

## INTRODUCTION

In essence, Sleep Disorders Breathing (SDB) are caused by tongue's position and low muscle tone inducing its collapse during inhalation. Their severity is increased with mouth breathing<sup>1,2</sup>.

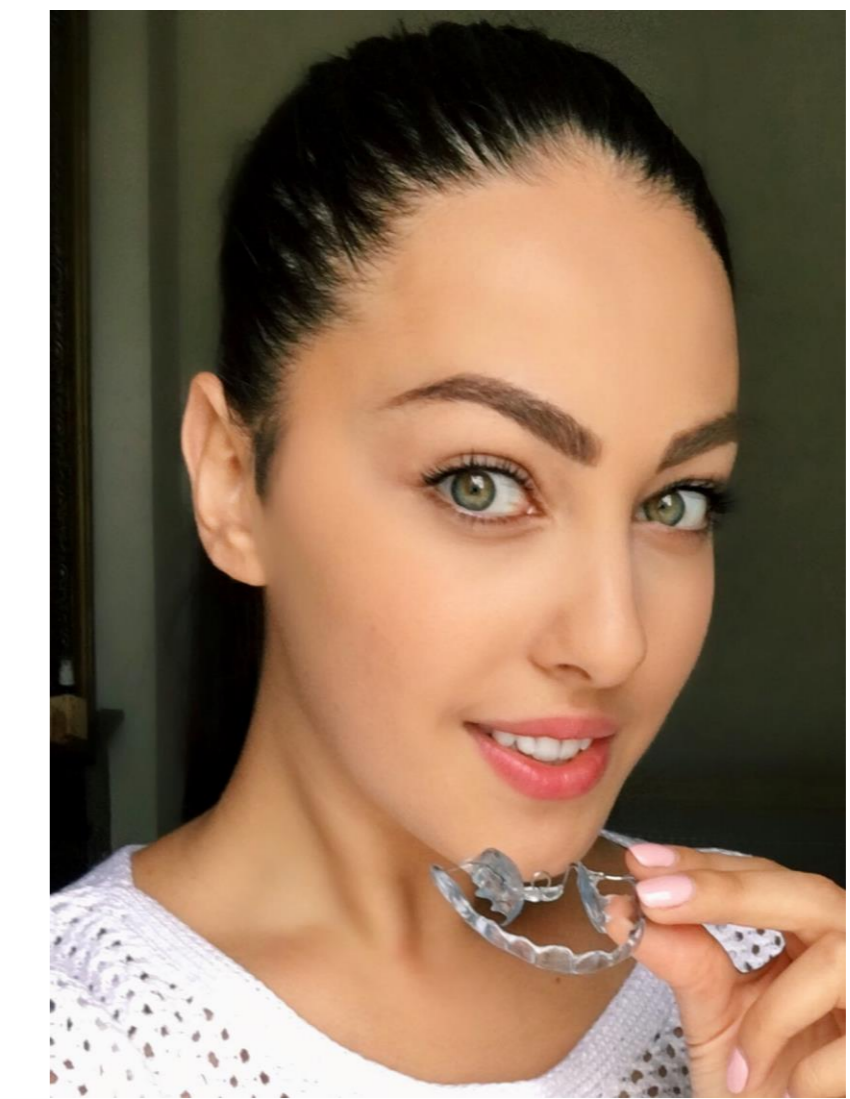
Tongue re-education aims at correcting tongue dysfunctions, rest position and improving its muscles' tonicity. It is an efficient way to treat SDB<sup>3</sup>. However, treatments success depends on patients' compliance and practitioners' experience.

The Tongue Right Positioner (TRP) is a custom made oral device, well-tolerated and worn during sleep. It is designed to restore physiological tongue positions operating or at rest<sup>4</sup>.

The goal of this study is to assess TRP's lasting effectiveness on upper airways dimension and patency. Then, we tested its efficacy on patients with Obstructive Sleep Apnea.

