OBSTRUCTIVE SLEEP APNEA

INCIDENCE, IMPORTANCE OF O.S.A.

- 4% of Middle Aged Men have OSA
- 2% of Middle Aged Women have OSA
- Systemic Hypertension occurs in up to 50%
- Bradyarrhythmias, Ventricular tachycardia, and probably myocardial ischemia and MI
- Source:National Heart, Lung, and Blood Institute

Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. N Engl J Med 1993;328:1230-5.

DEFINITION

- **SNORING**:-a noise from the upper air way due to partial upper air way obstruction
- **APNEA**:-is the cessation of air flow at the level of nostril and mouth for at least 10 seconds
- **APNEA INDEX**:-is the no. of apneas per hour of sleep
- **HYPOPNEA**;- is the decreased in tidal volume (50%reduction in thoraco-abdominal movement lasting for 10 seconds in presence of continuous air flow

- **SLEEP APNOEA SYNDROME (SAS)** :-30 or more apneic episode during a 7 hour period of sleep or an apnea index equal to or greater than 5

- GRADING: (BY THE AMERICAN SLEEP ASSOCIATION)

- MILD-5-20 APNOEAS PER HOUR
- MODERATE-20-40 APNOEAS PER HOUR
- SEVERE- MORE THAN 40 APNOEAS PER HOUR

DEFINITION CONTD.

- **TYPES**
- CENTRAL SLEEP APNOEA
- OBSTRUCTIVE SLEEP APNOEA
- MIXED TYPE

AETIOLOGY AND PATHOPHYSIOLOSY

- ASSOCIATED FACTORS-male sex , increasing age, obesity
- EXACERBATING FACTORS ;-alcohol and sedatives

- **CAUSES OF OBSTRUCTIVE SLEEP APNEA**
- NOSE:-
- Nasal polyp
- DNS
- Rhinitis
- Nasal packing
- PHARYNX:-
- Nasopharyngeal tumour
- Enlarged adenoids
- Enlarged palatal tonsils

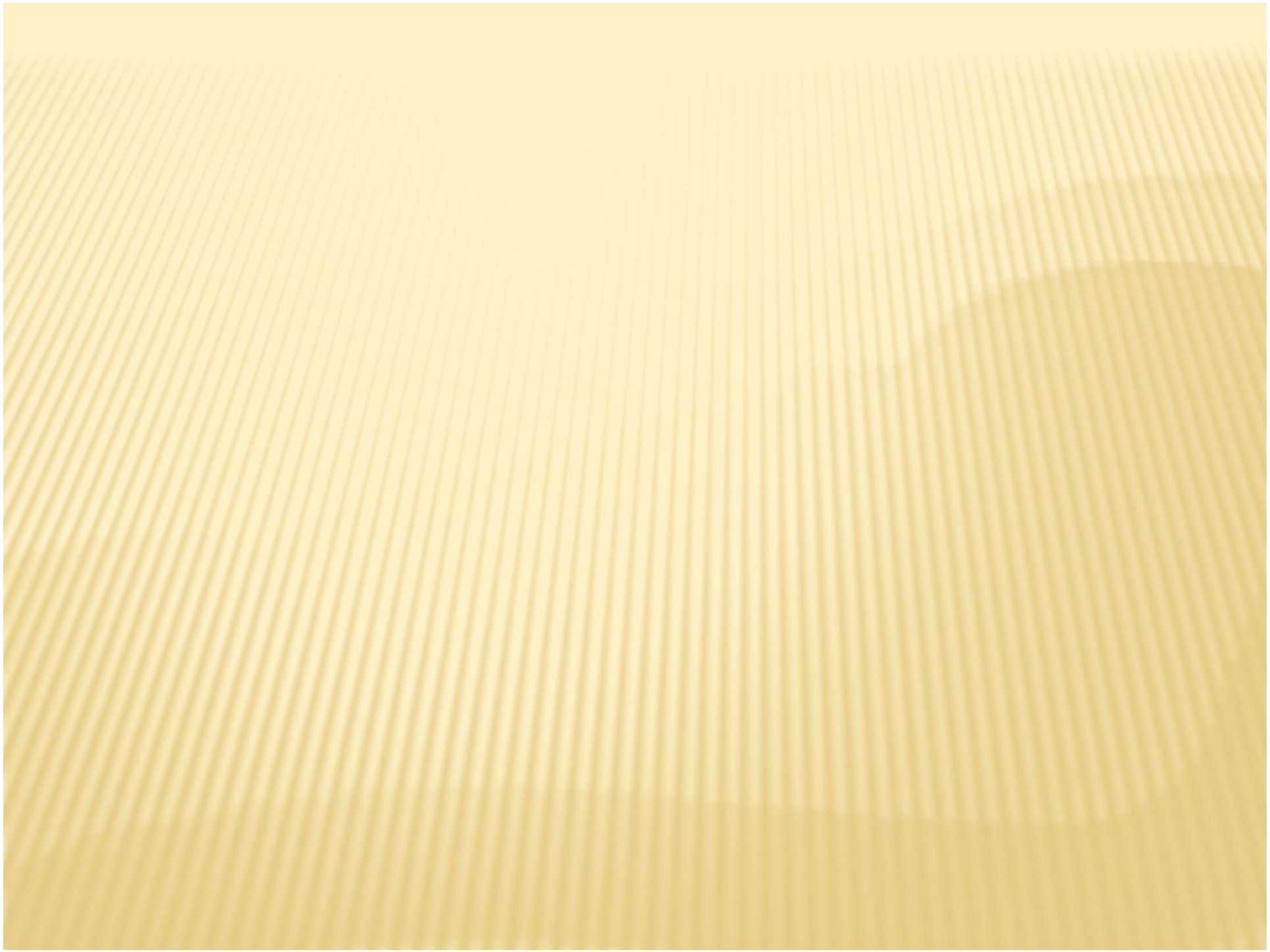
CAUSES OF OBSTRUCTIVE SLEEP APNEA

- Pharynx
- Enlarged lingual tonsil
- Retropharyngeal mass
- Large tongue
- Myxedema
- Acromegaly
- Micrognathia
- Retrognathia
- **Obesity**

CAUSES OF OSAS

- LARYNX:-
- Tumours
- Oedema
- Shy-drager syndrome
- CAUSES OF CENTRAL SLEEP APNEA
- HEART FAILURE
- FRONTAL LOBE DAMAGE
- BRAIN STEM DAMAGE
- INSTABILITY OF RESPIRATORY CENTRE

PATHO-PHYSIOLOGY OF OSAS



CLINICAL FEATURES

- COMMON
- Snoring-cardinal symptom
- Excessive day time sleepiness-commonest ass. symptom
- Obstructive episodes

- LESS COMMON
- Morning headaches
- Personality change
- Intellectual deterioration
- Poor memory
- Difficulty in concentrating

C/F OF OSAS CONTD.

