

Evidence Table - Oral Appliance Review

	Author// Citation// Question // Reviewer // Evidence Level	Study Design // Location (type) // Oral Appliance // Adjustable or Titratable // Titration	Selection Criteria Include (Exclude) // Sample Size // Rationale // Age // Gender // BMI // Hypopnea	Outcomes AHI // Min O ₂ Sat // ESS // Other // Adverse Events	Categorical Treatment Snoring // Other // Predictors	Internal Bias // External Bias	Reviewer Comments	Study Conclusions
1	Barnes et al// ??//1,5// WSN//1	RCT, comparison to placebo and to alternative treatment, crossover with CPAP, randomized treatment order, selected subjects, prospective// Sleep lab (full PSG, attended)// MRA, full, custom// Adjustable// Protocol defined: maximal comfortable protrusion, end-point criterion: maximal advance tolerated, advance measured: 10.3 mm (0.3)	OSA/severity, dental criteria (NS)// NS// 47.0 (0.9)// 80% M// 31.1 (0.5)// Referenced	Baseline AHI 21.3 ±1.3 (mean±SD); CPAP grp: post = 4.8 ±0.5, p=.001, .05 vs MRA; MRA grp: post = 4.8 ±0.5, p= .001; Placebo grp: post = 20.3 ±1.1, p=NS// Baseline Min SaO ₂ : 86.7 ± 0.6% (mean±SD); CPAP grp: post = 91.9 ± 0.3% p= .001; .05 vs MRA; MRA grp: post = 87.8 ±0.4%, p= .001; Placebo grp: post = 95.4 ±0.6%, p=NS// Baseline ESS 10.7 ±0.4 (mean±SD); CPAP grp: post = 9.2 ±0.4, p= .001; MRA grp: post = 9.2 ±0.4, p=.001; Placebo grp: post mean= 10.2 ±0.4, p=NS// FOSQ- Baseline = 3.1 ±0.1 (mean±SD); CPAP grp: post =3.3 ±0.1, p=.001; MRA grp: post = 3.3 ±0.1, p=.001; Placebo grp: post =3.3 ±0.1, p= .01. MWT- Baseline grp: =30.7 ±0.9 (mean±SD); CPAP grp: post = 30.0 ±0.9, p=NS; MRA grp: post = 29.6 ±0.9, p=NS; Placebo grp: 28.0 ±0.9, p=NS// NS	NS// MRA, Success- AHI<10 grp: 49.1% success; AHI<15, no sx grp: 55.2% success// NS	Patient selection: no, confounding factors: no directional dropout of bias, crossover bias: randomized// Population generalized: to OSA of mild-moderate severity (AHI 30-)	In a placebo-controlled RCT, efficacy is CPAP>MRA>placebo; sleepiness, CPAP>MRA>placebo; QoL, CPAP=MRA>placebo; and neurobehavioral tests no change	
2	Bloch, et al//9//1,6//JT//1	Case series with crossover, comparison to baseline and alternate therapy, randomized treatment order // Sleep lab (full PSG, attended) // Herbst, Monobloc, full, custom// Adjustable // Protocol defined: yes, end point: subjective success, anterior opening measured: yes	Snoring + OSA (AHI>5), adequate dentition (dental criteria- dental disease, sleep disorders)// Sample size not justified // 50.5 ± 1.5 // 24M, 1F // 27.4±0.6 // <25% baseline calibrated-Respirtrace sum signal	Herbst grp: pre AHI= 22.6± 3.1 (mean±SD), post = 8.7±1.5, p<.05; Monobloc grp: pre = 22.6±3.1, post = 7.9±1.6, p<.05 // NS // Herbst grp: pre ESS = 13.5, (mean±SD), post = 9.0, p<.05; Monobloc grp: pre = 13.5, post = 9.0, p <.05 // Arousal index: Herbst grp: pre mean= 41.0±3.7, post mean= 30.9±3.6 p<.05; Monobloc grp: pre mean=41.0±3.7, post mean= 26.5±3.9, p<.05. Snoring index: Herbst grp: pre mean= 41.0±3.7, post mean= 32.5±4.6, p<.05; Monobloc grp: pre mean= 41.0±3.7, post mean= 21.4 ± 4.2, p<.05 // Minor-temp: TMJ pain 7/24, tooth pain 3/24 muscle pain 4/24, same incidence each MRA	Herbst grp: 53% success, Monoblocgrp: 74% success, no significant difference; Preference- Herbst: 1/24, Monobloc: 15/24, p<.008// NS// NS	Patient selection: CPAP-refusing OSA, variable severity// Population generalized: OSA refusing CPAP, intensity: mild-severe		Two oral appliances improve snoring and OSA to similar degrees, but the custom Monobloc is preferred to the Herbst OA
3	Engelman, et	Randomized	OSA/severity:	MRA grp: pre mean=31 ± 26,	NS// MRA grp:	Patient	Effect size estimated	Significant differences in

	al//96// 1,2,3,5,6//KF-RC//1	controlled crossover, comparison to CPAP, consecutive subjects, prospective, PSG scorer blinded// Sleep lab initially, baseline PSG, f/u home (respiratory monitoring, unattended)// MRA 1 custom, full; MRA 2 custom, partial// Yes// Crossover after 2 months on each Rx, protocol defined: set at 80% max mandibular protrusion, anterior open measured: 2-4mm	AHI>4, age- 18 to 70, 2 or more symptoms include sleepiness- ESS >8 or sleepiness driving (dental criteria: <4 teeth either arch, other-plms, narcolepsy, major medical illness, shift work, living more than 50 miles from Edinburgh)// N=48 allowed power of 99% to detect 1 SD difference between treatment scores// 46 ± 9 years (range 18-70)// 48 finished- 36 M, 12 F// 28 ± 4 MRA, 31 ± 5 CPAP//NS	postmean=15 ±16, 52% decrease; CPAP grp: pre mean= 31 ± 26, post mean=8 ± 6, 74% decrease, effect size CPAP vs MRA .45, p<.001// NS// MRA grp:pre mean=14 ± 4, post mean= 12 ± 5;CPAP grp: pre mean= 14 ± 4, post mean=8 ± 5, effect size .57 CPAP vs MRA, p<.001// Performance-quality of life, FOSQ- MRA grp: post mean= 13 ± 3; CPAPgrp: post mean= 14 ±2, effect size .51 between CPAP & MRA, p=.001. Well being- SF 36- all 3 parameters better with CPAP than with MRA, effect sizes .34 - .52 for the 3 parameters// NS// Minor/temporary: pain= 33(69%). exess salivation= 9(19%); poor retention= 19(40%); sleep disturbance= 12 (25%); CPAP mask problems= 11 (23%), mask off during sleep 7 (15%), sleep disturbance= 16 (33%), stuffy nose= 8 (17%)	success (AHI<10) 22 (47%) Grp CPAP success (AHI<10) 31 (66%)// Predictors of Rx preference: higher BMI, greater daytime impairments tended to prefer CPAP vs MRA	selection- no; conf fact: no; crossover bias: not mentioned 24 started CPAP, 24 started MRA 1st, errors in ascertain: no careful follow up; loss to follow: minimal, met sample size needed for power calc//Populatio n generalized: probably, intensity: good range, sample enriched for sleepiness	and outcome measures extensive	outcomes between MRA & CPAP: AHI, effectiveness, symptom scores (ESS), FOSQ (qual of life), SF-36 (well being), better with CPAP, no significant differences in outcomes between MRA & CPAP: objective daytime sleep measurements by MWT, SF36- physical component, hospital anxiety & depression scale, cognitive scores, SE's, reported usage, preference. No significant differences in outcomes between 2 MRA appliances: no differences in use, satisfaction, effect, acceptance, or SE outcomes between 2 MRA devices, subgroup anaylysis- mild SAHS patients AHI 5-15: symptoms, efficacy, satisfaction, ESS, FOSQ, SF36 mental component scores better with CPAP than MRA, preferred Rx CPAP in 14 out of 18 pts
4	Ferguson, et al//25// 1,3,4,5//WSN//1	Crossover with other appliance with CPAP// Sleep lab, home (PSG, attended)// MRA, full occlusal coverage,custom// Titratable// NS	OSA/severity, dental criteria (OSA/severity, dental criteria)// NS// 44 (10.6)// NS// 32 (8.2)// 50% decrease in Respirtrace (effort)	MRA grp: pre mean= 25.3(15.0), post mean= 14.2(14.7), p <.005; CPAP grp: pre mean= 23.5(16.5), post mean= 4.0(2.2), p <.005 // MRA grp: pre mean= 78.7(8.6), post mean= 75.8(11.6); CPAP grp: pre mean= 76.8(9.1), post mean= 87.7(2.4) // MRA grp: pre mean= 10.3(3.1), post mean= 4.7(2.6), p <.005; CPAP grp: pre mean= 11.0(3.8), post mean= 5.1 (3.3), p <.05// NS// Minor/temporary: pain, sore teeth, jaw muscles, minor, temp; difficult chewing in AM, excessive salivation	MRA grp: 45%failed, CPAP grp: 0%failed// NS// NS	Patient selection: yes, errors in ascertain: uncertain (home study)// Population generalized: gender not specified, intensity: mild to moderate OSA		OA is an effective treatment in some patients with mild to moderate OSA and is associated with greater satisfaction than CPAP
5	Ferguson, et al//26// 1,4,5//KF-RC//1	Randomized cross-over with MRA and CPAP// Sleep lab (attended, PSG for Dx pre and post at home PSG unattended)//	OSA/ severity-mild-moderate AHI (15-50), dental criteria - 10 teeth each arch, live in metro Vancouver	MRA grp: pre mean= 19.7±13.8, post mean= 9.7±7.3, 51% decrease, p<0.005; CPAP grp: pre mean= 17.6±13.2, post mea= 3.6±1.7, 80% decrease, p<0.005// Lowest saturations- MRA grp: pre mean=	MRA grp: 76% success; CPAP grp: 100%success// Treatment success =	NS, NS, No crossover bias - tested for period and carryover effect, 2 week	Randomized controlled cross-over follow-up - complete follow-up on 25 of 27 patients enrolled for the clinical data	CPAP more effective 62% vs 48% with criterion <10 and symptoms reduced. Side effects more common with CPAP; patient preference and patient

