

# Mandibular advancement device titration using a remotely controlled mandibular positioner

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## Introduction

Mandibular advancement devices are successful in 50% of subjects with obstructive sleep apnea (OSA).

Remmers<sup>1</sup> used a single night laboratory titration to predict therapeutic outcome using a remotely controlled mandibular positioner (RCMP, SomnoMed MATRx™, Zephyr Sleep Technologies Inc., Canada).

We report on use of the RCMP in a clinical sleep practice.

## Methods

Full night diagnostic polysomnography (PSG-Dx)

AHI3A= (apneas + hypopneas with either 3% desaturation or EEG arousal)/TST

46 subjects (33M/13F, BMI 26±3.9 kg/m<sup>2</sup>)

40 with OSA (AHI3A>15/hr)

4 with positional/REM OSA (AHI3A in supine or REM >15/hr)

2 with snoring + arousal index >20/hr

Mandibular advancement therapy offered if

Diagnostic AHI3A (AHI3A<sub>Dx</sub>) <30/hr (n=30) or

AHI3A<sub>Dx</sub> ≥30/hr and refused CPAP (n=16)

Baseline and maximum jaw advancement (ADV<sub>MAX</sub>) determined prior to study by a dentist.

Full night polysomnography with RCMP in place (PSG-RCMP)

During PSG-RCMP, device progressively advanced from baseline to ADV<sub>MAX</sub> until apneas and hypopneas eliminated (ADV<sub>OPT</sub>), or until the patient expressed discomfort.

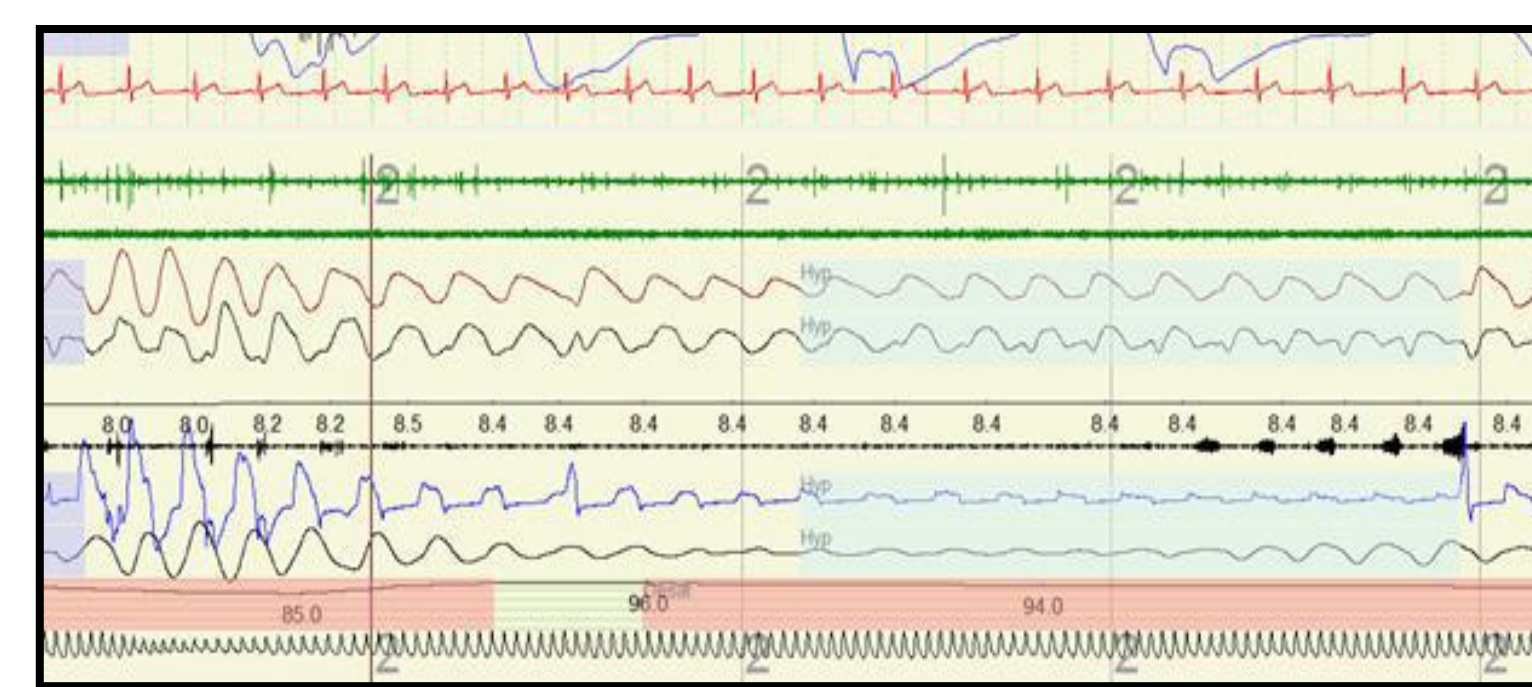
AHI3A<sub>RCMP</sub> calculated with sleep time limited to period with optimal/maximal advancement.

