The effect of fixed mandibular advancement on regional upper airway geometry in OSA patients

Olivier M Vanderveken²,₆, Wim Vos¹, Jan De Backer¹, Kristien Wouters⁴, Wilfried De Backer⁵, Marijke Dieltjens³, Marc Braem³,₆

¹Fluida nv, Kontich, Belgium; Departments of ²Otolaryngology, ³Dentistry, ⁴Scientific Coordination and Biostatistics and ⁵Respiratory Medicine, University Hospital Antwerp, Antwerp, Belgium ⁶Faculty of Medicine and Health Sciences, University of Antwerp, Antwerp, Belgium

Rationale
Obstructive sleep apnea (OSA) severity correlates with upper airway (UA) morphology. UA collapsibility however does not respond to mandibular advancement (MA) in an homogeneous way. This study investigates the regional effects in the UA of MA in a large population of OSA patients.

Methods
100 pts were consecutively enrolled. At present baseline polysomnography (PSG) data in terms of apnea-hypopnea index (AHI) is available for 86 pts. For 81 pts functional CT scan analysis (FRI) is performed without and with MA set in 75% of maximal protrusion (MP). UA volume (iVuaw), resistance (iRuaw), minimal area (Amin) and the distance hyoid-spina mentalis (H-SM) are assessed (see figure). Response is defined as an increase in Amin with MA.

Results
Baseline AHI values correlate with iRuaw (R=0.38), Amin (R=-0.29) and the distance H-SM (R=0.24). MA does increase Amin (+1 cm², p=0.005). Responders (resp) have a larger forward+downward motion of the SM as compared to non-responders (nresp). iVuaw change was predominantly found in responders and was located posterior of the uvula (see figure).
Conclusions

Amin and iRuaw do correlate with the severity of OSA. MA does improve these parameters. The largest changes in UA geometry were found posterior of the uvula. Next step is to investigate how these regional geometric changes with MA in situ do relate to clinical outcome.

This study was funded by IWT