In the name of God

Dr Hamidreza Mahaseni Aghdam

Prevention of Medical Emergencies

Patient Evaluation

- Chief Complaint
- HPI
- PMH
  - Questionair
- Review of Systems

- **Physical examination in dentistry consists of the following steps:**
- **1.Monitoring of vital signs**
- **2. Visual inspection of the patient**
- **3. Function tests as indicated**
- **4.Auscultation, monitoring (via electrocardiogram), and laboratory tests of the heart and lungs as indicated**

Vital signs The vital signs are as follows:

1. **Blood pressure**
2. **Heart rate (pulse) and rhyt**
3. **Respiratory rate**
4. **Temperature**
5. **Height**
6. **Weight Body Mass Index (**

Physical Examination

THE VITAL SIGNS

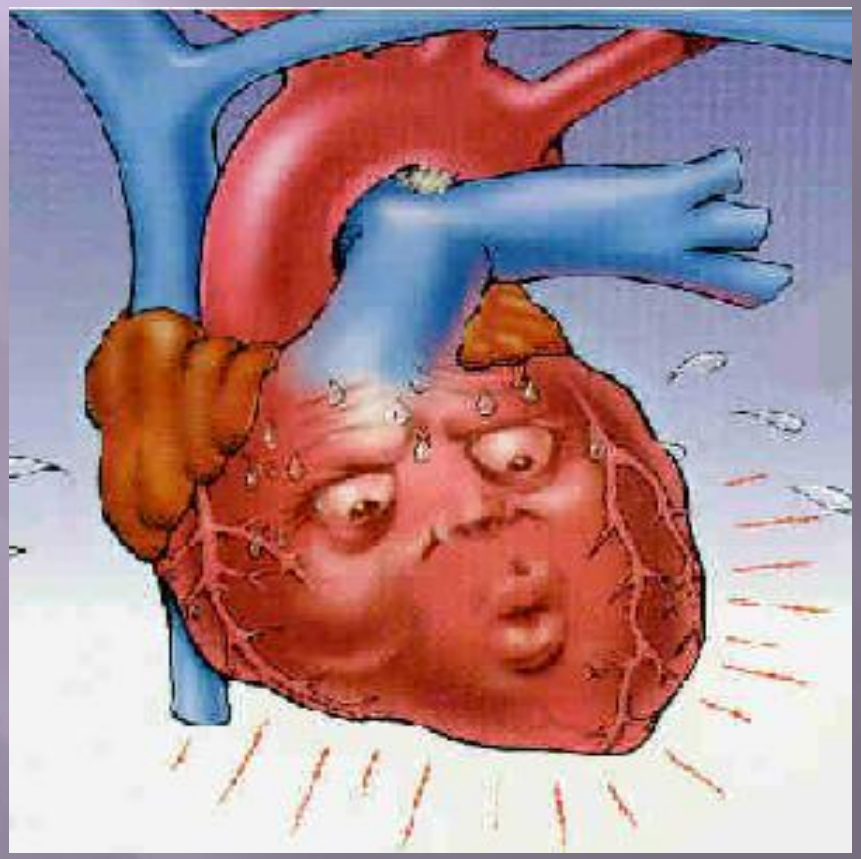
- BLOOD PRESSURE

- HEART RATE

- RESPIRATORY RATE

- TEMPERATURE

BLOOD PRESSURE



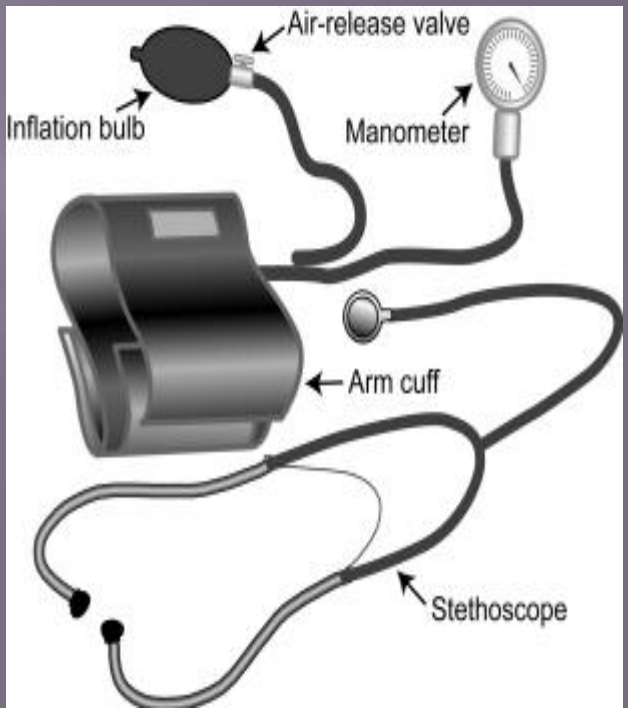
Choice of Blood Pressure Cuff (Sphygmomanometer)

- aneroid

- mercury


Intellisense
SYS
mmHg
135
DIA
mmHg
85
PULSE
/min
70
AM
7:30
MEM
START
STOP
BP629
OMRON


ADULT


Air-release valve
Inflation bulb
Manometer
Arm cuff
Stethoscope

Guideline

- Width of the bladder ⟶ 40% of the upper arm circumference (12-14cm in average)

- Length of the bladder ⟶ 80% of the upper arm circumference

✓Cuffs too short or too narrow

↘

falsely high reading

✓Regular-size cuff on obese arm

↘

false diagnosis of hypertension

Steps for getting ready to measure blood pressure

Avoid smoking or drinking caffeinated beverage for 30 min

rest at least for 5 min

Quiet room and comfortably warm

Arm must be free of clothing
no arteriovenous fistulas for dialysis
scarring from prior brachial artery cut downs
signs of lymphedema

Palpate the brachial artery

↓

viable pulse

Positioning the arm → the brachial artery is at heart level → level with the 4th interspace at its junction with the sternum