- Abnormal body movement
- Frequent waking
- Nocturnal choking
- Nocturnal enuresis
- Impotence
- Systemic hypertension
- Right heart failure
- Cardiovascular mortality

THE EPWORTH SLEEPINESS SCALE(ESS)

- ESS-is a self administered questionnaire which provides a measurement of the patient's general level of daytime sleepiness
  - 0=would never doze
  - 1=slight chance of dozing
  - 2=moderate chance of dozing
  - 3=high chance of dozing
- Situation Chance of dozing
- Sitting and reading
- Watching TV

THE EPWORTH SLEEPINESS SCALE

- Sitting, inactive in a public place ----
- As a passenger in a car for an hour Without a break_____
- Lying down to rest in the afternoon when circumstances permits ----------
- Sitting and talking to someone ----------
- Sitting quietly after a lunch without alcohol ----------
- In a car, while stopped for a few minutes in the traffic ---------

- *A score of 10 or more is considered sleepy.*
- *A score of 18 or more is very sleepy.*

DIFFERENTIAL DX DAYTIME SLEEPINESS

- SAS
- NARCOLEPSY
- NOCTURNAL MYOCLONUS
- DEPRESSION
- DRUGS
- SLEEP DEPRIVATION
- IDIOPATHIC HYPERSOMNOLENCE
- HYPOGLYCEMIA
- SEVERE ANAEMIA
- HYPOTHYROIDISM
- CEREBRAL TUMOUR

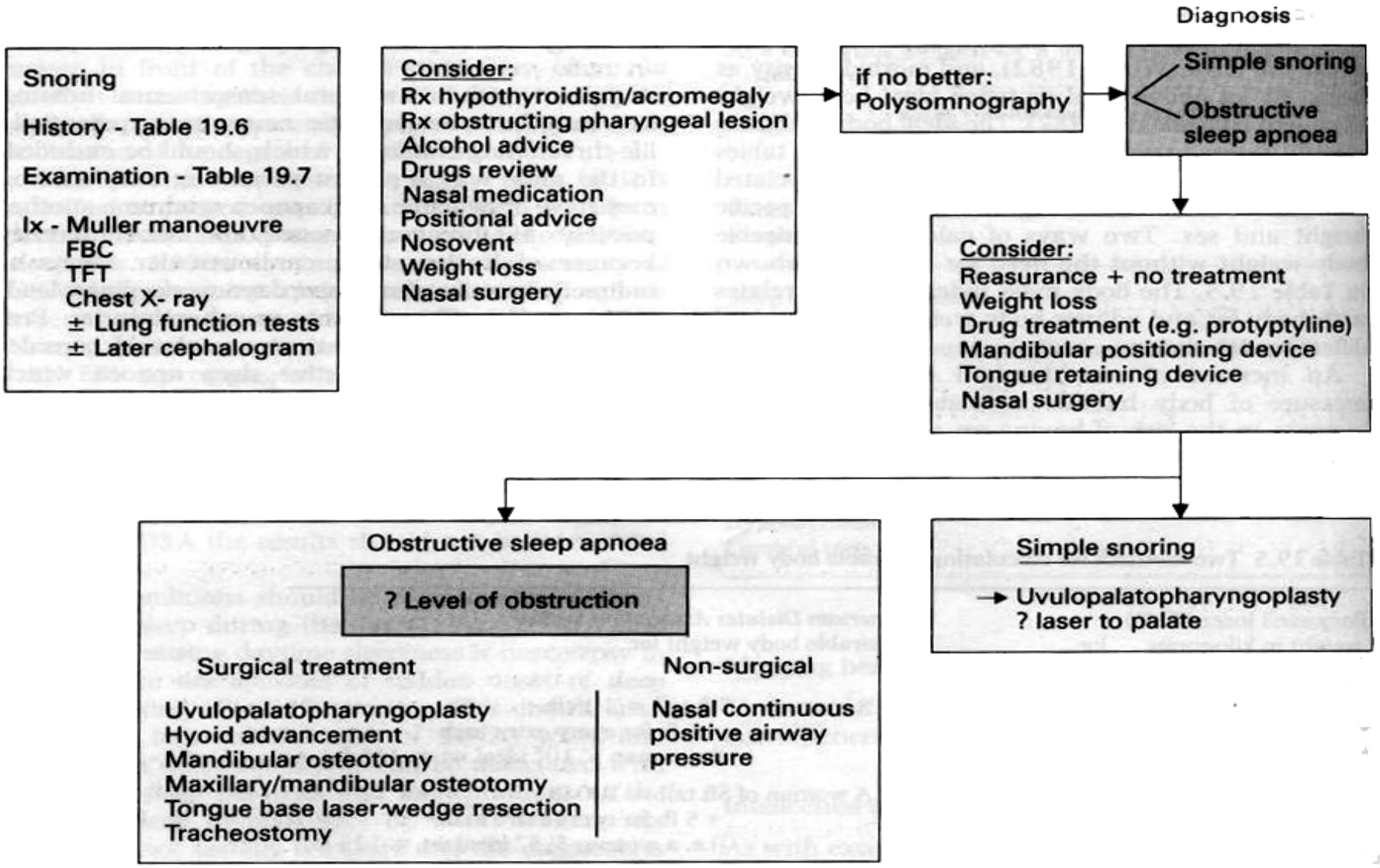


Figure 19.2 Management plan for an adult presenting with snoring

- DIAGNOSIS
- HISTORY
- Partner must be present
- Positional
- Obstructive episode
- Arousal
- Excessive daytime sleepiness
- Noctural chocking
- Intellectual deterioration
- Personality change
- Abnormal motor movement
- Morning headache

HISTORY CONTD.

- Nocturnal enuresis
- Impotence
- Nasal obstruction
- Sedative drugs
- Alcohol intake
- Cardiovascular symptoms
- Respiratory symptom
- Thyroid symptoms
- Social history

EXAMINATION

- GENERAL APPEARANCE
  obesity, acromegally, myxodema
- WEIGHT
- HEIGHT
- BLOOD PRESSURE
- CRANIOFACIAL MORPHOLOGY
  retrognathia, micrognathia
- NASAL EXAMINATION
- TONGUE SIZE

EXAMINATION COND.

- **SOFT PALATE, UVULA, TONSILS- classic picture of an enlarged swollen oedematous uvula and soft palate**

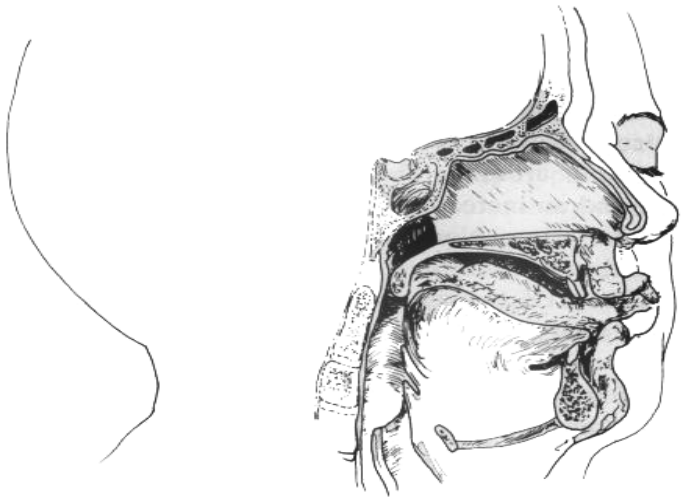


Fig. 81-2. Narrow oropharyngeal airway secondary to tongue approaching excessive tissues of soft palate. (From Thawley SE: Surgical treatment of obstructive sleep apnea, *Med Clin North Am* 69: 1337, 1985.)

