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- Respitrace 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 Respitrace (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 freqency 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% sucess; Placebo grp: O% 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, oss 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-tempory: 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 frp: 91% success; Placebo grp: NS??//Predictive equation for post Rx AHI: neck circumfrance-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% initally)- 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 critera:adequate, age:>18(OSA/severity, dental crtieria)ns//50.9//20 m, 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) pos tmena= 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 eman=19.3(9.6) post mean=11.6(5.6) p=<.01. group CPAP: premean=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 (pronunced 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, 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,	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 calcuation, 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 (respiratoty monitoring only, unattended)// MRA, full occlusal coverage, custom// No// Protocol defined: set 50% max protrustion (4-6mm), anterior openning 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 differece 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 (XO2) 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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1	**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**	
2	Barnes, et al.	?	1,5//WSN//1	RCT, comparison to placebo grp, comparison to alternative treatment grp, crossover with CPAP, randomized treatment order, selected subjects, prospective// Sleep lab (full PSG, attended)// MRD, full, custom// Adjustable// Protocol defined: maximal comfortable protrusion, end-point criterion: maximal advance tolerated, advance measured: 10.3 (0.3)	OSA/severity, dental criteria (NS)// NS// 47.0 (0.9)// 80% M// 31.1 (0.5)// Referenced	Baseline grp: pre mean= 21.3 (1.3); CPAP grp: post mean= 4.8 (0.5), p=.001, .05 vs MAD; MAD grp: post mean= 4.8 (0.5), p= .001; Placebo grp: post mean= 20.3 (1.1), p=NS// Baseline grp: 86.7 (0.6); CPAP grp: post mean= 91.9 (0.3), p= .001, .05 vs MAD; MAS grp: post mean= 87.8 (0.4), p= .001; Placebo grp: post mean= 95.4 (0.6), p=NS// Baseline grp: pre mean= 10.7 (0.4); CPAP grp: post mean= 9.2 (0.4), p= .001; MAD grp: post mean= 9.2 (0.4), p=.001; Placebo grp: post mean= 10.2 (0.4), p=NS// FOSQ- Baseline grp: pre mean= 3.1 (0.1); CPAP grp: post mean=3.3 (0.1), p=.001; MAD grp: post mean= 3.3 (0.1), p=.001; Placebo grp: post mean=3.3 (0.1), p= .01. SF36- Baseline grp: pre mean= 69.4; CPAP grp: post mean= 74.1 (1.2), p=.001; MAD grp: post mean= 73.7 (1.2), p=.001. MWT- Baseline grp: pre mean=30.7 (0.9); CPAP grp: post mean= 30.0 (0.9), p=NS; MAD grp: post mean= 29.6 (0.9), p=NS; Placebo grp: 28.0 (0.9), p=NS// NS	NS// MAD, 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>MAD>placebo; sleepiness, CPAP>MAD>placebo; QoL, CPAP=MAD>placebo; and neurobehavioral tests no change		
3	Barthlen	5	1,3,4,5,6//JT// 5	Case series with cross-over, comparison to baseline and alternate therapy (3 appliances), prospective // in-lab PSG // MAD (Snore Guard, SG, partial occlusive coverage), TRD, other: Soft palatal lifter, SPL // MAD advance 3-5 mm, anterior opening not measured // no adjustment	OSA severe not excluded// NS // age 31-80 // 7M, 1F // NS // NS	SG mean pre- 72.1 ± 39.9, post- 35.5 ± 39.4, p <.02; TRD pre- 50.3 ± 18.9, post- 43.5 ± 32.5, p 0.64; SPL pre 47.3 ± 8.0, post 57.4 ± 31.0 //SG mean nadir 02 sat pre- 80.4 ± 10.0%, post- 85.2 ± 9.6%, p 0.2; TRD pre-post, p ns; SPL no data // NS // Pain minor-temp: SG; severe-perm: tongue pain: TRD; gagging: SPL//NO AE	NS// NS//NO PREDICTORS	Patient Selection: CPAP failures; confounding factors: therapist expertise//NO EXTERNAL BIAS	Minimum number of patients, original study design	A MAD is an effective treatment in CPAP failed OSA patients, but the TRD and SPL are not.	
4	Bloch	9	1,6//JT// 1	Case series with crossover, comparison to baseline, therapy, alternate therapy, randomized treatment order // in-lab PSG // NO ORAL APPLIANCE// adjustable // end point: subjective success	Snoring + OSA (AHI>5), adequate dentition // sample size not justified // age 50.5 ± 1.5 // 24M, 1F // BMI 27.4±0.6 // hypopnea = <25% baseline calibrated Respitrace sum signal	AHI: baseline 22.6± 3.1 (mean±SD), Herbst 8.7±1.5, p<.05; Monobloc 7.9±1.6, p<.05 // O2sat: NS // ESS baseline 13.5, Herbst 9.0, p<.05, Monobloc 9.0 p <.05 // Arousal index: baseline 41.0±3.7, Herbst 30.9±3.6 p<.05, Monobloc 26.5±3.9, p<.05, Snoring index: baseline 41.0±3.7 Herbst 32.5±4.6, p<.05, Monobloc 21.4 ± 4.2, p<.05 // AE minor-temp: TMJ pain 7/24, tooth pain 3/24 muscle pain 4/24, same incidence each appliance	Snoring success: Herbst 10/19, Monobloc 14/19, no significant difference; Preference: Herbst1/24, Monobloc 15/24, p<.008//NO OTHER//NO PREDICTORS	Patients: CPAP-refusing OSA, variable severity//NO EXTERNAL BIAS		Two oral appliances improve snoring and OSA to similar degrees, but the custom Monobloc is preferred to the Herbst OA	
5	Bondemark	11	4,6//JT// 5	Case series, comparison to baseline, consecutive subjects, prospective // NS // MAD, monobloc type, full occlusal coverage, custom // not adjustable // protrusion set at 75% maximal	Snoring or OSA,convenience sample// NO SAMPLE SIZE RATIONALE // Age 54.4(8.8) // 23M, 9F // NS // NS	NS// NS// NS// NS// AE: low frequency of headache, cranio-mandibular pain, TMJ function no different between first use and 2 year follow-up.	NS // NS// NS	Selection bias: referral from ENT // population: snoring, OSA patients treated with OA		No adverse effects on TMJs or stomatognathic system were shown after 2 years use, but minor occlusal changes were found	
6	Cameron	13	1,6//JT// 5	Case series, comparison to baseline, sleep clinic patients, prospective//home (respiratory monitor, unattended)// MRD-mono-block type, full occ cov, custom//not adjustable//no	Clinic convenience sample of snorers and OSA//N=16// age 49 (30-68)// all male//BMI 29.6 (5.23)//hypopna= flow 50% baseline	AHI: pre 12, post 9,NS//NS//Sleepiness (VAS) grp pre mean 6.1, post mean 3.7, p < .0001// Snoring (VAS) premean 8.8, postmean 4.2, p<.0003//NS	NS// NS//Sleep-quality (VAS) premean 3.5, postmean 7.5, p .0001	Loss to f/u: 2 out 16//sample comprises low intensity disease	Useful subjective assessments	A monobloc MAD significantly reduced snoring assessed by bed partner with subjective improvement of sleepiness and sleep quality	

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7	Clark	16	1,4,5//KF-RC//3	Non-randomized controlled trial, crossover with CPAP, prospective, evaluators blinded//lab (PSG, attended)//MRD-herbst app, full occ cov, custom//adjustable//NS	OSA-severity-AHI>15, nasal patency, dental crit-good prot range > 7mm, age-21-75 yrs, other-good nasal airway, good health (OSA-severe, CSA, dental crit-missing teeth periodontal dis, caries, TMJ probs, ETOH, drug use, psychoact meds daily prev failure CPAP or AMP)//N=23, sample size NS//47.1 ± 8.1 yrs//all M//28.1 ± 3.8//50% or greater decrease airflow associated with arousal	Grp CPAP pre mean 33.9 ± 14.3 post mean 11.1 ± 3.9, resp 60% decr p= .001, grp AMP pre mean 33.9 ± 14.3 post mean 19.9 ± 12.7, 39% dec, p=.001// grp CPAP Low satn pre mean 84.3 ± 6.87 post mean 91.1 ± 6.4, resp 8.2% inc p.0003, grp AMP pre mean 84.3 ± 6.8 post mean 90.2 ± 4.4 resp. 7% inc p.0007//NS//*Sleep Quality: change in Stage 1 and 2 sleep grp CPAP pre mean 63.7 ± 12.5% post mean 56.2 ± 8.2, resp 11.7% decr, p=.0088, grp AMP pre mean 63.7 ± 12.5% post mean 58.3 ± 10.1, resp 8.5% decr, p=.0088; change in REM sleep, Grp CPAP premean 5.9 ± 5.8% post mean 20.7 ± 6.7, resp 250% inc, p=.0066, grp amp pre mean 5.9 ±5.8% post mean 20.88 ± 7.5, resp 254% inc, p=.0066; Daytime Symptom Scale Score combination of presleep symptoms, midsleep symptoms, EDS and daytime symptoms (decrease in score is improvement) grp cpap pre mean 2.0 ± .5 post mean 1.5±.4, resp 25% dec, p=.0001, grp amp pre mean 2.0 ±.5 post mean 1.4 ±.5, resp 30% decr, p=.0001* //TMJ, minor-temp, limited use of dev in 2 pts, sev-perm-prevented 1 pt from enrolling	NS//other-at 2weeks grp CPAP success=20N, failed=1N, 5%fail, grp amp success=20N, failed=1N, 5% fail, intolerant CPAP & amp, other-at 3-10weeks, grp CPAP success=1N, 5%success, grp amp sucess=17N, cont. use//NO PREDICTORS	NS, NS, crossover bias-yes, non randomized treatment order, NS //pop-yes, intensity-typical patients	Limitations-treatment success not defined, non-randomized treatment order, bias in treatment pref, prosp study, good # subjects, complete follow-up, blinded scoring was strength	AMP device achieved substantial success in most cases less effective than CPAP overall, less effective in more severe cases. AMP preferred as long term treatment option, this preferred biased in that it was provided free	