		SnoreGuard partial occlusal, non-custom or pre-fabricated?// No// Protrusion 7mm, anterior opening 7 mm	(NS)// NS// 46.2±10.9 (25-72)// 24 M, 3 F//30.4±4.8 (21-42)// ≥50% decrease effort	83% ±7.4, post mean= 83.8% ±7.3, unchanged; CPAP grp: pre mean= 83% ±6, post mean= 88.7% ±2.5, 7.4% increase, p<0.05// NS// NS// Muscle pain with MRA mild and temp, 1 patient mod-sev; no TMJ; more side effects with CPAP	AHI<10 with improved symptoms - MRA 48% vs 62% for CPAP// EDS- MRA grp: 52% success; CPAP grp: 72% success. Satisfaction moderately -very satisfied p< 0.05 SG vs CPAP- SG grp: 68% success; CPAP grp: 62% success//NS	washout between Rx, NS, some patients no PSG with MRA - couldn't retain appliance at night// Populations generalized: sleep lab referral practice, intensity: mild to moderately severe OSA (AHI 15 -50)		satisfaction higher with MRA
6	Gostopoulos, et al//100// 1,4//KF-RC//1	RCT, comparison to placebo grp, crossover with placebo appliance, prospective, consecutive, double blind// Sleep lab (PSG, attended)//MRA, full occlusal coverage, custom// Titratable// Protocol defined: wore MRA for acclimatization period (8 ± 4 wks) - incremental advancement until max comfortable limit reached then washout and rand to either Rx for 4 wks then crossover to other Rx, advance measured: 7 ± 2mm (3-13), 80% ± 9% maximum protrusion (50-95%), protrusive range measured: yes	OSA/severity- AHI > 10, dental criteria- ability to protrude mand by ≥3mm, age >20years, at least 2 symptoms include EDS, snoring, witnessed apneas, fragmented sleep (dent criteria- insufficient teeth, bad gag reflex, periodontal disease or dental decay, central sleep apnea psychiatric disease, narcotic or sedative or psychoactive drug use)// NS//4 8±11// 59M, 14 F// 29 ± 4.7// Citation (reference earlier paper)	MAS grp: pre mean= AHI 27.1 ±15.3, post mean=12 ± 2, 55.6% decrease, p=significant; placebo grp: pre mean= AHI 27.1±15.3 post mean=25±2, 7.7% decrease, p=NS, MRA vs. Control p<0.0001// MRA grp: pre mean= 86±6, post mean= 89±1, 3.5% increase; placebo grp: pre mean= 86±6, post mean= 86±1, 0% change, p<.0001 MRA vs Control// MRA grp: pre mean= 11 ±5, postmean= 7±1, 36.3% decrease, p=significant; placebo grp: pre mean= 11±5, post mean= 9±1, 18% decrease, p<.01, p<.0001 MRA vs placebo, (82% normal ESS in MRA vs 62% placebo, p<.01)// Arousal index- MRA grp: pre mean= 35±13.5, post mean= 25±2, 28.6% decrease, p=significant, placebo grp: pre mean= 35±13.5, post mean= 33±2, 5.7% decrease. Sleepiness- MSLT (min)- MRA grp: post mean 10.3 ± .5; placebo grp: post mean= 9.1 ± .5, p=.01 for MRA vs placebo (48% normal MSLT MRA, 34% normal MSLT placebo).Snoring frequency (snores per hour)- MRA grp: post mean=207±20, placebo grp: post mean=366 ± 21, snoring frequency much less with MRA (p<.0001),	NS// Complete response (AHI<5 per hour) - MRA grp: 36% success; placebo grp: 0% success. Partial resp (AHI down by 50% but>5)- MRA grp: 27% success; Placebo grp: 0% success. Treatment failure (AHI not down by 50% or <5)- MRA grp: 27 failure (37%) Grp Placebo 73 failure (100%)//NS	Patient selection: yes, confounding factors: no, crossover bias: no treatment by period interaction or period effects from MSLT, ESS, or PSG variables, errors in ascertain: good careful monitoring, loss to f/u: not a problem// Population generalized: yes, likely, intensity: good range of severity	More patients reported improved frequency & intensity of snoring with MRA, more patients reported improved sleep quality with MRA, more patients reported satisfaction with MRA, good snoring measurement objectively obtained, well done, thorough follow-up, no effect of placebo, large sample size	Large randomized placebo controlled study showed that MRA improve snoring, AHI and both subjective and objective sleepiness

				snoring intensity less with MRA// NS// Minor/temporary: jaw discomfort more common with MRA, more tooth discomfort with MRA, more excess salivation with MRA				
7	Hans, et al//32//2,4//KF//2	RCT, comparison to alternative appliance, crossover with other appliance (device B to Device A), prospective//Home (unattended, respiratory monitoring only)//12 patients MRA, 12 patients modified MRA without advance, partial, prefabricated//No//Protocol defined: MRA (device A) set with incisors edge to edge, ~ 6 to 8 mm forward protrusion, 6 to 8 mm ant opening, Device B: no advancement and 1 mm ant opening, Advance measured: yes, Anterior opening measured: yes	Snoring, no systemic disease (OSA/severity: AHI >30/hour (unless referred), dental criteria: edentulous subjects, age: minors, chronic disease, sed-hypn meds, pregnant women, prisoners, minors, mental disability, previous surgery for OSA, other sleep disorders, severe EDS//NS//51.9 ± 12.3 (range 25 to 69 years)//20M, 4F//NS	MRA (10 subjects) grp: pre mean= 35.6 ± 28.4, post mean=21.1 ± 21.4, p≤0.05; Device B (8 subjects) grp: pre mean=36.5 ± 43.7, post mean= 46.8 ± 46.9, p=NS; All MRA (17 subjects) grp: 42.4 ± 37.5, post mean= 29.7 ± 21.4, p<0.05//NS//MRA (10 subjects) grp: pre mean=12.0 ± 3.9, post mean=8.2 ± 4.0, p≤0.05; Device B (8 subjects) grp: pre mean= 13.0 ± 4.5, post mean=12.5 ± 5.7, p=NS; All MRA (17 patients) grp: pre mean=12.9 ± 4, post mean=9.6 ± 4, p<0.005//NS//NS	NS//NS//NS	Patient selection: yes, by sleep study – but patients not well described in terms of symptoms, confounding factors: pts were similar in both groups. Said they were randomized but not how it was done, crossover bias (order effect): Nearly all patients using Device B crossed-over to the MRA, errors in ascertainment: not measured – but only a two week treatment period, loss to f/u: 33% lost in Device B, 17% lost in MRA group (Device A)// Population generalized: probably, intensity: good range of severity included	Not a bad study, small in numbers, but patients randomized to the groups, one appliance unlikely to be effective (Device B) due to absence of advancement of mandible and in that group most patients got worse, the MRA (Device A) was fairly effective even in severe patients.	
8	Johnston, et al//106//1,3,4//WSN-	RCT, comparison to placebo group// Home (unattended,	Snoring, OSA/severity, dental criteria	MRA grp: pre mean=31.9 (21.2) all patients, post mean=22.9(22.8), p=.011 OA vs placebo; Placebo grp:	NS// NS// NS	Confounding factors: treatment	MRA effective for mild - moderate OSA. Less effective in more severe	

	RR//2	respiratory monitoring)// MRA// No// NS	(NS)// Yes// 55.1// 16 M, 4 F// 31.6// 50% reduction air flow	post mean=37.7 (24.9) // NS// MAA grp: pre mean=13.9(6.4) all patients, post mean= 11.6(6.7), p= NS OA vs placebo; Placebo grp: post mean=12.6(6.3)// ODI-MAA grp: pre mean=30.7(18.8) all patients, post mean=21.1 (19.8), p=.002; OA vs placebo- Placebo grp: post mean=31.2(18.2)		position determined a priori, not adjustment for effect// NS	cases	
9	Mehta, et al//56// 1,2,4,6// KF-RC//2	Random crossover placebo control trial// Sleep lab (full PSG, attend)// MRA, full, custom//Yes// Advanced to max tolerated protrusion over 19.7±8.8 weeks (range 5-40 wks) mean advance 7.5 ± 1.8 mm (78% of max protrusion), anterior opening 3-4 mm	Snoring, OSA/severity- AHI ≥ 10 per hr, ≥ 2 symptoms of OSA (dental criteria - edentulous, periodontal disease, exaggerated gag reflex, regular sedative use)// Sample size of 30 for power of 0.8 and p< 0.05 // 48 ± 9 (range 35-73)// 19 M,5 F// 29.4 ± 3.1 (24.8-36.3)// ≥50% reduction in airflow or thoracoabdominal movement, 10 sec + a desaturation ≥3% or arousal	Active grp: pre mean= AHI 26 ± 15, post mean= 14 ± 2, 46% decrease; Placebo grp: pre mean= 26 ± 19, post mean= 30 ± 2, 15% increase; p<0.0001 between active and placebo grp at outcome// Active grp: pre mean= 88 ± 7, post mean= 91 ± 1, 3% increase; Placebo grp: pre mean= 82 ± 9, post mean= 87 ± 1, 6% increase; p<0.0001 between active and placebo grp at outcome// Active grp: pre mean= 10.1 ± 1.1, post mean= 3.9 ± 0.6, p<0.01; Placebo grp: NS// Snoring Frequency per hour- Active grp: post mean: 242 ± 28, 47% decrease;Placebo grp: post mean= 402 ± 29, p<0.005 between active and placebo grp at outcome. Snoring- mean snoring intensity, dB- Active grp: post mean= 49 ± 1; Placebo grp: 52 ± 1, p< 0.0001 between active and placebo grp at outcome. Snoring, max snoring intensity, dB- Active grp: post mean= 68 ± 1; Placebo grp: post mean= 70 ± 1, p=NS between active and placebo grp at outcome. Arousal index- Active grp: post mean= 27 ± 2, 34% drop; Placebo grp: post mean= 41± 2, p<0.0001 between active and placebo grp at outcome// Minor-temporary: pain, jaw discomfort 12.5%, excess salivation 50%, gum irritation 20%, mouth dryness 46%, tooth grinding 12.5%	Subjective reports - Active grp:70% success// Complete success: resolution of symptoms & AHI < 5 per hour; partial response; improved symptoms & AHI reduced by 50% but AHI staying over 5 per hour; Tx failure; ongoing symptoms &/or not reduced by 50%; Compliance failure, inability to use the tx. Complete grp: 37.5% success; Partial grp: 25% success; Failure grp: 37.5% fail; Sleep Quality- Active grp: 91% success; Placebo grp: NS??//Predictive equation for post Rx AHI: neck circumference-baseline AHI (high NC or high AHI - higher AHI post Rx) + 2	Patient selection: yes, No, No Crossover bias, None, loss to f/u: few dropouts and they were considered compliance failures// Population generalized: typical OSA patients, intensity: good severity range	Calculated time in supine sleep but did not analyze effect of supine on A+HI with MAS, NC at online data supplement, blinding not mentioned	Well-done randomized placebo controlled crossover study - 62% had complete, or partial response in patients with moderate to severe OSA