If the patient is seated ----- rest the arm a little above the patient’s waist

If standing ------ support the arm at the midchest level

- Center the bladder over the brachial artery

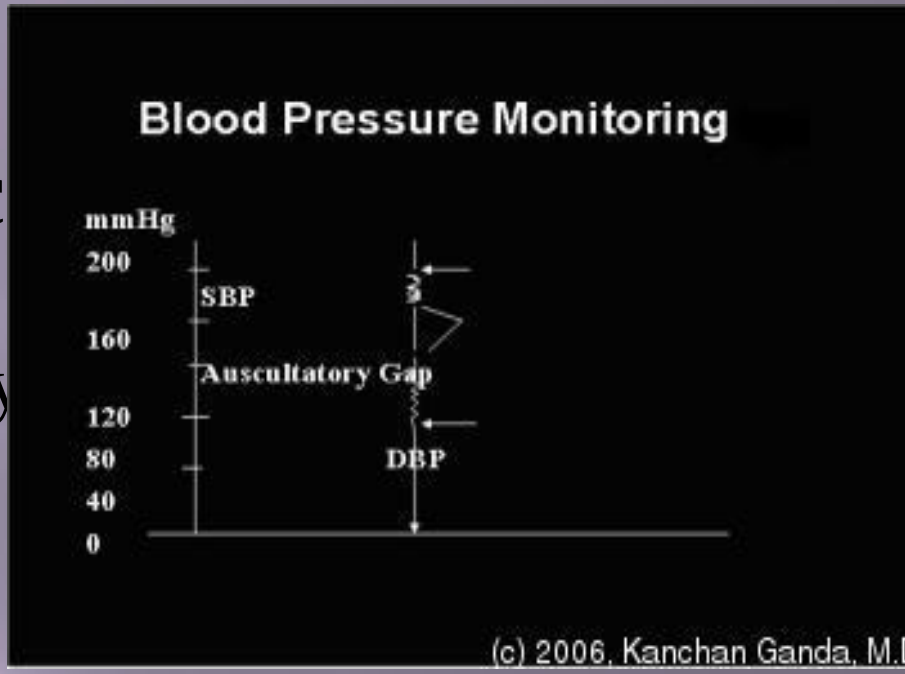
the lower border of the cuff

↘ 2.5 cm above the antecubital crease

secure the cuff snugly

↘ patient's arm slightly flexed at the elbow

How high to raise the c



estimate the systolic pressure by

add 30 mm Hg

- avoid discomfort from unnecessary high cuff pressure
- avoid error caused by an auscultatory gap

may lead to serious
underestimation of systolic pressure
or overestimation of diastolic pressure

if hear ---- record completely

Deflate promptly --- wait 15 to 30 second
place the bell of the stethoscope

Korotkoff sounds are relatively low in pitch
heard better with the bell

Inflate rapidly again
deflate at a rate of about 2 to 3 mm Hg per second
hear the sounds of at least two consecutive beats
systolic pressure

Lower the pressure slowly → the sounds become muffled and then disappear

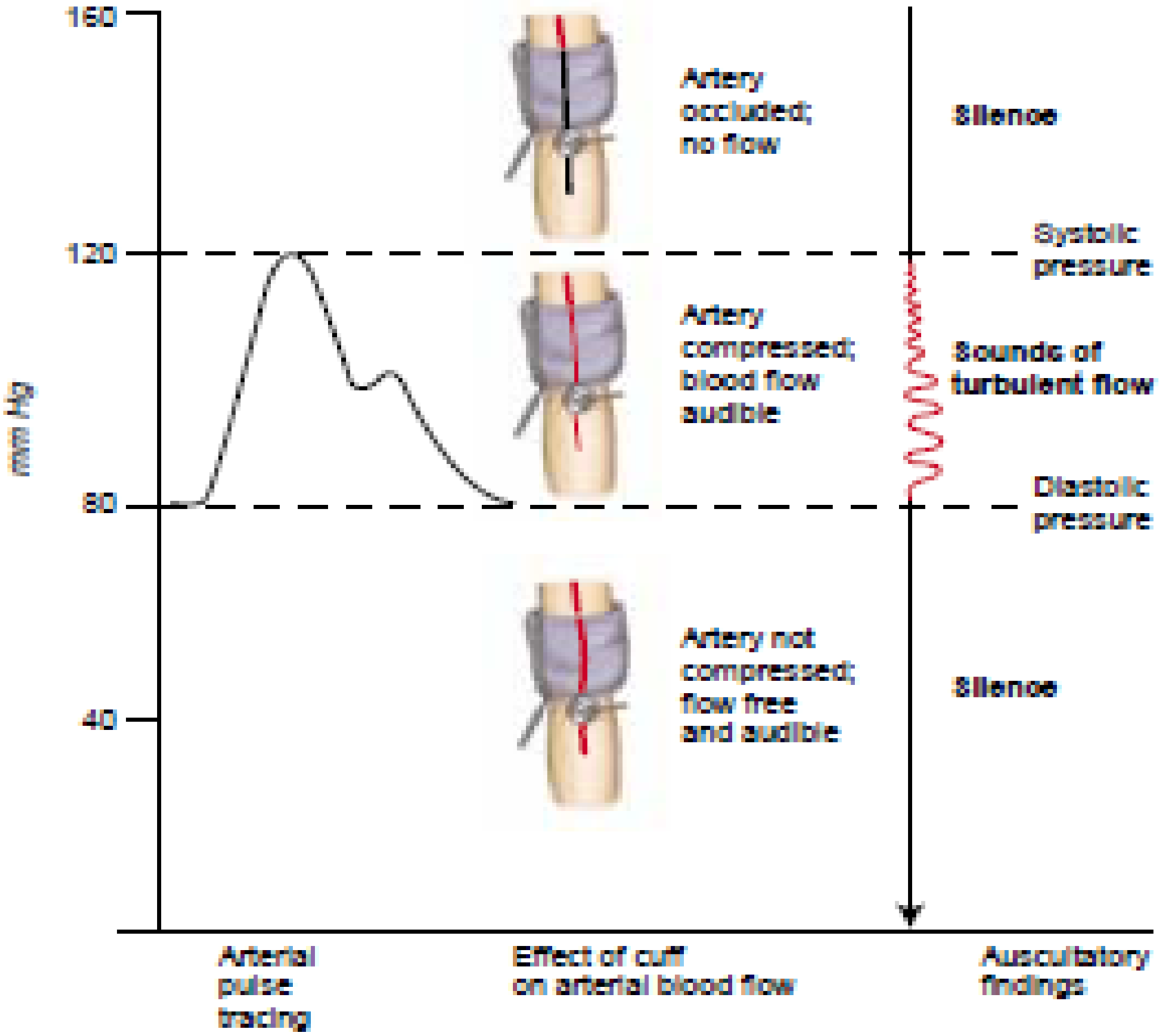
to confirm it → listen as the pressure falls another 10 to 20 mm Hg

disappearance point → best estimate of true diastolic pressure in adults

❖If these two points are farther apart (more than 10 mm Hg)

↘ record both figures

(e.g. in aortic regurgitation the sounds never disappear)


160
120
80
40
mm Hg
Artery occluded; no flow
Artery compressed; blood flow audible
Artery not compressed; flow free and audible
Silence
Systolic pressure
Sounds of turbulent flow
Diastolic pressure
Silence
Arterial pulse tracing
Effect of cuff on arterial blood flow
Auscultatory findings