## THE TRP

- Non-removable oral medical device for young patients
- Removable custom made device for adolescent and adults
- Fits on upper dental arch, acts permanently/nightly on the tongue
- Establishes physiological lingual functions and posture
- Comfortable and well tolerated (> 98% compliance)



## TRP effects on nasopharyngeal patency of young orthodontic patients

### Patients

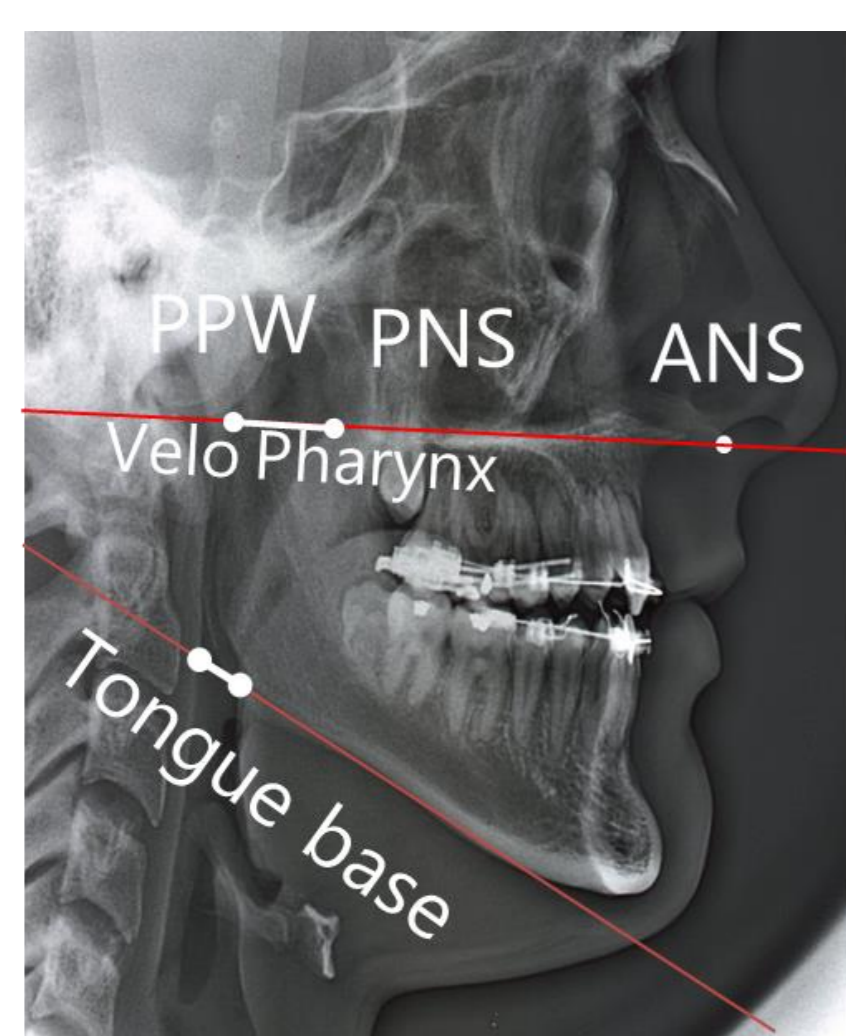
- 70 orthodontic patients, age 11.4 ± 2.7 years
- 45 females and 25 males
- 49 equipped with fixed TRP – 21 control without TRP
- 75% with mouth or mixed breathing
- All patients have tongue dysfunctions

