The use of an oral mandibular advancement device out of thermo flexible vinyl in connection with sleep related breathing disturbances.

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Effectiveness of Mandibular Advancement Devices

(ASDA-Review, Schmidt-Nowara 1994)

- Abnormalities (14 studies)
  - AHI reduction of approx. >50%: 70%
  - Middle AHI with and without device: 42/18
  - Certain patients bad AHI
  - S1 reduced, SWS and REM increased
- Snoring (9 studies)
  - Subjective in >95% improved
  - Objective testing only with 65 patients

Effectiveness of Advancement Devices

(ASDA-Review, Schmidt-Nowara 1994)

- Compliance (8 studies): 75%
- Unwanted side effects
  - Jaw joint pain
  - Discomfort
  - Bite changes

Problem Definition

Only single lower jaw protractors

- Therapy success not always predictable
- Acceptance not always predictable
- Individual manufactured often too expensive
  - ↳ Trial use of simple devices helpful

Requirements for the Mandibular Advancement Device

- Easy Fitting
  - Easy size selection
  - No special apparatus required
  - Fitting is not harmful
  - Wrong fitting can be corrected
  - Not time consuming
- Individual adjustments possible
- Lower jaw adjustment controllable
- Can be used for several months
- Inexpensive

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Methodology Prior to Fitting

- Diagnostic assurance based on stepped diagnostic
- Otolaryngology examination
- Dental examination
- Mueller maneuver
- Jaw geometry and teeth imaging

Method for Fitting of SnorBan

- One size only
- Trial fit before softening the mouthpiece
- 10 seconds in water taken off the boil point
- Fit onto lower teeth
- Slide onto upper teeth
- Slides the lower jaw up to 50-75% forward
- Bite firmly
- During the cooling process, press with tongue and fingers on to gum and teeth

Method After the Adaptation Time

- Questionnaire
- Polysomnograph
- Otolaryngology check up
- Dental check up
- Jaw Geometry
- Mann-Whitney-U-Test, Wilcoxon-Test, Variation Analysis

Prospective Patients

All patients

- Selection of 53 consecutive patients
  - 5 patients (9%) refused
  - 7 patients (13%) denied for dental reasons
- 41 patients (78%) were provided with SnorBan
  - 39 patients (74% / 95%) returned for follow-up

Prospective Patient

Check on existing patients

- 33 Male, 6 Female
- 51.1 ± 9.2 years
- BMI = 27.4 ± 4.5 kg/m^2
- Average wearing length: 4 (1-24) weeks
- Not Permanent getting used to : 10 patients
- Average time getting used to: 4 (0-21) days
- Average wearing / nights: 7 (1-8) hours
- Average repetitive wearing / weeks: 7 (1-7)