- Avoid slow or repetitive inflation of the cuff
  venous congestion can cause false reading

  (low systolic and high diastolic)

- BP should be taken from both arms
  subsequent reading should be made on the arm
  with the higher pressure

  → pressure difference of more than 10-15 mm Hg
  suggest arterial compression or obstruction
  on the side with the lower pressure

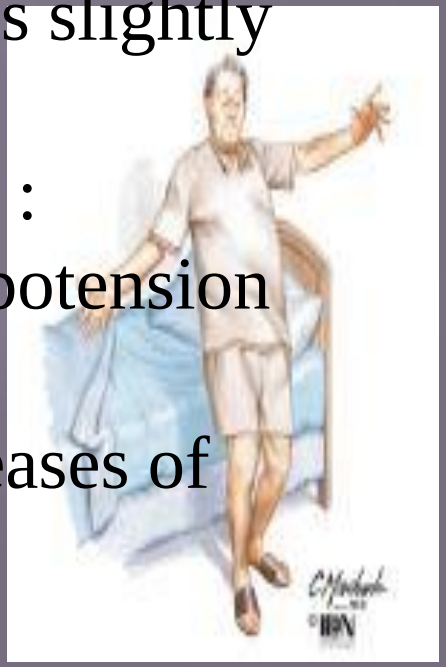
- taking antihypertensive
- history of fainting
- postural dizziness
- possible depletion of blood volume

→ Take the BP in three positions supine, sitting, standing

Normally when the patient rises … SBP drops slightly

A fall of 20 mm Hg in SBP or more indicates : orthostatic hypotension

Causes:
Drugs, loss of blood, prolonged bed rest, diseases of ANS



- ✓Hypertension should be diagnosed only when a higher than normal level has been found on at least two or more visits after initial screening

- ✓A pressure of 110/70 would usually be normal but could also indicate significant hypotension if past pressures have been high

When cuffs of the proper size are used for both the leg and the arm, blood pressures should be equal in the two areas.

The usual arm cuff, improperly used on the leg, gives a falsely high reading.

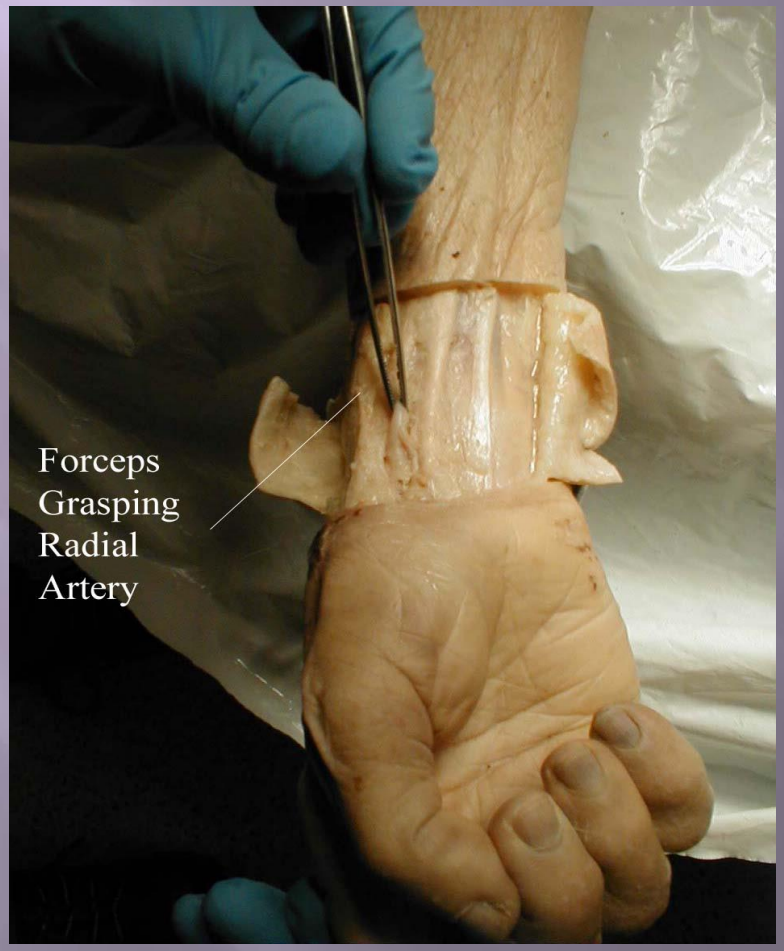
A systolic pressure lower in the legs than in the arms is abnormal.

✓ *Weak or Inaudible Korotkoff Sounds*

- erroneous placement of your stethoscope
- failure to make full skin contact with the bell

- possibility of shock

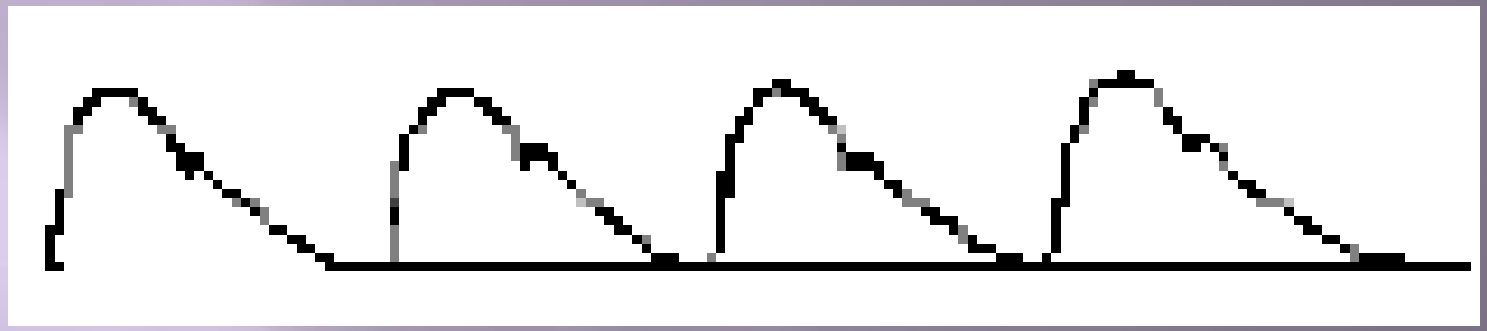
HEART RATE



By examining arterial pulses:

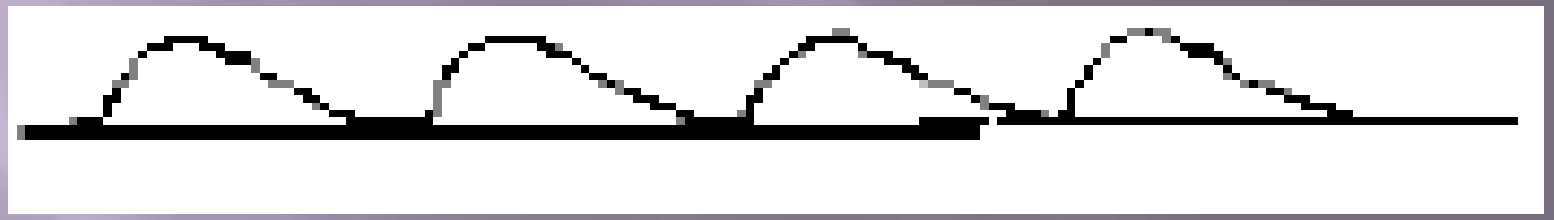
- ✓can count the rate of the heart
- ✓determine its rhythm
- ✓assess the amplitude and contour of the pulse wave
- ✓and sometimes detect obstructions to blood flow

Normal



The pulse pressure is about 30–40 mm Hg. The pulse contour is smooth and rounded. (The notch on the descending slope of the pulse wave is not palpable.)

Small, weak

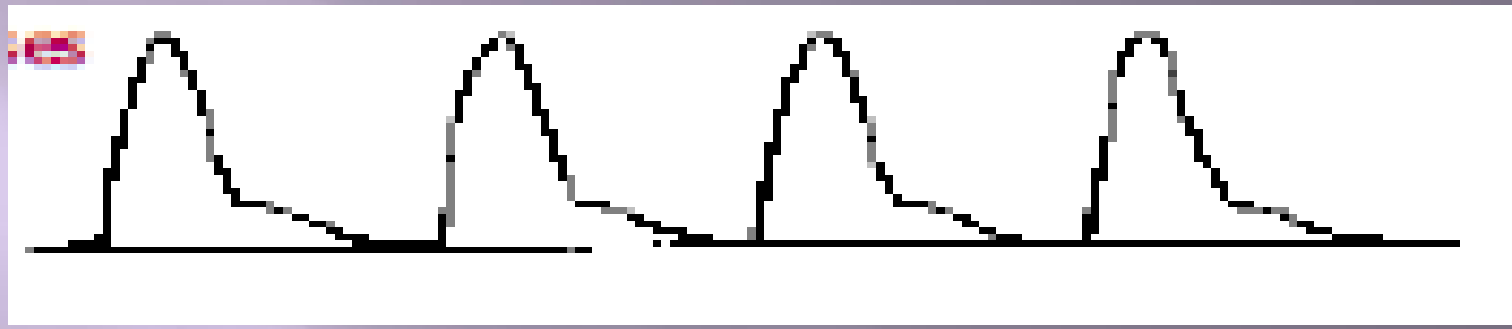


The pulse pressure is diminished, and the pulse feels weak and small. The upstroke may feel slowed, the peak prolonged. Causes:

(1) decreased stroke volume, as in heart failure, hypovolemia, and severe aortic stenosis

(2) Increased peripheral resistance, as in exposure to cold and severe congestive heart failure.

Large, Bounding



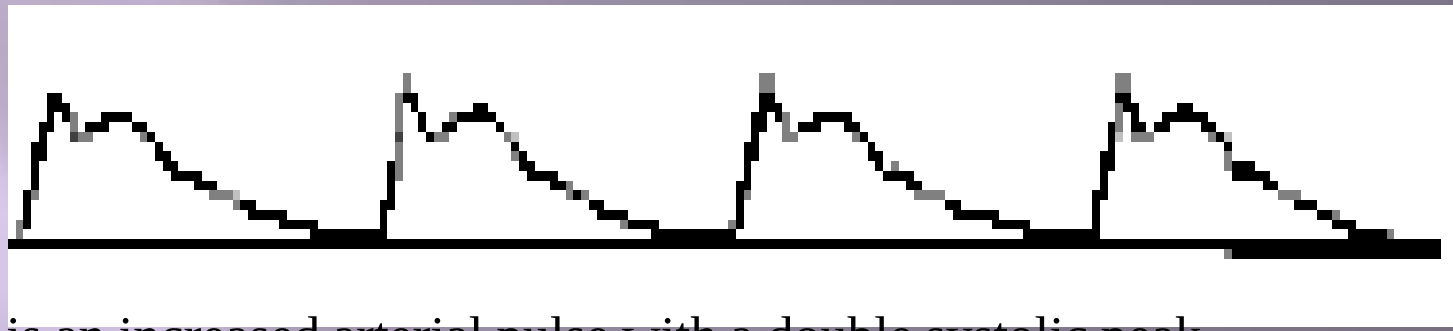
The pulse pressure is increased and the pulse feels strong and bounding. The rise and fall may feel rapid, the peak brief. Causes:

(1) an increased stroke volume, a decreased peripheral resistance, or both, as in fever, anemia, hyperthyroidism, aortic regurgitation, arteriovenous fistulas, and patent ductus arteriosus

(2) an increased stroke volume due to slow heart rates, as in bradycardia and complete heart block

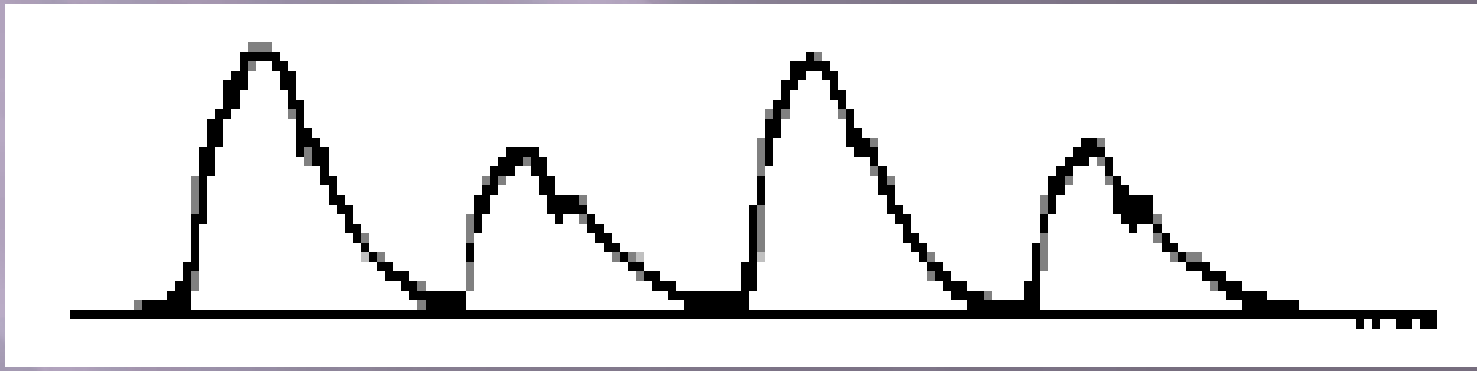
(3) decreased compliance (increased stiffness) of the aortic walls, as in aging or atherosclerosis.