### 3 measurements

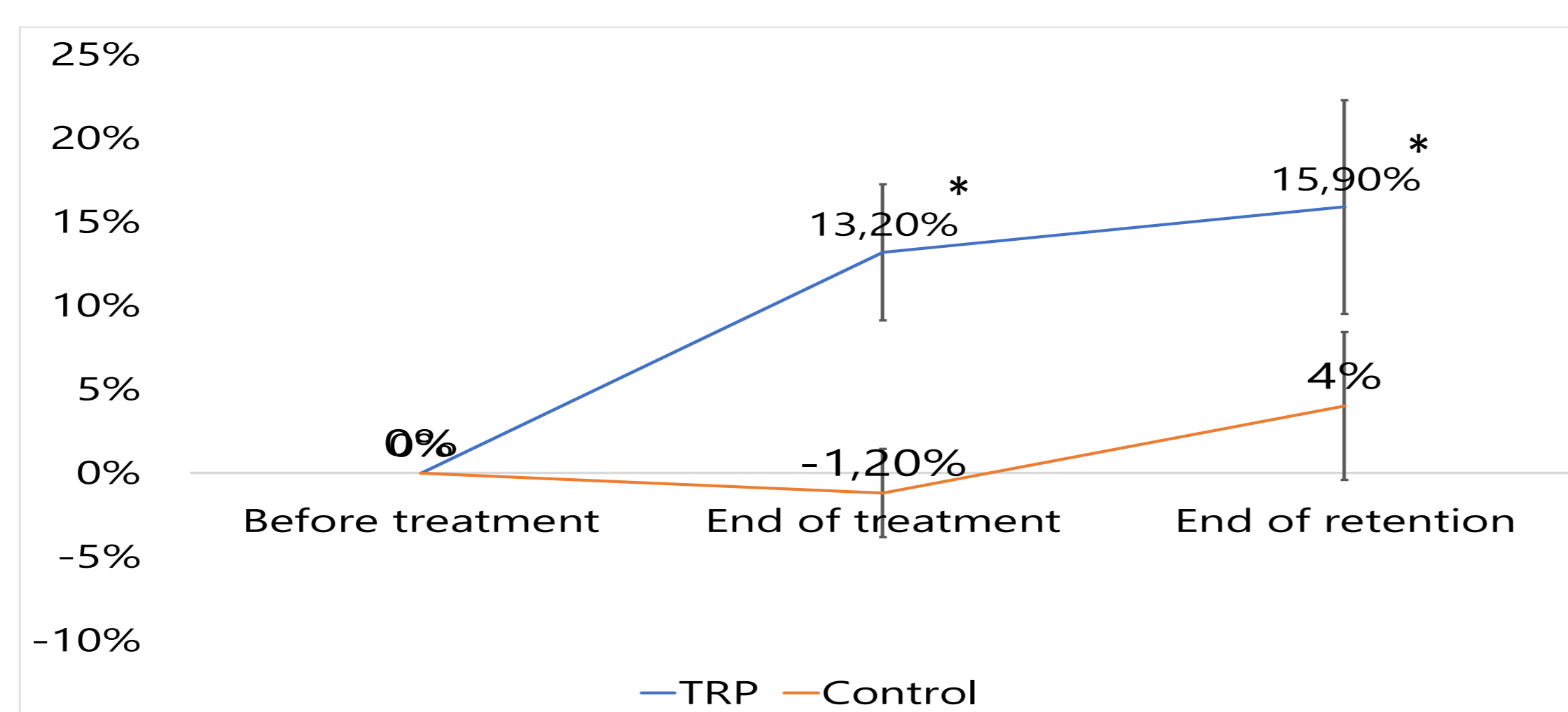
- Before treatment
- End of treatment: TRP is removed when tongue dysfunctions are corrected and nasal breathing restored (17 ± 7.5 months)
- End of retention (11 ± 6.3 months after TRP removing)