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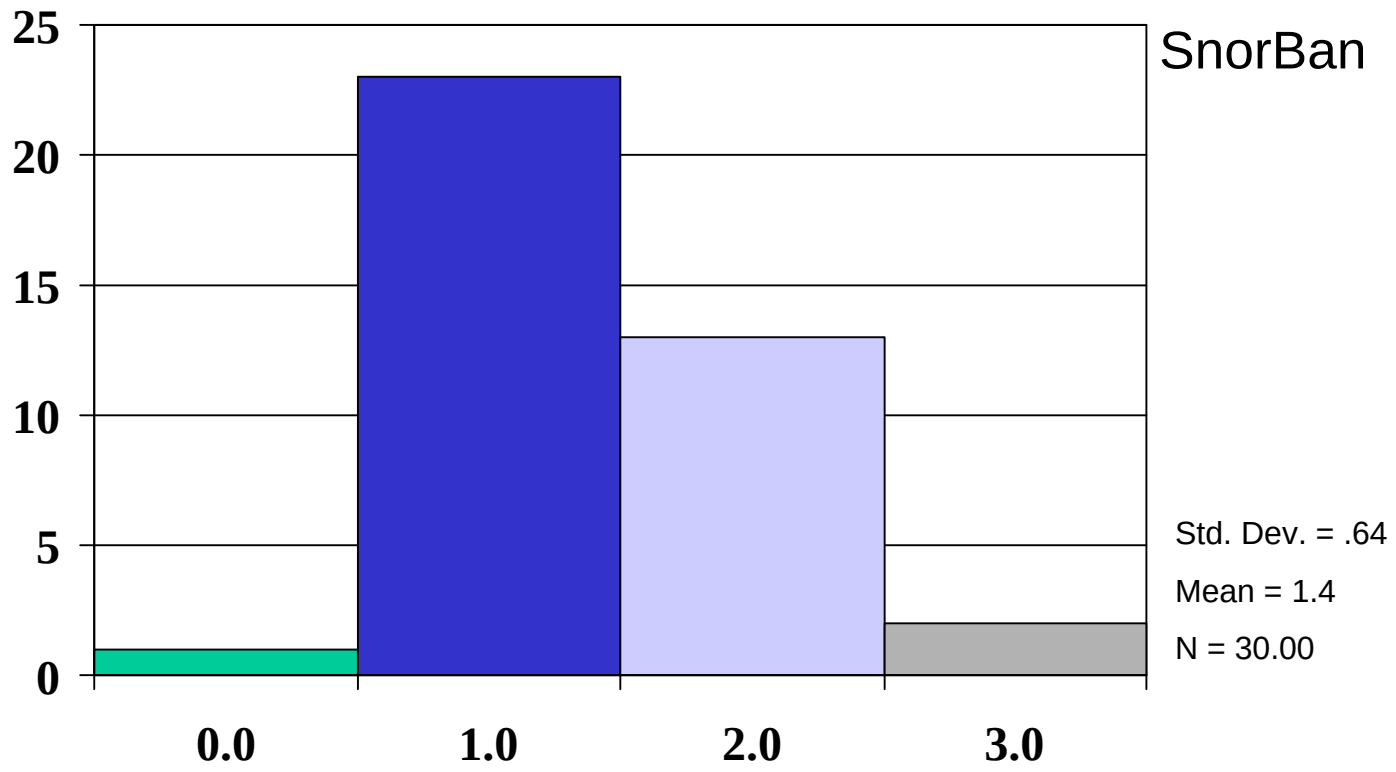
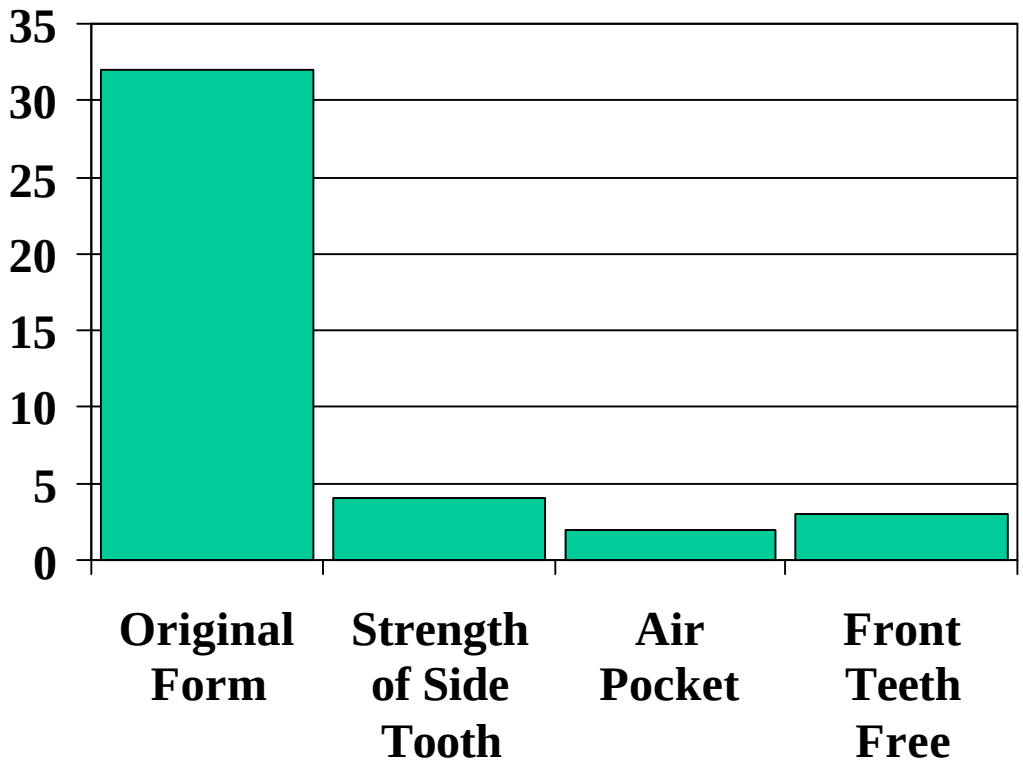
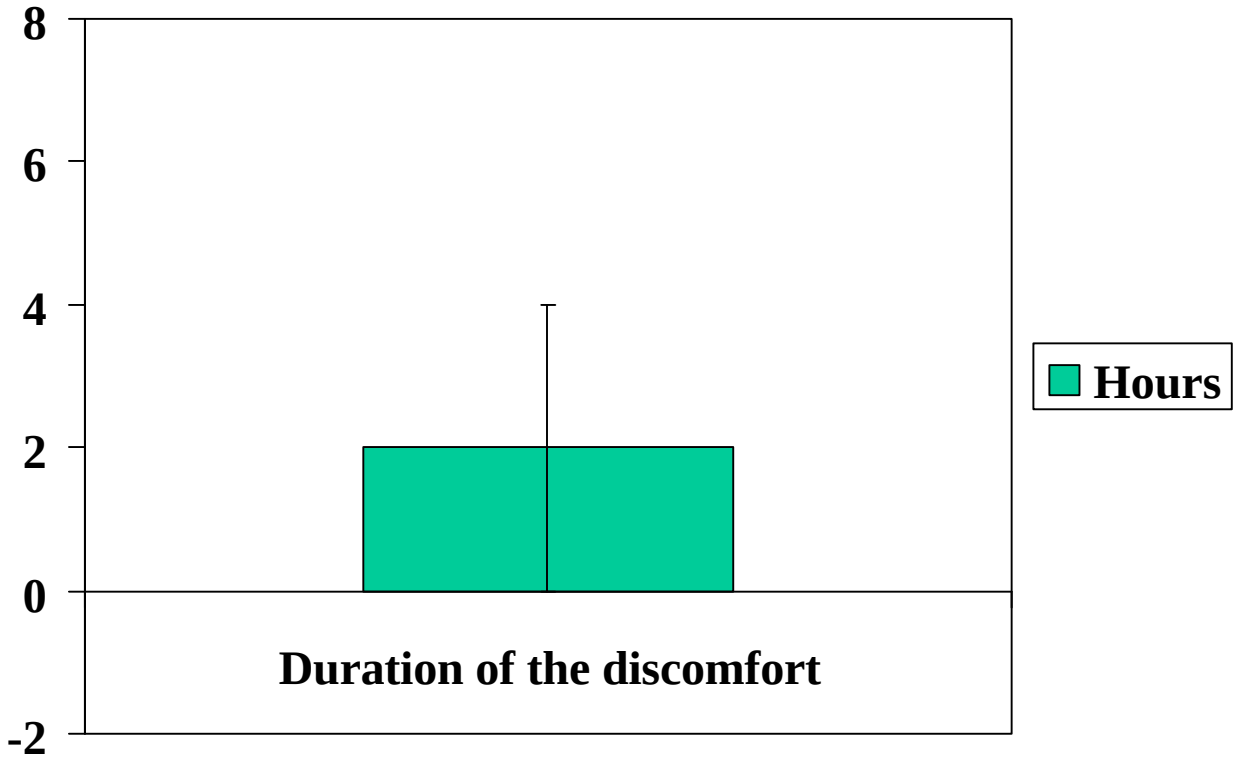


