatment AHI values, age, neck size, BMI, ESS, and co-morbidities. At the one-month point there were no significant differences between the two appliances in overall, supine and non-supine AHI (Figure 1.a. and 2.a.). Although there were no significant difference in the pre- or post-treatment RDI, or in the change in RDI resulting from treatment (Figure 1.b.), 55% of the patients with the MRD-T had $\geq 50\%$ reduction while only 23% showed this improvement with the MRD-H ($p < 0.05$)(Figure 2.b.).

Expert vs. Novice: The 46 patients treated by the expert had a higher prevalence of hypertension, diabetes and diagnosed OSA ($p < 0.05$) because this practice was referred patients who fail CPAP. There were no significant differences between practices in pre-treatment overall, supine or non-supine AHI values (Figure 1). Although not significant, the mean percentage reduction and the percentage of patients with $\geq 50\%$ reduction in AHI were higher for the novice vs. the expert using the MRD-T (Figure 2.a.). A review of the records showed that the novice's staff completed the one-week telephone coaching sessions in 100% of the cases while the expert's staff completed the follow-up in only 6.5% of the cases. A number of the poor outcomes at one-month were attributed to the patient not understanding the MRD adjustment instructions.

Conclusions: There were no differences in outcomes between MRD-T and MRD-H or between the novice and expert dentist using AHI. With a more subtle measure of sleep disordered breathing (RDI), the MRD-T appears superior to the MRD-H. More consistent follow-up and coaching resulted in the novice achieving better percent change in AHI as compared to the expert at one-month. The novice managed all complications without assistance using the expert's manual.

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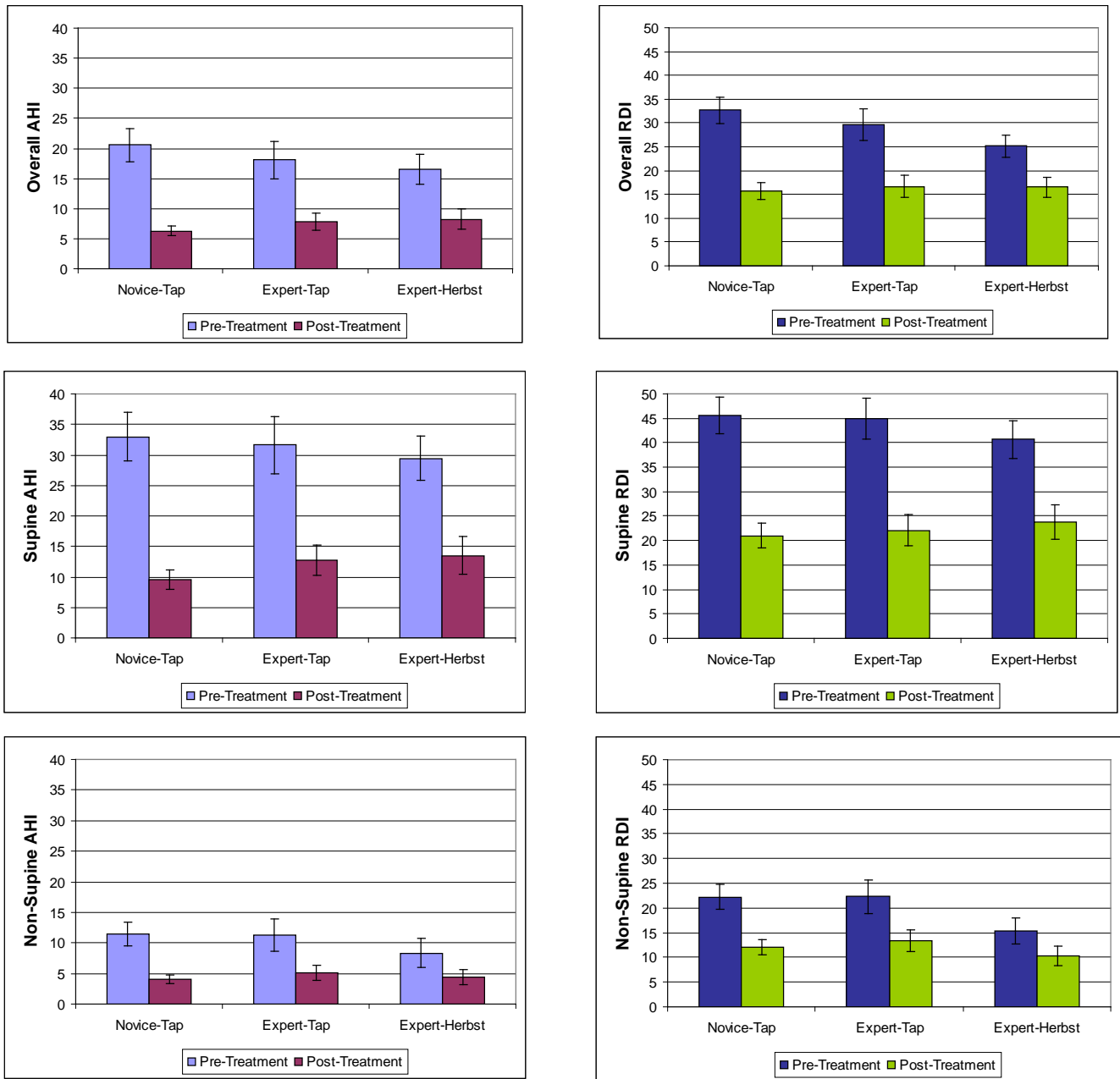