### THE TRP TREATMENT IS ASSOCIATED WITH STABLE INCREASES IN PHARYNGEAL ANTERO-POSTERIOR DIAMETERS

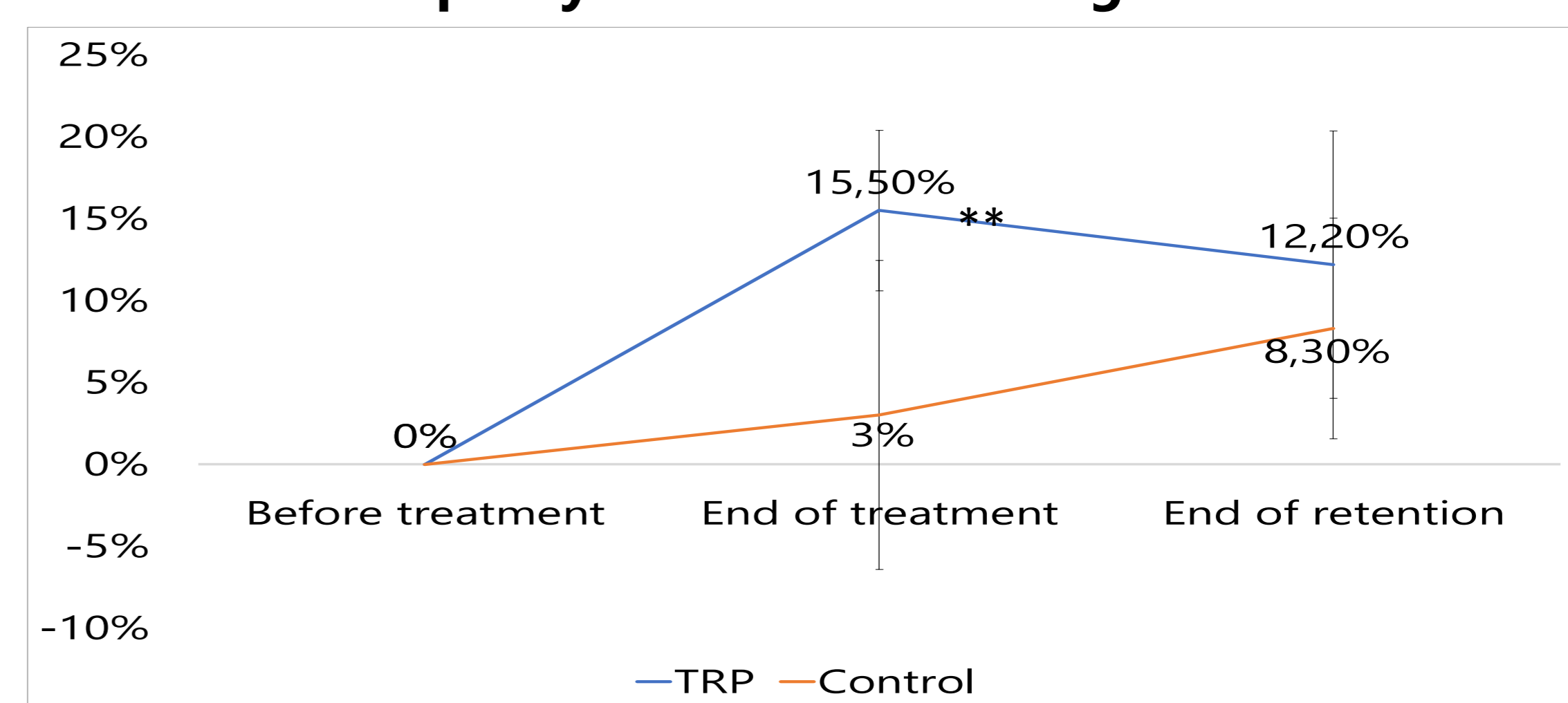
#### Cephalometric measures



#### Evolution of velopharynx diameter



#### Evolution of pharynx diameter at tongue base level

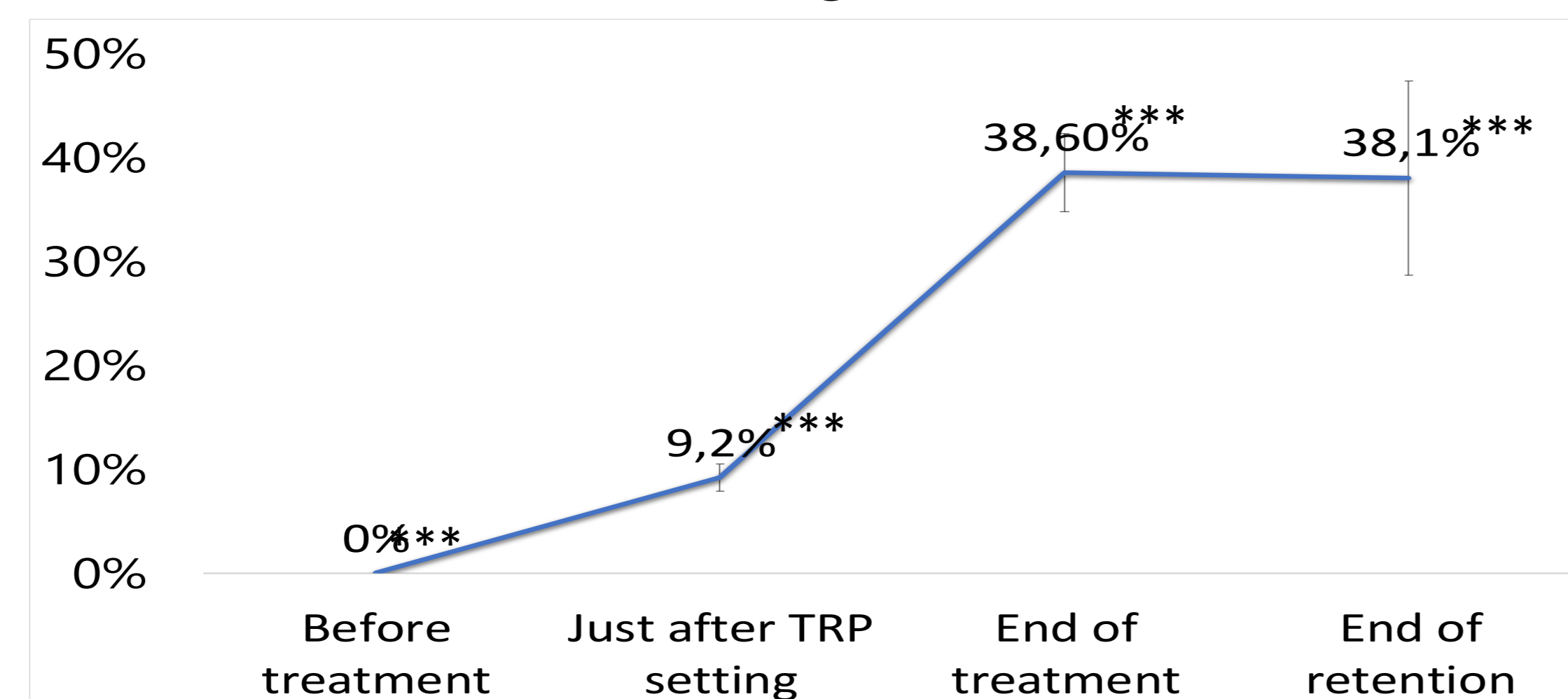


### THE TRP INCREASES NASAL PATENCY, INSTANTLY, PROGRESSIVELY AND PERMANENTLY, REGARDLESS OF PATIENTS SIZE

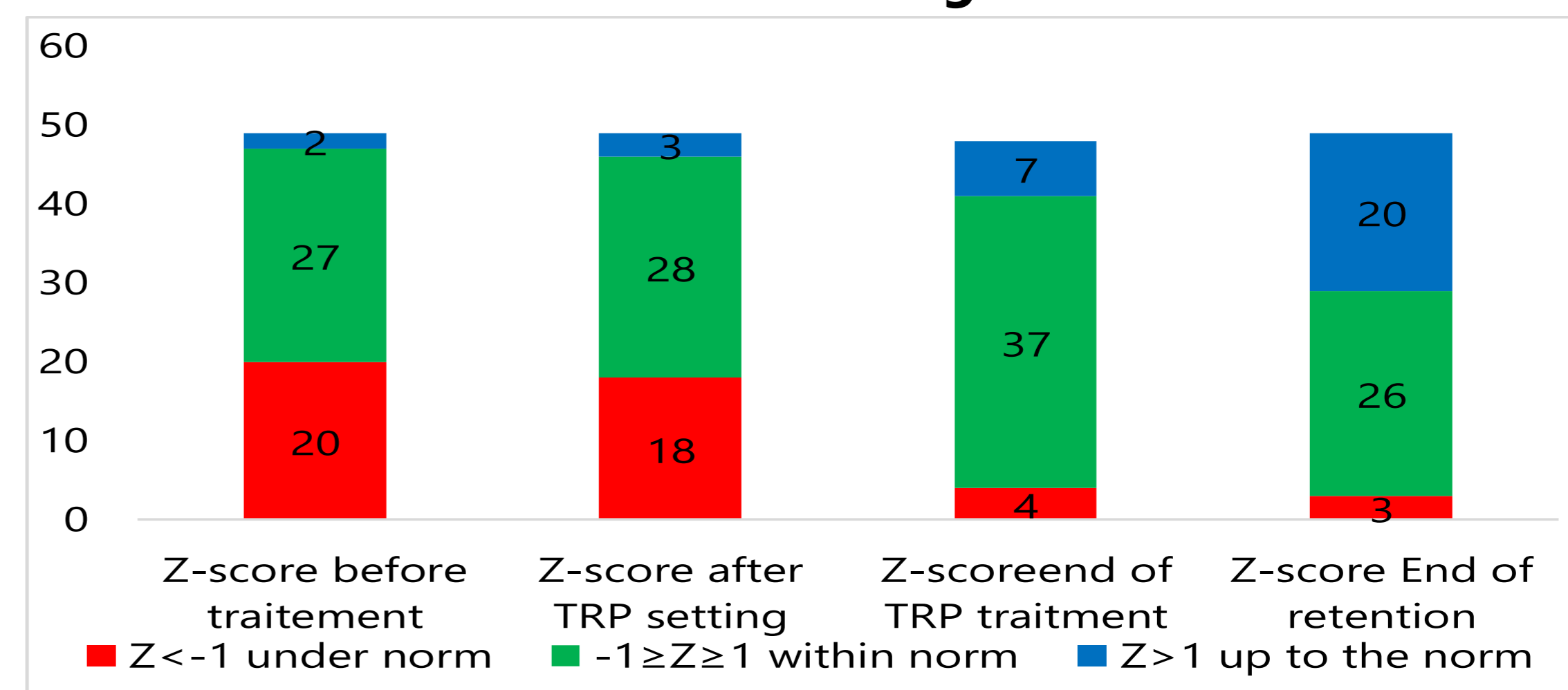
#### Effect on nasal patency PNIF



#### Evolution of PNIF during TRP and after TRP treatment



#### Z-score distribution during TRP treatment



\*p<0.05 \*\*p<0.01 \*\*\* p<0.001