Repetitively of the Refitting

Original Faulty Teeth / Variations



Discomfort in the Morning



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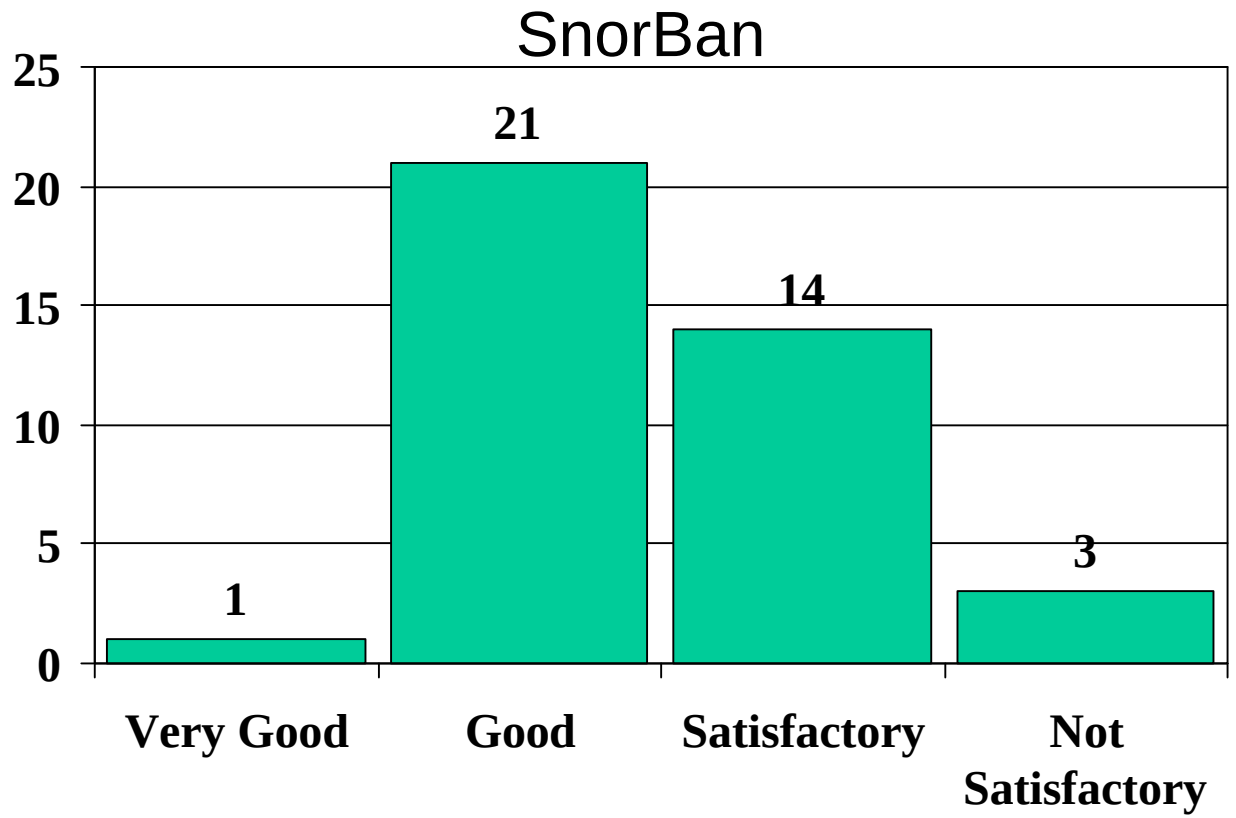
Fitting



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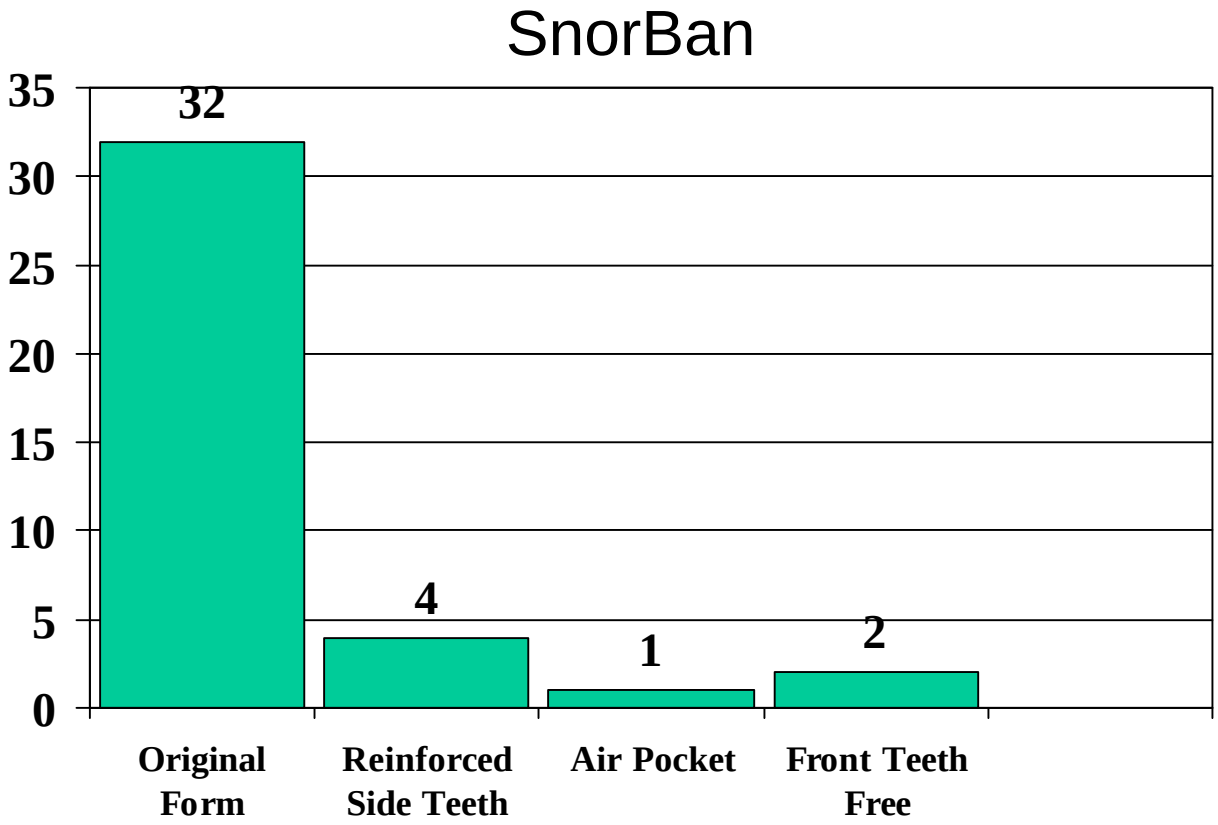
Modifications