Success defined (Responders) by

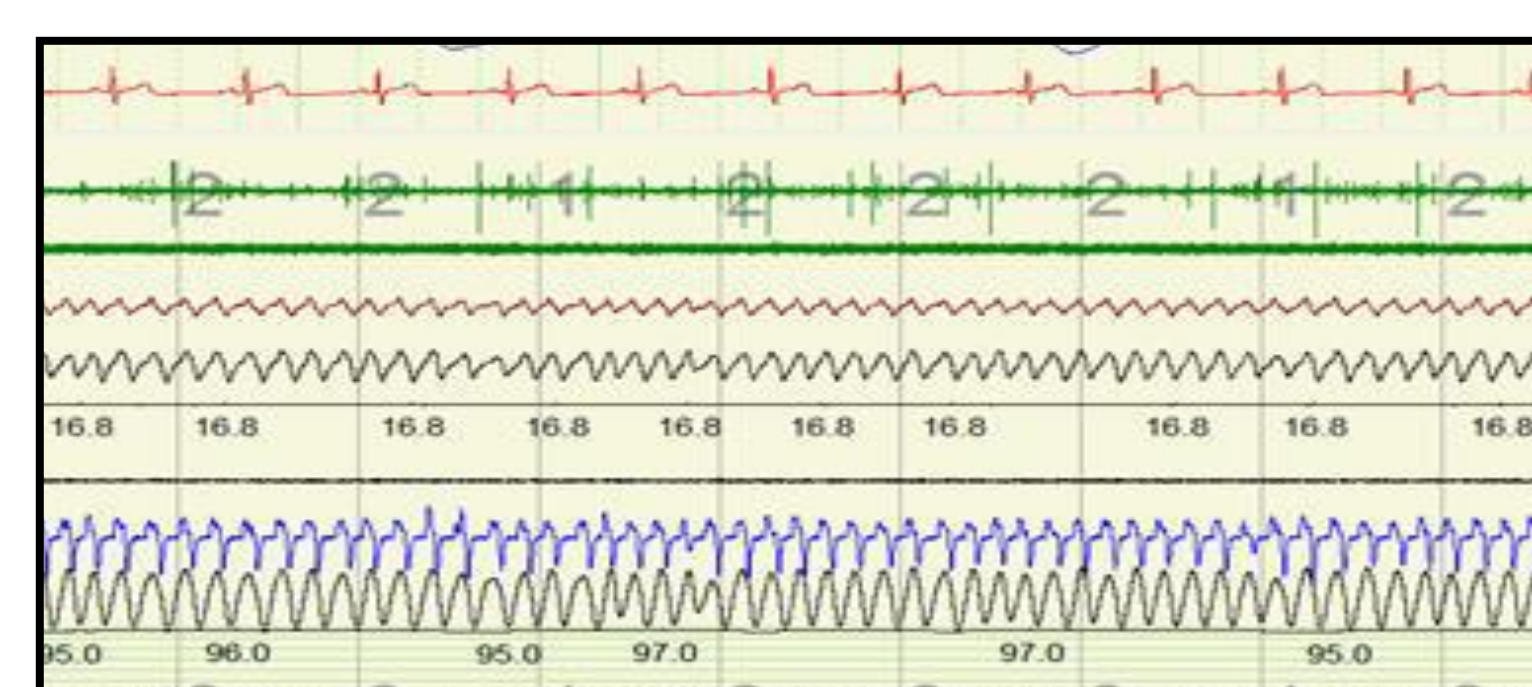
50% reduction if AHI3A<sub>Dx</sub> was <20/hr, and AHI3A<sub>RCMP</sub><15/hr

3 patients with significant response = AHI3A >50% reduction but

AHI3A<sub>RCMP</sub> between 15-25/hr



RCMP titration 8.0-8.4 mm with apneas, hypopneas still present.