8	Clark	18	3,4//KF-RC//5	Consecutive subjects, retrospective, unblinded case series//lab (PSG, attended)// MRD-adj herbst, full occ cov, custom//adjustable//75% of max protrusion	Mild-moderate OSA, other-using amp for at least 1yr (NS)//N = 65 No ss rationale//Age- M 56.4 (28-80) F- 55.7 (31-68)//46M, 7F//NS//NS	Grp pre mean- 20.9 ± 20.7//NS//NS//NS//Muscle Pain min-temp 10 of 27 (37%) using appliance, Tooth pain sev-perm 8 of 27 (37%), TMJ min-temp pain 8 (30%), Occ changes min-temp 5 (15%) sev-perm 7 (26%) Other-min-temp 11 dry mouth 41%	NS//Other- Compliance, Grp 1 32 N success, 60%, crit def: nightly use @ 1 year//NO PREDICTORS	NS, NS, NS, errors in ascertain: mail & phone both concur//not sure patients used Rx//loss to follow-12 out of 65 not found (18.5%//Pop-not well described/ intensity - mild to moderate OSA	Difficult to determine efficacy without objective PSG data. Long term use of AMP leads to irreversible changes in occlusion for 26% of OSA patients	Long term use of AMP leads to irreversible changes in occlusion for 26% of OSA patients	
9	De almeida	New	4//KF//5	Case series, comparison to baseline//sleep lab (full PSG, attended)//MRA, Klearway, full custom//titratable//initial setting was 60% maximum protrusion, PSG done, if symptoms persisted appliance advanced 0.5 mm per week. End-point criterion-Yes, 10.3 ±1.6 mm, anterior opening measured 2mm	Include- OSA/severity- AHI 5 to 30, dental criteria > 10 teeth each jaw, age> 25, BMI < 33. Exclude- dental criteria (X) TMJ symptoms//No//46.7 ± 5.8//7 men//27.4 ± 1.5//NS	All: pre mean=13.2 □ 5.8, post mean=5.6 □ 3.7, response= 57.6% decrease, p-value < 0.05//All: pre mean=78.7 □ 5.1, post mean=83.3 □ 6.4, response= 5.8% increase, p value- NS//NS//Stage 3 and 4 Sleep- All: pre mean=18.3 □ 12.3, post mean=37.3 □ 19.3, reponse=104% increase, p value < 0.05//NS	NS//TMJ Morphology-Normal outlines, morphology and signal intensity. 4 patients – normal positioning of the articular disc. 1 patient had an anterior displacement with reduction and 2 patients had anterior displacement without reduction. In 13 joints, the anterior displacement of the condyle with the appliance in place was less than or equal to the seen with maximum opening//amount of protrusion	Patient selection: yes, no confounding factors, crossover bias, errors in ascertainment, loss to follow-up//population generalized: yes, intensity=mild to moderate		Important information on the joint, information on an important predictor of outcome – the amount of mandibular protrusion	
10	Denbar	108	?//RR accept, WSN reject//case report	NS//lab(PSG), attended//MRD: TAP/auto-titrating CPAP, OC, custom//yes//protocol defined: jaw position determined by serial oximetry studies	CPAP failed to control OSA (NS)//61 years//1M//29.1//NS	Case study: pre AHI 85.0, post AHI TAP 40 (56% decrease), AHI with TAP + CPAP 7.0 (92% decrease)//Case study: pre min SaO2 87%, with TAP 84%, TAP + CPAP no sat < 90% //pre-ESS 19//	NS//NS CATEGORY MISSING	NS//NS	Case study but only publication discussing combination therapy	Unique approach of OA/CPAP combination for a patient where neither CPAP nor the OA could completely control the OSA	
11	Endo	X03	6?//WSN//3	Case series, cephalometry compared to control group at baseline and treatment to baseline// PSG, attended// monobloc, full dental coverage, custom// not titratable// advance 70% max	Exclude UPPP//N patients=103, controls 98// age patient mean 51.2//gender NS// patient BMI 24.5(2.2)// hypopnea >50% reduction of effort plus reduced airflow	Cephalometry, baseline: Compared to controls, patients demonstrated micrognathia, relatively enlarged tongue, low lying hyoid bone. Cephalometry, treated: Compared to baseline, patients with a better reduction in AHI had 'balance relationship' between maxilla, mandible.	NS//NS//NS	Internal validity: Limited description of patients and controls prevents assessment; external validity: Japanese OSA pts of moderate severity, but selection process not described.		Japanese OSA patients appear to differ from controls by craniofacial features (micrognathia); and treatment success is correlated with some cephalographic findings	

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1	**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**	
12	Engleman	96	1,2,3,5,6//KF-RC//1	Randomized controlled crossover, comparison to CPAP, consecutive subjects, prospective, PSG scorer blinded//baseline PSG in lab, f/u home (resp monit, unattended)//MRS 1 custom, full; MRS 2 custom, partial//Adjustable//crossover after 2 months on each RX, prot def: set at 80% max mand protrusion, ant open meas: 2-4mm	OSA-sev: AHI>4, age- 18 to 70, other: 2 or more symptoms include sleepiness- ESS >8 or sleepiness driving (dent crit: <4 teeth either arch, other-plms, narcolepsy, major medical illness, shift work, living more than 50 mils from Edinburgh)//n=48 allowed power of 99% to detect 1 SD diff between treatment scores//46 ± 9 yrs, range 18-70//48 finished, 36M, 12F//28 ± 4 MRS, 31 ± 5 CPAP//NS	Grp MRS pre mean AHI 31 ± 26, post15 ±16, 52% decr, Grp CPAP premean 31 ± 26, post 8 ± 6, 74% decr, effect size CPAP vs MRS .45, p<.001//NS//Grp MRS pre mean ESS 14 ± 4, post mean 12 ± 5, Grp CPAP pre mean 14 ± 4, post 8 ± 5 effect size .57 (CPAP vs MRS), p<.001//Other- perf-qual of life, FOSQ, grp MRS post mean 13 ± 3, grp CPAP post mean 14 ±2, effect size .51 btwn CPAP & MRS, p=.001, Other- Well being- SF 36- all 3 parameters better w CPAP than with MRS, effect sizes .34 - .52 for the 3 parameters//NS//GRP MRS pain: 33(69%) min-temp, Other: xs saliv 9(19%) min-temp, poor retention 19(40%) min-temp, sleep disturb 12 (25%); Grp CPAP mask problems 11 (23%), mask off during sleep 7 (15%), sleep disturb 16 (33%), stuffy nose 8 (17%)	NS// Grp MRS: 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 MRS	Patient selection- no; conf fact: no; crossover bias: not mentioned 24 started CPAP, 24 started MRS 1st, errors in ascertain: no careful follow up; loss to follow: minimal, met sample size needed for power calc//pop: probably generalizable, intensity: good range, sample enriched for sleepiness	Effect size estimated and outcome measures extensive	Significant differences in outcomes btwn MRS & CPAP: AHI, effectiveness, symp scores (ESS), FOSQ (qual of lif), SF-36 (well being), better w CPAP, No significant differences in outcomes btwn MRS & CPAP: obj daytime sleep meas by MWT, SF36-phys component, hosp anxiety & depression scale, cog scores, SE's, reported usage, preference. No significant differences in outcomes btwn 2 MRS apps: no diffs in use, satisfaction, effect, acceptance, or SE outcomes btwn 2 MRS devices, Subgroup anaylysis- mild SAHS pts AHI 5-15: symptoms, efficacy, satisf, ESS, FOSQ, SF36 mental component scores better with CPAP than MRS, preferred Rx CPAP in 14 out 18 pts	
13	Esaki	23	1, 2, 6//JT// 5	Case series, comparison to baseline//in lab// MAD full occ cov, custom //adjustable//adjusted to reduced snoring awake	Selection NS (NS)//age mean 56.0// all male// BMI mean 27.9//hypopnea=<50%, >10% of reference breathing	AHI pre-mean 44.2, post-mean 11.7, p < .05//NS//NO ESS//NO OTHER//side effects NS	AHI<15: success= 6, fail = 2// ESS NS// predictor: AHI:MAD advance, R2 .88		Interesting method determ advance, excellent corr adv, AHI change	An adjustable MAD improves AHI in proportion to the degree of mandibular advance	