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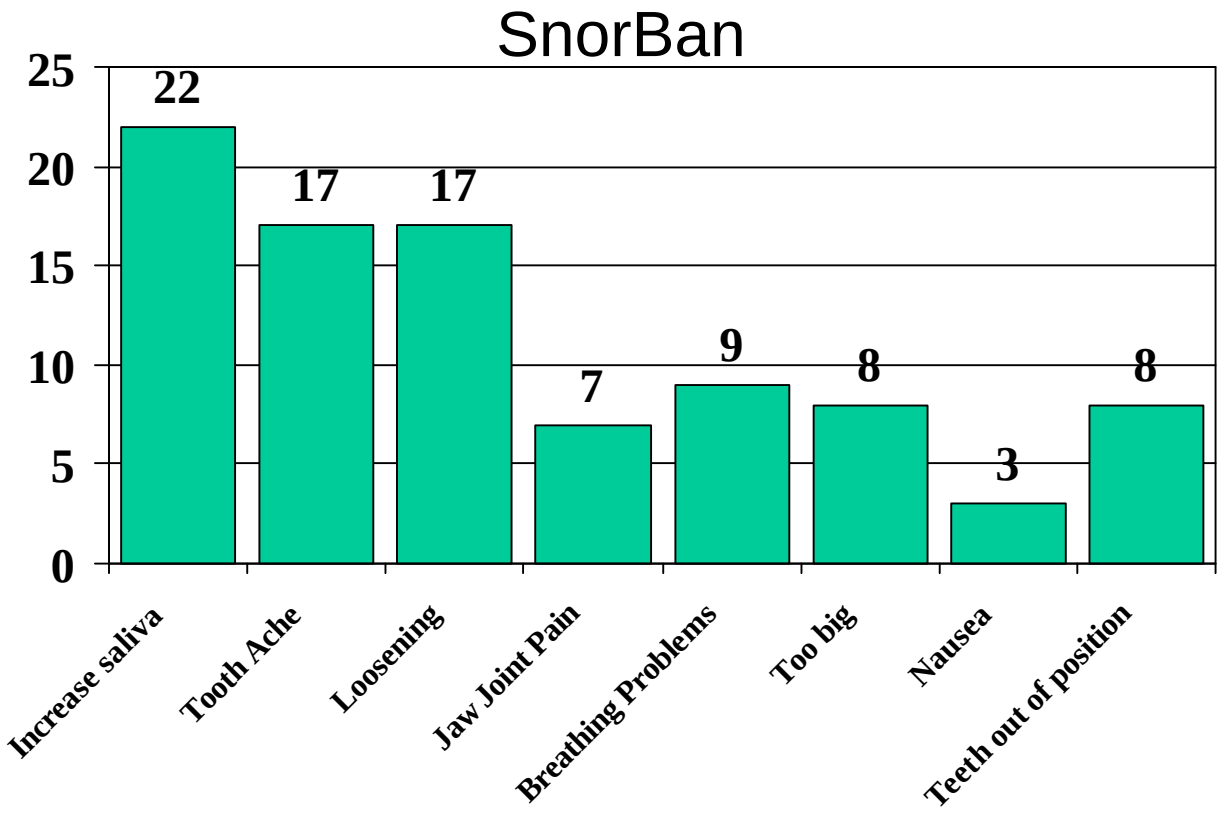
Unwanted Reactions



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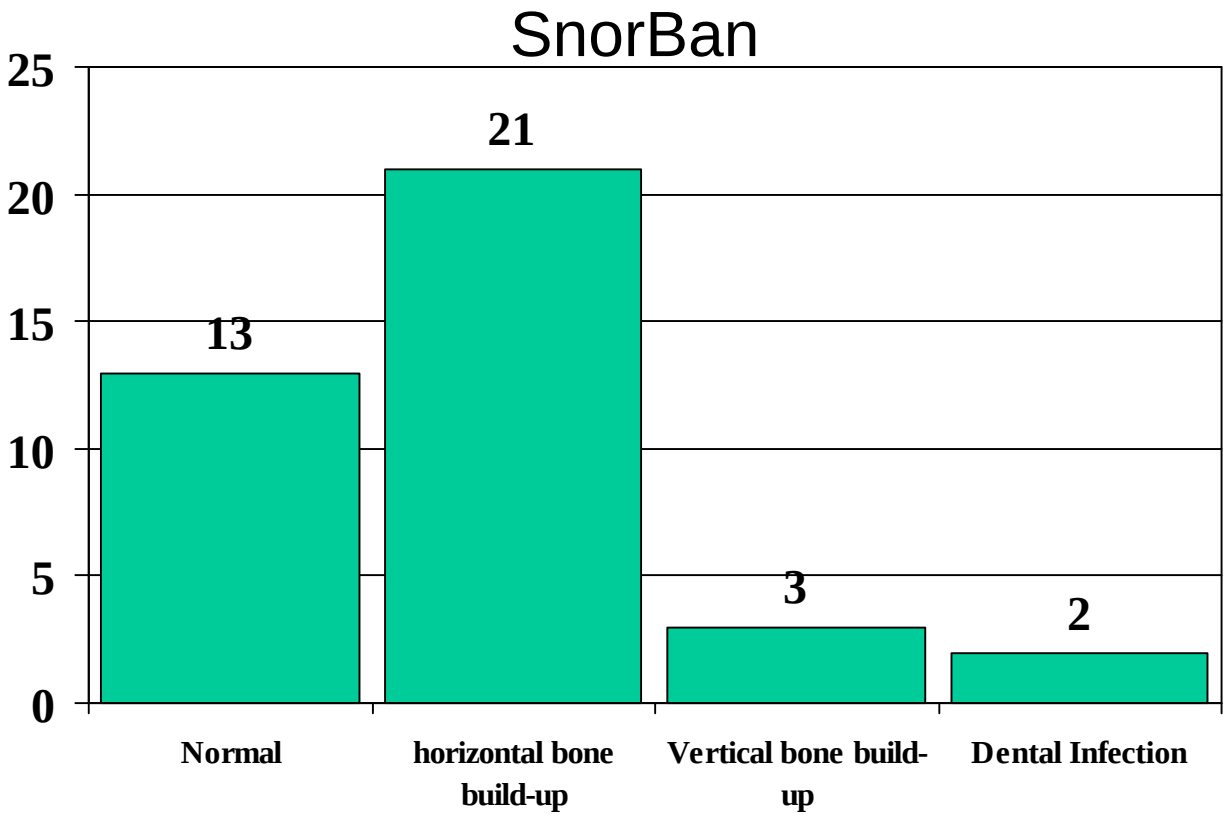
Orthopedic Diagram