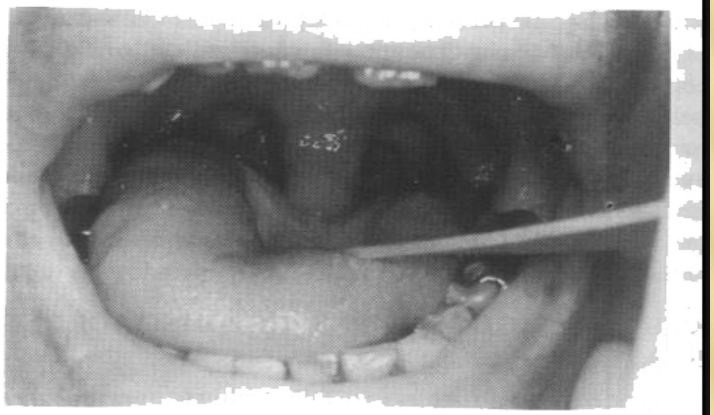
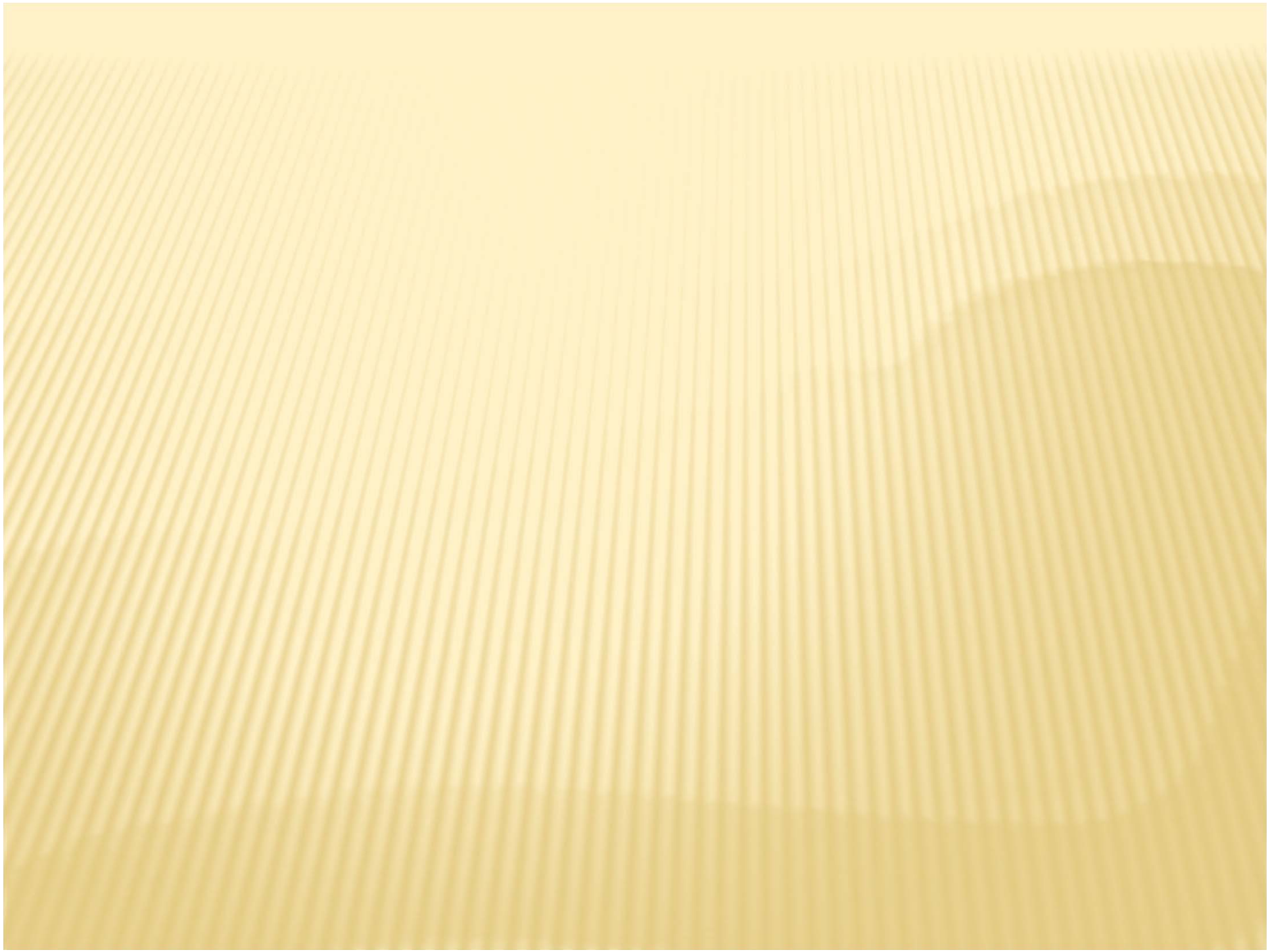


Fig. 81-3. Large uvula in obstructive sleep apnea. (From Thawl SE: In Cummings CW and others, editors: *Otolaryngology—hea and neck surgery: update I*, St Louis, 1989, Mosby.)

- **Nasopharynx –adenoida, polyps, cyst, tumour**
- **HYPOPHARYNX;-LINGUAL TONSILS, VALLECULA, EPIGLOTTIS, SUPRAGLOTTIC CYST, TUMOUR**
- **LARYNX –VOCAL CORD MOBILITY**