					ceph measurements			
10	Pitsis, et al//97//1,2,6//WSN-RR//1	RCT, comparison to placebo group, compare to alternative treatment group// Sleep lab (PSG, attended)// No// MRA-4, 14mm opening, full occlusal coverage, custom// NS// Protocol defined: yes, advance measured: yes, anterior opening measured: yes	OSA severity: AHI>5, other-2 symptoms (OSA-sev: CSA, dent crit: edent, other-perio disease)// NS//50 yrs mean// 20M, 3F// 31 mean// NS// NS	MRA-1 4mm opening grp: pre mean= 21, post mean= 8; MRA-2 14mm opening grp: pre mean= 21, post mean= 10// MRA-1 4mm open grp: pre mean= 87, post mean= 89; MRA-2 14mm open grp: pre mean= 87, post mean= 88// MRA-1 4mm open grp: pre mean= 18, post mean= 12; MRA-2 14mm open grp: pre mean= 18, post mean= 12// NS// NS// TMJ: min-temp, jaw discomfort, other- min-temp: salivation, dry mouth, tooth grinding, gum irritation	Complete success (no sx, AHI<5)- 4mm grp: 52% success, 14mm grp: 35% success; partial success (sx better, AHI<50% initially)- 4mm grp: 22% success, 14mm grp: 26% success// NS// NS	Patient selection: yes, confounding factors: no, crossover bias: no, loss to f/u: 1 out 24// Population: mild-moderate OSA		Long-term OA use produces dental movement, usually minor and asymptomatic. Bite opening of OA doesn't affect efficacy, but small opening more acceptable too
11	Randerath, et al//X09//1//KF//2	RCT, comparison to alternative treatment group// Sleep lab (full PSG, attended)// MRA, activator, full occlusal coverage, custom// NS// Not well described, anterior opening measured: 12 mm	CPAP more effective.MRA not titrated. Sub-optimal result with ISAD// No//56.5 ± 10.2// 16M,4F// NS// Reduction of ± 50% in airflow > 10 sec or reduced flow and effort with a 4% desat	MRA grp: pre mean=17.5 ± 7.7, post mean= 13.8 ± 11.1; CPAP grp: pre mean= 17.5 ± 7.7, post mean=3.2 ± 2.9// MRA grp: pre=83.6 ± 4.6, post=85.3 ± 3.1; CPAP grp: pre= 83.6 ± 4.6, post= 89 ± 3.4//NS//Arousal Index-MRA grp: pre=21.8 ± 9.9, post=17 ± 5.1; CPAP grp: pre=21.8 ± 9.9, post=14.1 ± 5.1; Snoring (snores per hour)- MRA grp: pre=54.5 ± 26/hr, post=36.4 ± 17.7; CPAP grp: pre=54.5 ± 26, post= 10.3 ± 5.0 // NS	NS//Success AHI < 10- ISAD- 30% success, 70% failed; CPAP- 100% success// No AHI, younger age, better result	Patient selection: yes, confounding factors: no, crossover bias: no, errors in ascertainment: no, loss to f/u: no// Population generalized: yes, intensity:mild to moderate	CPAP more effective. MRA not titrated. Sub-optimal result with MRA	
12	Rose, et al//107//1,2,3//KF-RR//2	Randomized crossover with other appliance, prospective// Both sleep lab, home (attended baseline PSG, unattended home, respiratory monitoring for f/u)// MRA: type A MRA-full, custom; MRA:type B MRA partial, custom// Both adjustable// Protocol defined: both appliances were set at 75% max protrusion, anterior opening: MRA-5mm, MRA appliance-10-12mm	Mild OSA, >10 healthy teeth per arch, refused CPAP(TMJ problems)// No// 56.8±5.2//22M, 4F// 27.5±3.1// Airflow reduced by ≥ 50% below baseline for at least 10 seconds	Type A MRA grp: pre mean= 16.0±4.4 post mean= 7.4±5.3, 53.8% decrease, p≤0.01;Type B MRA grp: pre mean=16.2±4.6 post mean= 5.5±3.3, 66% decrease, p≤0.01//Type A MRA grp: pre mean= 89.1±3.2 post mean= 90.1±4.8, 1% increase, p ?signif; Type B MRA grp: pre mean= 88.7±1.2 post mean= 92.2±2.1, 3.9% increase, p=significant// NS// Snoring (VAS 1-10)- Type A MRA grp: pre mean= 9.1±0.8 post mean= 3.2±1.4, 65% decrease; Type B MRA grp: pre mean= 8.8±1.0 post mean= 3.4±2.7, 61% decrease, p=significant; Daytime Sleepiness (VAS 1-10)- Type A MRA grp: pre mean= 7.2±1.7, post mean= 5.4±1.0, 25% decrease, p=significant; Type B K grp: pre	NS//NS//NS	Patient selection: mild OSA diagnosed in the sleep lab, confounding factors: randomized, crossover bias: not applicable, errors in ascertainment: subjects likely used the appliance, loss to f/u: very high-large number failure to crossover	Well-done study in a thin older group of patients with mild OSA. Good comparison of 2 distinctive appliances. Trouble following the patients in the trial-not all clearly accounted for. The AHI was lower with the MRA appliance. No success rate given for reductions in AHI	Both appliances effective for mild OSA. Treatment outcome influenced by OA design

				mean= 7.0±1.5 post mean= 4.1±0.7, 41% decrease, p=significant; Sleep quality (VAS 1-10)- Type A MRA grp: pre mean= 6.4±1.8 post mean= 4.1±1.4,36% decrease p=significant; Type B MRA grp: pre mean= 6.2±1.2 post mean= 4.5±2.1, 27% decrease p=significant//Failure to tolerate: 1 patient, pain in jaw and/or TMJ: 2 patients sev-d/c Rx, mild in 5/23, gag reflex: 1 patient d/c Rx, Other: failure to retain appliance in the mouth in 2 pts, xs salivation # not given		and high drop outs// Population: probably, intensity: only mild		
13	Tan, et al//102//2,3//WSN,RR//1	Prosp, RCT, consecutive patients, crossover study of MRA to CPAP//Lab-PSG//full occlusal coverage//Single position appliance set at 75% of max protrusion (10 subjects) or partly adjustable appliance (14 subjects) titration not described	mild mod OSA (AHI >10 and <50), dental criteria:adequate, age:>18(OSA/severity, dental criteria)ns//50.9//20m, 4f//31.9//ns	group MRA: pre mean=22.2(9.6) post mean=8.0(10.9) p<.01. Group CPAP: pre mean=22.2(9.6) post mean=3.1(2.8) p<.001ns//group MRA: pre mean=13.4(4.6) post mean= 9.0(5.1) p<.001. Group CPAP: pre mean=13.4(4.6) post mean=8.1(4.1) p<.001//other:Arousals group MRA pre mean=19.3(9.6) post mean=11.6(5.6) p<.01. group CPAP: pre mean=19.3(9.6) post mean=9.8(6.6) p<.01//12/24 mild jaw discomfort early in the am, 1 stopped MRA due to side effects, 2 stopped CPAP due to SE	ns//other:Success=use+AHI<10 group MRA n success=16 n failed=7 % success=70%. Group CPAP n success=22 n failed=2 % success=ns// General health scores improved with both treatments - no diff between treatments; 17 of 21 who used both treatments chose the MRA for long term treatment.	Patient selection NS//NS//No apparent order effect, two-week wash-out //NS//Minimal loss to follow-up//generalizable//good range of severity	Adherence not stated.	The MRA may be a suitable alternative to CPAP in patients with mild to moderate OSA. MAS were well tolerated and preferred by the majority of subjects.
14	Walker-Engstrom, et al//??//1//KF//1	RCT, comparison of an appliance at 2 settings, prospective, blinded evaluators, intention to treat analysis// Home, unattended (resp monitoring only)//MRA, partial occlusal coverage, custom //No// Protocol defined: yes, set at 75% to max protrusion or 50% maximum, end point criterion: advance	Severe OSA at > 20, age: 20-65, no drug abuse and no mental illness (pronounced malocclusion, severe cardiac, resp, neurol disease, nasal obstruction)// Yes, 40 patients per grp for a power of 80% to detect a greater 25% difference in normalization rates	75% grp: pre mean= 50.4 ± 4.7, post mean=15.6 ± 6.2, response= 69% ↓, p= < 0.001; 50% grp: 47.0 ± 5.1, post mean= 17.4 ± 5.7, response =63% ↓, p= <0.001// NS// 75% grp: pre mean= 11.5 ± 3.1, post mean= 7.5 ± 2.6, response= 35 % ↓, p=<0.001; 50% grp: pre mean= 11.7 ± 3.1, post mean= 8.6 ± 2.8, response =26% ↓, p= < 0.001 // ODI-75% grp: pre mean =49.7 ± 5.6, post mean= 19.1 ± 7.0, response= 34% ↓, p= < 0.001; ODI-50% grp: post mean = 18.0 ± 6.0, response= 59.6% ↓, p-value= <0.001; // Snoring Index= 75% grp,	75% MRA grp- 77% success, 23% failed; 50% MRA grp-62% success, 38% failed//Tx success AI < 5 and AHI < 10. 75% group- 52%success,48 % failed; 50% grp-31% success, 69% failed; satisfied with Rx-90%	Patient selection: yes, confounding factors: no, patients were randomized to the two different groups, cross-over bias: no, errors in ascertainment: no, loss to f/u: minimal - intention to	Blinded, intention to treat, sample size calculation, severe OSA patients, detailed f/u	Well-done adequately powered study that shows more advancement means more success with OSA MRA tx

		measured: 50% group 5.0 mm (4.8 to 5.3) 75% group 7.2 mm (6.7-7.6) anterior opening measured: 2mm	with the more advanced appliance and alpha of 0.05// 50.4 in 75% grp, 54.3 in 50% grp// All male// 30.2 ± 1.2 in the 75% MA group (no difference between grps) 30.5 ± 1.4 in the 50% MA group//50% reduction in airflow with a 4% desat	pre mean =0.86 ± 0.1, post mean = 0.57 ± 0.1, 34 % ↓, p-value=<0.001; 50% grp- pre mean= 0.83±0.1, post mean= 0.66 ± 0.1, response= 20.5 %, p-value= < 0.001//TMJ discomfort, 75% grp - minor-temp in 12.5%, none in 50% grp; Occlusal change, 75% group - minor-temp in 15%, 50% grp - minor-temp in 5%	success, 10% failed; success defined as a decrease of 50% in AI of AHI- 75% grp- AI 88% success, 12% failed; 75% grp- AHI 83% success, 17% failed; 50% grp- AI 78% success, 22 % failed; AHI 76% success, 24% failed// Lower BMI lower, more advancement	treat//population: can be generalized, intensity: focus on severe OSA		
15	Wilhelmsson plus SE from Tegelberg (#84) and Qual of life from Walker-Engstrom (#88) and Ringqvist (X02) and WalkerEngstrom (#89)//90// 1,3,4, 5//KF-WSN-RC-RR//1	RCT, prospective, comparison to baseline & alternative Rx (UPPP)// Home (respiratory monitoring only, unattended)// MRA, full occlusal coverage, custom// No// Protocol defined: set 50% max protrusion (4-6mm), anterior opening measured: 5mm interincisal	NS (OSA/severity: AI > 25, dental criteria -insufficient teeth, bad maloccl., severe periodontal disease, severe caries, age: <20 or 65years, other-mental illness, drug misuse, nasal obstruction, severe cardiovascular, respiratory or neurological disease)// Sample size based upon pred success rate-MRA 80%, UPPP 50%, alpha =.05, beta=.2, needed 35 patients in each arm to detect diff, assumed drop out rate 10 patients per group, enrolled 49 MRA and 46 in UPPP// 49.3yrs MRA, 51yrs UPPP// All M// 26.9MRA, 27.1 UPPP//50% reduction in air-flow	MRA grp: pre mean AHI= 18.2(15.7 - 20.8 95% CI), post mean AHI= 5.8, - 12.4 response, p<.001; UPPP grp pre mean= 20.4 (17.4 - 23.3 95% CI), post mean=10.4, -10resp, p<.001//MRA premean AI= 10.8 (9.2 - 12.4 95% CI), post mean= 2.2, -8.6 response, p<.001; UPPP grp pre mean AI= 12.3 (10.7 - 13.9 95% CI), post mean= 5.5, -6.8 resp, p<.001: greater fall in AHI & in AI with MRA than with UPPP//NS- no difference in sleepiness at baseline between grps at 12 months no difference between grps, but did improve from baseline?// Snoring index (# per hour), MRA grp: pre mean= 0.7 (.6-.8 95%CI) post mean= 0.5, -.1 response; UPPP grp: pre mean= 0.7 (.7-.8 95% CI) post mean= 0.5, -.2 response, p<.001; Oxygen desat index (# 4% desats per hr),MRA grp: pre mean= 17(14.1-19.8 95% CI), post mean= 6.1, -10.9 response, p<.001; UPPP grp, pre mean= 18.4 (15-21.8 95% CI), post mean= 9.3, -9.1 response, p <.001; //SE mentioned in Tegelberg study #84 at 12 months: 2/37 patients with severe TMJ, 1/37 mild TMJ; 5/37 oral dryness; 8/37 stiffness in jaw; 0/37 occlusal change, from Walker-	NS// Success AHI 50% reduction, Grp MRA, 30 of 37 completers (81%) , 30 of 49 rand, 61% success, Grp UPPP 26 of 43 completers (60%), 26 out 46 rand (57%), GRP completers - MRA better reducing AHI by 50%; intention to treat no diff// Other-compliance - Tegelberg #84 73% pts (27/37) used MRA ≥5 nts/week//Other - QOL - Walker-Engstrom #88 - QOL improved in both UPPP and MRA grps at 1 yr, with contentment higher in UPPP grp//Pred: BMI	Patient selection:NS, confounding factors: NS, crossover bias: NS, errors in ascertainment: NS, loss to f/u: significant in MRA grp, not in UPPP// Population: probably generalizable, intensity: mild to moderate OSA	Large prospective random study compared MRA to UPPP with sample size calc, blinded sleep study scoring & complete follow up, needs intention to treat analysis, (Tegelberg references Wilhelmsson, Walker-Engstrom ref both Teg and Wil) data from Tegelberg #84 regarding adherence & SE in MRA grp, data from Waler-Engstrom paper 88 for quality of life, data from Ringqvist (X02) for long term side effects	Large prospective random study showing that OA is more effective than UPPP. Fours year use of OA with limited mandibular protrusion (50% max) and partial dental coverage (molars) producers no signifincat dental or skeletal change. Good long-term outcomes in OA group.