Bisferiens



A bisferiens pulse is an increased arterial pulse with a double systolic peak.
Causes: pure aortic regurgitation, combined aortic stenosis and regurgitation, and, though less commonly palpable, hypertrophic cardiomyopathy.

Pulsus Alternans



The pulse alternates in amplitude from beat to beat even though the rhythm is basically regular. When the difference between stronger and weaker beats is slight, it can be detected only by sphygmomanometry.
Pulsus alternans indicates left ventricular failure and is usually accompanied by a left-sided S3.

Blood pressure

- ASA 1: <140 & <90
  - routin dental procedures
  - F/U every 6 m.
- ASA 2: 140-159 & 90-94
  - Control 3 subsequent sessions
  - Stress control
- ASA3: 160-199 & 95-114
  - Medical consult
  - Stress control
- ASA4:
  - Medical consult
  - Treat the emergencies dental positions with medical treatment

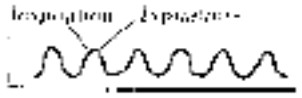
RESPIRATORY RATE

Observe the *rate, rhythm, depth, and effort of breathing.*

Count the number of respirations in 1 minute either by visual inspection or by subtly listening over the patient's trachea with your stethoscope during your examination of the head and neck or chest.
Normally, adults take 14 to 20 breaths a minute in a quiet regular pattern.
An occasional sigh is normal.
Check to see if expiration is prolonged which is suggested narrowing in the bronchioles

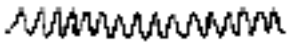
TABLE 3-12 ■ Abnormalities in Rate and Rhythm of Breathing

When observing respiratory patterns, think in terms of *rate*, *depth*, and *regularity* of the patient's breathing. Describe what you see in these terms. Traditional terms, such as tachypnea, are given below so that you will understand them, but simple descriptions are recommended for use.



Normal

The respiratory rate is about 14–20 per min in normal adults and up to 44 per min in infants.



Rapid Shallow Breathing *(Tachypnea)*

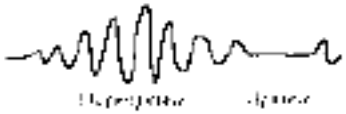
Rapid shallow breathing has a number of causes, including restrictive lung disease, pleuritic chest pain, and an elevated diaphragm.

Rapid Deep Breathing *(Hyperpnea, Hyperventilation)*

Rapid deep breathing has several causes, including exercise, anxiety, and metabolic acidosis. In the comatose patient, consider infarction, hypoxia, or hypoglycemia affecting the midbrain or pons. *Kussmaul breathing* is deep breathing due to metabolic acidosis. It may be fast, normal in rate, or slow.

Slow Breathing *(Bradypnea)*

Slow breathing may be secondary to such causes as diabetic coma, drug-induced respiratory depression, and increased intracranial pressure.

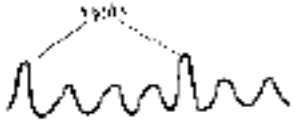


Cheyne–Stokes Breathing

Periods of deep breathing alternate with periods of apnea (no breathing). Children and aging people normally may show this pattern in sleep. Other causes include heart failure, uremia, drug-induced respiratory depression, and brain damage (typically on both sides of the cerebral hemispheres or diencephalon).

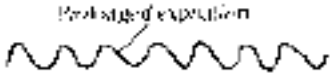
Ataxic Breathing *(Biot's Breathing)*

Ataxic breathing is characterized by unpredictable irregularity. Breaths may be shallow or deep, and stop for short periods. Causes include respiratory depression and brain damage, typically at the medullary level.



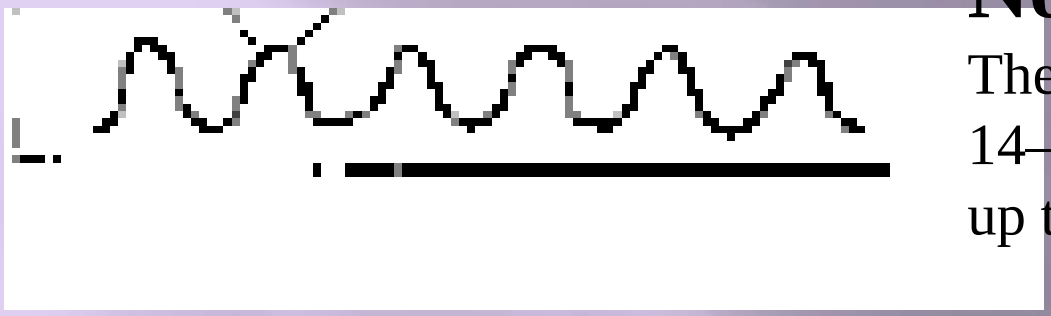
Sighing Respiration

Breathing punctuated by frequent sighs should alert you to the possibility of hyperventilation syndrome—a common cause of dyspnea and dizziness. Occasional sighs are normal.



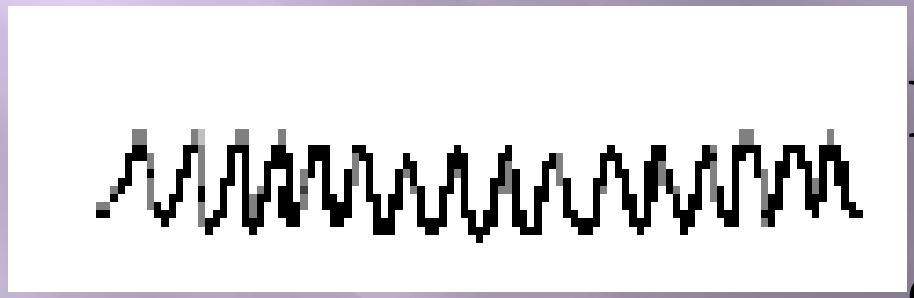
Obstructive Breathing

In obstructive lung disease, expiration is prolonged because narrowed airways increase the resistance to air flow. Causes include asthma, chronic bronchitis, and COPD.