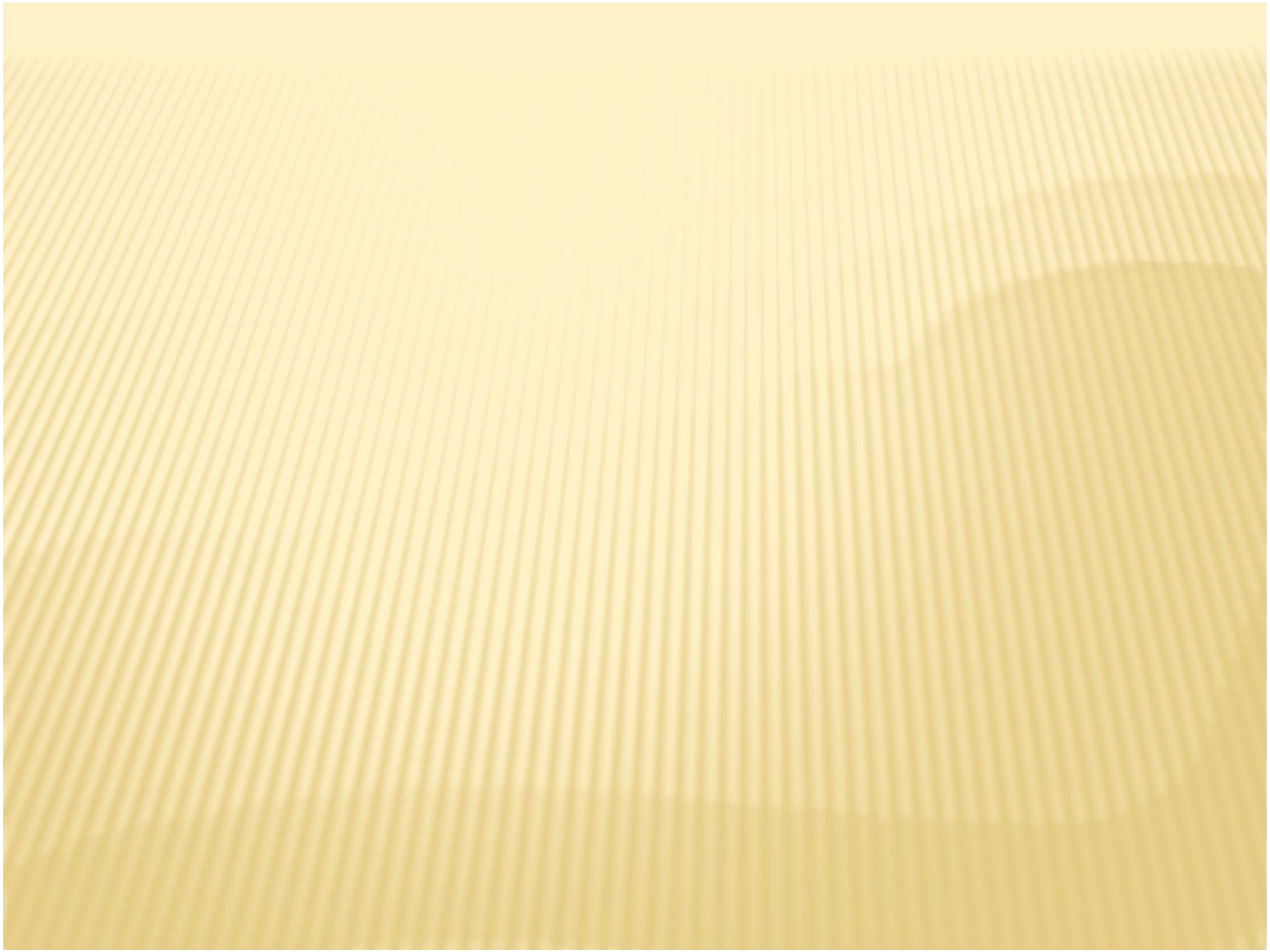
INVESTIGATION

1. TO ASSESS THE PATIENT GENERAL CONDITION
   - FBC-polycythemia, anemia
   - TFT-
   - CXR-cardiopulmonary disorder
   - ECG
   - ABG
   - LUNG FUNCTION TEST
2. TO DIFFERENTIATE BETWEEN SIMPLE SNORING AND SLEEP APNOEA-POLYSOMNOGRAPHY

PARAMETER MEASURED DURING POLYSOMNOGRAPHY

- EEG, EMG, EOG
- These three measurement are required for sleep staging and allow differentiation between sleep and wakefulness.
- The EEG allows the division of non-REM sleep into 4 stages.
- The EOG detects REM stage sleep
- The EMG allows the differentiation between REM sleep and arousal

- OXYGEN SATURATION
- ECG
- NASAL AND ORAL AIRFLOW
- CHEST AND ABDOMINAL MOVEMENTS
- TRACHEAL MICROPHONE
- OESOPHAGEAL BALLON MANOMETER



POLYSOMNOGRAPHY CONTD.