RCMP titration 16.8mm therapeutic (ADV<sub>OPT</sub>)

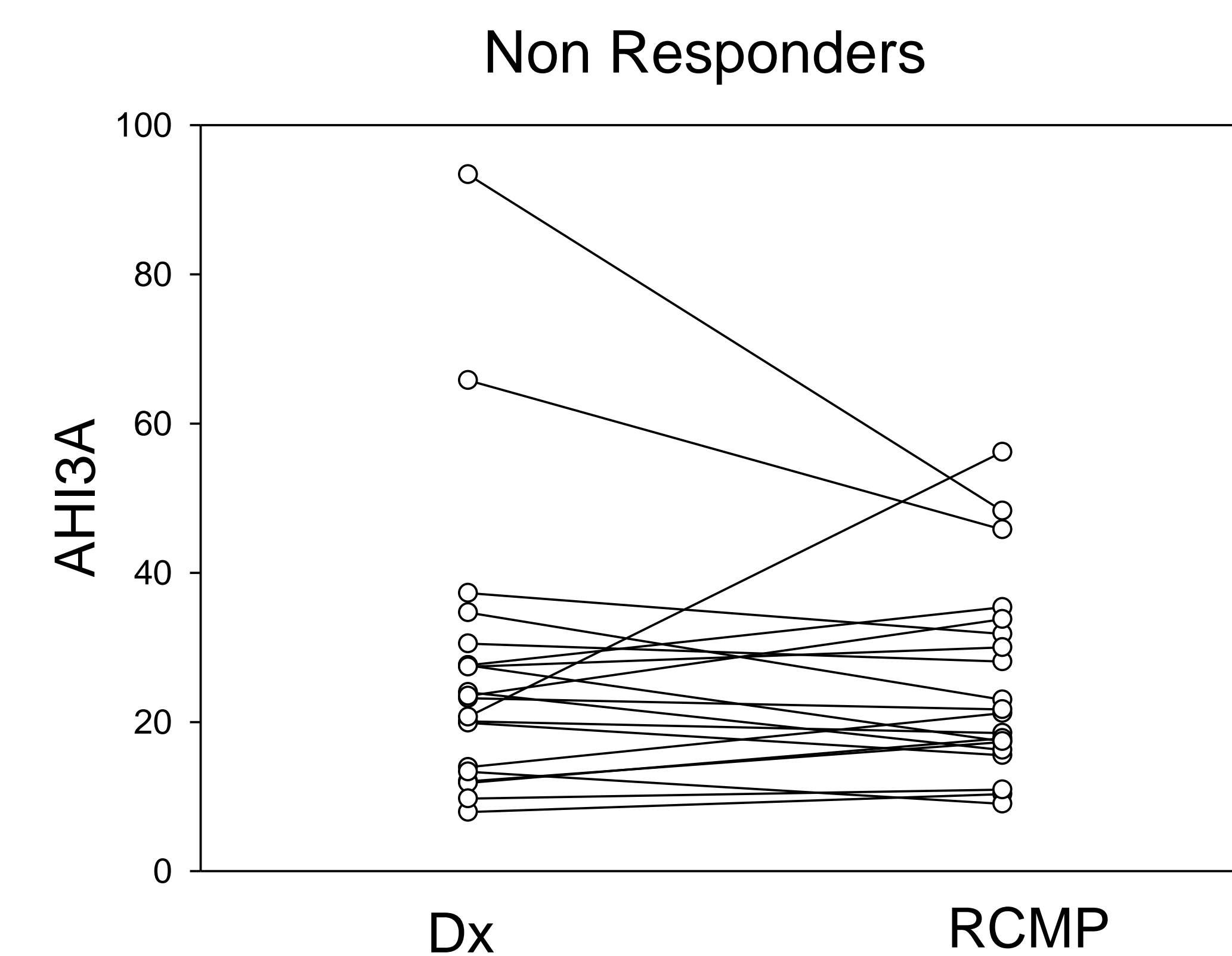
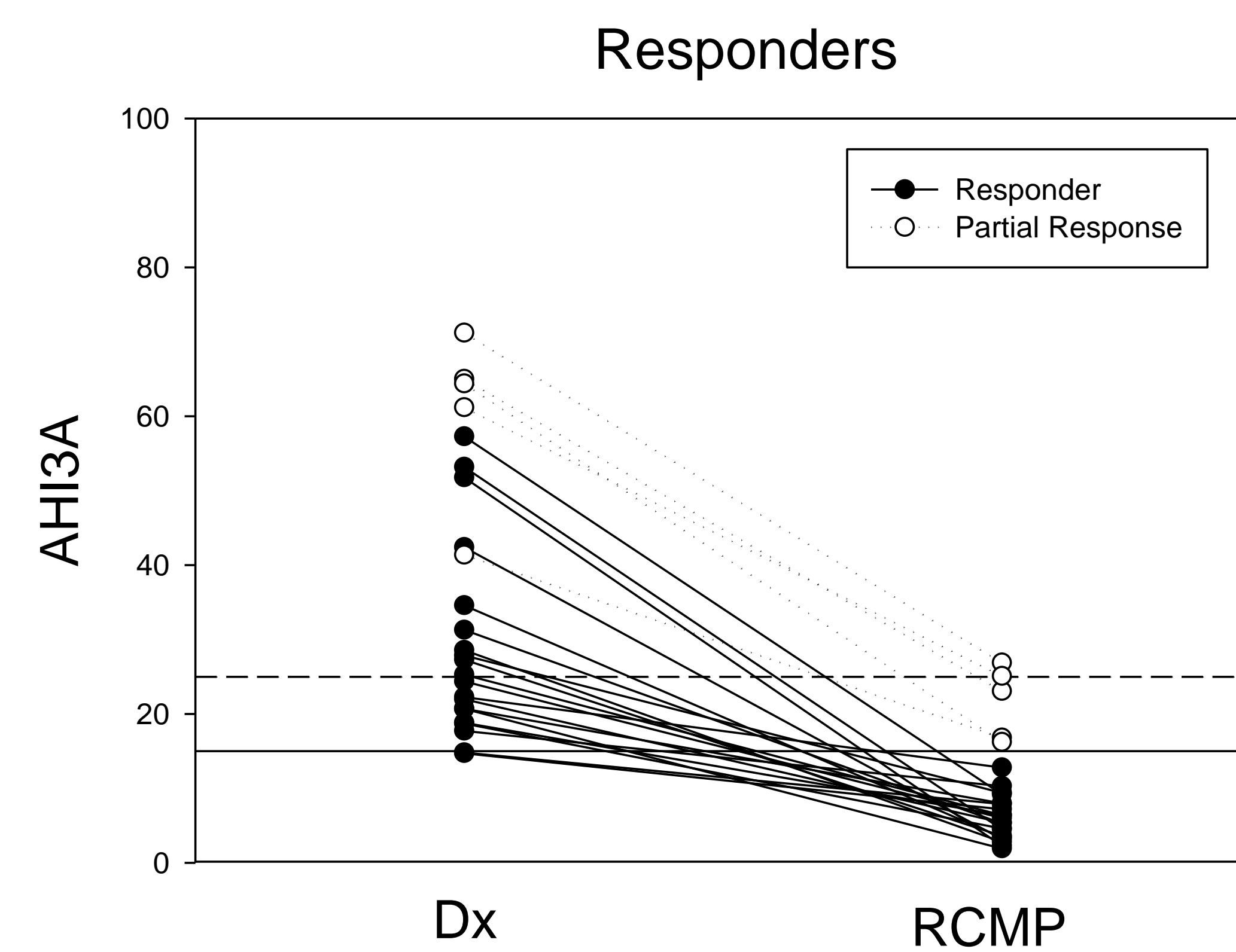
## Results