			by thermistor with 4% desaturation	Engstrom (#89) after 4 years - TMJ: minor-temporary=1patient; occlusal changes: minor-temporary=4patients, severe-permanent=1pt; Retention problems, broken plastic, broken clasps: minor-temporary, from Ringqvist (X02) Cephalometry: in comparison to UPPP group (no OA therapy) no change in skeletal or dental parameters except for minor elongation of incisors	not factor in MRA grp, higher BMI more fall in AI in UPPP, PUAO: MRA grp- dominant obst in oropharynx (type I) in 24pts, hypopharynx in 2, combo in 15, type 1: MRA success 96% UPPP 77%, type II & III- MRA success 92%, UPPP success 59%, success not diff for diff obstruct types regardless of Rx grp//Walker-Engstrom (#89) after 4 years72% of OA group successful Rx, UPPP group 35% success			
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	Author	Citation	Question/ Reviewer // Evidence Level	Study Design// Location (type)//Oral Appliance// Adjust-titratable// Titration	Selection Criteria Include (Exclude)// Sample Size Rationale// Age//Gender//BMI//Hypopnea	Outcomes AHI // O2 Sat //ESS// Other//AE	Categorical Tx-Snoring //Other//Predictors	Internal Bias // External Bias	Reviewer Comments	Study Conclusion	
1											
17	Fransson	103	1,2,6 //KF- WSN//5	Case series, comparison to baseline, consecutive//not stated (oximetry)//MRD full, custom, closed ant dimension //No//75% of max protrusion or at least 5mm, advance measured 6.1 ± 1.8 mm, ant opening measured 6.4±2.0 mm	Snoring or OSA, sufficient number of teeth, adults (max protrusion < 6 mm, severe caries, periodontal disease)//54.9 ±9.0 (31-73)//13 F, 52 M//29.2 ±3.6 (21-38)//NS	NS//Min SaO2; Grp OSA premean 79% (59-91 range), post mean, NA, Grp snorers, premean, 92% (87-98 range), post mean NA //NS// Other: oxygen desaturation index Grp OSA premean, 14 (5-61 range), post mean, NA; Grp snorers pre mean 1 (0-3 range) post mean NA; Other; 1 Li/ML Grp all, response +1.5 ° , p < 0.05; Other, Pharynx area, Grp all pre mean 668.7 ±248, post mean 727, response +58.3 8.7% incr, p 0.001; Other; MPH, Grp all: premean 21.2 ±4.6 mm, post mean 22.8, +1.6mm 7.5% incr, p <0.001; Other; SNB, Grp all -0.4° p<0.01//not stated	NS//NS//NS	NS, NS, NS, NS, loss to f/u 12/77 = 16% reasonably high rate //pop probably generalizable, intensity, range from no OSA to severe	Large cohort of consecutive patients including snorers and patients with OSA followed after 2 years of appliance use	Mandibular protrusion was slightly reduced and the lower incisors were proclined. The SNB angle decreased significantly due to posterior rotation of the mandible and a significant increase in anterior face height. The hyoid bone to mandibular plane distance increased	
18	Fransson	109	2//KF//5	Consecutive case series, comparison to baseline, prospective//NS(oximetry)//MRD, full occ, custom//No//set at 75% of max. protrusion and at least 5mm from retruded position, advancement: 6.4±2.1mm, anterior opening: 6.9mm±2.150	Snoring, OSA, enough teeth, protrusion range ≥6mm (severe caries or periodontal disease)//N=77, no sample size rationale//54//63M, 14F//NS//NS	ns//ns//ns//others: ODI (1 hr): OSA: pre mean=14±11.6 post mean=ns; Snorers: pre mean=ns post mean=ns; other: Mean Oxygen Nadir: OSA pre mean=78%±8.2 post mean=ns; Snorers: pre mean=ns post mean: ns//Other: MPH upright pre 21.4± 4.7 post 15.0 ±5.3, 30% decrease//ns//ns	NS//NS//NS	NS, NS, NS, NS, NS// Population -?generalizable without sleep studies, intensity: not sure-didn't have sleep studies	Not a great paper. No efficacy data presented on ODI or snoring etc. Mechanism paper. Nice to have supine cephs	The MPD increased pharyngeal width at all levels both upright and supine. MPH upright shortened with the MPD. It increased area in the oropharynx and hypopharynx in the upright position. Going from upright to supine the pharyngeal area reduced significantly. The MPD increased pharyngeal area also	
19	Fransson	New	1,6//KF//5	Case series, comparison to baseline, consecutive selected subjects, prospective//sleep lab(resp monitoring only, attended)//MRA, full, custom//yes-one piece design//not described	OSA or snoring, patients who failed other Rx were still included(dental criteria-protrusive range < 6mm, edentulous, poor teeth)//N=65, no ss rationale//OSA 56 yrs (31-73) Snoring 52 (37-70)//52M, 13F//OSA 30 (range 21 to 38) snoring 28 (23-35), NC: OSA 42.5 cm (range 37-51.5) snoring 39.9 (34-46)//NA	ns//desat) OSA n=39, ODI pre mean=14.7± 12.7, post mean=3.1 ± 4.2, 79% decrease, p-value=<0.001//minimum O sat.: OSA n=39, pre mean=78.2± 8.1, post mean=89 ± 4.7, 14% increase, p-value=< 0.001//NS//Snoring time: Back: pre mean=81.1± 14.2, post mean=67.5± 19.7, 16.8% decrease, p-value=<0.001. Side: pre mean= 65.9 ± 48.1, post mean=48 ± 20.8, 27% decrease response, p-value=<0.001//NS	Snoring on Likert Scale 90% classified as snoring responders: pt reports: pre mean= 7 (0-10), post mean= 0 (0-8), 100% decrease, p-value= <0.001. Relative resport: 8 (4-10), 1.5 (0-9), 81% decrease//Treatment success (ODI < 5 at outcome or reduced by > 50%): OSA n=39, 32 success, 7 failed, 82% success, 18% failed//sleep quality questionnaire-76% classified as daytime tiredness symptom responders and 84% classified as night symptoms//positional upper airway obstruction: 83% of supine dependent were ODI responders vs 79% of the non-supine dependent OSA pt-therefore supine dependent not predictive outcome	Patient selection=yes most likely, confounding factor=na, crossover bias=na, errors in ascertainment=pts probably used the tx can't be sure//population-probably, intensity=milder end of the spectrum		Well-done large case series with two follow up points at 6 months and 24 months showing persistent benefit, limitation is that the oral appliance protocol was not described, side effects not mentioned	
20	Fransson	new	1//KF//5	Case series, comparison to baseline, consecutive subjects, prospective//sleep lab (resp monitoring, attended)//MRA, partial, custom//No//set at 75% of max protrusive range, min 5 mm, anterior openings measured=no, protrusive range measured=yes	Snoring or OSA, OSA=ODI > 5, adequate # teeth, (dental criteria=max protrusion < 5mm or periodontal disease, indications for bilevel or trach)//N=35, no ss rationale//52.9 ± 9 (36-75)//29m/6f//27±3.6 (21 to 38), NC: 40.5±3.5 (33 to 50)// No	ns//Oxygen desaturation index: OSA 22, pre mean=15.4 ± 13.4, post mean =3.5 ± 3.7, response=77% ↓, p-value=<0.001. Oxygen saturation level: OSA 22, pre mean= 81.9 ± 11, post mean= 85.7 ± 8.0, response= 4.6%, p-value=NS//NS//means snoring time supine: 25, pre mean=75.2%, post mean=59.7%, response=-21%, p-value=<0.001//26% teeth not meeting in am, minor-temp	grp 29, success=24, failed=5, 83% success, 17% failed.//Daytime tiredness: 24, success=16, failed=8, 67% success, 33% failed	confounding factors=na, crossover bias=no, errors in ascertainment=likely that pts used the device but is based upon self report, loss to follow up=few pts lost to f/u//na		Well-done series	
21	Fritsch	28	1,3,4//KF-RC//5	Randomized controlled trial crossover, comparison to baseline and with 2 different appliances, prospective// sleep lab (PSG, attended)//Herbst and Monobloc 3 weeks each, Protrusion 75% of max. (4.3 to 10.1mm) opening 8.7-16.8mm//ADJUSTABLE//TITRATION?	CPAP failures or refusers AHI>5, Snoring with arousals>20h// N=22//NS//NS// BMI 26.8// Hypop decrease to < 25% for> 10 secs in calibrated respiration sum	16 patients preferred Monobloc, 5 preferred Herbst, 1 no preference. Pre AHI 27.6±3.5 post with preferred 6.3±1.4//NO O2 SAT// ESS pre- 12.0 (10-14) post- 8 (6-10) Snoring Index-pre- 58.7+7.3 post- 23.7+4.6//NO OTHER//NO AE	7 subjects (32%) occlusive changes//from cephs and models: Decrease in overbite and overjet, decrease in the mean upper incisors to maxillary plane angle. MISSING EITHER OTHER OR PREDICTORS	NS, NS, NS, NS, NS//Population likely generalizable, intensity mild to moderate OSA		Careful document of side effects on long term use. Up to 30 months. Occlusal changes more common than previously thought	