ANTERIOR TIBIALIS EMG

SLEEPING POSITION DETECTOR

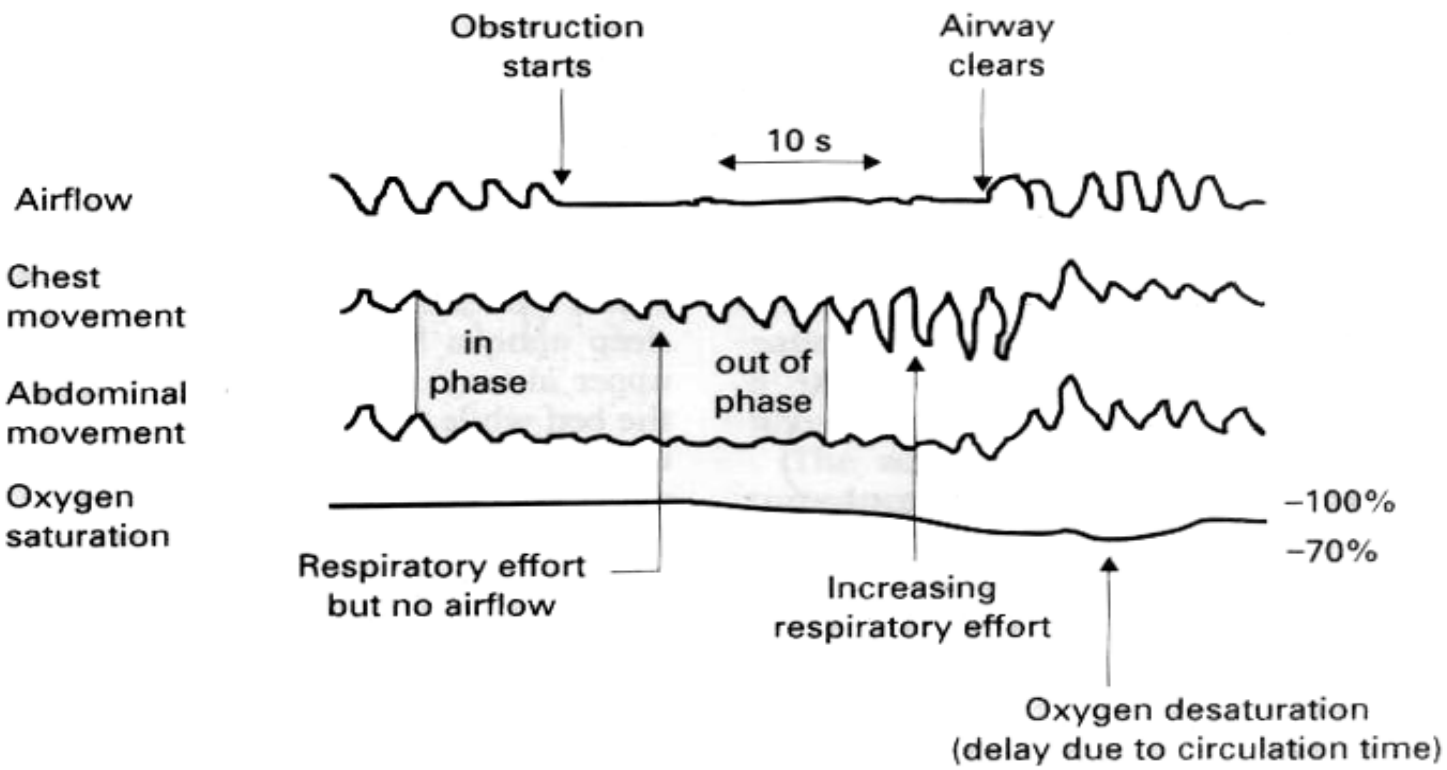


Figure 19.3 An obstructive episode recorded on polysomnography

3. TO ASSESS THE SITE OF OBSTRUCTION

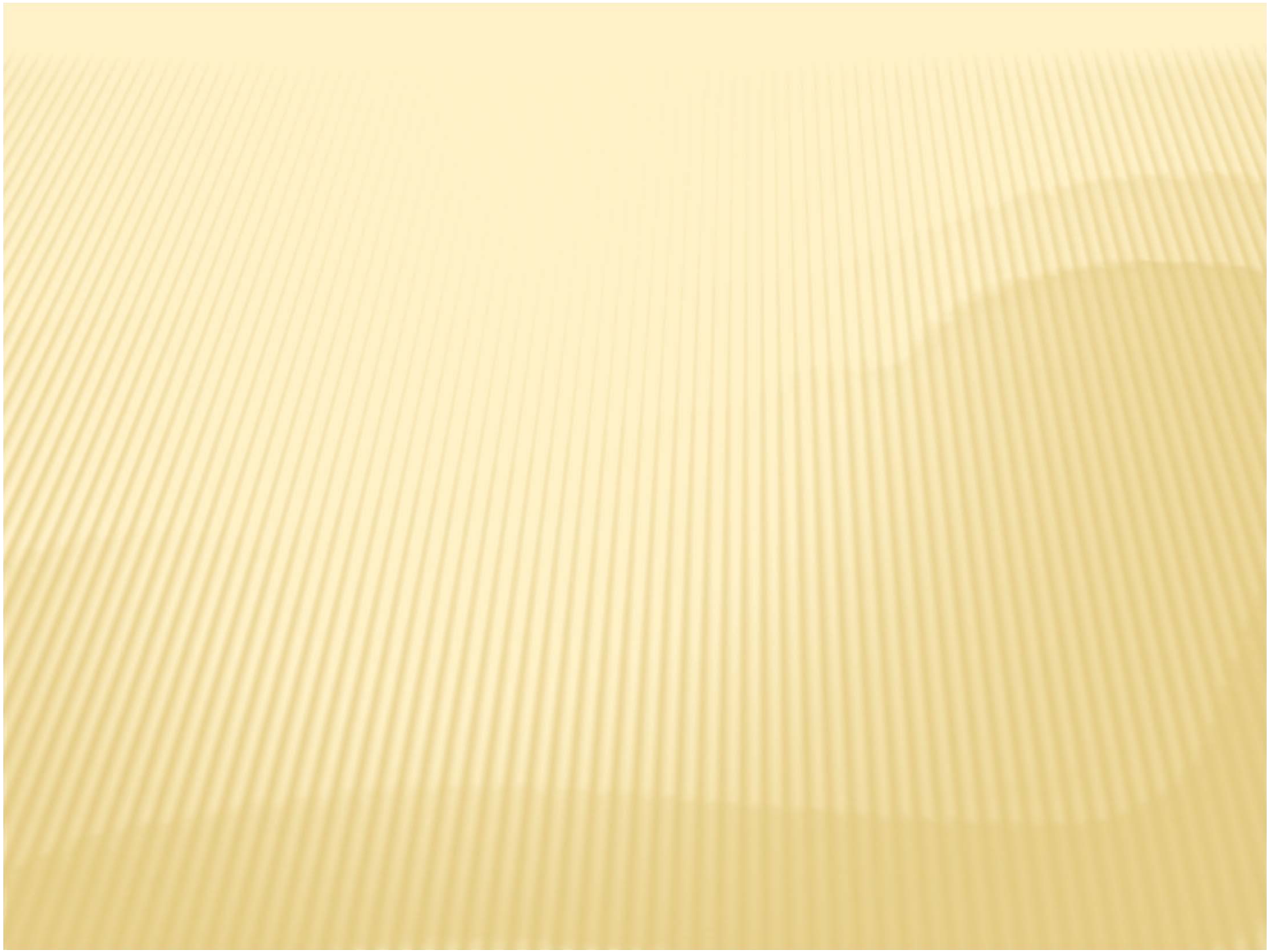
A. AWAKE PATIENTS

B. SLEEPING PATIENTS

A. AWAKE PATIENTS

MULLER'S MANOEUVRE

velopharyngeal sphincter is visualized with a nasoendoscopy while the pt. Performing a reverse valsalva



TO ASSESS THE AIR WAY CONTD.

LATERAL CEPHALOMETRY

- The relationship between various soft tissue and bony points is measured on a very accurately taken lateral head and neck x-ray. The relevant measurements are length of soft palate (pns-p), the airway space (pas), the position of hyoid relative to the mandible (mp-H)
- If mp-h>24mm, pas<5mm–more chance of OSAS
- Can not predict the success of uppp

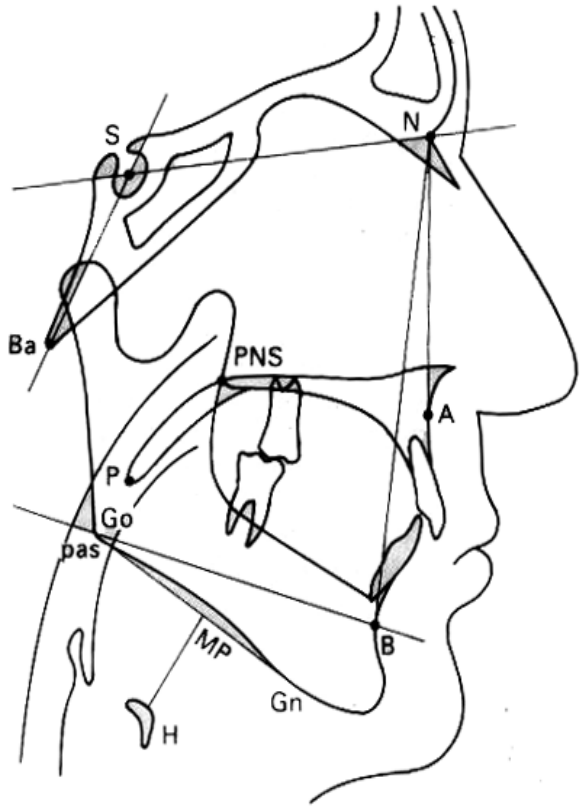


Figure 19.4 Measurements made on a lateral cephalogram. S: sella; N: nasion; PNS: posterior nasal spine; SNA: angle of lines from sella to nasion to point A; P: tip of soft palate; Go: gonion; pas: posterior airway space; SNB: angle of lines from sella to nasion to point B; MP: mandibular plane; H: hyoid; Gn: gnathion. (From Partinen *et al.*, 1988, *Chest*, 93, 1199–1205, by kind permission of the publishers)

TO ASSESS SITE OF OBSTRUCTION CONTD.