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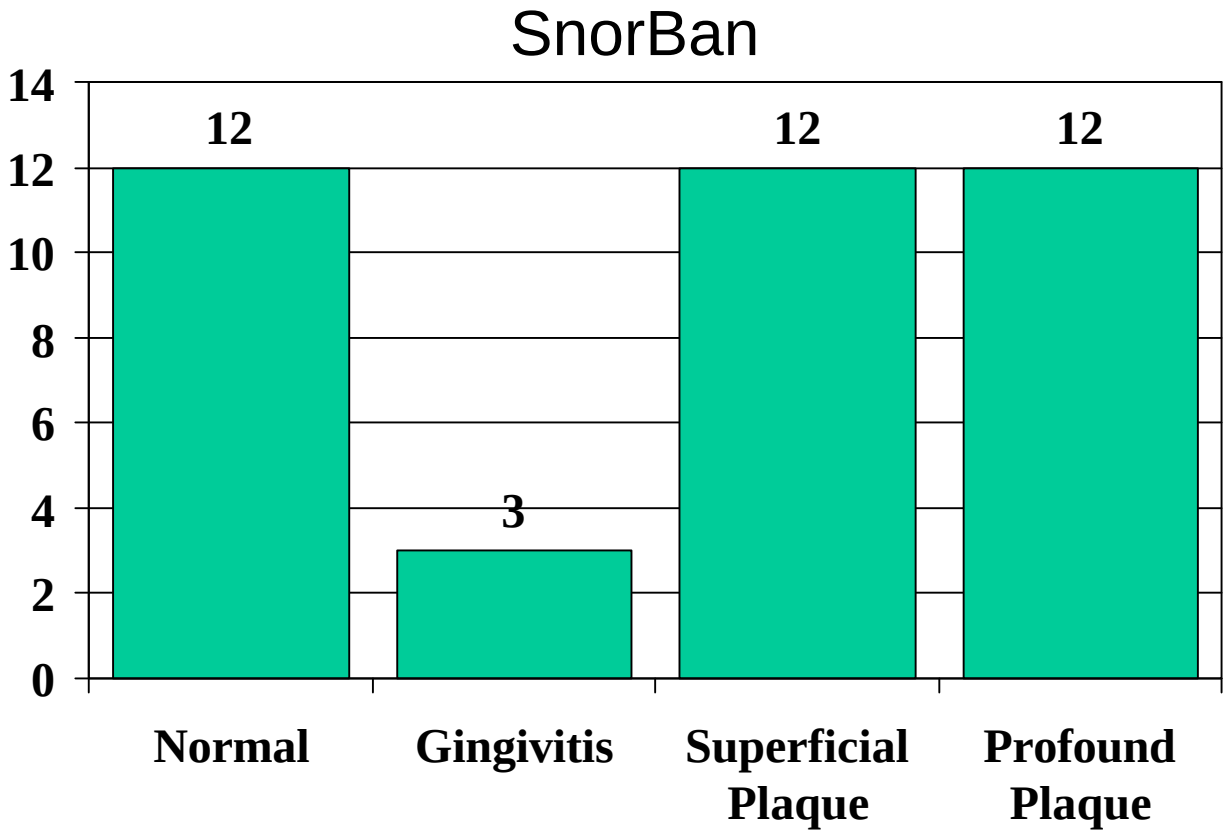
Dental Diagnosis



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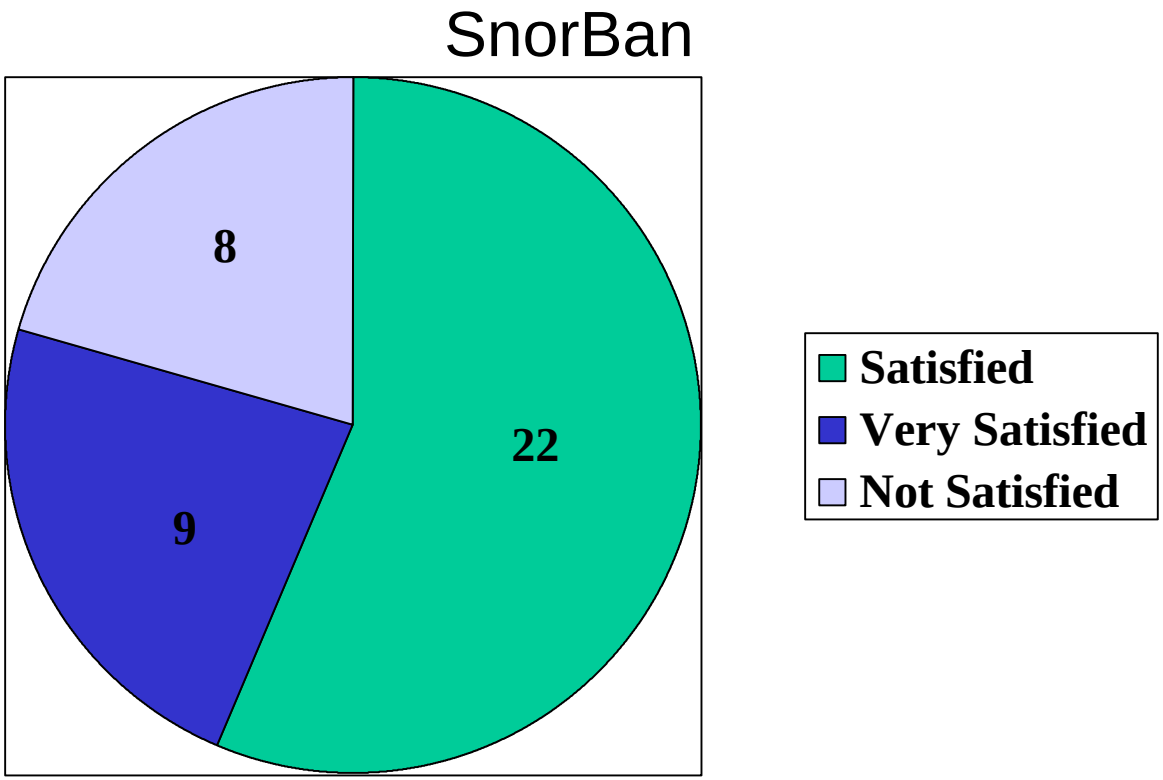
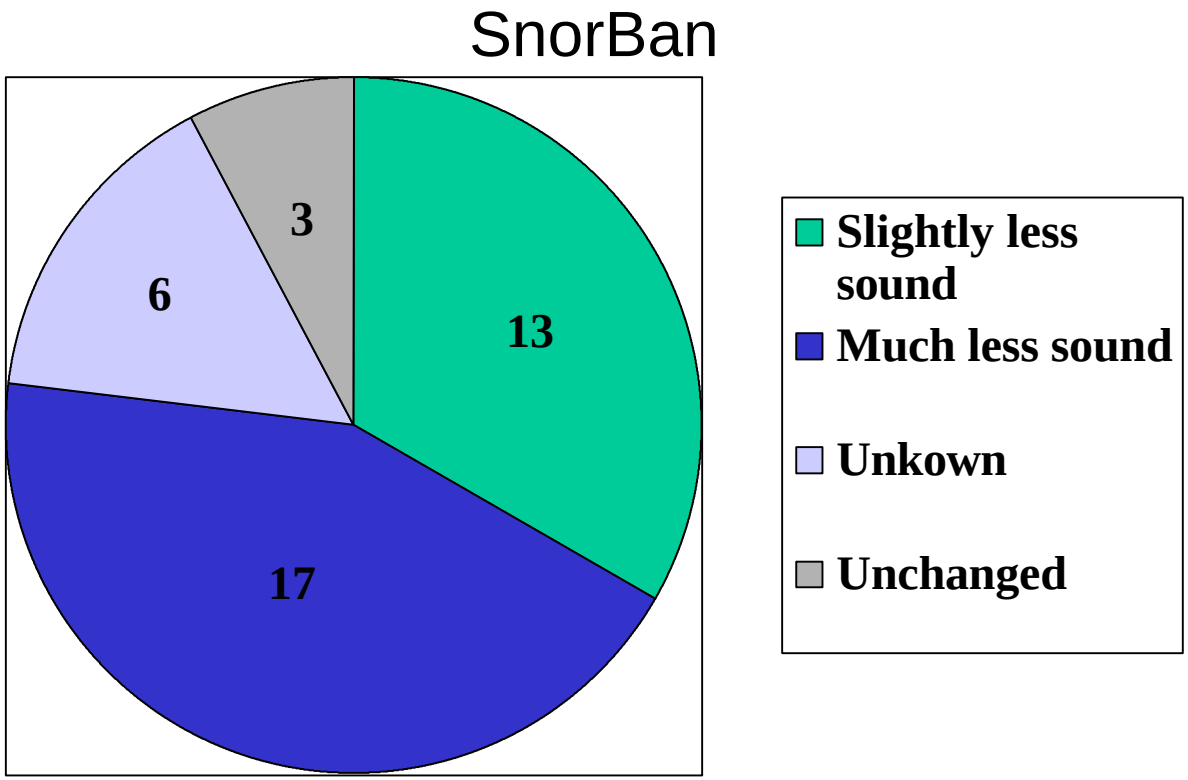
Satisfaction