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	Author	Citation	Question// Reviewer // Evidence Level	Study Design// Location (type)//Oral Appliance// Adjust-titratable// Titration	Selection Criteria Include (Exclude)// Sample Size Rationale// Age//Gender//BMI//Hypopnea	Outcomes AHI // O2 Sat //ESS// Other//AE	Categorical Tx-Snoring //Other//Predictors	Internal Bias // External Bias	Reviewer Comments	Study Conclusion	
1											
22	Gale	29	1,2//WSN//5	Case series with crossover//NS (NS)//MRD-yes, full occ cov, custom//not adj; 75% max anterior//NS	Dental criteria, age (dent crit)//Yes//51.5 (11.9)//27 M, 5F//28.6 (4.5)// NS	Grp pre-mean 26.6 (19.3) //NS //NS //other-group pre-mean 80.22 (48.1 SD), resp 28.34 (59.06), p .011//NS	NS// other- N failed 9 out of 32 no change//NO PREDICTORS	patient sel-yes, confound fact-dental sel factors//pop-clinic, intensity-mod		OA significantly increased minimum pharyngeal cross-sectional area suggesting it may be an effective therapy for OSA	
23	Gao	30	1,2,6//KF-RC//5	Case series, comparison to baseline, prospective, blinded PSG scoring//sleep lab (PSG, attended)// MRD not named//NS//NS	OSA mild to severe (NS)//N=11 no sample size rationale//Age 49.5±7.2//8 M, 3 F// BMI 27.2 ± abstract, 23.9 ± 2.3 in text//Hyp. decreased airflow, ongoing effort, 4% desat + arousal	AHI 44.6±22.5 to 9.6±6.3, 78% decr, no p given//Low SaO2 71.4±15.0 to 82.0±7.7, 15% incr, no p given//NS//MRI oropharynx change 5555.95±2103 to 6882.95±2260, 24% incr, p<0.001; other-whole airway, premean 122666 ± 4129, postmean 13926.37 ± 4576, 13.5% incr, p<0.01//NS//NO AE	NS//NS//small tongue and large pharynx predict better decrease in AHI	NS, NS, NS, Don't know, not mentioned//population not well described, good range of severity	MRD increases UA size especially in the high oropharynx in diameter and cross-section. Small sample size	MRI with and without OA shows increase in airway size with AMP. Smaller tongue size, larger increase in oropharyngeal space predicts response	
24	Gavish	31	1,2//WSN//5	NS//lab (PSG, attended)//MRD-funct magnetic syst, full occ cov, custom//yes//prot def: minor alt made to improve efficacy per patient report, adv meas: approx 5.0mm (60%max), ant open meas: 11.4 mm	Snoring, dent crit, age (OSA-severity, dent crit, age)// No//50.5 (2.6)//9M,1F//27.2 (2.5)// 50% airflow + arousal	Grp pre-mean 25.0 (10.65), post-mean 15.0 (8.1), p .0016 // grp pre-mean 88.1 (4.95), post-mean 90.40 (3.13), pval .043 // grp pre-mean 6.65, pos-tmean 2.58, pval .0013// other-oral cavity, grp AOD premean 9.44 (3.32), postmean 14.33 (5.63), p .015, grp MOD premean 8.89(3.41), postmean 12.22(4.60), p .040, grp AOA pre-mean 27.24(10.79), post-mean 40.22(14.89), p .015// NS	NS//NS//NS	patient sel-yes, conf fact-sel(TMJ, dent)// pop-sel clinical samp, intensity-mod		Anterior region of oral cavity increased in size, correlated strongly to decrease in RDI, no increase in pharyngeal airway size noted	
25	Gotsopoulos	100	1,4//KF-RC//1	Randomized controlled trial, comparison to placebo grp, crossover with placebo app, prospective, consecutive, double blind// lab (PSG, attended)//MAS, full occ cov, custom//Titratable//prot def: wore MAS for acclim period (8 ± 4 wks) -incremental advmnt till max comfort limit reached then wash out and rand to either Rx for 4 wks then crossover to other Rx, adv meas: 7 ± 2mm (3-13), 80% ± 9% max protrus (50-95%), prot range meas: yes	OSA-sev: AHI > 10, dent crit: ability to protrude mand by ≥3mm, age >20yrs, other-at least 2 symptoms include EDS, snoring, witnessed apneas, frag sleep (dent crit-insuffic teeth, bad gag reflex, periodontal dis or dental decay, other-central sleep apnea psychiatric disease, narcotic or sedative or psychoactive drug use)//NS//48±11//59M, 14 F//29 ± 4.7//citation	Grp MAS, premean AHI 27.1 ± 15.3, post 12 ± 2, 55.6% decr, p=signif, Grp placebo pre mean AHI 27.1±15.3 post 25±2, 7.7% decr, p=NS, MAS vs. Control p<0.0001// Grp MAS premean minSaO2 86±6, post 89±1, 3.5% incr, Grp Placebo premean 86±6, post 86±1, 0% change, P<.0001 MAS vs Control//Grp MAS premean ESS 11 ±5, post 7±1, 36.3% decr, p=signif, grp Placebo premean 11±5, post 9±1, 18% decr, P<.01, P<.0001 MAS vs placebo, (82% normal ESS in MAS vs 62% placebo, p<.01)// Other-Arousal index, grp MAS premean 35±13.5, post 25±2, 28.6% decr, p=signif, Grp placebo premean 35±13.5, post 33±2, 5.7% decr, Other-Sleepiness-MSLT (min), Grp MAS post mean 10.3 ± .5, Grp placebo post mean 9.1 ± .5, P=.01 for MAS vs placebo, (48% normal MSLT MAS, 34% normal MSLT placebo), Other-Snoring Freq. (snores per hr), Grp MAS post 207±20, Grp Placebo post 366 ± 21, snoring freq much less w MAS (P<.0001) snoring intensity less w MAS//NS//Pain: min-temp, jaw discomf more common w MAS, other: min-temp, more tooth disomfort w MAS, more excess saliv w MAS	NS//Other-complete resp (AHI<5 per hr) Grp MAS 26 succ (36%) Grp Placebo 0 succ (0%), Partial resp (AHI down by 50% but>5) Grp MAS 20 PR (27%) Grp Placebo 0 PR, Trtmnt failure (AHI not down by 50% or <5) Grp MAS 27 failure (37%) Grp Placebo 73 failure (100%)//NS	NS, NS; crossover bias: no trtmnt by period interaction or period effects from MSLT, ESS, or PSG variables, errors in ascertain: good careful monitoring, loss to follow: not a prob//Pop: yes, likely generalizable, intensity: good range of severity	More patients reported improved frequency & intensity of snoring with MAS, more patients reported improved sleep quality with MAS, more patients reported satisfaction with MAS, Good snoring measurement objectively obtained, well done, thorough follow-up, no effect of placebo, large sample size	Large randomized placebo controlled study showed that MAS improve snoring, AHI and both subjective and objective sleepiness	

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1											
43	Markund	New	1//KF//5	Comparison to baseline, retrospective//resp monitoring only//MRA, full occlusal coverage, custom, some hard acrylic, some soft acrylic//adjustable by dentist//goal was 4 to 6 mm of advancement, increased for persisting symptoms, advance measured :4 to 6 mm, anterior opening measured: 5mm	Snoring, OSA/Severity: severe if they failed CPAP (snoring, dental criteria: class III occlusion, edentulous, arthralgia, myofascial pain, periodontal disease; CSR)//n=619, No sample size rationale//m:51 yrs (25-74), f:55 yrs (30-75)//492m/120f//NS//>50% decrease in airflow and a >3% desaturation	277 pts, pre mean=21 (1.1-74), post mean=7.6(0-7.2), response=64% ↓, p=P<0.001//238pts, pre mean=83(48-98), post=86(56-95), response=3.6% ↑, p=0.001//NS//dental side effects including occlusal changes occurred - freq not given, led to d/c RX in 99 pts	NS//237 OSA: N:129 (54% success, AHI < 10), 122 severe OSA: 44N, (39% success)219 OSA: 158N, (72% success)//lower AHI, demographic:female, other: more advancement, Poorer outcome: weight gain, nasal obstruction	patient selection: pts have the appropriate disease; confounding factors: N/A, crossover bias: N/A, errors in ascertainment of exposure: potentially b/c compliance with tx based upon self-report, loss to follow-up: minimal//population: yes, it is a large clinical population, intensity: good range of severity	Large study with fairly complete long-term follow-up	One of few studies with enough subjects to determine predictors of outcome	
44	Mayer	55	1,2//WSN//5	Case series, comparison to baseline, prospective-retrospective// sleep lab (full PSG, attend)//MRD- Esmarck device, partial, custom//No//NS	OSA severity AI > 30, dental criteria (<20,>75 / 55.1 (8.5)//NS // M=24, F=6 // BMI 31.7 // NS	Grp N=30, pre-mean 64.6 (19.4), post-mean 31.3 (31.9), p.0001 // grp N=30, pre-mean 72.9 (17.1), post-mean 81.7 (10.9), p.0001 //NS //Other: Vigilance Test, grp n=30 pre-mean 7.6 (12.1), pos-t mean 3.7 (6.8), p.03; regression analysis indicates a better result with Ed in patients with prognathic maxilla, retrognathic mandible, lower tongue base, shorter uvula, small retropalatal space//NS	NS//NS CATEGORY MISSING	patients have appropriate disease // pop generalize - severe OSA pts, intensity AI>30	Data showed no significant difference between control & apnea patients with regard to import cephal landmarks, antic "apneic skull" not found, cephal pred: narrower SNB angle & shorter the uvula, the more effect the device	The narrower the SNB angle, the wider the SNA angle. The shorter the uvula, the more effective the OA	
45	McGown	101	3,4//KF-RC//5	Retrospective case series, consecutive sel subjects//sleep lab (PSG, attended)//NS//MRD: 2 diff MAS- Grp A Silencer (full, custom) or Grp B Herbst (full, custom)//both adjustable//prot def: usual clin protoc- not described	Snorers or OSA-mild-sev, Consec pts treated at Royal London Hosp, Middlesex Hosp btwn 1994 & 1997 (NS)//NS//NS//140 M, 26F//NS//NS	NS//NS//NS//NS//Pain: discomfort, min-temp: 25 of 69 users, 24 non-users, TMJ: 26 of 69 users, 21 non-users, Occ changes: 9 out of 69 users, 2 non users, Other: excess saliv, 7 of 69 users, 13 non users, 41% users had SE's nightly, subs who stopped had more SE's: 57 of 126 (45%) stopped appliance (29 side effects, 12 poor efficacy)	Grp Users, self reported snoring improved 93% success, Grp non-users, 39% success//Daytime symptoms- self report improvmt >50%: Grp users 64% success, Grp non users 33% success//SE's increased rate of stopping, less snoring and improved symptoms more likely to use.	NS, NS, NS, NS; loss to follow: not bad for retro survey study//pt pop not well described, good range of intensity	Some hesitation, protocol for OA treatment not well described, baseline grp not defined well. Only self-report data	Long-term follow-up of MAS users & non users after minimum 1 year treatment. Side effects were related to stopping treatment and symptom improvement to continuing treatment	
46	Mehta	56	1,2,4,6// KF-RC//2	Random crossover placebo control trial//sleep lab (full PSG, attend) // MRD, full, custom//Yes//advanced to max tolerated protrusion over 19.7±8.8 wks (range 5-40 wks) mean advance 7.5 ± 1.8 mm (78% of max protrusion), ant opening 3-4 mm	Snoring, OSA severity, AHI ≥ 10 per hr, ≥ 2 symptoms of OSA (dental criteria - edentulous, periodontal disease, exag gag reflex, regular sedative use)// sample size of 30 for power of 0.8 and p< 0.05 //48 ± 9 (range 35-73)//M=19, F=5//29.4 ± 3.1 (24.8-36.3)// ≥50% reduction in airflow or thoracoab movement, 10 sec + a desat ≥3% or arousal	Grp Active; pre-mean AHI 26 ± 15, post- mean 14 ± 2, 46% decr; grp Placebo pre- mean 26 ± 19, post- mean 30 ± 2, 15% incr; p<0.0001 btwn active and placebo grp at outcome//grp Active: Min SaO2:pre-mean 88 ± 7, post- mean 91 ± 1, 3% incr, grp Placebo min SaO2 pre mean 82 ± 9, post mean 87 ± 1, 6% incr; p<0.0001 btwn Active and placebo grp at outcome// Grp Active ESS pre-mean 10.1 ± 1.1, post- mean 3.9 ± 0.6, p<0.01, Grp Placebo NS//Other: Snoring Freq per hr, grp Active post- mean 242 ± 28, 47% decr, Grp Placebo post mean 402 ± 29, p<0.005 btwn active and placebo grp at outcome; Snoring- mean snoring intensity, dB, grp Active, post- mean 49 ± 1, grp Placebo 52 ± 1, p< 0.0001 btwn active and placebo grp at outcome; Snoring, max snoring intensity, dB, grp Active post- mean 68 ± 1, grp Placebo post- mean 70 ± 1, p=NS btwn active and placebo grp at outcome; Arousal index, grp Active post- mean 27 ± 2, 34% drop, Grp Placebo post-mean 41± 2, p<0.0001 btwn active and placebo grp at outcome//minor-temp: pain, jaw discomfort 12.5%, excess salivation 50%, gum irritation 20%, r	Subjective reports - Grp Active 70%, success, 30% fail//Complete success: resolution of symptoms & AHI < 5 per hr; partial response; improv symptoms & AHI reduced y 50% but AHI staying over 5 per hr; Tx failure; ongoing symptoms &/or not reduced by 50%; Compliance failure, inability to use the tx. Grp Complete - N success = 9, 37.5% success; Grp Partial n success 6, 25% success; Grp Failure N fail = 9, 37.5% fail; Sleep Quality, Grp Active 91% success, 9% fail, Grp Placebo NS??//Predictive equation for postRx AHI: Neck circum-baseline AHI (high NC or high AHI - Higher AHI postRx) + 2 cephal measurements	Yes, No, No Crossover bias, None, Few dropouts and they were considered compliance failures//Typical OSA patients with good severity range	Calc time in supine sleep, did not analyze effect of supine on A+HI w MAS, NC at online data supplement; blinding not mentioned	Well-done randomized crossover controlled study - 62% had complete, or partial response in patients with moderate to severe OSA	