Figure 1. Comparison in a) AHI and b) RDI for Novice vs. Expert with TAP and Tap vs. Herbst by position.

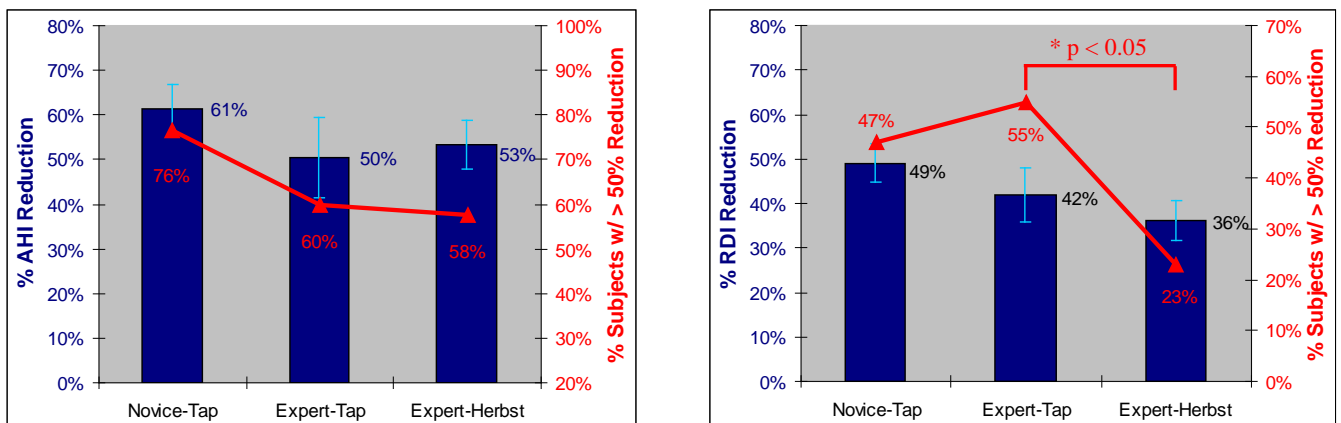


Figure 2. Comparison of the mean + SE percent change and distribution of subjects in each group that exhibited at least a 50% reduction in a) AHI and b) RDI for Novice vs. Expert with TAP and Tap vs. Herbst MRD.

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