14	Eveloff	24	1,3,6//KF-RC//5	Case series, comparison to baseline, prospective, blind subj-evaluation//lab (PSG, attended)//MRD-herbst, full occ cov, custom//not titrated//NS	OSA-severity, cpap intol, incompl CPAP resp, pref for AMP, contraindict to cpap or surgery (NS)//N=19, sample size rationale NS//45 ± 1.8 (27-57)//16 M, 3F//31 ± 1.2//≥50% decr airflow with arousal or ≥4%desat	Grp AMP pre mean 34.7 ± 5.3, post mean 12.9 ± 2.4 resp 62.8% decr p <0.002 //grp AMP Low satn premean 84.1 ± 0.2 post mean 88.0 ± 1 resp 5% incr//NS//NS// Min-temp pain -none at time of FU, TMJ-min-temp, none at time of FU	NS//NS//lower Pre Rx AHI and ceph variables smaller posterior facial ht, Incr pre SNA, smaller PAS, smaller MPH put into pred equation fo post rx AHI. MPH shorter in responders (responders = postRx AHI < 10). PNS-P shorter in responders	NS, NS, NS, NS, NS (no loss to follow-up at outcome PSG// pop-typ referred pts, intensity-very good range severity		AMP is an useful modality to treat OSA, 14 of 15 patients had a reduction in AHI with treatment. Lower AHI related to better outcome	
15	Ferguson	25	1,3,4,5//WSN// 1	Crossover with other appliance with CPAP//lab, home (PSG, attended)//MRD, full occ cov,custom//titratable//NS	OSA-severity, dental crit (OSA-severity, dental crit)// NS// 44 (10.6)// NS//32 (8.2)// 50% decrease Respitrace (effort)	Grp AMP pre-mean 25.3(15.0) post-mean 14.2(14.7), p <.005, grp CPAP premean 23.5(16.5) postmean 4.0(2.2), p <.005 // grp AMP premean 78.7(8.6) postmean 75.8(11.6), grp CPAP premean 76.8(9.1) postmean 87.7(2.4) // grp AMP premean 10.3(3.1) postmean 4.7(2.6), pval <.005, grp CPAP premean 11.0(3.8) postmean 5.1 (3.3), p <.05 //NS//NS pain, sore teeth, jaw muscles, minor, temp; difficult chewing in AM, excessive salivation, minor, temp	grp AMP 45%failed, grp CPAP 0%failed//NS//NO PREDICTORS	Patient selection-yes, errors in ascertain-uncertain (home study)// pop-gender not specified, intensity-mild to mod OSA		OA is an effective treatment in some patients with mild to moderate OSA and is associated with greater satisfaction than CPAP	
16	Ferguson	26	1,4,5//KF-RC//1	Randomized cross-over with AMP and CPAP// Lab attended PSG for Dx pre and post at home PSG unattended//SnoreGuard partial occl, non-custom//Protrusion 7mm, ant opening 7 mm//NO TITRATION	OSA Severity mild-moderate AHI (15-50), dental - 10 teeth each arch, live in metro Vancouver (NS)//N=27// Age 46.2±10.9 (25-72)//24 M, 3 F//BMI 30.4±4.8 (21-42)//Hyp ≥50% decr effort	AHI Pre AMP 19.7±13.8, Post 9.7±7.3, 51% decr, p<0.005; PreCPAP 17.6±13.2 Post Mean 3.6±1.7, 80% decr, p<0.005// Lowest Satn AMP pre 83% ±7.4, post 83.8% ±7.3, unchanged; Lowest Satn Pre CPAP 83% ±6, Post CPAP 88.7% ±2.5, 7.4% incr, p<0.05//NS// Muscle pain with AMP mild and temp, 1 patient mod-sev; no TMJ; more side effects with CPAP ONE CATERGORY MISSING	Subj snoring AMP 19/25 (76%) success, CPAP 100% snoring success//Treatment success = AHI<10 with improv symptoms - AMP 48% vs 62% for CPAP//EDS PreAMP 84% Post 40% (11 of 21 EDS improved); Pre CPAP 86% Post 24% (13 of 18 improved)//Satisfaction mod-very satis p< 0.05 SG vs CPAP; Grp SG success 17 of 25 (68%) success; Grp CPAP success 13 of 21 (62%) success//NS TOO MANY CATEGORIES	NS, NS, No crossover bias - tested for period and carryover effect, 2 week washout between Rx, NS, some patients no PSG with AMP - couldn't retain appliance at night//sleep lab referral practice, mild to mod-sev OSA (AHI 15 - 50)	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 satisfaction higher with AMP	

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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 protusion < 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% reasonablly 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 hypophyarnx 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-pro~~s~~trusive 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 re~~s~~port: 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 questionnarie-76% classifiied as daytime tiredness symptom responders and 84% classified as night symptoms//positional upper airway obstruciton: 83% of supine dependent were ODI responders vs 79% of the non-supine dependent OSA pt-therefore supine dependent not predicitve 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, pro~~s~~trusive range measured=yes	Snoring or OSA, OSA=ODI > 5, adequate # teeth, (dental criteria=max protrusion~~in~~n < 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//mean~~s~~ 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 respitrace 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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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 O 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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26	Hans	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 SnoreGuard, 12 patients modified SG without advance, partial, prefabricated//No//Protocol defined: SnoreGuard (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	SnoreGuard (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 SnoreGuard (17 subjects) grp: 42.4 ± 37.5, post mean= 29.7 ± 21.4, p<0.05//NS//SnoreGuard (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 SnoreGuard (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 SnoreGuard, errors in ascertainment: not measured – but only a two week treatment period, oss to f/u: 33% lost in Device B, 17% lost in SnoreGuard 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 SnoreGuard (Device A) was fairly effective even in severe patients.		
27	Higurashi	X06	1//RR//5	NS//??//TRD, no occlusal coverage, custom//NS//NS	OSA severity//NS//mean 59.4//Male 6, Female 2//Mean 25.3//NS	NS//all pre- 69.1 post-83.9//NS//ODI -all: pre-40.5 post-10.7. 90%>SpO2 (%)- all:pre-19.78 post- 2.95//NS	NS//NS//NS	NS//NS		TRD positively effected cases of OSA by lowering ODI and time below 90% O2 desaturation, and by raising lowest O2 desaturations. Accept-although small N, one of only studies with TRD	
28	Ishida	34	1,2,6//KF-RC//5	Case series, comparison to baseline, prospective// sleep lab (PSG)// PMA - not described//NS//NS	OSA mild to severe//N=19, No sample size rationale// Age 52.8// 19 M//BMI 28//NS	AHI pre 37.8±28.3 to post 12.9±14.6, 66% decr, p<0.001// Low SaO2 pre 78.3%±15.3 to post 85.3±8.2, 9% incr, p<0.01//NS TWO CATEGORIES MISSING	NS//grp all n success: 13 (68.4%), n failed: 6 (31.5%), 68.4% success, 31.5% fail, cat effec: other-stated intraesophageal press sig dec dur PMA comp to pre PMA (p<.05); sleep architect-arousals #, % stage 1 sig dec (p<.01) in cases w AHI >30 bef PMA, sleep arch improved only in severe cases//MRI with and without PMA during day nap	patient sel- not sure, clin feat not desc, sel crit not defined, conf fact: pre, post comp-short time btwn measuremnts, grps prob unchanged, no comp grp, errors in ascertain- not obj meas//pop- not comp sure, prob, intens- not desc but pre AHI 37.8 ± 28.3-mean is sev range	Not great paper but studied more severe patients, patients thinner and japanese, assesed predictors of outcome, useful and did MRI pre- and post-treatment, main problem- paper too short, much detail missing	No clinical variables predict response. MRI shows glosso- pharygeal obstruction is corrected by PMA	
29	Johnston	106	1,3,4//WSN-RR//2	Randomized controlled trial, comparison to placebo group//home, unattended(resp monitoring)//MRD//No//NS	snoring, OSA/severity, dental criteria(ns)//yes//55.1//16m, 4f//31.6//50% reduction air flow	Group MAA: pre mean=31.9(21.2) all pts post mean=22.9(22.8) p=.011 OA vs placebo. Group Placebo: post mean=37.7(24.9) //ns//MAA: pre mean=13.9(6.4) all pts post mean= 11.6(6.7) p= NS OA vs placebo, Placebo: post mean=12.6(6.3)//other:**ODI-** MAA: pre ,mean=30.7(18.8) all pts post mean=21.1 (19.8) p=.002 OA vs placebo. Placebo: post mean=31.2(18.2)	NS//NS//CATEGORY MISSING	treatment position determined a priori, not adjustment for effect//NS	MAD effective for mild -moderate OSA. Less effective in more severe cases		