Intensity of Snoring



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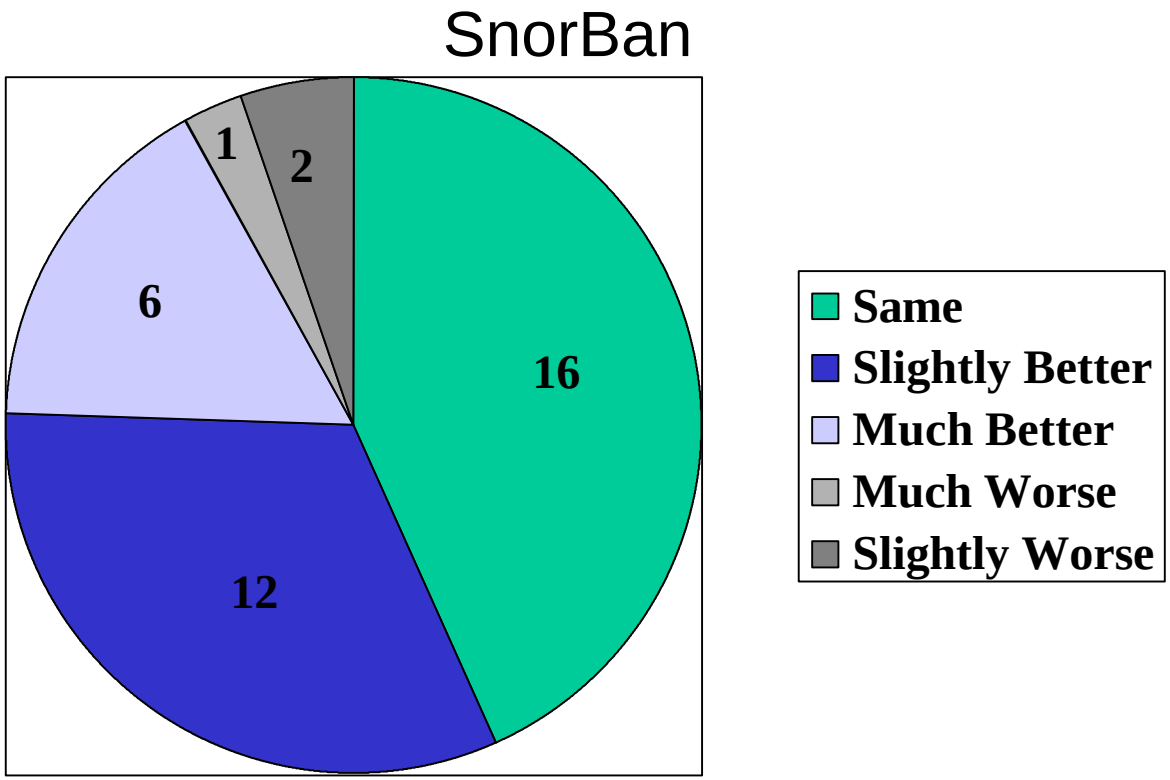
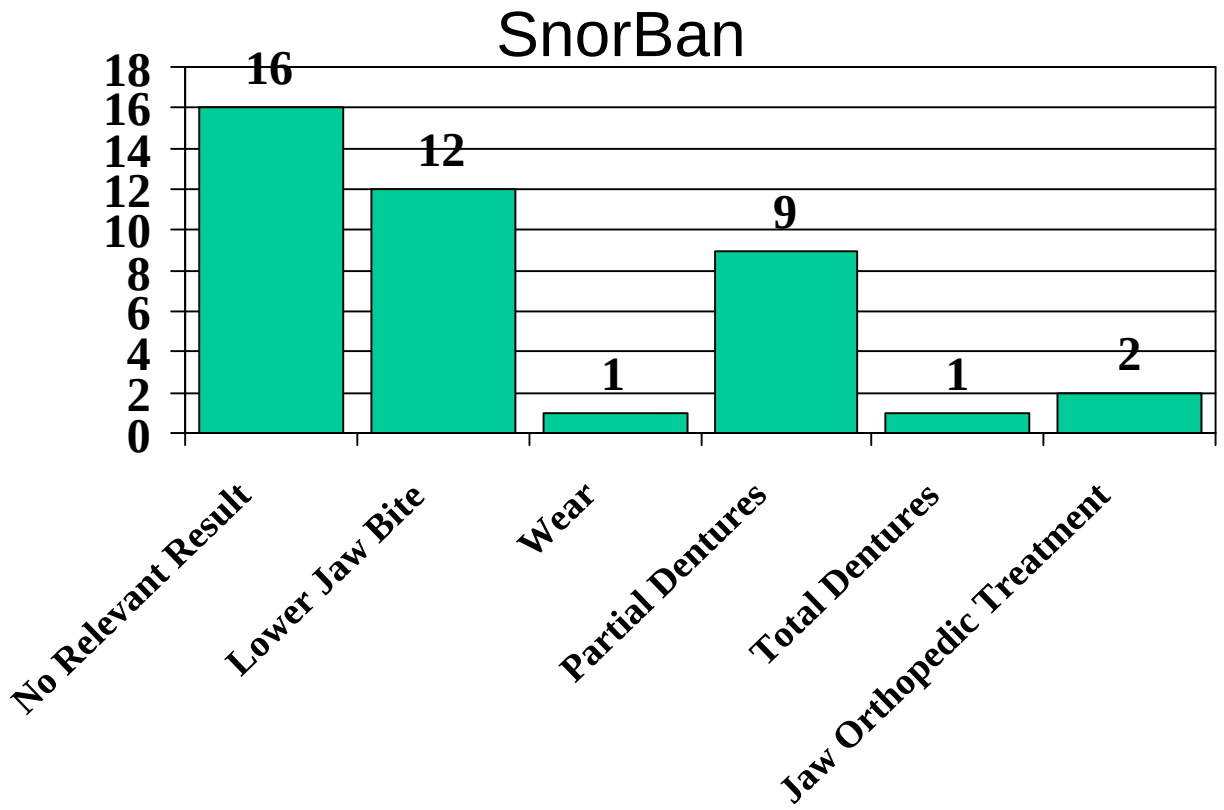
Overall Results