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	Author	Citation	Question/ Reviewer // Evidence Level	Study Design// Location (type)//Oral Appliance// Adjust-titratable// Titration	Selection Criteria Include (Exclude)// Sample Size Rationale// Age//Gender//BMI//Hypopnea	Outcomes AHI // O2 Sat //ESS// Other//AE	Categorical Tx-Snoring //Other//Predictors	Internal Bias // External Bias	Reviewer Comments	Study Conclusion	
1											
53	Pancer	66	1,4,6//KF-RC//5	Case series, comparison to baseline, prospective//LAB (PSG, attended)//MRD-Thornton - custom, full occl cov//ADJ// advanced if snoring until no more advancement poss or not tolerated or discom developed	Snoring and OSA mild to sev, good dental health, ≥ 8 teeth in each Arch (NS)//N=134, no sample size rationale// Age 50 ± 10 yrs (28-74)//117 M, 17 F//BMI 30 ± 6//episodes w ≥ 50% reduction in airflow +desat≥4%	Grp all (n=75): premean 43.5 ± 28.4, post mean 12.4 ± 14.7, 71% decr, p <.0005// Grp Low Sat pre mean 79 ± 13, post 85 ± 9, 8% incr p=NS// Grp ESS premean 11 ± 5, post 7 ± 3 36% decr, p<.0005//Other: arous ind: grp all, premean 37 ± 27, post mean 16 ± 13, 57% decr, p <.0005// Tooth Discomfort- 60% sometimes/often (S/O), gum discom- 9% S/O, tongue discom- 10% S/O, jaw discomf- 40% S/O, excess saliv- 48% S/O	Snoring improved in 114 of 116 (98%) with loud snring at baseline, 2% failure// Oth: Success def as AHI post< 10/hr, grp OSA only (n=72), 38 N succ, 53% success/other: satis very or mod satisfied = succ, grp All (n=121), 87% success//Higher BMI less percentage decrease in AHI	NS, NS, NS, errors in ascrt: amnt protrus set by pt so even if TAP worked during the f/u PSG, pt could dec amt prot at later date & lose efficacy, Loss to follow-up 134 consec treated pts, 121 clinical f/u (90%) and 75 pts (56%) had f/u PSG //population: likely generalizable, intensity: good range of OSA severity	Large study with nearly complete clinical f/u - but significant number of patients without PSG follow-up, Success (decrease in AHI) inverse with BMI	An adjustable MAD (the TAP) is effective treatment for snoring in most patients & improves OSA in many patients. Higher BMI poorer result	
54	Pantin	68	3,4// KF-RC//5	Case series, retrospective, observational //dental office (NS)//MRD-MAS//NS/Set at ~75% max protrusion	Snoring & OSA mild (AHI> 20 unless CPAP failure)//N=132//47.5 ± 9.9//119 M, 13 F//NS//NS	Grp 121 pts PSG, premean 22.1 ± 18.4//NS//NS//SE noted in 81% mostly mild-temp, Pain: 8pts (7.5%) stopped Rx due to pain in teeth, musc or TMJ, excess saliv: min-temp: 40 (30%), dry mouth- min-temp: 30 (23%), On dent exam: 8% had new TMJ noises, Occ changes detect in 15 pts (14%) - sev-perm in 2 (1.5%), a dec in overjet noted btwn 1 & 3mm, occ changes more common after 2yrs of Rx	Grp N=132 Bed partner rated snoring,107 N succ, 18 fail, 81% succ, 14% fail//NS//NS	NS, NS, NS, NS, Loss to fu: 132 of 191 treated & 106 of 191 examined; some pts not followed up w or examined may have had poor reults or AE// probably a typical OSA population, intens: milder end of spectrum of OSA, snorers	Long term f/u (31 ± 18 monts) large number of patients evaluated objectively and subjectively for side effects. Not an efficacy study - no f/u PSG	Dental SE are common in MAS patients with long term Rx but are mostly minor. Severe complications (including significant occlusal change) uncommon	
55	Pellanda	70	1,2,4//RC- KF//5	Case series//lab (PSG, attended)//No//MRD-Serenox, -partial-occ cov, custom//NS//appliance set at near max protrusion (protrusion max median 11.5 mm (7-15))	OSA-sev; AHI > 15 per hr, dent crit; adequate dentition, ≥ 6mm mand adv, no period dis or decay, no TMJ, other-adequate nasal airflow//N=15 no rationale//60 yrs median (32-74)/ 10 M, 4 F//28.9 median (20.4-40.6) //NS	14/15 study Grp N=14, pre med: 36.2 (18-80), post med 5.5, 85% dec (p<0.002)/Low sat Pre med 73%, postmed 88%, 21% incr//NS//Other: posterior airway space on ceph (mm), pre med 8mm, post 14.5 mm, 25% incr, mand plane to hyoid dist on ceph, pre med 18.5 mm, post 14.5mm, 22% dec//AE: muscle pain: 2/15 minor-temp; TMJ: 1 sev-perm discont Rx, 8/15 minor-temp	Snoring: 12 of 14 improved//Other: EDS better 10 of 10; Satis w Rx - 12 of 15 pts satis (80%); Sleep qual, 5 pts bad at base, 5 better (100%), 9pts fairly good to good baseline, 9 better (100%), Treatment success =AHI down by ≥ 50% and < 20 per hr, grp 15pts, 13 of 15 succ, 2 of 15 fail, 87% succ, 13% fail//NS	NS, NS, NS, NS, Loss to follow-up: only 1 pt drop out//generalizable; good intensity range mild to sev	Small pre-post study but near complete follow-up, hard to comp median values to other studies, effective appliance	Improved snoring and OSA with the oral appliance. Cephs showed increase in airway size and decreased MPH with therapy.	
56	Petelle	New	6//KF//5	Case series, comparison to baseline, prospective// ?? (full PSG, attended)//MRA, full, custom//yes//2 consecutive nights of PSG-one for titration of the appliance and one with the MRA set at the therapeutic position, adv measured: 12.6± 2.7 (120% of mx protrusion)	snoring//OSA /severity. All were CPAP failures (inadequate teeth, TMJ, prior UPPP)//n=7, no ss rationale//50 ± 17 yrs (20-60)//6m/1w//28± 4 (22-33)//reduction in airflow with a > 3% desaturation or an arousal	grp:All: pre mean=66.9 ± 32.4, post (titration night) mean=26.1 ± 20.7, post (tx night) mean=19.6 ± 20.2, 71% decrease, p-value=<0.05//NS //Apnea Index (AI) pre 35.2 ± 27.1 to 6.9 ± 6.3, 80% decr, p-not stated ; Stage 3 and 4 as % TST: All- pre mean=9.3 ± 10.2, post (titration night) mean=21.6 ± 18.7, post (tx night) mean=27.6 ± 18.1, 197% increase, p-value=<0.05//NS- one patient had discomfort during the night that caused wakefulness, after titration 7/7 jaw tightness in am (minor-temp) and 7/7 TMJ area discomf in am (minor-temp)	NS//NS//NS	Patient selection=yes, confounding factors=no, crossover bias=no, errors in ascertainment=yes studies doen in the lab with the appliance in place, loss to follow up=no//population=probably, intensity=moderate to severe grp	accept-not necessarily for the ET but should be included b/c it describes an overnight titration protocol for MRA		
57	Pitsis	97	1,2,6//WSN-RR//1	Randomized controlled trial, comparison to placebo group, compare to alternative treatment group//lab (PSG, attended)//No//MRD: yes, 4, 14mm opening, full occ cov, custom//NS//prot def: yes, adv meas: yes, ant open meas: yes	OSA sev: AHI>5, other-2 symptoms (OSA-sev: CSA, dent crit: edent, other-perio disease) NS//50 yrs mean// 20M, 3F//mean 31// NS// NS	Grp MAS-1 4mm opening: premean 21, post mean 8, Grp MAS-2 14mm opening: premean 21, post mean 10/ Grp MAS-1, 4mm open: premean 87, post mean 89, Grp MAS-2, 14mm open, premean 87, post 88/ Grp MAS-1 4mm open, premean 18, post 12, Grp MAS-2 14mm open, premean 18, post 12/ NS/ NS/ TMJ: min-temp, jaw discomf, other- min-temp: salivation, dry mouth, tooth grinding, gum irritation	Complete success (no sx, AHI<5), Grp 4mm: 52% succ, Grp 14mm 35% succ. Partial success (sx better, AHI<50% initially), grp 4mm 22% succ, grp 14mm 26% succ// NS	Patient selection: yes, loss to follow: 1 out 24// population mild-mod. OSA/ Bite opening of OA doesn't affect efficacy, but small opening more acceptable too	Long-term OA use produces dental movement, usually minor and asymptomatic		