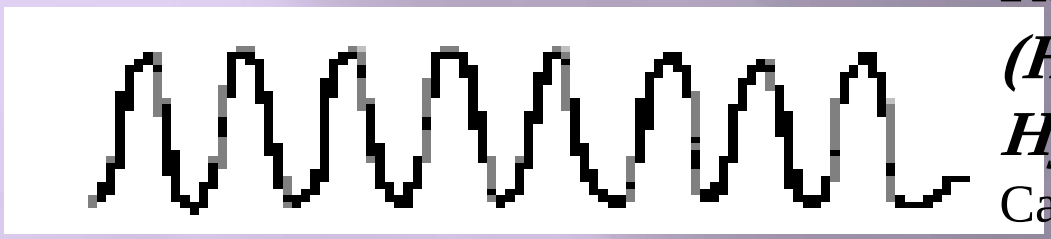
Normal

The respiratory rate is about 14–20 per min in normal adults and up to 44 per min in infants.



Rapid Shallow Breathing *(Tachypnea)*

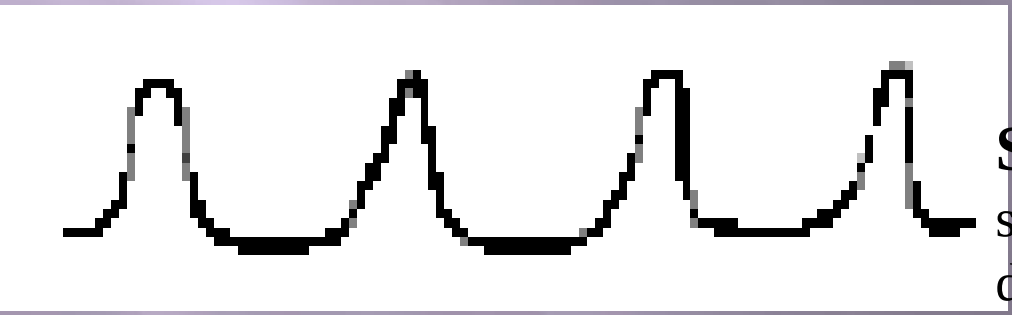
Causes: restrictive lung disease, pleuritic chest pain, and an elevated diaphragm



Rapid Deep Breathing *(Hyperpnea, Hyperventilation)*

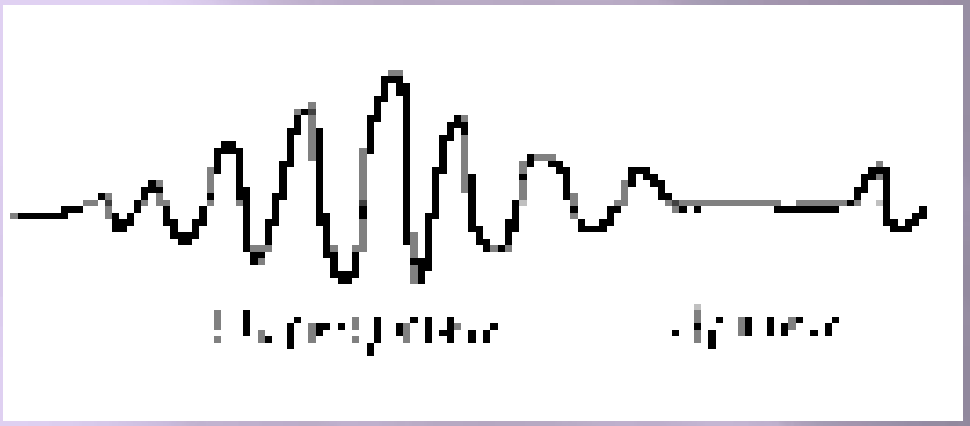
Causes: exercise, anxiety, metabolic acidosis.

In the comatose patient, consider infarction, hypoxia, or hypoglycemia affecting the midbrain or pons.



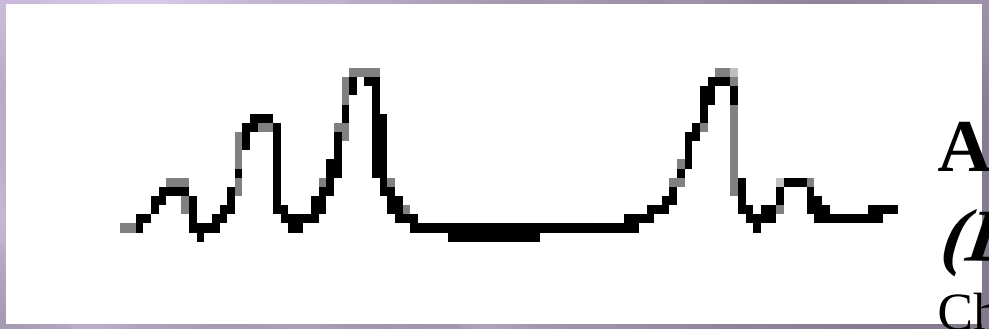
Slow Breathing *(Bradypnea)*

secondary to such causes as diabetic coma, drug induced respiratory depression, and increased intracranial pressure



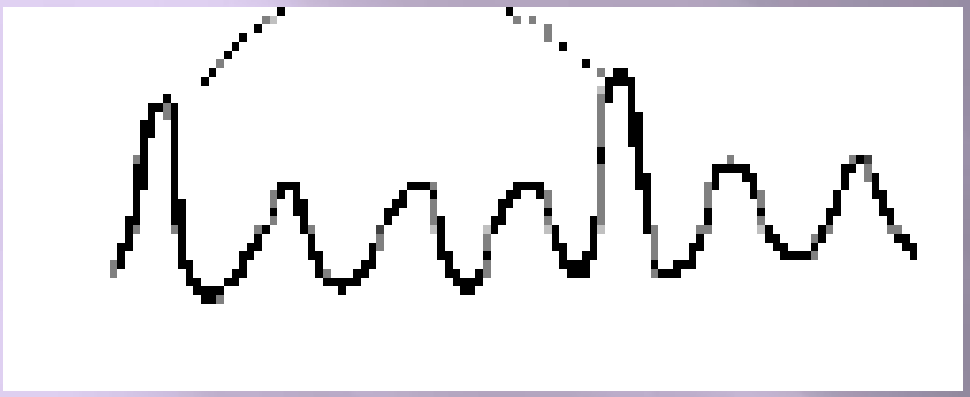
Cheyne–Stokes Breathing

Periods of deep breathing alternate with periods of apnea.
Children and aging people normally may show this pattern in sleep.
Other causes : heart failure, uremia, drug-induced respiratory depression, brain damage