- **CT SCAN**

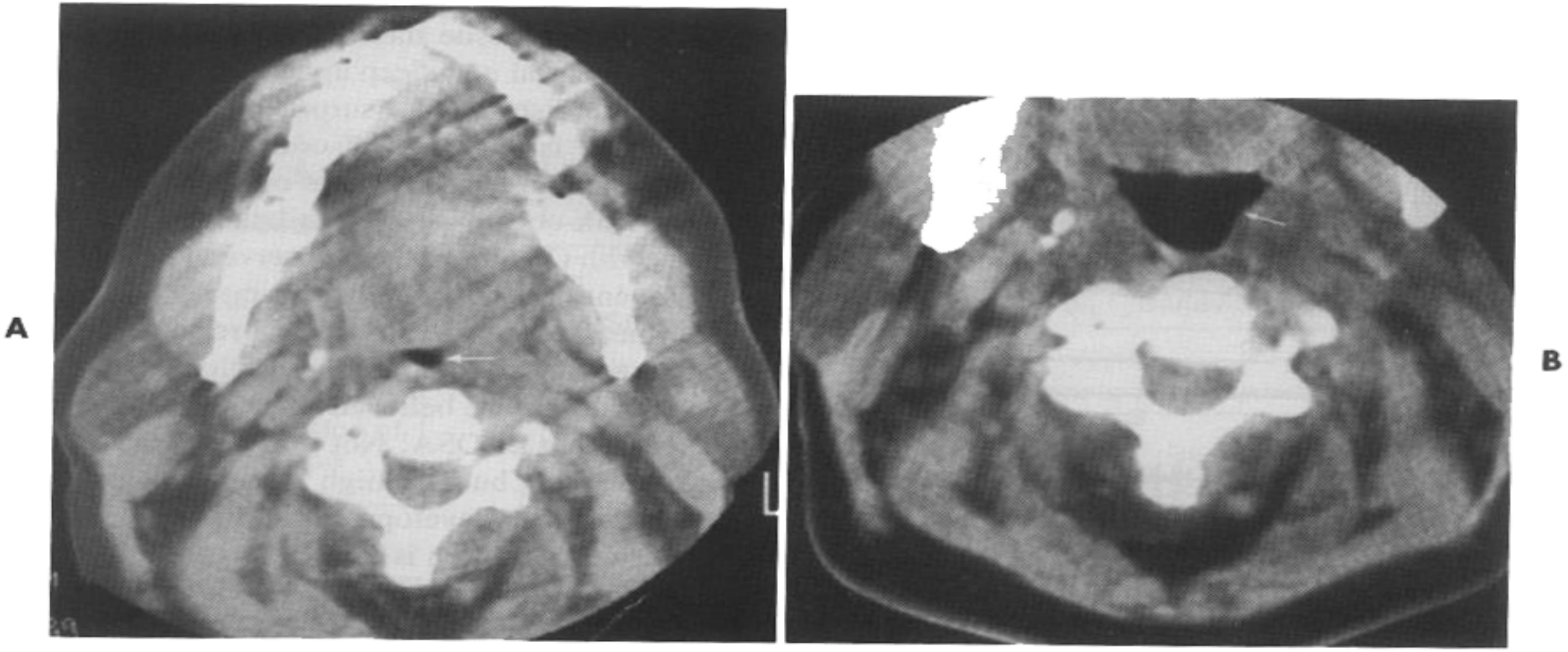


Fig. 81-5. A, Computed tomography scan of oropharyngeal area demonstrating narrow lumen *(arrow)*. **B,** Same patient after enlargement of oropharyngeal area by uvulopalatoplasty. Note enlargement of oropharyngeal airway. (From Thawley SE, Shepard JW. Understanding of the sleep apnea syndrome: causes and treatment, *VA Practitioner* 2:60, 1985.)

- **B. SLEEPING PATIENTS**
  1. **Fibreoptic nasendoscopy**
  2. **Somnoflouroscopy**

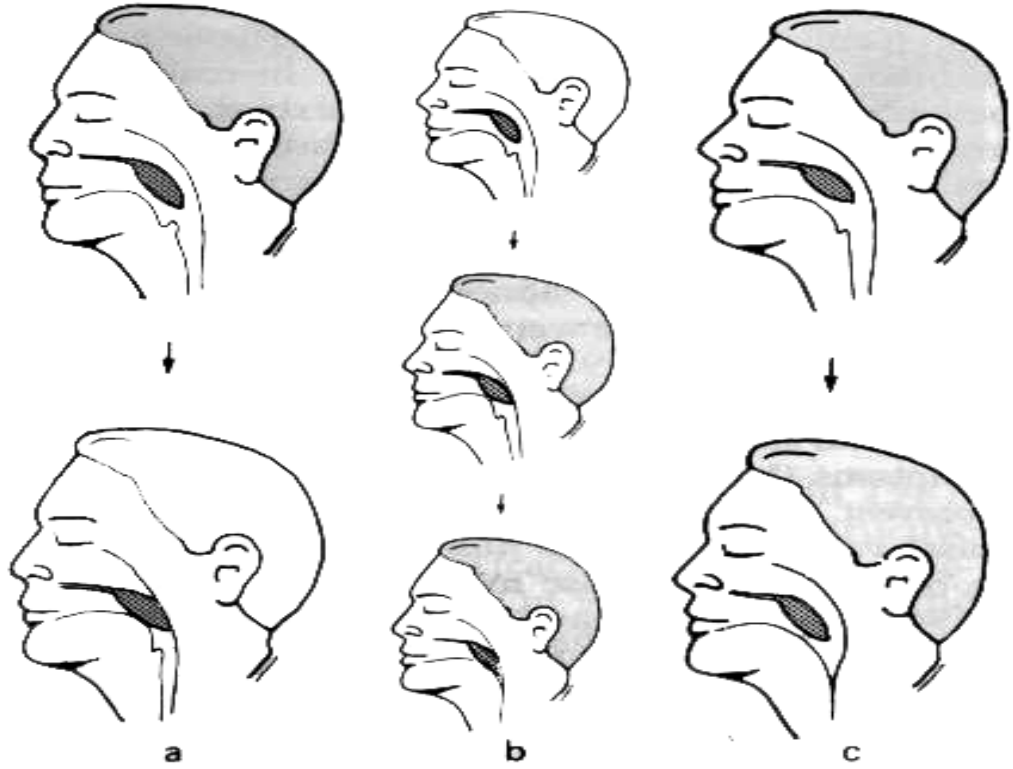


Figure 19.5 Levels of upper airway obstruction based on somnofluoroscopy. (a) Type-1 airway obstruction. Obstruction occurs at level of soft palate only during somnofluoroscopy. (b) Type-2 airway obstruction. Obstruction occurs initially at level of soft palate followed by closure of more distal airway. (c) Type-3 airway obstruction. Obstruction initially occurs distal to soft palate. Airway at soft palate level may close or remain open. (From Hegstrom *et al.*, 1988, *American Journal of Radiology*, 150, 67–69, by kind permission of the publishers)

TO ASSESS THE SITE OF OBSTRUCTION CONTD.