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1											
58	Randerath	X09	1//KF//2	NS//sleep lab(full PSG, attended)//MRA, activator, partial, custom//not described//not well described, anterior opening measured: 12 mm	CPAP more effective.ISAD not titrated. Sub-optimal result with ISAD//20//56.5 ± 10.2//16M/4F//NA//Reduction of ± 50% in airflow > 10 sec or reduced flow and effort with a 4% desat	AHI, ISAD, pre mean=17.5 ± 7.7, post mean= 13.8 ± 11.1. AHI, CPAP, pre mean= 17.5 ± 7.7, post mean=3.2 ± 2.9//O2, ISAD pre=83.6 ± 4.6, post=85.3 ± 3.1. AHI, CPAP, pre= 83.6 ± 4.6, post= 89 ± 3.4//NA//Arousal Index, ISAD, pre=21.8 ± 9.9, post=17 ± 5.1. CPAP, pre=21.8 ± 9.9, post=14.1 ± 5.1. Snoring (snores per hour) , ISAD, pre=54.5 ± 26/hr, post=36.4 ± 17.7. CPAP, pre=54.5 ± 26 , post= 10.3 ± 5.0 //NS	NS//Success AHI < 10, ISAD, success=6, fail=14. CPAP, success=20, fail=0//no AHI, younger age better result	Patient selection: yes, no confounding factors, crossover bias, errors in ascertainment, loss to follow-up//population generalized: yes, intensity=mild to moderate	CPAP more effective. ISAD not titrated. Sub-optimal result with ISAD		
59	Robertson	73	4//WSN-RR//5	Case series, comparison to baseline, observational study, consecutive subjects, prospective, evaluators not blinded//MRD, full occ cov, custom// not adjustable// end pt crit: 75% of max protrusion	Snoring, plus medical referral, use 7 nights/wk, 5+hr/night (EXCLUDE MISSING)// SSR MISSING//age 49(8.9)// 87M, 13F//BMI & HYPOPNEA MISSING	NS//NS//NS//Other- Cephalogram shows that maxillary incisors retrocline, mandibular incisors proclined; changes appear at 12-24 months//?? MISSING CATEGORY	NS//NS CATEGORY MISSING	Internal validity: no bias// external validity: sample typical of a OA users referred to a dentist for snoring and OSA		Unique study of effect of OA use on tooth position shows a systematic change in incisor inclination over 12-24 months of OA use	
60	Robertson	111	3,4//KF//5	Case series, comparison to baseline, no consecutive subjects, prospective//MRD, full, custom, rigid splint//Non-adjustable//Protocol defined: splint set at 75% of maximum protrusion;protrusive range measured: max protrusion 3 to 14 mm;end point criterion: advance measured- 6.83 +/- .8 mm, anterior opening measured: 5.64 +/- 1.86 mm	Snoring, mild to moderate OSA, had to be wearing MRA 5-6 hrs/night, 7 nights/week (NS)//No//Men 49.0 +/- 8.3, women 51 +/- 10.2 //87M 13F//NS//NS	NS//NS//NS//NS//Dental and occlusal changes noted:small increase in SNA and ANB, increased total anterior face height, lower face height, and posterior face height, increased maxillary length, mandible displaced downward, disrupted mand first molar and maxillary first pre molar, retroclined maxillary incisors, proclined mandibular incisors, lower OB lower OJ, more protrusion was related to the amount of increase in ANB (ANB would increase if the mandible rotated downward or the maxilla lengthened)	NS//NS//No	Patient selection: yes; confounding factors: no; crossover bias: no; errors in ascertainment: likely; loss to fu: minimal//Population generalized: yes	Long term follow up that found significant dental and occlusal changes with time. Overlap with some of the other Robertson papers	NS	
61	Rose	107	1,2,3//KF-RR//2	Randomized crossover with other appliance, prospective//both lab, home (attended baseline PSG, unattended home Resp monitoring for fu)//MRD:type A Silencor-full, custom; MRD:type B Karwetzky partial, custom//both adjustable//protocol defined: both appliances were set at 75% max protrusion, anterior opening: Silencor-5mm, K appliance-10-12mm	Mild OSA, >10 healthy teeth per arch, refused CPAP(TMJ problems)//N= 26, no sample size//Age 56.8±5.2//22m,4f//27.5±3.1//airflow reduced by ≥ 50% below baseline for at least 10 seconds	Grp Type A Silencor: pre mean AHI 16.0±4.4 post 7.4±5.3, 53.8% decr, p<0.01; Grp Type B K: pre mean AHI 16.2±4.6 post 5.5±3.3, 66% decr, p<0.01//Grp Type A Silencor: pre mean Min SaO2 89.1±3.2 post 90.1±4.8, 1% incr, p ?signif; Grp Type B K: pre mean Min SaO2 88.7±1.2 post 92.2±2.1, 3.9% incr, p=signif//ns//others: Snoring (VAS 1-10): Type A Silencor: pre mean 9.1±0.8 post 3.2±1.4, 65% decr; Type B K: pre mean 8.8±1.0 post 3.4±2.7, 61% decr, p=signif; other: Daytime Sleepiness (VAS 1-10): Type A Silencor: pre mean 7.2±1.7, post 5.4±1.0, 25% decr, p=signif; Type B K: pre mean 7.0±1.5 post 4.1±0.7, 41% decr, p=signif; other: Sleep quality (VAS 1-10): Type A Silencor: pre mean 6.4±1.8 post 4.1±1.4,36% decr p=signif; Type B K: pre mean 6.2±1.2 post 4.5±2.1, 27% decr p=signif//Failure to tolerate: 1 pt, Pain in Jaw and/or TMJ: 2 pts sev-d/c Rx, mild in 5/23,Gag reflex: 1 pt d/c Rx, Other: Failure to retain appliance in the mouth in 2 pts, xs salivation # not given	NS//NS//NS	NS, NS, NS, NS; loss to follow-up: very high-large number failure to crossover and high drop outs//Patient slection: mild OSA diagnosed in the sleep lab; intensity: only mild	Well-done study in a thin older group of patients with mild OSA. Good comparison of 2 distinctive appliances. Trouble following the patients in the trial-not all clearly accounted for. The AHI was lower with the K appliance. No success rate given for reductions in AHI	Both appliances effective for mild OSA. Treatment outcome influenced by OA design	
62	Rose	99	1,3,4//WSN-RR//5	Case series, comparison to baseline, observational study, consecutive (selected) subjects, retrospective//NS (PSG)//mrd, oc:full, custom//adjusted//adjusted after PSG if effect inadequate, end point: PSG + 'comfort', advance measurement: 4-6mm, anterior opening: 8-12mm	OSA-sev: mild to mod OSA (dent crit < 10, other- periodontal disease, TMJ dysfunction) NS/ mean 52/ NS/ 28.6/ NS/ NS	pre mean=21.7, post mean= 6.8, p<=.001//pre mean= 81.8, post mean= 86.1 p<=.05// ns//sleep stages=ns; arousals, median: pre-mean= 29.5 post mean= 12.5 response= <.01, other cephs: ns, dental casts: ns/ns	NS//NS CATEGORY MISSING	ounding factors= selected for long-term users (success)//population=to certain long term OA users, intensity= moderate	Good snoring measurement objectively obtained, cross over with active vs. inactive OA in large N study	In addition to control PSG evals regular dental follow-ups are mandatory	

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1											
63	Rose	105	1,3//WSN-RR//5+C108	Case series, comparison to baseline, consecutive, retrospective//sleep lab(PSG)//MRD, full occ, custom//NS//NS	OSA not severe, refused CPAP(dental criteria)ns//55.2//24m,2fi//27.8//50% airflow or less + 4% desat	group-baseline: pre mean=17.8(*.5), group-6-12 wk: pre mean=4.2(3.3) p= <.001, group-6-12 mos: pre mean=8.2(7.1) p= <.01, group-18-24 mos: pre mean=8.2(3.5) p=<.01/group base: pre mean=79(12.6), group-6-12 wk: pre mean=83.2(13.0) p=<.01, group 6-12 mos: pre mean=79.6(11.8) p=ns, group 18-24mos: pre mean=80.1(12.9) p=ns/ns/ns/ns	NS//NS CATEGORY MISSING	NS//to mild moderate OSA accepting OA use i	In an RCT, a non-adjusted MAD reduces AHI more than placebo, but does not significantly change sleepiness	The AHI and ODI were lower for MAD than for placebo. The MAD was less successful in pts with OSA or ODI > 50. Compliance was excellent and complications were mild	
64	Rose	New	1//KF//5	Case series, comparison to baseline, consecutive selected subjects, retrospective//sleep lab (full PSG, attended)//MRA, partial, custom//yes//if repeat PSG showed an insufficient reduction in AHI the appliance was advanced further, advance measured=4 to 6 mm, anterior opening measured=5 to 10 mm	mild to severe OSA(periodontitis, arthralgias, TMJ dysfunction, CSR, BMI >40, psychosomatic complaints)//N=81, no ss rationale// 55±10 (24-75) //15fi/101m//27.8±3.6 (range 22.7-38.7)//NS	mild n=48, pre mean= 10.6(2-14.9), post mean=5.8 (0.2-17.3), response=43% ↓, p-value=<0.01. Mod n=51, pre mean=21.7 (17.3-28.4), post mean=7.7 (1.0-30.1, response=64.5% ↓, p-value=<0.001. Sev n=17, pre mean=42.1 (33.2-64.9), post mean=18.1(2.4-48.8), response=57% ↓, p-value=<0.001./mild: pre mean=83.3(75.1-92.2), post mean= 89.2(86.3-97.2) response=7% ↑, p-value=<0.01, mod: pre mean=78.7(67.1-90.2), post mean=84 (70.5-92.8), response=6.7% ↑, p-value=<0.01. Sev: pre mean=82.7(55.7-94.4) post mean=84.2(72.8-93.5) response=1.8% ↑, p-value=<0.01//NS//Arousal index: mild: pre mean=12.3(1-25.2), post mean=7.1(2-16.8) response=42% ↓, p-value=<0.001. Mod: pre mean=25.2(5.2-36.2), post mean=10.4(0-22.7), response= 59% ↓, p-value=<0.01. Severe: pre mean=32.2 (2-52.7), pre mean= 11.7(2.4-21.4), response=64% ↓, p-value=<0.01. REM: Mild pre mean=13.2(2.1-21.7), post mean=14.9(2.5-23.8), response=1.7% ↑, p-value=<0.001. Mod: pre mean=14.2(3.9-27.3) post mean=19.5(6.3-24.2) response=37% ↑, p-value=<0.05. Severe: pre mean=8.7(0.2-14.1) post mean=14.5(2.7-25.4) and response=67% ↑, p-value=<0.01//Muscle-teeth pain -14 (1	NS//Treatment success optimal AHI<5 per hr, responder AHI down by 50% but AHI remains over 5, non-response AHI up or not down enough: mild:27/31 success optimal, 0 success response, 4/31 failed/non responder, 87.1% success optimal, 0% responder, 12.9% failed. Moderate: 24/33 success optimal, 5/33 success responder, 4/33 failed/non responder, 72.7% success optimal, 15.2% success responder, 12.1% failed. Severe: 7/17 success optimal, 5/17 success responder, 5/17 failed non responder, 41% success optimal, 29.4% success responder, 29.4% failed. All: 58/81 success optimal, 10/81 success responder, 13/81 failed/non responder, 71.6% success optimal, 12.3% success responder, 16% failed. EDS-PRE grouped as not present, present, severity present and post treatment grouped as persistent, reduced, completely resolved: N=69, success=18, success reduced=40, failed persistent=11, success resolved=26%, success reduced=58%, failed persistent=16%	Patient selection=yes good range of OSA severity from psg, confounding factors=no, crossover bias=no, errors in ascertainment=yes most likely pts used the tx, loss to follow up=minimal//population=yes most likely, intensity=good range of severity	Well-done large case series with a good amount and duration of follow up		
65	Rose	X04	1, 6//WSN//5	Case series, comparison to baseline// ?? PSG, attended// MAD (Karwetzky type), partial dental coverage, custom//adjustable//adjusted if follow-up test shows poor result; anterior opening: 10-12mm	OSA/Severity: mild/moderate, BMI<30 (NS)//N=57//age 56.5 (7.3, SD)// 51 M, 7F// BMI 26.4 (2.0)// hypopnea <50% flow	AHI pre- mean 22(12.2), post- 10.4 (9.7), p<.05; Minimum SpO2 pre- mean 80.7 (6.8), 83.2 (7.5), p<.05. Treatment success correlated with mandibular plane, facial height, hyoid position.	NS//NS//NS	Internal validity: no bias; external validity: population: limited to mild-moderate non-obese (BMI<30) OSA clinic patients.		Treatment success with an OA is correlated with 'horizontal' craniofacial morphology and a downward and forward hyoid position	
66	Ryan	77	2//WSN//5	Case series, comparison to baseline, image evaluators blinded to outcome// PSG, attended// MRD-Klearway, full occ cov, custom// titratable//NO TITRATION	OSA-sev: mild to moderate (dent crit, other-nasal obstruct) no; convenience/ 55(25-70)/ 12:3, M:F/ 32 (23-65)/ 43 (34-48)/ NS	AHI: pre median 28 (9-45, 95% CI), post median 8 (1-28), p<.001/ NS/ NS/ Other: cross-sect area (mm2) hypopharynx pre-median 67 (12-237), post 64(34-251), p <.02; oropharynx pre-median 103(39-235), post 115(40-297), p NS (>.05); velopharynx pre-median 96(43-281), post 126(57-283), p<.005; lateral diameter (mm), velopharynx pre-median 14.5(7.4-28.1), post 17(9.9-33.9), p <.005// correlation: cross sect area change, AHI change, r= .64, p=.01//	NS//NS CATEGORY MISSING	Internal validity: no bias// external validity: restricted to OSA clinic pop w teeth, intens: mild to mod/ standardized observations		Effective oral appliance therapy for OSA is associated with increase in pharyngeal cross sectional area and minor changes in pharyngeal shape	
67	Sanner	X05	1,6//RR//5	NS//sleep lab (full PSG)//MAD, custom//yes//advanced measure: 65% max	OSA/severity(dental criteria, TMJ)//13//57.2//14m:1f//31.4//NA	Treatment	NA//NA//airway patency during Mauller maneuver with MAD in place	NS//NS		MAD is effective in many but not all patients. MRI may prove to be useful in predicting efficacy when MAD is used during Muller maneuver	