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30	Kato	39	1,2//WSN//5	Case series, comparison to baseline, prospective-retrospective //NS (oximetry, unattend)//MRD, full, custom//fixed but 3 versions of progressive advance//2 mm per week, advance measured 2,4,6 mm; anterior opening measured 5-8 mm	Dental criteria (UPPP)// No //49 (27.1-66.6, 95%CI) //NS //BMI-28.7 (23.0-40.0) //O2 desat 4+%	NS //NS //NS //ODI4 (oxy desat 4+%); Grp advance 0mm-mean%26, p NS; Grp 2mm, mean 17.3, p<.05; Grp 4mm 14.7, p<.05; Grp 6mm, mean 10.8, p<.05-compared to 0mm ; Mean nadir Sa02, Grp advance 0mm, mean %Sa02= 87.2, 95% CI= 78.0-91.8, p NS; Grp 2 mm, mean%Sa02= 89.2, 95%CI= 80.0-92.6, p <.05, Grp 4mm, mean%Sa02= 89.5, 95%CI= 78.1-93.4, p<.05; Grp 6mm mean%Sa02= 89.6, 95%CI= 81.3-92.5, p<.05, compared to 0mm; P'Critical closing Pressure - Grp advance 0mm, Velopharynx mean, 95% CI = 2.2(0.2-3.0), Oropharynx mean, 95% CI = 1.3 (-2.6-4.2); Grp 2mm, Velopharynx mean, 95%CI=0.1 (-1.9-1.4), Oropharynx mean, 95% CI = -1.2 9(-5.4-2.4), p<.05, both parameters compare to 0mm; Grp 4 mm, velopharynx mean, 95% CI, =-1.7 (5.7-0.1), oropharynx mean, 95%CI = -2 (-8.5-1.0), p<.05; Grp 6mm, velopharynx mean 95%CI = -3.3(-10.1-0.1), oropharynx mean 95% CI = -3.5 (-15.4-0.2), p<.05// NS	NS//NS//NS	patients have appropriate disease, no confounding or crossover bias //pop generalize - limited description, prob representative of mod OSA, intensity mod OSA	Helps define mechanism	Step advancement of mand pos resulted in dose-depend reduction of closing press of passive pharynx. Improvement of both oxygenation and pharyngeal collapse significantly depends on the mand. Position	
31	Kingshott	New	1 ~~2~~//KF//5	Case series, comparison to baseline~~,~~ prospective//sleep lab (full PSG, attended)//partial, tongue stabilizing device, prefab, 4 diff. sizes, allows ~~for~~ oral breathing//No//tongue inserted into the bulbous compartment and held by negative pressure	Snoring, current TSD users on a nightly basis plus using TSD for >2 months, willing to stop using it for one night(self reported OSA symptoms, on medications that affect muscle tone, previous UA surgery, o~~k~~ngoing Rx for SDB//N=6, no ss rationale//51± 4//men//30 ± 3// 50% reduction in thoracoabdominal movement for at least 10 seconds	grp All: pre mean=26 ± 17, post mean= 15 ± 13, response= 42.3% decrease, p-value=0.06//NS//NS//arousal frequeny: all: pre mean=34±16, post mean=22 ± 14, 35% decrease, p-value=0.004//oxygen desaturation: All- pre mean=10 ± 10, post mean=5 ± 5, 50% decrease, p-value=0.09//Stage 1 sleep: All- pre mean=10 ± 3, post mean= 8 ± 2, 20% decrease, p-value=0.03//snoring frequency in the 61 to 70dB range: all- pre mean=41 ± 52, post mean= 8± 16, 80% decrease, p-value=<0.046	NS//NS//NS	pt selection=yes, confounding factors=na, crossover bias=na, errors in ascertainment=pts wore TSD during outcome night, loss to follow up=no//population= probably, but very small study, highly selected pts., intensity=milder group of pts		Data on tongue advancing appliances is so minimal, is a well done but very small study, several nearly significant results likely NS because it is so underpowered	
32	Liu	42	1,4,6//KF-RC//5	Case series comparison to baseline, prospective// sleep lab (PSG, attended)// Klearway, custom, full occl coverage//titratable// Adv 2/3 max prot. Further titration if symptoms persisted	OSA>15 AHI and dental criteria 10 teeth each arch, (exclude TMJ)// N=47 no sample size rationale// Age 49.1 (25-80)// 42 M, 5 F// BMI 29.6 ±6 (22.3-55.0)// ≥50% decr airflow with ≥4% desat or arousal	AHI 40.3±16.6 to 17.1±12.3, 40% decr, p<0.01// Low SaO2 75.6±14.1 to 80.0±15.97, 5.8% incr//NS//NS//pain, min-temp: mild jaw & tooth discom in am gen gone 1 mo., Excess saliv, min-temp: present, temp, generally gone 1 mo.	NS//Good responders (75% decr) 13/47 (27.7%), Mod responders (25 to 75% decr) 25/47 (53.2%), Poor responders (<25% decr) 9/47 (19%)//Good response assoc. longer maxilla, smaller oropharynx, smaller overjet, less erupted maxillary molars, larger ratio of vertical airway length to CSA of the soft palate all associated with a better response to Rx. Lower age and lower BMI in the good response group	NS, NS, NS, NS, NS//pop-prob generalizable but not well desc, intens-good severity range	Reasonably good case series with pre- and post-comparison that was complete	Predictive formula based on large N. Lower age and BMI associated with a better response	
33	Liu	43	1,4//WSN//5	Case series, comparison to baseline, consecutive subjects, prospective//lab (PSG, attended)//MRD-Klearway, full occ cov, custom//titratable//prot def: yes, end pt crit: max reduce snor, apnea report, adv meas: 5.7mm, ant open meas: 8.0 mm	OSA-sev, dent crit (dent crit)//No// 49.1//42M, 5F//29.6//referenced, NS	Grp all pre-mean AHI 40.3, post-mean 17.0 //grp all pre-mean 75.62, post-mean 80.0 //NS //NS //pain, min-temp: jaw muscle, tooth	NS//NS//NS	pt sel-yes, conf fact: selection for study// pop-sel. OSA pts, intens: mild to sev		Better treatment response seen in younger patients, lower BMI, longer maxilla, smaller orophar, smaller overjet, less erupted maxillary molars, large ration vert airway length to cross-sec area of soft palate	

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34	Liu	44	1,2,4// KF-RC//5	Case series, comparison to baseline, prospective// lab (PSG attended)// MRD full occl// not adjustable// Protrusion 75% of max, anterior opening 7mm	OSA >10 AHI, (exclude AI<5, AHI <10, period, TMJ, edent)// N=22, no sample size rationale given// Age 58.9 (40-68)// Gender NA// BMI NA// Hyp≥ 50% decr airflow + ≥ 4% desat or arousal.	AHI 40.3±21.7 to post 11.7±11.8, 71% decr, p<0.01//Low Satn pre 73.4% ± 8 to 79.6% ± 18, 8.3% incr, p<0.01// other-total # desats, grp premean 164.09 ± 109.7, post mean 55.6 ± 78.4, resp 66.1% decr, p < .01, Other-stage 1 sleep %, grp all premean 45.1 ± 19.5, postmean 30.6 ± 14.1, resp 32% decr, p<.01, Other-stage 2 sleep %, grp all premean 46.3 ± 16.8, post mean 57.9 ± 12.8, resp 25% incr, p<.05, Other-retropalatal airrway space ceph var, grp all premean 8.6 ± 1.9, post mean 12.1 ± 2.6, resp 42% decr, p <.01 //mild temporary TMJ in 3/22 (13.6%) elim by adj to device, excess saliv, min-temp: 4pts- 18% ESS MISSING?	Snoring 18/22 (81.8%) success// treatment succ: AHI < 10, Grp all 13/22 (59.1%), 9/22 (40.9%) failure, Grp mild-mod 7/ 8 (87.5%) success, 1/8 fail (12.5%), Grp sev 6/14 (42.9%) success, 8/14 (57.1%) failure//Subj EDS Grp all: 17/20 (85%) success, 3/20 (15%) failure//More severe AHI less success. Cranial facial features not predictive. Larger oropharynx and shorter cranial base less likely to respond. ONE EXTRA CATEGORY	NS, NS, NS, NS, NS//pop-probably generalizable, intens- good range of severity	Reasonably well-done case series. No sample size calculation and statistics poorly reported, but confirms MAD better results with mild to mod RDI than with severe OSA	Six months follow-up show MRD alternative for OSA in mild to moderate AHI	
35	Liu	New	NS//KF//5	Case series, comparison to baseline, prospective//sleep lab (full PSG, attended)//Klearway, full, custom//titratable//Set at 2/3 max protrusion then incremental advancement until symptoms resolved. Protrusive range measured	OSA/severity-mild to severe (AHI > 15), dental criteria-10 teeth each jaw, normal mandibular movement, lived in metro Vancouver (dental criteria-TMJ problems)//No//45.1 ± 12.1//12 men, 4 women//26.7 ± 4.3 (21.3 – 34.6)//NS	All: pre- 33.44 □ 12.5 post-11.2 □ 7.7 p value < 0.001, Good Response (AHI ≤15) n = 11 pre-29.2 post- 7.0 □ 4.5 response-76%↓ p value< 0.001, Poor Response (AHI >15) n = 5 pre- 30.9 post- 20.4 □ 3.9 response- 34%↓ p value < 0.001//All: pre- 77.0 □ 9.6 post- 82.4 □ 6.7 reponse- 7% increase p value <0.05//NS//NS//NS	NS//NS//NS	pts selection: likely, no confounding factors, not a crossover effect, errors in ascertainment: likely that they used it, no loss to follow-up//population generalized: likely, intensity=good range		Information on predictors of outcome that is important	
36	Lorino	45	2//WSN//5	Case series//NS (NS)//other-wax bite, 5-6 mm adv//NS//NS	NS (NS)// NS//28-57// 6M, 4F//NS//NS	NS//NS//NS//*other- resp resist, grp rest premean 3.5 (.2), grp advanced, active pre mean 3.6 (.2), grp adv, passive pre mean 2.9 (.2), p < .001* //NS	NS//NS MISSING CATEGORY	NS//NS		5-6 mm passive advancement reduces respiratory resistance	
37	Lowe	47	1,2,3,4//WSN//5	Case series, comparison to baseline, prospective-retrospective//sleep lab (PSG, attended, resp monit only, unattended)//MRD-Klearway, full occ cov//custom/titratable//prot def: yes, end pt crit: subj improvement, adv meas: 11.3 mm, ant open meas: 2mm	Dent crit (dent crit)// get real//44//36M, 2F//30.3//NS	Pre- mean 32.6(2.1 SEM), post- mean 12.1 (1.7 SEM), p <.0001// NS // NS // *other: outcome: airway video (n=9) shows inc at all levels, sig only @ velopharynx//* NS	NS// other success = no sympt + RDI < 15 def., grp all: 71% succ, RDI < 30: 80% succ, RDI 30+: 39% succ NO PREDICTORS	patient sel: yes, conf fact: sel factors// NS		OA significantly reduces RDI in moderate to severe patients and has a direct effect in airway size and is tolerated easily through the night	