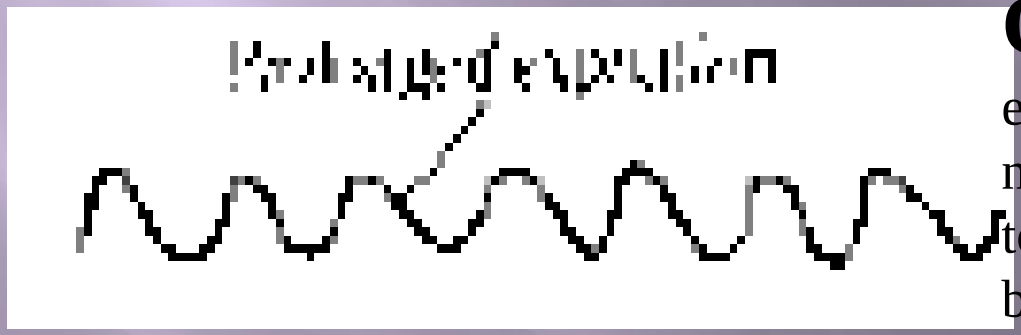
Ataxic Breathing *(Biot's Breathing)*

Characterized by unpredictable irregularity
Breaths may be shallow or deep, and stop for short periods. Causes: respiratory depression and brain damage



Sighing Respiration

Breathing punctuated by frequent sighs.
possibility of hyperventilation syndrome—a common cause of dyspnea and dizziness.

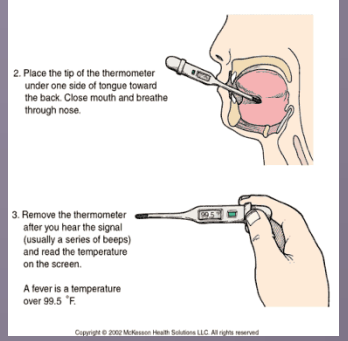


Obstructive Breathing

expiration is prolonged because narrowed airways increase the resistance to air flow. Causes: asthma, chronic bronchitis,and COPD.

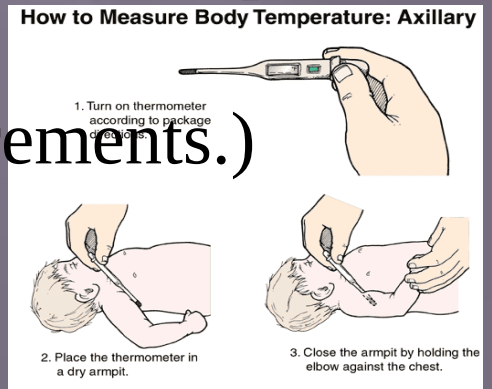
TEMPERATURE

•The average oral temperature →37°C
In the early morning hours ⟶ 35.8°C
In the late afternoon ⟶ 37.3°C.



•Rectal temperatures are higher than oral temperatures by an average of 0.4 to 0.5°C

•Axillary temperatures are lower than oral temperatures by approximately1 degree
(less accurate than other measurements.)



- *Fever or pyrexia* refers to an elevated body temperature
- *Hyperpyrexia refers to extreme* elevation in temperature, above 41.1°C
- *Hypothermia* refers to an abnormally low temperature, below 35°C rectally.

✓Taking oral temperatures is not recommended when patients are unconscious, restless, or unable to close their mouths.

✓Rapid respiratory rates tend to increase the discrepancy between oral and rectal temperatures. In this situation, rectal temperatures are more reliable.

✓For oral temperatures when using a glass thermometer
- shake the thermometer down to35°C
- insert it under the tongue
- close both lips wait 3 to 5 minutes

•hot or cold liquids, and even smoking, can alter the temperature reading ---- delay measuring the temperature for 10 to 15 minutes.

✓For a rectal temperature:
- The patient lie on one side
- Lubricate and insert it about 3 cm to 4 cm
- Remove it after 3 minutes

✓Taking the tympanic membrane temperature is common quick, safe, and reliable if performed properly.
- external auditory canal is free of cerumen
- Position the probe in the canal infrared beam is aimed at the tympanic membrane
- Wait 2 to 3 seconds

•This method measures core body temperature is higher than the normal oral temperature by approximately 0.8°C

- The chief cause of hypothermia is exposure to cold.
  Other causes include:
  - reduced movement as in paralysis
  - Interference with vasoconstriction as from sepsis or excess alcohol
  - starvation
  - hypothyroidism
  - hypoglycemia

- Elderly people are especially susceptible to hypothermia and also less likely to develop fever

Welcome to “Doctor’s World”

Box 16-13 Cardiac Conditions Associated with the Highest Risk of Adverse Outcome from Endocarditis for Which Prophylaxis with Dental Procedures Is Recommended

- Prosthetic cardiac valve
- Previous infective endocarditis
- Congenital heart disease (CHD)*
  - Unrepaired cyanotic CHD, including palliative shunts and conduits
  - Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure†
  - Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
- Cardiac transplant recipients who have cardiac valvulopathy

*Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of CHD.

†Prophylaxis is recommended because endothelialization of prosthetic material occurs within 6 months after the procedure.

Box 16-14 Dental Procedures for Which Endocarditis Prophylaxis Is Recommended for Patients in Box 16-13

All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa.*

*The following procedures and events do not need prophylaxis: routine anesthetic injections through noninfected tissues, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of deciduous teeth, and bleeding from trauma to the lips or oral mucosa.

Box 16-15 Dental Procedures in Which Prophylaxis Is Not Recommended

- Restorative dentistry
- Routine local anesthetic injection
- Intracanal endodontic therapy and placement of rubber dams
- Suture removal
- Placement of removable appliances
- Making of impressions
- Taking of oral radiographs
- Fluoride treatments
- Orthodontic appliance adjustment
- Shedding of primary teeth

Table 16-6 Antibiotic Regimens for Prophylaxis of Bacterial Endocarditis

Situation	Agent	REGIMEN 30–60 MIN BEFORE PROCEDURE: Adults	Children*
Oral	Amoxicillin	2 g	50 mg/kg
Parenteral	Ampicillin	2 g IM or IV	50 mg/kg IM or IV
	Cefazolin/ ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV
Penicillin allergy, oral	Cephalexin†	2 g	50 mg/kg
	Clindamycin	600 mg	20 mg/kg
	Azithromycin/ clarithromycin	500 mg	15 mg/kg
Penicillin allergy, parenteral	Cefazolin/ ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV
	Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

*Total children's dose should not exceed adult dose.
†Cephalosporins should not be used in patients with immediate-type hypersensitivity reaction to penicillins. Other first-generation or second-generation oral cephalosporins may be substituted in equivalent adult or pediatric doses.
IM, Intramuscularly; *IV*, intravenously.