	A	B	C	D	E	F	G	H	I	J	K
	Author	Citation	Question// Reviewer // Evidence Level	Study Design// Location (type)//Oral Appliance// Adjust-titratable// Titration	Selection Criteria Include (Exclude)// Sample Size Rationale// Age//Gender//BMI//Hypopnea	Outcomes AHI // O2 Sat //ESS// Other//AE	Categorical Tx-Snoring //Other//Predictors	Internal Bias // External Bias	Reviewer Comments	Study Conclusion	
1											
73	Stradling	83	1//WSN-RR//5	Case series, comparison to baseline, selected subjects, prospective// respiratory monitor, unattended in home, oximetry, other-PTT// MRD, full occlusal coverage, custom// not adjustable, 75% max protrusion	Snoring, current OA user// N=15// age 50.3 (32-65)// 2 F, 13 M// BMI 27.0 (22-33)// neck 41.7 cm (34-46)	Snoring pre- mean 193, post-20, p<.0001; Snoretime pre- mean 818, post- 50, p<.0002; Sound level pre- mean 1.5, post 0.2, p<.0001; SaO2 dips >4% pre- mean 5.3, post- 3.8, p<.03; Arousal pre- mean 19.0, post- 15.0, p<.05; Effort pre- mean 13.5, post- 9.7, p<.002	MISSING INFORMATION	internal validity: no bias; external validity: sample selected for snoring successfully treated with OA		Well-done study with objectively documented benefit on snoring with secondary benefit of better breathing	
74	Tan	102	2,3//WSN,RR//1	Prosp, RCT, consecutive patients, crossover study of MAS to CPAP//Lab-PSG//full occlusal coverage//Single position appliance set at 75% of max protrusion (10 subjects) or partly adjustable appliance (14 subjects) titration not described	mild mod OSA (AHI >10 and <50), dental criteria:adequate, age:>18(Osa/severity, dental criteria)ns//50.9//20m, 4f//31.9//ns	group MAS: pre mean=22.2(9.6) post mean=8.0(10.9) p<.01. Group CPAP: pre mean=22.2(9.6) post mean=3.1(2.8) p<.001ns//group MAS: pre mean=13.4(4.6) post mean=9.0(5.1) p<.001. Group CPAP: pre mean=13.4(4.6) post mean=8.1(4.1) p<.001//other:Arousal group MAS pre mean=19.3(9.6) post mean=11.6(5.6) p<.01. group CPAP: pre mean=19.3(9.6) post mean=9.8(6.6) p<.01//12/24 mild jaw discomfort early in the am, 1 stopped MAS due to side effects, 2 stopped CPAP due to SE	ns//other:Success=use+AHI<10 group MAS n success=16 n failed=7 % success=70%. Group CPAP n success=22 n failed=2 % success=ns// General health scores improved with both treatments - no diff between treatments; 17 of 21 who used both treatments chose the MAS for long term treatment.	Patient selection NS//NS//No apparent order effect, two-week wash-out //NS//Minimal loss to follow-up//generalizable//good range of severity	Adherence not stated.	The MAS may be a suitable alternative to CPAP in patients with mild to moderate OSA. MAS were well tolerated and preferred by the majority of subjects.	
75	Tsuiki	X01	1, 2//WSN//5	Case series, comparison to baseline// PSG, attended// MAD (Klearway), full occlusal coverage, custom//titratable//yes, end point criteria: symptoms, adv measured: 85-80% of max protrusion, anterior opening: 2mm	OSA/severity, dental criteria(dental criteria)/N=18//age 45.9//15M:18F//BMI 27.7(5.4)//	all(n=18), pre mean=32.1(13.1), post mean=9.9(7.6), p-value<0.0001. Responders(n=13), pre mean=34.0(14.3), post mean=5.9(3.9), p-value<0.0001; non-responders (n=5), pre mean=27.3(8.8), post mean=20.1(4.5), p-value=NS	NS//NS//Cephalometry: in responders, anterior velopharynx and posterior hypopharyngeal surfaces are displaced anteriorly; not in non-responders.	Internal validity: no bias; external validity: patient selection restricted to OSA patients selected for OA therapy		Successful reduction of AHI in OA users is associated with mobility of the airway soft tissues	
76	Walker-Engstrom	New	1//KF//1	Randomized controlled trial, comparison of an appliance at 2 settings, prospective, blinded evaluators, intention to treat analysis// home, unattended (Resp monitoring only)//MRD, partial occlusal coverage, custom //No//yes, set at 75% to max protrusion or 50% maximum, end point criterion: adv. measured: 50% group 5.0 mm (4.8 to 5.3) 75% group 7.2 mm (6.7-7.6) anterior opening measured: 2mm	severe OSA at > 20, age: 20-65, no drug abuse and no mental illness (pronounced malocclusion, severe cardiac, resp, neurol disease, nasal obstruction)//sample size needed 40 per grp, enrolled 86, 77 completed//50.4 in 75% grp, 54.3 in 50% grp//all male//30.2 ± 1.2 in the 75% MA group (no Diff)- b/w grps 30.5 ± 1.4 in the 50% MA group//50% reduction in airflow with a 4% desat	75% grp: Pre mean= 50.4 ± 4.7, post mean=15.6 ± 6.2, response= 69% ↓, p= < 0.001, 50% grp: 47.0 ± 5.1, post mean= 17.4 ± 5.7, reponse =63% ↓, p= <0.001//NS//75% grp: pre mean= 11.5 ± 3.1, post mean= 7.5 ± 2.6, response= 35 % ↓, p<0.001; 50% grp: pre mean= 11.7 ± 3.1, post mean= 8.6 ± 2.8, response =26% ↓, p= < 0.001 //ODI-75% grp: pre mean =49.7 ± 5.6, post mean= 19.1 ± 7.0, response= 34% ↓, p= < 0.001; ODI-50% grp: post mean = 18.0 ± 6.0, response= 59.6% ↓, p-value= <0.001; //Snoring Index= 75% grp, pre mean =0.86 ± 0.1, post mean = 0.57 ± 0.1, 34 % ↓, p-value=<0.001. 50% grp- pre mean= 0.83±0.1, post mean= 0.66 ± 0.1, response= 20.5 %, p-value= < 0.001//TMJ discomfort, 75% grp - minor-temp in 12.5%, none in 50% grp; Occlusal change, 75% group - minor-temp in 15%, 50% grp - minor-temp in 5%	75% MA grp-success=77%, 23% failed. 50% MA grp-62% success, 38% failed//TX success AI < 5 and AHI < 10=grp 75%, n success=22, n failed=20, % success=52%, % failed=48%. Grp 50%, n success=13, n failed= 29, 31% success, 69% failed. Satisfied with RX= 79 finishers, 71-success, 8-failed, 90% success, 10% failed. Success defined as a decrease of 50% in AI of AHI-grp 75%, n success-AI 88%, failed 12%. AHI 83%, 17% failed. Grp 50%-Ai 78%, 22 % failed, AHI 76%-24% failed//lower BMI lower, More advancement	Patient selection:right disease, no patients were randomized to the two different groups, no cross over bias, no errors in ascertainment, loss to follow-up=minimal - intention to treat, population=can be generalized, intensity=focus on severe OSA	Blinded, intention to treat, sample size calculation, severe OSA pts, detailed f/u	Well-done adequately powered study that shows more advancement means more success with OSA MRA tx	

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1											
81	Yoshida	95	1,2//WSN-RR//5	Case series, comparison to baseline//lab (PSG, attended)//No//MRD: Esmark//NS//NS	OSA-sev (NS) NS// mean 57.7 yrs// 1 F, 19 M// NS// NS// NS	Grp 1 pre mean 57.2 (21.1), post mean 25.8 (29.3), p<.0001// NS// NS// Other correlation of AHI decrease w mand jaw length, soft palate length (inverse)/ Cranio fact: mand jaw length, soft palate length// NS	NS//NS CATEGORY MISSING	Patient selection: yes// Population: no, indadequate descrip, intensity: variable// NS	Effect size estimated and outcome measures extensive	MAD is indicated for the treatment of OSA	
82	Yoshida	X07	1//RR//5	NS//sleep lab (full PSG, attended)//MAD, full, custom//No//No	UARS//NS//mean 38.4 yrs//15 F, 17 M//Mean 25.2//NS	All: pre- 3.1 post-1.9//All: pre- 85.4 post- 89.4//All: pre- 13.2 post- 5.8//Arousals (Arousal Index):All: pre- 35.5 post-5.8. Sleep Efficiency: All:pre- 85.4 post- 90.3. MSLT: All: pre- 6.3 post-12.9//NS	All: success- 22 of 22 fail-0 of 22 success-100% fail- 0%/NS//NS	NS//NS	Ten patients did not snore originally	MAD is an important treatment option for UARS	