38	Marklund	49	4//RR//3	Non-randomized controlled trial//NS//MRD-MAD hard acrylic, MAD soft elastomer, full & part occ cov, custom & prefab//No//adv meas: mean 5.7mm, ant open meas: mean 9.9mm	Other-treatd with OA for OAT (NS)// NS// mean 53yrs// 78M, 14 F-includes ctrl grp// NS// NS	NS// NS// NS// NS// Subjective:37/69 with no change, 28/69 altered occlusion disappears during day, 3/69 permanent change in occlusion	NS//NS//NS			After mean 2.5 yrs OA use, changes occ studied, diff in app design-hard & soft-obsvd as related to occ changes: treatment induced mean changes overjet, overbite, arch width both app typs, changes to be unrelated deg protr, 3pts out 60 resp to quest were aware of perm bite changes, follow up import pts freq unaware of occ changes, smallr chgs occ seen in pts use soft oa	

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39	Marklund	50	1,6//KF- RC// 5	Case series, comparison to baseline, prospective// sleep lab (PSG attended)// MRD full occl cov, custom, fixed adjusted to maximize effectiveness// Protrusion 58% of max, 6mm median.	OSA severity, CPAP decliners, (exclude dent crit, BMI>40, CSA)// N=47 no sample size rationale// Age 58 (37-72)// 40 M, 4 F// BMI 28 (22-37)// Hypop decrease airflow ≥50% plus ≥3% desat	Mild AHI (21 pts) 11.0 (6.5-19) to 5.3 (0.0-17) p=0.001; Mod. AHI (15 pts) 27 (20-38) to 7.2 (1.3-19) p=0.001; Severe (8pts) 53 (44-68) 14 (1.6-32) p=0.01 (median values)//NS//NS//ODI Grp mild pre med 6.5 (2.7-14), post med 3.9 (0.6-12), -40% resp, p .008, Grp mod: pre med 24 (9.9-31), post med 6.9 (.7-15), -71% resp, p .008, Grp sev: pre med 53 (19-72), post 14 (2.6-35), -74% resp, p =.04//Aleep struct - % REM, Grp mild: pre med 15% (10-22), post 21% (7.3-34), +40% resp, p .005, Grp mod: pre med 16% (8.1-26), post 21% (10-27), +31% resp, p .02, Grp sev: pre med 14% (0-18), post 20% (6.9-28), +43% resp, p .01//Arous ind: Grp mild: pre med 13 (5.1-26), post 8.5 (2.5-16), +35% resp, p .001, Grp mod: pre med 23 (10-57), post 10 (5.3-28), +56% resp, p .002, Grp sev: pre med 34 (30-67), post med 16 (3-28), +53% resp, p .01// % SWS: Grp mild: pre med 7.3% (0-22), post 8.6% (0-18), +13.6% resp, Grp mod: 5.8% (0-17), post 7.2% (.2-23), +19.4% resp, p .004, Grp sev: pre med 0.2% (0-3.3), post 8.8% (.8-17), +4300% resp, p .01//AE NS	Snoring mild Grp: 20 Success, 1Failure; Grp Mod 12S, 3F; Grp Severe 5S, 3F// EDS 34/42 (81%) success, 8/42 (19%) failure// Success Grp mild 20/21 (95.2%) success, Grp mod: 12/15 (80%) success, Grp sev: 5/8 (62.5%) success// Combined Success Score AHI <10 & satis snoring Grp mild: 17/21, (81%) success, Grp mod 9/15 (60%) success, Grp sev: 2/8 (25%) success, GROUP ALL: 28/44 (64%) success. 16 pts unsatis result- 9 good snor but AHI not reduc, 2 AHI red but still snor, 5pts both snor & high AHI//Poorer result with lesser protrusive ability – needed at least 5 mm advancement to work, Better response with lower AHI.	NS, NS, NS, NS, NS//pop-yes, intens: good range of OSA severity	Complete follow-up of subjects, main problem is use of median values, hard to compare to other studies	Results better in mild and moderate cases of OSA but worse if limited protrusion	
40	Marklund	51	1,2//WSN//5	NS//sleep lab (PSG, attended)//MRD-yes, full occ cov, custom//adjustable//prot def: adj AHI > 10, anterior open meas: 5+mm	OSA-sev AHI>20, other-not on cpap (NS)// NS// 57yrs// all M// median 28 kg per m2// dec airflow > 50%	Grp total: pre-mean 23 (med), post-mean 7.6, p <.01, grp supine: pre- mean 39, post- mean 11, p <.01, grp non-sup: pre- mean 15, post-mean 2.6, p < .01//NS//NS//NS//NS	NS// other-treatment succ AHI < 10, grp sup AHI < 15: N succ= 20, N fail =10, grp non-sup, AHI < 10: N succ = 26, N fail= 4 NO PREDICTORS	pt sel-yes, conf fact: sel for sev, loss to follow: 0/ pop-yes, intens: full range/		Successful apnea reduction using MRD is associated with a normal mandatory plane angle and a small lower anterior facial height	
41	Marklund	52	1,2,6//KF-RC//5	Case series, comparison to baseline, consecutive, prospective//sleep lab (PSG, attended)// custom MRD//adjustable//Set 4-6 mm advance, ant opening 5 mm, appliance adjusted if snoring persisted or it patient had pain, end point - at f/u-protrusion 10 mm (8-14)	OSA sev (AHI < 15 per hr or < 30 minutes of sleep in lat or sup position) //N=26//median age sup depend grp 59 (37-60); non-sup dep grp median 54 (37-68)//M=23, F=3//NS//decr >50% in airflow with desat ≥ 3%	Grp N =12 supine dependent AHI - premedian 15 (6.5-27), post 3.4 (0-10), <0.01; Sup AHI, pre med 41 (16-70), post 5.9 (0-15), p<0.01; Lateral AHI, pre med 3.3 (0.5-7.6), post 1.4 (0-6.2), p=NS; Grp N =14 Non-SupDepAHI premed, 22, (13-66), post 11 (3.3-32) p<0.01; Supine AHI, premed 44 (1.8-73), post 21 (6.3-60) p=0.02; Lateral AHI, premed 21 (12-70), post 4.5 (0-31) p<0.01//NS//NS// Other: arousal index; SupDep premedian 17 (7.4 to 26) post 8.2 (4.1 to 28) p<0.01; Non-Supdep premedian 24 (5.2 to 67) post 11 (36 to 27) <0.01//NS	NS //grp supine dependent AHI success 10/12; N fail 2/12, 83% success; grp nonsupdep success 2/14, N fail 12/14, 14% success; All N success 12/26, N fail, 14/26, 46% success NO PREDICTORS	tx success (AHI < 10 in lat & sup positions with MRD but definition of success rigged in favors of the sup dep pts because the AHI in lateral position was < 10 per hr, pre tx in those pts pre tx, so of course it is <10 post tx) MISSING ONE CATERGORY	BMI not related to success with MRD	Patients with Supine dependent OSA (higher AHI supine) have a better result with an MRD	
42	Marklund	53	1,3,4//WSN//5	NS//lab (PSG, attended)//MRD- MAD, full occ cov, custom//no but re-constructed prn for adj//prot def: after 2 mo habit per, adj made due to se, insuff trtmnt, end pt crit: lack se, effect subj reports, adv meas: 4-6mm, ant open meas: ≥ 5mm	OSA pts, snoring, OSA severity, can't tolerate CPAP (NS)// No // 50(12) // M=17, F=2 //BMI 26 (3.5) //50%reduct in thermistor flow +3%desat	Grp .7 year, N=19, pre-mean 25 (16), post-mean 8.8 (7.6), p<.001; Grp 5.2 yr, N=19, pre-mean 22(17), post-mean 4.9 (5.1), p<.001 // grp .7 yr, N=18, pre-mean 80 (3.8), post-mean 87 (5.5) , p<.05, grp 5.2 yr N=19, pre-mean 82(8.1), post-mean 89 (5.4), p<.05 // NS // ODI4 (Oxygen desat index 4%) , Grp .7 yr, N=7, pre-mean 12(6.7), post-mean 1.1 (0.6), grp 5.2 yr N=19, pre-mean 15(14), post-mean 4.4 (4.3), p<.05 // SE minor-temp; occlusive changes 2/19; severe permanent - occlusive changes 0/19	Grp 5.2 yr, N=19, N success= 14, N fail = 5 // Sleepiness, Grp 5.2 yr, N=19, N success = 13, N fail = 6 CATEGORY MISSING	patients have approp disease, confounding factor selective follow-up at .7 yr, no loss to follow-up - 14 patients received other therapy // pop generaliz - mild to mod OSA pop		19 of 33 patients suff treated with MAD (AHI < 10 w satisfact reduct snoring) Of 19 suff trtd pts, 17 (89.4%) used MAD after 5.2 yrs. 6 of long term trtmnt pts had dev replaced w new ones, poor fit, loss of app. 2 of 10 had dev adj btwn short term & long term visits, this indicates need for prof dent follow up. The pts who replaced, adj dev during study per exp better apnea reduct at long term follow up than pts still using orig dev	

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43	Markund	New	1//KF//5	Comparsion 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 crietria: class III occulsion, edentulous, arthalgia, 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 ceph landmarks, antic "apneic skull" not found, ceph pred: narrower SNB angle, wider SNA 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 69 users, 2 non users, Other: excess saliv, 7 of 69 users, 13 non users, 41% users had SE's nightly, subjs 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 improvmnt >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 ceph 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 placebo controlled crossover study - 62% had complete, or partial response in patients with moderate to severe OSA	

	A	B	C	D	E	F	G	H	I	J	K
1	**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**	