Dental Result



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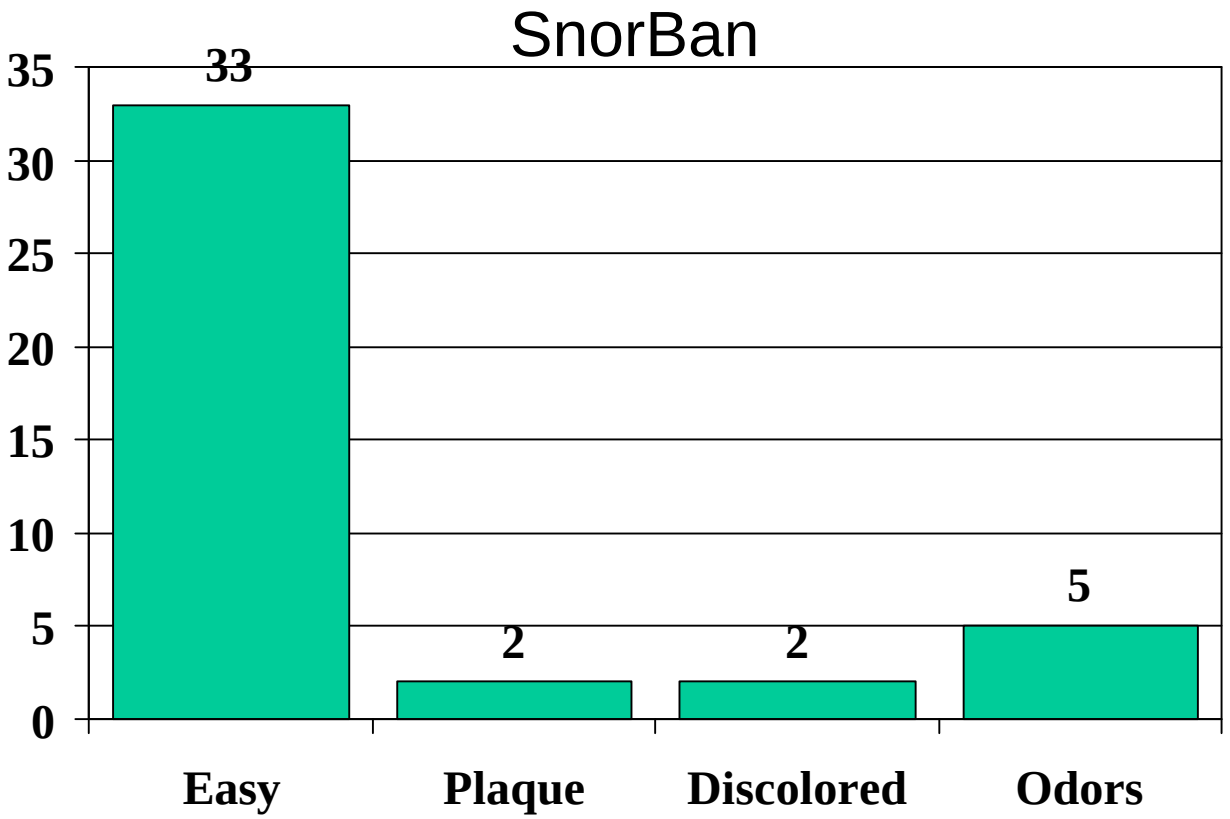
Cleaning of the Device



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Effectiveness with SnorBan

Respiratory Parameters

* =p<0.05 ** = p<0.01	Without SnorBan	With SnorBan	Improvement
AHI (n/h)	16.6 ± 15.6	8.2 ± 10.7 **	51%
Arousal Index (n/h)	12.5 ± 11.5	9.3 ± 8.4*	26%
Average Oxygen Intake %	93.5 ± 1.8	93.9 ± 1.7	0.4%
Minimum Oxygen Intake %	82.8 ± 6.8	86.8 ± 6.3 **	4.7%
Snoring Period %SPT	16.3 ± 15.5	6.6 ± 12.2 *	59.5%

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Effectiveness with SnorBan

Sleep Parameters

* = p<.05	Without SnorBan	With SnorBan	Changes
SE (%)	83.7 ± 11.0	84.3 ± 11.1	7%
SW (%)	16.7 ± 9.8	15.7 ± 10.3	6%
S1 (%)	16.9 ± 8.3	13.0 ± 7.9	23%
S2 (%)	40.3 ± 13.5	36.2 ± 11.4	10%
SWS (%)	12.8 ± 10.1	16.5 ± 12.8	29%
REM (%)	12.1 ± 7.8	16.5 ± 10.0	32%

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Kephalometrie

* =p<0.01	Without SnorBan	With SnorBan	Correlation to AHI change
SNA (*)	79.5 ± 5.0		
SNB (*)	79.4 ± 4.8	82.3 ±4.5 *	
ArGoMe (*)	128.8 ± 6.4		
MP-H (mm)	25.9 ± 8.4	21.7 ± 6.8 *	
PAS (mm)	11.1 ± 3.4	14.3 ± 3.8 *	
Maximum UK Protrusion (mm)	9.5 ± 2.0		
UK-Protrusion (mm)		4.6 ± 1.6	0.42