	N	AHI3A <sub>Dx</sub> /hr	AHI3A <sub>RCMP</sub> /hr
<b>Responders</b>	25	35±18	9.1±7.2
<b>Non Responders</b>	21	27±18	25±13

54% of subjects showed a therapeutic response

Degree of advancement in Responders

ADV <sub>MAX</sub> - ADV <sub>OPT</sub>	N
<2 mm	20
2-5 mm	5



## Results

Responders (n=25)	Diagnostic Mean±SD (range)	RCMP Mean±SD (range)
Sleep Time	334±72.6 (120-439)	145±77.1 (16.5-305)
AHI3A	35±18 (15-71)	9.1±7.2 (1.9-27)
REM AHI3A	30±23 (0.0-76)	11±12 (0.0-45)
Supine AHI3A	47±27 (0.0-105)	17±19 (0.0-69)

Non Responders (n=21)	Diagnostic Mean±SD (range)	RCMP Mean±SD (range)
Sleep Time	332±101 (56.5-451)	139±72.8 (44.5-272)
AHI3A	27±20 (7.9-93)	25±13 (9.0-56)
REM AHI3A	29±16 (0.0-66)	31±23 (0.0-69)
Supine AHI3A	40±29 (11-128)	22±17 (0.0-63)

Degree of Advancement compared to maximum (ADV<sub>MAX</sub>)

	Total	Responders (therapeutic)	Non Responders
ADV <sub>MAX</sub>	17±2.6	17±2.3	17±3.1
ADV <sub>OPT</sub>	16±2.8	16±2.7	16±2.9
△ <sub>ADV</sub>	0.9±1.7	1.0±1.5	0.7±2.0

## Conclusions

The RCMP system was used to advance the dental device over a range of jaw advancements and was well tolerated.

In 20/46 subjects, titration reduced AHI3A to <15/hr, and 5/46 experienced significant response during the one night titration.

5/25 required 2-5mm less than maximal advancement (ADV<sub>MAX</sub>) recommended by dentist.

Lack of benefit was predicted in 21/46 subjects. The long-term utility of suboptimal advancement, prediction of futility, and sustained efficacy need to be addressed separately.

## Acknowledgements

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## References

[1] Remmers J, Charkhadeh S, Grosse J, Topor Z, Brant R, Santosham P. Remotely controlled mandibular protrusion during sleep predicts therapeutic success with oral appliances in patients with obstructive sleep apnea. Sleep. 2013;36:1517-25.