47	Menn	57	1,2,3//WSN//5	Case series, comparison to baseline//sleep lab (full PSG, attend, MWT)//MRD, partial, custom//NS//NS	OSA pts - OSA severity RDI 10+, age 18+, dental critera, other NS (dental criteria - no teeth, other TMJ) / NS / 53 / M=22, F=1 / BMI=29 /decr airflow + 4% desat & or arousal	Grp N=23, premean 37(23), postmean 18(20), p<.001 / Grp N=23, premean 78, postmean 86, p<.005 / NS / MWT Grp N=13 premean 25 (9), postmean 32(10), p<.05: CEPH, Grp PAS, premean 4.0(1.6), post mean 6.8(3.8), p<.01; Grp MP-H, premean 26.6 (8.1), postmean 17.9 (6.4), p<.001 / pain, min.-temp: discomfort	NS/ RDI Success = 50% better + RDI<20, N Success = 16, N fail = 7; RDI Success = RDI <10, N success =12, N fail = 7	Patiens have appropriate disease, no crossover bias // pop generalize-OSA	Ceph meas: non of stand ceph meas sig correlated with changes in RDI, O2 sat nadir, or MWT mean sleep latency	MRD is useful in the long-term treatment of pts with mild/moderate OSA	
48	Millman	59	1//WSN//5	Case series, comparison to baseline// sleep lab (full PSG, attend)// MRD- Herbst, full, custom//yes//wear until comfortable	OSA patients with UPP + OA - OSA severity RDI 10+ (NS) // No // 42.7 // M=17, F=1// BMI 29.3 //airflow < 50% plus arousal OR 2% desat	Grp N=18, pre-mean 37.2 (7.1), post-mean 15.3 (4.4), p<.01 // N=18, pre-mean 83.9 (1.6), post-mean 87.9 (1.2) p<.05 //NS/ NS//NS	NS //NS CATEGORY MISSING	patients have appropriate disease, confounding factor UPPP // pop generalized - to OSA + UPPP, mild to severe intensity		OA appears to be an effective mode of therapy to control OSA after unsuccessful UPPP	
49	Neill	104	1,4//KF-RR//5	Case series, comparison to baseline//sleep lab, (full PSG, attended)//MAS custom, partial//No//attempted to get 75% max protrusion, end point criterion comfort, 75% protrusion, ant opening measured 11mm average	OSA (AHI>5), plus 2 symptoms of ESS>10, am h'ache, snoring, nocturnal choking, > 18 yrs (dental contraindications, other sleep disorder, signif comorbidity, CSA)//NS//47.7±10.1//18M, 1F//31.9 ±4.6//NS	Grp all, premean RDI 22.2 ±19.8, post 16.5±21.4, 26% decr, p=0.03; Grp all supine RDI, 30.8±23.8, post18.8±22.1, 39% decr, p=0.01//NS//Grp All ESS pre 12.2 ± 4.8 post 10.4 ± 3.7 14.8% decr, p=NS//Other:snoring, Grp All premean aver snore level 52.7±4.1, post 50.7±2.7, 3.8% decr, p=0.05; Grp All snore freq 6.7±5, post 6±4.2, 10% decr, p=NS//15 of 19 (79%) had SE - minor -pain, teeth, gums, xs salivation, choking, unable to keep in mouth, in 5 of 19 (26%) SE prevented regular use	Snoring by partner report on Likert scale mean improvement 50.8 ±27%, p<0.001//other: Grp All 4 (21%) complete success (RDI<5) , Grp All 10 (52.6%) partial success (RDI>5 but ≥50% reduction), Grp All 5 (26.3%) failure (RDI>5 and <50% reduction)//Other: improved sleep quality 28 ± 23%, p<0.001; other: improved daytime alertness by 22±24%, p<0.01//no predictors - not age, bmi, initial RDI or positional OSA	Patient selection bias: no; Confounding factors: N/A; Crossover bias (order effect): Randomly assigned to first of last part of night with MAS; Errors in ascertainment: used the device during the follow-up study; Loss to follow-up: No//Population: probably generalizable; Intensity: Mild to severe – good range	Measured snoring objectively. Small study, Not an appropriate way of measuring AHI, used 2 appliance types, (1 in 16 pts), the other in semidentate and edentulous patients	The MAS improves objective and subjective indices of OSAS and snoring. Side effects were common and insome cases prevented regular use. MAS is a viable alternative to CPAP. Reliance on subjective response may be misleading	KAF said reject, RR said keep - on rereview although not a great study KAF elected to accept
50	Ng	110	1,2//KF-WSN//5	Case series, prospective, comparison to baseline//sleep lab (PSG attended)//MAS, full occl cov, custom//titratable//yes-titrated to max comfortable limit, adv measure: 4.6±1.4mm	OSA sev AHI > 10 and at least 2 sympt (exclude simple snoring, dental criteria, CSA)//N=10, sample size rationale ns//Age 44±12//9M, 1F//BMI 30.8±6.2//cited	Grp All: pre AHI 25.0±9.8, Post AHI 13.2±20.2, 47% decr, p=0.03//Low SaO2 mean SEM 86±4, Post 90±3, 5% incr, p=0.01//NS//other: Upper Airway Collapsibility **(UACP) ST2 NREM** pre mean SEM -1.6±1.4 post -3.9±1.9, 144% decr, p≤0.01; other: **UACP SWS:** pre mean SEM -2.5±1.9 post SEM -4.7±1.7 88% decr, p≤0.02//AE: mild side effects xs salivation, gum irritation, mouth dryness, jaw discomfort	NS//all: n success = 7 (70%); n failed=3 (30%); 6 (60%) AHI <10; complete response(CR) AHI<5 + symptom resolution (5, 50%). Partial response-improved symptoms plus a >50% reduction in AHI but AHI > 5/hr (2, 20%). Failure < 50% reduction in AHI (3, 30%)// Amt of mand protrusion did not correlate with change in UACP; baseline UACP did not correlate with AHI, change in UACP correlated with change in AHI.	NS, NS, NS, NS, NS//population likely generalizable, intensity range from mild to severe OSA	Largely a mechanisms paper, shows that oral appliances decrease upper airway collapsibility, greater the decrease in collapsibility the greater the improvement in AHI	MAD reduces collapsibility of the upper airway in sleep	
51	O'Sullivan	62	1,4,6//KF-RC//5	Case series, consecutive, comparison to untreated, retrospective prob// follow up study split night-half with dev, half without//sleep lab (PSG, attended)//MRD, partial occ cov, custom//No//prot def: set 75% max protrus, adv meas: yes, ant open meas: set 10mm	Snoring, OSA-sev other- if AHI > 20 if refused, failed CPAP (NS)//NS// 49.1 ± 11.8 yrs (range 31-75)// 52 M, 9 F// 29 ± 3.8 (range 21.3-39.6)//reduct airflow ≥50% plus SaO2 dip ≥ 4%	Grp MAS - AHI, premean 32.2 ± 28.5, post 17.5 ± 22.7, -46% resp, p < .01//grp MAS Low SaO2 premean 84.0 ± 9.8, post 87.0 ± 8.9, +3.6% resp, p <.01 //NS //other-% stage 1, 2 sleep, grp MAS premean 74.8 ± 11.4, post 64.2 ± 12.3, -14.2% resp, p<.01, other- % stage 3, 4 sleep, grp MAS, premean 9.0 ± 9.1, post 16.3 ± 13.1, +81% resp, p<.01, other-arousal ind, grp MAS premean 31.4 ± 20.6, post 19 ± 14.6, -39.5% resp, p <.01, Other-snorers per min: Grp=51, premean 9.4 ± 4.0, post 8.2 ± 5.0, p .05//pain-mild jaw discom, min temp: 38 sub mild, temp 22 of 38pts, excess saliv, min-temp 11 of 57, dry mouth min-temp 12 of 57, grinding min-temp: 3 of 57, gum irrit, min-temp: 4 of 57, retntion, min-tem: 7 of 57 remvd involunt dur sleep	47 of 48 snoring judged better by bed prtner (98% success), 1 of 48 failure (2%)//Other - 26 pts AHI > 20 baseline, succ=AHI < 20, Grp MAS 14 of 26 succ, 12 of 26 fail, 54% succ, 46% fail; other- tirednsss awakning in 44pts, succ= impr, grp MAS 30 of 44 succ, 14 of 44 fail, 68% succ, 32% fail, other-EDS 39 sub, grp MAS 24 of 39 succ, 15 of 39 fail, 62% succ, 38% fail//Predictors: AHI < 60 better result than AHI> 60	NS, NS, NS, NS, loss to follow: small, 4 dropouts, 6 unwill do final psg but did question//pop-probably generalizable, intens: good range of disease severity	Main reason to include is large sample size, some predictors of success looked at, good objective measurement of snoring	When A+HI < 60 MAS can be acceptable treatment	
52	Ono	63	1,2,6//WSN//5	Case series, comparison to baseline, case series with cross-over, compare to baseline and alt rx, randomized tx order //sleep lab (full PSG, attend) //TRD-2 types//No //NS	OSA pts - mild to severe / dental criteria - TMJ probs / no / 46.6 / M=6, F=1 / BMI 28.1 / 50% reduction effort with reduced flow	Grp TRD-A- premean 41.1 (17.8), postmean 15.8 (9.2, p<.05; Grp TRD-B- premean 41.1 (17.8), post mean 13.5 (10.6), p<0.5 / NS / NS / NS /	NS//NS CATEGORY MISSING	Patients have appropriate disease// generalizable - select patients, variable intensity	Only 7 patients, but one of a few papers on TRD	TRD improves AHI after 6 months	

	A	B	C	D	E	F	G	H	I	J	K
1	**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**	