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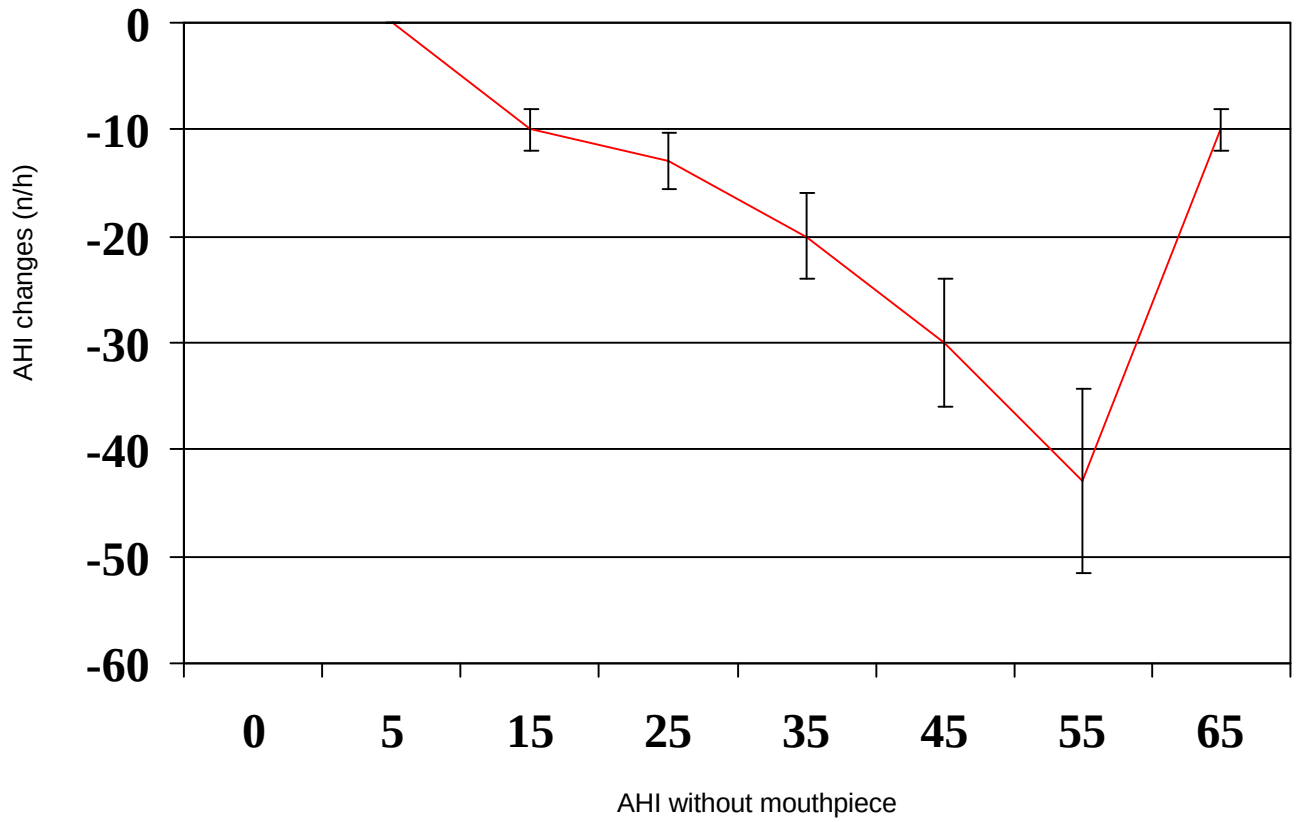
Changes of AHI Through SnorBan Mouthpiece



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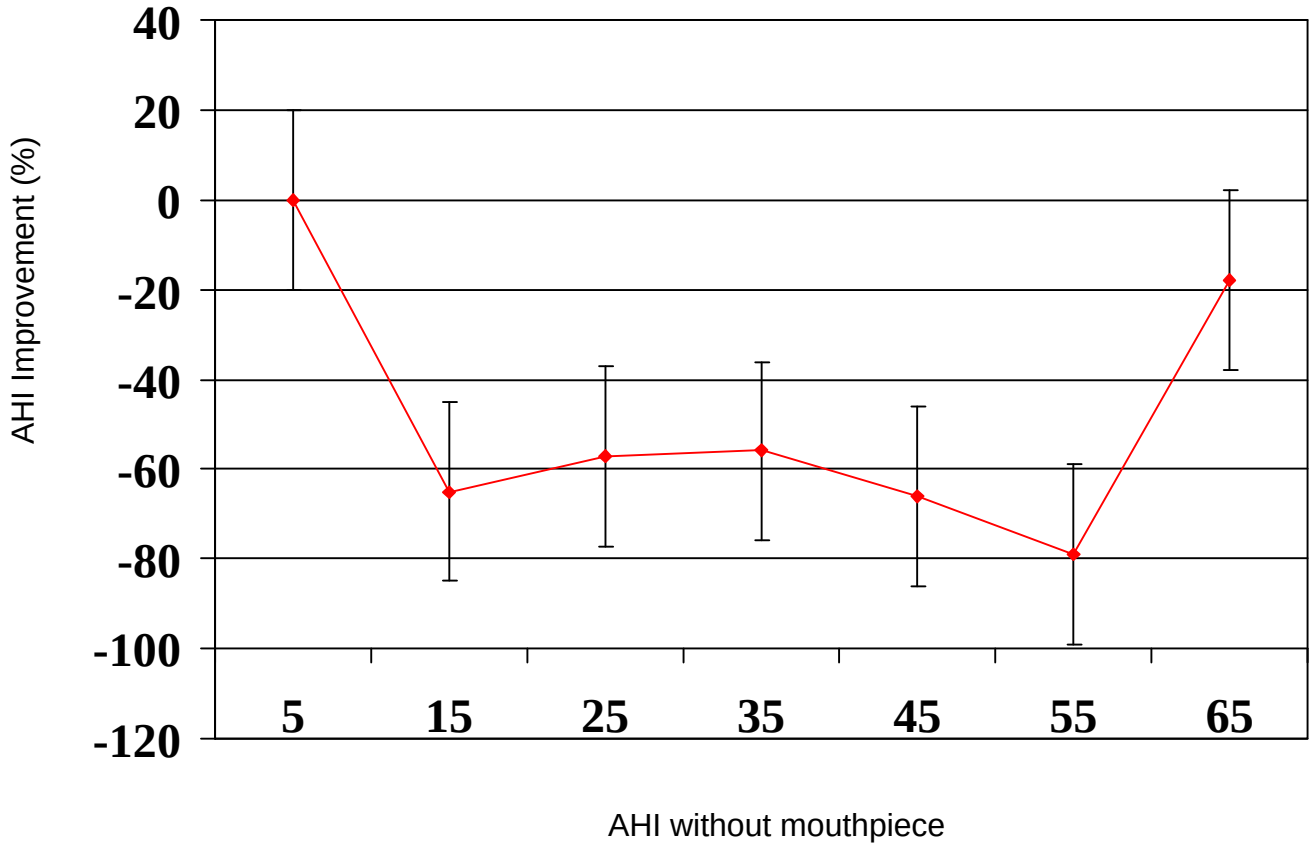
Improvement of AHI after AHI study



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Summary

- In one case increase of AHI (6.5 to 25.6), did not get accustomed to device
- Improvement of AHI of 50-80%, if AHI > 10/h
- Reduction to AHI <10/h possible even if AHI is high (56.5 to 3.8)
- With SnorBan AHI> 10/h in 36% of patients
- Compliance of 75%