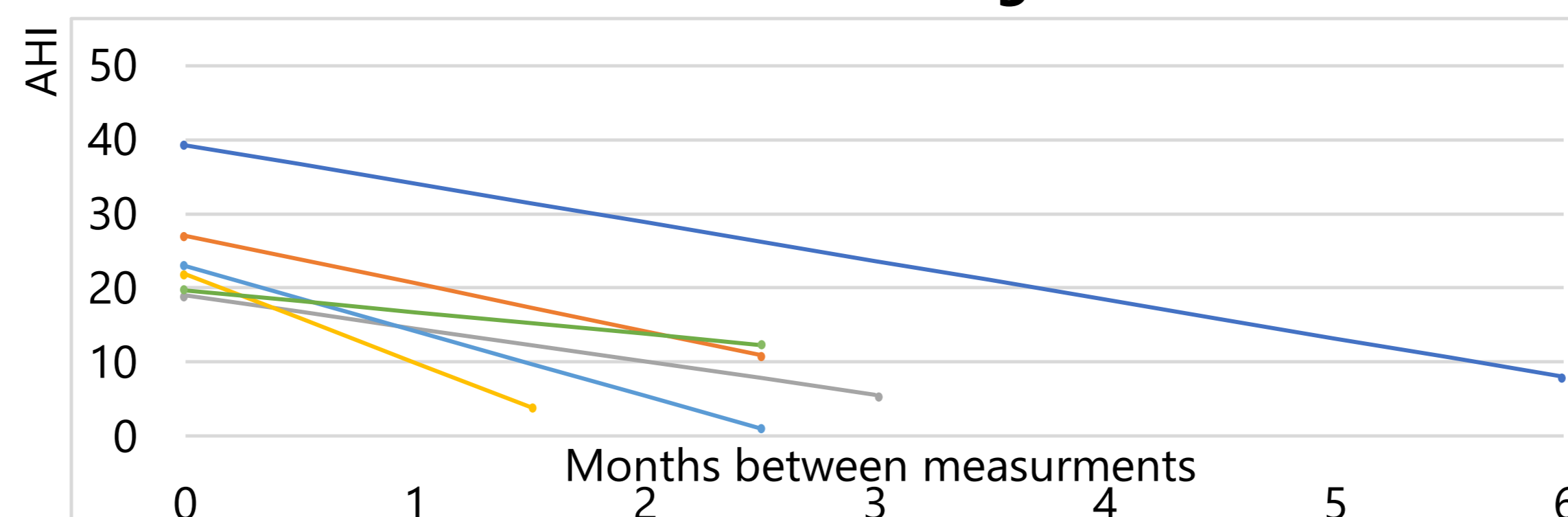
## TRP effects on Adult Obstructive Sleep Apnea

### TRP TREATMENT IS ASSOCIATED WITH A REDUCTION OF 71 ± 6% IN AHI

#### Patients and AHI measurements

- N=6,
- Age : 49,4 ± 6,8 years
- 2 women et 4 males
- BMI : 26,3 ± 4,5 kg/m<sup>2</sup> (min : 21 – Max: 32)
- Moderate to severe OSAS (18 ≤ AHI ≤ 39)
- First measurement before TRP setting
- Second measurement during treatment with TRP in mouth (median 2.5 months)

#### Evolution of OSA before and during TRP treatment



#### Distribution of patients

OSA severity categories	Before	with TRP
Severe (AHI ≥ 30)	2	0
Moderate (15 ≤ AHI < 30)	4	0
Mild (5 ≤ AHI < 15)	0	4
None (AHI < 5)	0	2

## DISCUSSION

Evolution of pharyngeal diameters and nasal patency of young patients suggests a succession of effects triggered by a TRP treatment.

First, muscles and tissues tensions are mechanically activated by TRP when fitted<sup>5</sup>.

Then the re-educating constraint and new proprioceptive status between tongue, teeth and palate improve oropharyngeal muscles functions, positions and tonicity. This leads to the progressive improvements of Upper Airways functions observed.

Re-educated tongue self-maintains physiological functions and position, leading to persistence of improvements previously acquired.

We observed beneficial effects on adult patients with OSA. We hypothesize that TRP modes of action are similar on apneic adults as on young patients.

These preliminary results show that the TRP has the potential to become an effective preventive or curative alternative to conventional treatments of SDB. Further results are needed to assess the long-term effects of TRP treatment on OSA patients.

## REFERENCES

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