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 ascert: 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//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 of14 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 failry 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 discomfort in am (minor-temp)	NS//NS//NS	Patient selection=yes, confounding factors=na, crossover bias=ns, 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 discomfort, 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% initally), 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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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, sucess=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 sustematic change in incisor inclinitation 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 f/u: 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 f/u)//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 measuremnet: 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	counding 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	

	A	B	C	D	E	F	G	H	I	J	K
1	**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**	
63	Rose	105	1,3//WSN-RR//5+C108	Case series, comparison to baseline, consectuive, retrospective//sleep lab(PSG)//MRD, full occ, custom//NS//NS	OSA not severe, refused CPAP(dental crtieria)ns//55.2//24m,2f//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: pr eman=79.6(11.8) p=ns, group 18-24mos: pre eman=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 wre lower for MAD than for placebo. The MAD was less successful in pts with OSA or ODI > 50. Compliance was excelelnt and complications were mild	
64	Rose	New	1//KF//5	Case series, comparison to baseline, consectutive selected subjects, retrospective//sleep lab (full PSG, attended)//MRA, parial, 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 dysfunt'n, CSR, BMI >40, psychosomatic complaints)//N=81, no ss rationale// 55±10 (24-75) //15f/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 meant=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 sucess optimal, 5/33 sucess 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, severly present and post treatment grouped as persistent, reduced, completely resolved: N=69, success=18, success reduced=40, failed persistant=11, success resolved=26%, success reduced=58%, failed persistant=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=minimial//populatin=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 applaince therapy for OSA is associated with increase in pharyngeal cross sectional area and monor 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 Maulller 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
1	**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**	
68	Schmidt-Nowara	New	1,2//KF//5	Case series, comparison baseline, retrospective//45 of 71 sleep studies, sleep lab, attended PSG or unattended resp monitoring only//MRA, partial occlusal coverage, pre-fabricated:boil and bite//No//set at 3mm posterior to the max acceptable advance (incisors end to end), anterior opening measured: 7.2 ± 2.1 mm	signigicant snoring, OSA, OSA who failed other RX(NS)//68//54 (33-75)//61m/7f//NS//no	20 n, pre-mean=47.4(34-60.6), post mean=19.7(10.9-28.5), response=58%, p<0.001//20N, pre mean=74.5(69.8-79.2), post mean=80.4 (78.2-82.7), reponse=8%↑, p<0.02//NS//111N, post mean= ↑ by 3.2 ± 3.6, p=<0.01;50N, post mean= ↑ by 2.3 ± 3.0, p= <0.001; 61N pre mean= 6.9±2.3// Pain-discomfort 47% minor-temp, 22% severe-permanent; Excess salivation -27% minor-temp, 40% sev-permanent	65N, 27 success (snoring eliminated), reduced 37, unchanged=1, 42% success, 1.5% failed//sleepiness: 51N, 26 success, 25 failed, 51% success, 49% failed//sleep quality: 56N, 49 success, 7 failed, 89% success, 13% failed	pt selection: not sure-many had no sleep studies, confunding factors: N/A no comparator group, cross-over bias: NA, errors in ascertainent of exposure: wore it during f/u psgs but f/u mostly by surveys//population: not sure, intensity: good range	Nicely shows the effect of an MRA on the posterior airway space	Information on mechanisms	
69	Schonhofer	78	1,4//KF-RC//5	Case series, comparison to baseline, consecutive subjects, prospective//NS (PSG, attended)//MRD Snorban-boil & bite, full occ cov, pre-fab//not adjust//min 75% max prot	OSA-sev: RDI>10 per hr (dent crit: max-mand insuff inadeq # teeth, periodontis, TMJ dysfunction, other: nasal polyps, large tonsils, sleepiness exp when driving or MVA due to sleepiness)//N=22 (no ss rationale)//48.6 ± 8.9 yrs//NS// 31.4 ± 5// ≥ 50% reduct airflow from baseline w ≥ 4% desat	Grp responder N=11: AHI premean 27.6 ± 7.3, post 7.3 ± 2.9, 56% decr, p .01; Grp non-responder: AHI premean 36.8 ± 22.2, post 30.4 ± 23.1, -17.4% p=ns//Grp responder: Low SaO2 premean 79.3 ± 11.3, post 82.9 ± 9.4, +4.5%, p<.05, Grp non-responder: Low SaO2 premean 72.8 ± 8.2, post 75.4 ± 8.2, +3.6% // Grp responder: ESS premean 12.8 ± 4, post 9.3 ± 3.6, -27%, p<.05, Grp Non-responder: ESS pre-mean 15.5 ± 3.7, post 14.4 ± 4.4, -7% //Other-Snoring intensity (snoring index #/hr): grp responder-premean 28.6 ± 9.9, post 15.6±8.5, -45%, p<.01, grp non-resp premean 43.3±19.8, post 37.1±17.1, -14% resp, Other-Snoring visual analogue scale (1-5): grp respond: premean 4.5±.7, post 2.3± .8, -49%, p<.05, grp non resp pre mean 4.6± 0.5, post 41.1, -13%, Other- % REM sleep: Grp respond: premean 12.5±5.3, post 16.1 ± 4.7, +29%, p<0.05, grp non-resp premean 9.3 ±7.5, post 10.8±6.2, +16%, Other- % slow wave sleep: Grp respond. premean 14.4±6.8, post 17.3±5.2, +20%, p<.05, Grp non-respond, premean 12.4±5.5, post 13.8 ± 6.2, +11%, Other-arousal index: grp resp. pre mean 33.5 ±	NS//Other- responders reduct RDI > 50% from baseline and ≤10/hr and no relevant SE. Success: 11 of 22 responders, 8 of 22 non-resp, 50% responders, 36.4% non-resp, plus 3 drop outs due to side effects//No predictors of success - amt prot not predictive	NS, NS, NS, NS; loss to follow: accounted for drop outs//Population: patients with OSA from clinic population, intensity: with good range of severity	50% success with an inexpensive Appliance ($27.50 USD plus $330 for oral surgeon); suggest using cheap MAD as a trial to select pt for permanent appliance	Some concern about frequency of TMJ difficulty - ?related to appliance design	
70	Schonhofer	79	1,3,6//WSN-RR//5	Case series, comparison to baseline// ?? PSG, attended// full occlusive coverage of maxillary teeth with tongue depressor (Snorex), custom// not adjustable//NO TITRATION	Select: adequate nasal airway, dentition, TMJ/ N=23// age 53.7(8.6)// 22M, 1F// BMI 31.1 (6.8)// hypopnea = 50% decrease airflow + 4% desat	AHI: user n=6 pre-mean: 32.7 (11.5), post 16.7 (4.3), p<.05; non-user n=8 pre-mean 42.4 (16.1), post 40.6 (17.3)// O2Sat min: user pre 85.2 (3.6), post 87.5 (1.5), p<.05; non-user pre 70.8(14.1), post 75.8(13.5)//	17/23 were unable to tolerate/use appliance; 6/23 were able to use and 5/23 were using at 6 months MISSING CATEGORIES	Internal validity: large drop out rate// external validity:selected OSA users (dent crit), intensity: variable, include severe		A tongue-depressing oral appliance is unusable by the majority of patients, and produces modest improvement in patients able to use it	
71	Schonhofer	X08	1,4,6//RR//5	Randomized control trial-comparison to alternative treatment group, crossover with other appliance - CPAP, prospective//sleep lab (full PSG, attended)//SnorEx//No//NS	OSA severity, dental criteria (dental criteria)//NS//mean 53.7 yrs//22 M, 1 F//Mean 31.1//NS	Compliant (6/23) RDI pre-32.7 post-16.7//Compliant (6/23) pre-85.2 post-87.5//NS//NS	NS//NS//NS	NS//NS	17 of 23 patients were non-compliant and not available for follow-up evaluation	This specific OA (SnorEx) is very difficult to tolerate due to side effects and lack of efficacy	