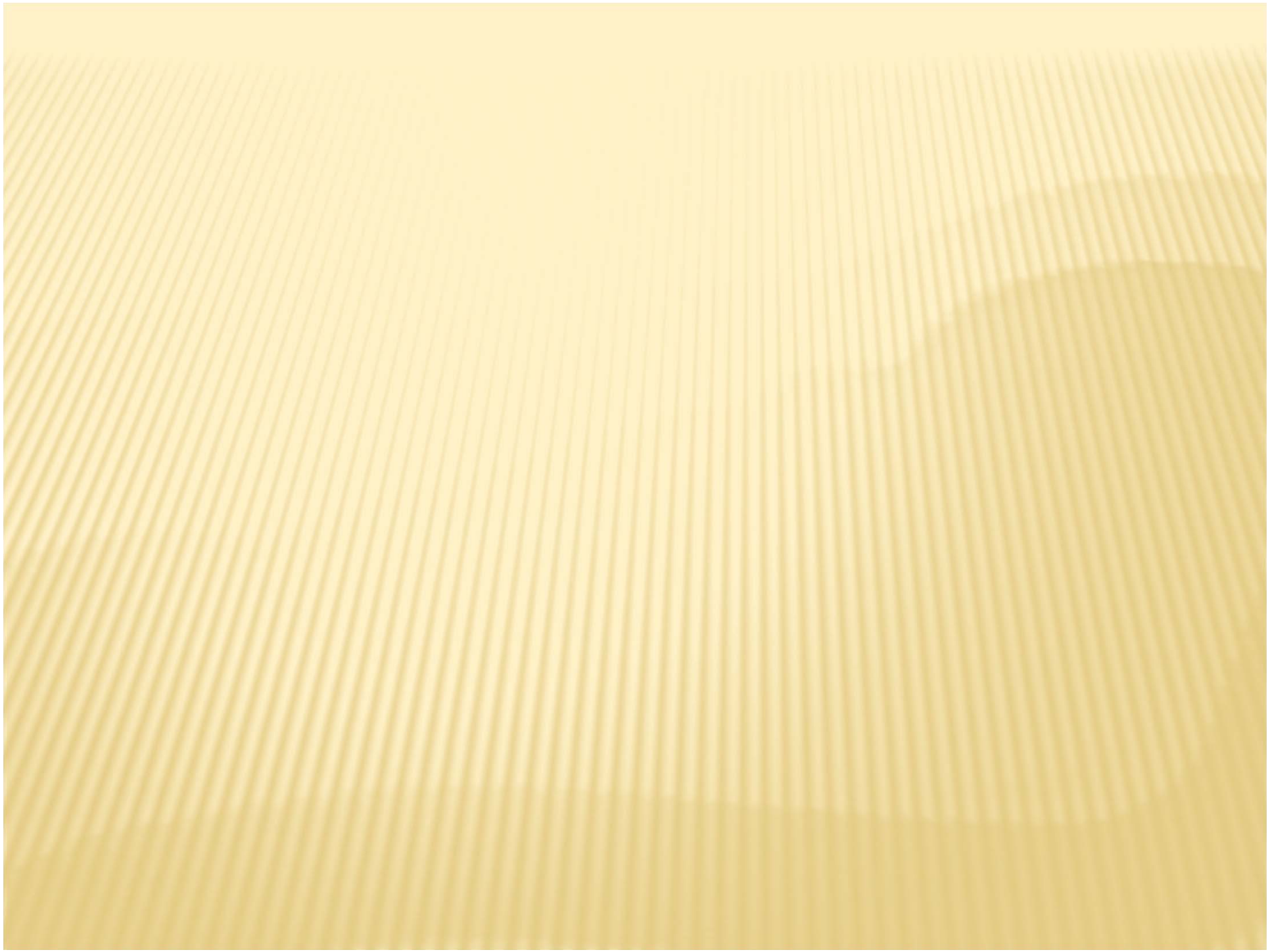
- SINE-CT
  - IMATRON C-100 RAPID SEQUENCE SCANNER ALLOWS 8CM OF AIRWAY TO BE SCANNED IN 240ms AND THIS CAN BE REPEATED IN 0.7ms INTERVAL.
- CINE CT DIVIDES PT. INTO TWO GROUP-THOSE WITH SOFT PALATE LEVEL OBSTRUCTION,THOSE WITH MULTI SEGMENTAL OBSTRUCTION.
- PHARYNGEAL MANOMETRY.

TREATMENT

- CHOICE OF TREATMENT DEPENDS ON
- 1.Is it snoring orobstructive sleep apnoea ?
- 2.What does the pt. wants?
- 3 .The severity of obstruction and the presence of complication?
- 4.The level of obstruction?.
- NO TREATMENT
  - No daytime sleepiness
  - Investigation excludes OSAS or cardic arrythmias
  - The pt. not concerned by the snoring noise

MEDICAL TREATMENT

- EXCLUDES HYPOTHYROIDISM AND ACROMEGALLY
- ALCOHOL ADVICE
- DRUGS REVIEW
- WEIGHT LOSS
- AVOID SUPINE POSITION (tennis ball)
- NASAL MEDICATION
- NASOVENT
- DRUG TREATMENT(PROTRIPTYLINE)
- POSITIONAL DEVICE
- TONGUE RETAINING DEVICE
- NASAL CONTINUOUS AIRWAY PRESSURE



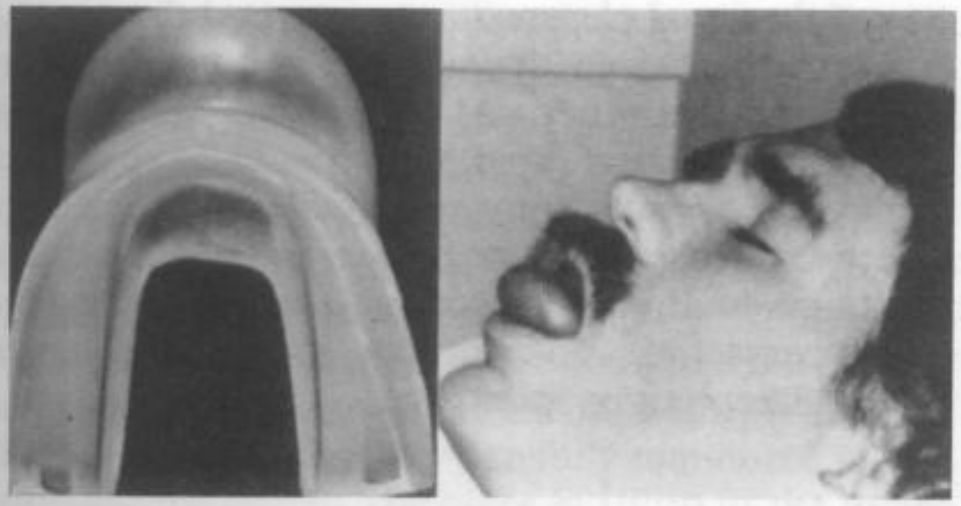


Figure 19.8 The tongue retaining device

Figure 19.9 A patient using nasal continuous positive airway pressure

During normal breathing the throat is clear and open, allowing air to flow freely to and from the lungs.

While a person with OSA sleeps, tissue at the back of the throat collapse and block the flow of air.

Positive pressure therapy can keep the airway open so that air flows freely to and from the lungs.