72	Skinner	98	1,2,3,4,6//RC-KF//5	Comparison to baseline, prospective, PSG scored blind//sleep lab (PSG, attended)//MAS -TAP, full occ, custom//titratable// prot def: 1 half turn (2mm) every 1-2 nights depending upon tolerance, end pt crit; until no snoring & improved EDS or max adv tolerated	OSA: mild-mod AHI 10 to 40 Severe-AHI 30 to 80 if CPAP failures (dent crit: edentulous or insuff teeth on either arch, other: sev cardiovasc, psychol, or neurol disorders affecting sleep, other sleep disorders)//NS//47.6±10.9 yrs (25 to 93)//14M, 1 F//29.3±4.6// >50% reductn in resp effort >10 sec or reductn in effort with desat ≥ 3% and or an arousal	Grp MAS premean 34 ± 22, post 10±5, 71% decrease, p=.001//Grp MAS pre mean 76±6, post 82±4, 8% increase, p= .012//Grp MAS premean 12±5, post 6±4, 50% decrease, p=.0001//Other-arousal freq: Grp MAS, premean 37±20, post 19±7, 48.6% decrease, p=.001; Other-% REM sleep, Grp MAS premean 17±6, post 22±7, 29.4% increase, p=.03, Other-supine cephs pre & post trtmnt in 11 pts: mand plane to hyoid (MPH) Grp MAS premean 25.3±7.8. post 16.5±9.6, 34.8% decrease, p=.002//No subjs reported SE's preventing them from using MAS, pain: min-temp= 28%, other-salivation: min-temp = 7%	93% pts improved snoring//other: 79% improved well being; 79% improved sleep quality//Other-7 of 14 succ (50%) (trtmnt success-AHI ≤10 per hr, resolution of symptoms. 4 of 14 partial success-(28.6%) AHI 10-15 per hr w improved symptoms, 3 of 14 Trtmnt failure-(21%) inability of pt to cont use the MA Grp Not success//baseline MPH correlated w decrease in AHI & arousal index	Patient selection bias: No; conf fact: no comparative grp, cross bias: not cross study, errors in ascertain: subj prob used oral app, short term study, at least wore during follow up PSG, loss to follow: minimal//pop: prob generalizable to other OSA pts, intensity: good range disease sev- 11 to 79 per hr AHI	One of few studies of the TAP appliance, small study, case series, but ESS data, supine cephs showing MPH related to AHI improvement, 1 yr follow-up	MAS was an effective therapy for OSA, total success of 79%, higher MPH predictor of better decrease in AHI	

	A	B	C	D	E	F	G	H	I	J	K
1	**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**	
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; Arousals 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 critera:adequate, age:>18(OSA/severity, dental crtieria)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) pos tmena= 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 MAS pre eman=19.3(9.6) post mean=11.6(5.6) p=<.01. group CPAP: premean=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 criterai)//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-vaue=<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 (pronunced 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 succcess=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 calcuation, 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	**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**	
77	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 (respiratoty monitoring only, unattended)// MAD, full occlusal coverage, custom// No// Protocol defined: set 50% max protrustion (4-6mm), anterior openning 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- MAD 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 MAD and 46 in UPPP// 49.3yrs MAD, 51yrs UPPP// All M// 26.9MAD, 27.1 UPPP//50% reduction in air-flow by thermistor with 4% desaturation	MAD 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//MAD 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 MAD than with UPPP//NS- no differece in sleepiness at baseline between grps at 12 months no difference between grps, but did improve from baseline?// Snoring index (# per hour), MAD 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),MAD 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-Engstrom (#89) a	NS// Success AHI 50% reduction, Grp MAD, 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 - MAD better reducing AHI by 50%; intention to treat no diff// Other-compliance - Tegelberg #84 73% pts (27/37) used MAD ≥5 nts/week//Other -QOL - Walker-Engstrom #88 - QOL improved in both UPPP and MAD grps at 1 yr, with contentment higher in UPPP grp//Pred: BMI not factor in MAD grp, higher BMI more fall in AI in UPPP, PUAO: MAD grp-dominant obst in oropharynx (type I) in 24pts, hypopharynx in 2, combo in 15, type 1: MAD success 96% UPPP 77%, type II & III- MAD 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	Patient selection:NS, confounding factors: NS, crossover bias: NS, errors in ascertainment: NS, loss to f/u: significant in MAD grp, not in UPPP// Population: probably generalizable, intensity: mild to moderate OSA	Large prospective random study compared MAD 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 MAD grp, data from Waler-Engstrom paper 88 for quality of life, data from Ringqvist (XO2) 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.	
78	Yoshida	91	1,2//WSN-RR//5	Case series, comparison to baseline//sleep lab (PSG, attended, other- EMG upper airway m)//No// MRD// NS// NS	NS (NS) No// 54 (8.4)// 3F, 12M// NS// NS// NS	Grp 1 pre mean 36.8 (18.5), post mean 11.6(9.8), p <.002/ Grp 1 pre mean 67.8(10.9), post mean 75.7(10.3)//NS//NS//NS//NS	NS// Other: EMG pre-, during, post apnea described//MISSING PREDICTORS	pt sel: yes , 0 loss to follow//pop: no, sparse descrip, intensity: range//NS	Results very similar to study #92	MAD activated masticatory and tongue muscles during sleep and prevented upper airway from collapsing	
79	Yoshida	92	1,3,4//KF-RR//5	Case series, comparison to baseline// sleep lab (PSG, attended)//No//MRD, full occ cov, custom//could be adj if symptoms developed //Protocol: set at 60-80% of max, 3-10mm, ant open meas: 6-12mm	Snoring, OSA, suffic teeth, no pain, arthralgia or joint sounds in TMJ//NS//53.6 ± 8.9 (28-83)/ 223 M, 33 F/ 28.3 ± 2.8 (21-39)//50% drop in effort or airflow from baseline	Premean AHI 43.2 ± 25.2, post mean 18.2 ± 21.3, 57.9% decr, p= .0001//Pre mean O2 sat nadir 72.6 ± 9.2, post 75.2 ± 8.3, 3.6% incr, p=.05//NS//Other -sleep effic Grp MRD premean 84.2% ± 13.6, post mean 85.8 ± 9.8, 1.9% incr, p=.05; Other - stage 1% Grp MRD premean 18.8 ± 9.9, post 15.5 ± 9.5, 17.6% decr, p=.005; Other - REM% Grp MRD premean 9.1 ± 8.3, post 13.6 ± 4.2, 49.5% incr, p =.05, Other: total arousals(#) Grp MRD premean 94.9±85.6, post 67.8 ± 46.9, 28.6% decr p=.05//NS//pain: min-temp in 22 pts, 5 pts d/c MRD due to pain, Other - excess salivation-min-temp number not given	Snoring NS//Other-success (AHI < 10 per hr) Grp MRD, 54% success, 56% failed, Other: responders (50% decrease in AHI) Grp MRD 66% success, 44% fail	patients have relevant disease//pop- yes, intens-wide range/ OA improved respiration during sleep & improved sleep qualitypt sel: pts have OSA; no control grp; not crossover study; errors in ascertain: cant' tell if they used the device, loss to follow: not clear how many had final study//pop: OSA (psg +symptoms); intensity: good range of severity	Some deficiencies but a good case series	Large cohort of patients followed long-term, good success rate, well-tolerated appliance	
80	Yoshida	94	2,4,6// KF-RC//5	Comparison to baseline and to other groups (non-randomized)//sleep lab (PSG, attended)//MRD, full occl cov, custom//adjustable by DDS//prot def: set at 60-80% max adj, if still snoring, sleepy, or SE adjusted, adv meas: 3-10mm, ant open meas: 6-12mm	Snoring and OSAS - sympt and psg, suffic teeth, no arthalgia, myofacial pain or joint sounds due to TMJ disorders (MISSING EXCLUDE)//N=72, NS//53.3 ± 9.2 (37 -72)//62 M, 10 F//27.9 ± 2.9 (21-39)//NS - ref to AASM 1999 paper	Grp MRD n=72 premean AHI 43.0 ± 25.6, post 21.6 ± 18.3, 49.8% dec, p=.0001; Grp supine n=44 premean 29.8 ± 26.1, post 11.3 ± 13.8, 62% dec, p = .0001; Grp prone n=13 premean 5.5 ± 8.6, post 1.6 ± 2.9, 71% dec, p=.0001; Grp side n = 15 premean 7.7 ± 11.8, post 8.7 ± 12, 13% increase//Grp MRD premean AI 25.6 ± 19.8, post 11.5 ± 13.8, 55% dec, p=.0001; Grp MRD O2 Sat nadir: premean 72.3 ± 10.6, post 75.3 ± 8.3, 4% increase, p=.004; Grp MRD premean Mean O2 sat- 92.2 ± 2.7, post 93.3 ± 2, 1.2% increase, p=.0001//NS//Other-Stage 1 sleep% Grp MRD premean 19.3 ± 11.3, post 14.4±7.5, 25.4% dec, p=.0001, other-REM sleep% grp MRD premean 9.3±8.5, post 14.5±5.2, 56%increase, p=.0003, other-arousal index grp MRD premean 12.7± 12.2, post 9.4±6.6, 26%dec, p=.02//side effects minor-temp	NS//Other-success (AHI < 10), Grp MRD 38 of 72 success, 34 of 72 failed, 52.8% success, 47% fail; Other- Responders (AHI reduced by 50%), Grp MRD 44 of 72 (61%) success, 28 of 72 (39%) fail//Outcome=pts w most resp events in supin pos-AHI reduced sig, patients with most events in prone pos-AHI reduced sig, patients with most resp events in prone pos didnt have sig reduct AHI-didnt achieve normalization/ PUAO= presence of predominant supine OSA does better w MRD//NS	NS, NS, NS, NS, loss to f/u-not clear from paper - appears all 72 had post RX PSG//populatoin-probably can generalized, intensity-good range of OSA	Large study, good success rate, one of the few to monitor body position	Supine predominant OSA better result than lateral predominant OSA	

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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	