NASAL SUGERY

DNS-SEPTOPLASTY

INFERIOR TURBINATE HYPERTROPHY-TURBINECTOMY

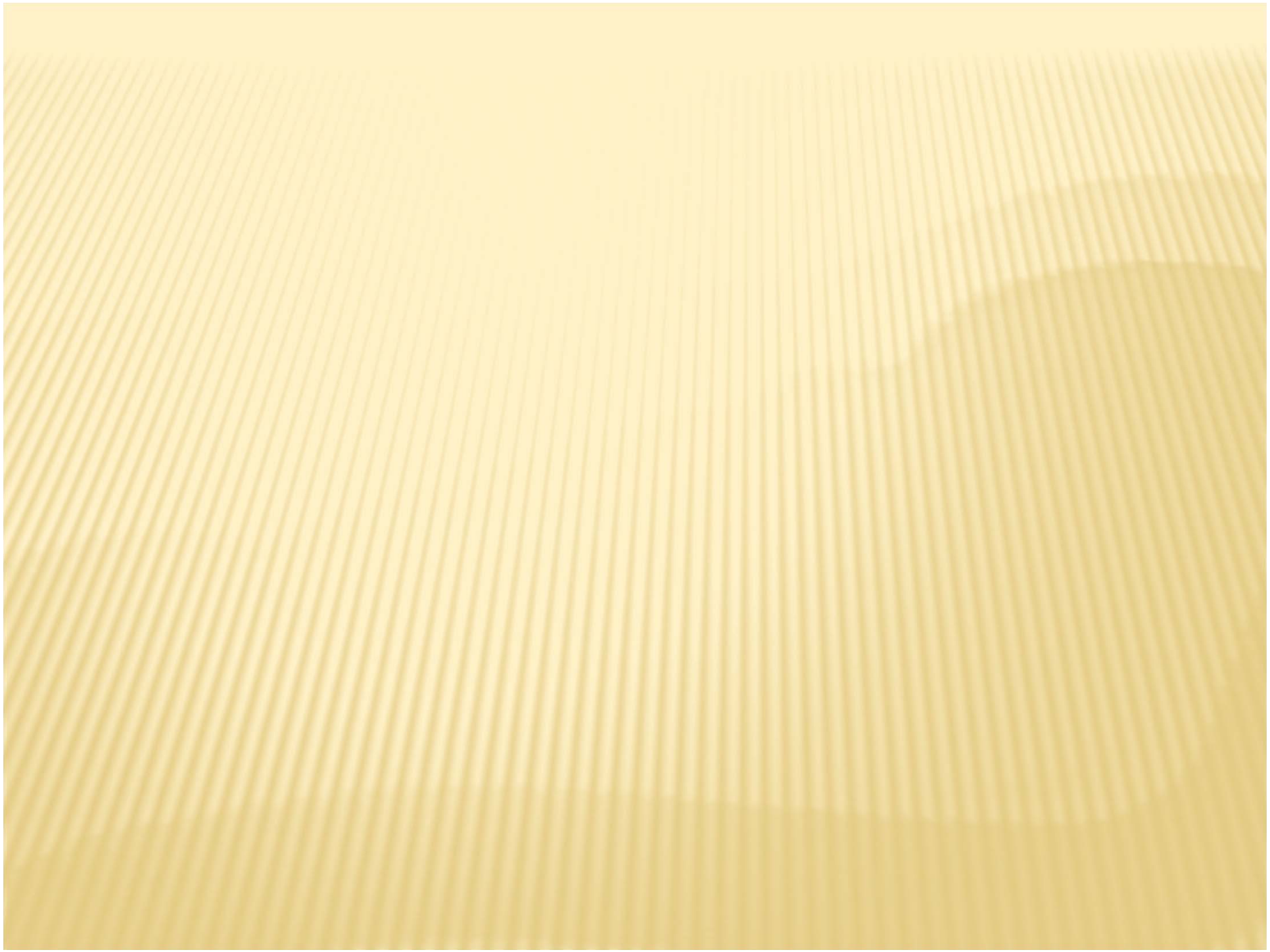
POLYPS-POLYPECTOMY

UVULOPALATOPHARYNGOPLASTY(UPPP)

- STRUCTRE TO BE REMOVED:
- TONSILS, FAUCIAL PILLARS, UVULA, VARIABLE AMOUNT OF SOFT PALATE
- PRINCPLE:-
- DECREASING EXCESSIVE AND SPACE-OCCUPYING TISSUE, A CORRESPONDING INCREASING IN THE CROSS SECTIONAL AREA OF THE VELOPHARYNX, STIFFENING OF THE REMAINING TISSUE FROM SCARRING WHICH REDUCES VIBRATION AND COLLAPSE

UVULOPALATOPHARYNGOPLASTY

- SUCCESS RATE
  - 85-90% in curing snoring
  - 50-60% in reducing AI in OSAS
- It has been shown not to improve the long term mortality
- Improves the daytime sleepiness anddriving performance
- COMPLICATION:
  - Nasal regurgitation of fluid
  - Dry throat
  - Distrubances in taste
  - Hypernasal voice
  - Velopharyngeal stenosis-most serious complication



ALATAL PROCEDURE

A recently developed procedure for the treatment of patients with simple snoring

t involves an attempt to stiffen the soft palate by removing a longitudinal strip of mucosa from its oral surface using N d-yag laser

Not recommended for obstructive sleep apnoea

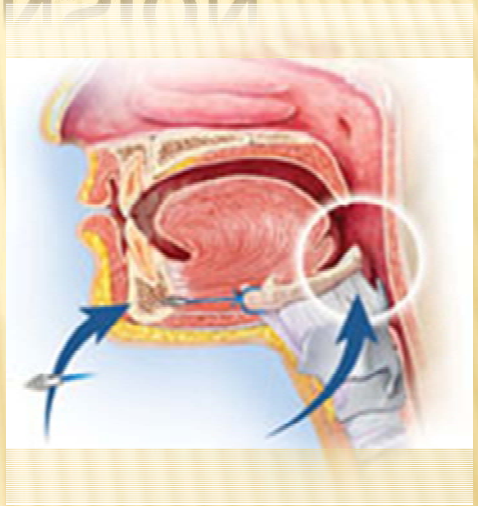
LASER ASSISTED UVULOPALATOPLASTY WITH OR WITHOUT TONSILLECTOMY

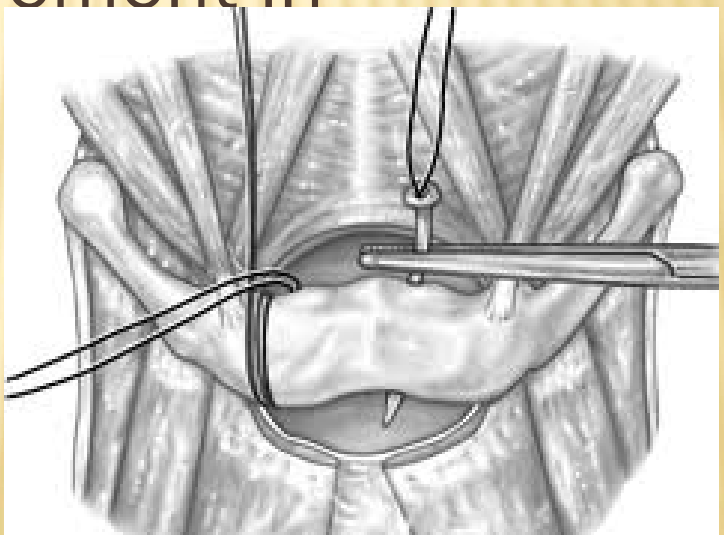
ALATAL IMPLANTS

- Minimally invasive and less painful than other palatal surgeries
- Woven cylindrical implants inserted to stiffen palate and reduce palatal flutter causing snoring, indicated for simple snoring
- + Reduces snoring sound intensity, does not completely eliminate snoring

YOID MYOTOMY WITH SUSPENSION

- Hyoid Repose system similar to tongue base suspension technique
- Study shows improvement in AHI from 40 to 19





MAXILLOFACIAL TECHNIQUES

cated in failure cases of UPPP

ANDIBULAR OSTEOTOMY AND GENIOGLOSUSS ADVANCEMENT
ITH A UPPP