- تعریف واژه ها

- گیجی (confusion): یک وضعیت مغزی که ویژگی آن بروز اغتشاش فکری همراه با اختلال درک و فهم

- هذیان(delirium): یک اختلال مغزی که ویژگی آن بروز توهم و خیال , تحریک مغزی ,خستگی جسمانی و عدم ارتباط است

- سر گیجه (dizziness): احساس ارتباط با فضا , احساس عدم تعادل همراه با سر گیجه

علل بروز اختلال هوشیاری:

مسمومیت دارویی (overdose)	شایع ترین
هیپرونتیلاسیون	شایع
هیپوگلیسمی	شایع
هیپرگلیسمی	شیوع کمتر
حمله مغزی عروقی (CVA)	شیوع کمتر
هیپرتیرویدیسم	بندرت
هیپوتیرویدیسم	بندرت

عوامل مستعد کننده:

- متداولترین دارویی که مورد استفاده قرار میگیرد , الکل است
- سایر داروها از جمله بنزودیازپین های خوراکی مانند تریا زولام نیز ممکن است آثار نامطلوب مشابهی ایجاد کنند
- باید انجام درمان دندانپزشکی را به جلسه دیگری موکول کرد
- تجویز داروهای دیگر مانند داروهای بی حسی موضعی یا آرام بخش دستگاه عصبی بیماری که مقادیر نامشخصی که دارای ویژگی های مهار کنندگی دستگاه عصبی مرکزی را دریافت نموده اند ؛ بیش از پیش مهار میکند عواقب وخیمی خواهد داشت

- هیپرونتیلاسیون شایع ترین عامل غیردارویی است که باعث بروز تغییر هوشیاری در حین انجام درمان دندانپزشکی میشود

- هیپرونتیلاسیون بندرت باعث بیهوشی در فرد میشود ولی اگر تشخیص و درمان با تاخیر انجام شود ؛ این وضعیت ممکن ایجاد شود

- تقریبا در تمام موارد ترس و اضطراب مهمترین عوامل مستعد بروز هیپرونتیلاسیون در مطب دندانپزشکی هستند که اغلب در افراد جوان بروز مینماید

- در اکثر موارد بیماران زیر 40سال به این وضیعت دچار میشوند

- بیماری سیستمیک:

- دیابت ملیتوس و عوارض بالینی حاد آن , هیپوگلیسمی, به طور شایع در بیماران دندانپزشکی ایجاد نمیشود

- بروز ایسکمی مغزی عروقی و انفارکتوس کمتر شایع است ولی میتوانند جزو عوامل جدی ایجاد کننده تغییر در هوشیاری باشند

- اختلال در عملکرد غده تیروییید وضیعت دیگری است که ممکن است تغییراتی در میزان هوشیاری مشاهده شود با وجود اینکه احتمال بروز عوارض بالینی حاد ناشی از کم کاری یا پرکاری تیروییید بسیار کم است

پیشگیری:

- تشخیص میزان غیرمعمول و بالای اضطراب در بیمار دندانپزشکی میتواند به انتخاب درمان جایگزین مناسب وبه حداقل رساندن بروز سنکوپ وازودپرسو و هیپرونتیلاسیون کمک کند

- استفاده مناسب از روشهای تسکین دهنده میتواند به جلوگیری از بروز مسمومیت دارویی مرتبط با درمان کمک نماید

- با توجه به تاریخچه پزشکی بیمار طرح درمان را به گونه ای تغییر داد که احتمال بروز خطر برای بیمار به حداقل برسد

- پرسشنامه مربوط به تاریخچه پزشکی ,تاریخچه گفتاری, معاینه وضیعت جسمانی و کنترل علایم حیاتی

تظاهرات بالینی:

- چهره سرد و مرطوب , اختلال فکری و رفتار عجیب در بیمار مبتلا به هیپوگلیسمی
- بیمار مبتلا به هیپرگلیسمی چهره گرم , خشک و روشن . وجود بوی میوه ای استون در تنفس بیماران هیپرگلیسمی

- حمله مغزی عروقی ممکن است همراه با از دست رفتن ناگهانی هوشیاری بروز نماید و یا همراه با تظاهر تدریجی علایم ونشانه هایی باشد که مربوط به اختلال در عملکرد دستگاه عصبی مرکزی هستند
- این علایم شامل درجات متفاوتی از اختلال در تکلم, تفکر,حرکات, احساسات یا بینایی باشد

- اگر هیپو تیرو‌ییدیسم درمان نشود, باعث بروز سستی , خستگی , خواب آلودگی و آرام صحبت کردن

- هیپرتیرو‌ییدیسم بی قراری, حالت عصبی , تحریک پذیری و درجاتی از عدم هماهنگی در حرکات مانند لرزش های خفیف و ملایم تا لرزش های تکان دهنده وشدید
- یکی از عواقب جدی ناشی از عدم درمان هیپرتیرو‌ییدیسم , بروز طوفان تیرو‌ییدی یا بحران تیرو‌ییدی که مرگ و میر قابل توجهی دارد

پاتوفیزیولوژی:

- در دیابت و اختلال در عملکرد غده تیروییید , مقدار یا کمیت خون جریان یافته تغییر نمیکند , اما کیفیت آن دچار تغییر میشود
- در صورتیکه میزان گلوکز خون بسیار بالا یا بسیار پایین باشد ؛ بیشترین علایم حاد مربوط به دیابت رخ میدهد
- دیابت بیماری عروق خونی نیز میباشد , شیوع بروز بیماریهای قلبی عروقی در بیماران دیابتی بیشتر است

- علایم و نشانه های اختلال در عملکرد غده تیروییید در ارتباط با میزان هورمون تیروییید موجود در گردش خون (تیروکسن) و اثرات فارماکولوژیک ان در سایر قسمتهای بدن است

- ناکافی بودن حجم (کمیت) جریان خون مغزی هم میتواند باعث بروز علایم ونشانه های اختلال هوشیاری شود

- نارسایی موقت حجم جریان خون , باعث بروز حمله موقتی ایسکمی و نارسایی طولانی تر باعث بروز تغییر نورولوژیک دایمی میشود که به آن انفارکتوس مغزی عروقی گفته میشود

- درمان:
- مرحله اول : تشخیص؛ در اکثر موارد تغییر در میزان هوشیاری به صورت تدریجی است (در طی ساعت ها , هیپوگلیسمی و تا هفته ها و طولانی تر اختلال در عملکرد تیروییید) بنابراین دندانپزشک و کادرمطب میتوانند قبل آغاز درمان به وجود اختلال هوشیاری پی ببرند

- مرحله دوم: خاتمه دادن به درمان دندانپزشکی و فعال نمودن تیم اورژانس

- مرحله سوم: تصحیح وضعیت بیمار
- در اکثر موارد بیمار هوشیار است , بنابراین وی در هر وضعیتی که راحت است قابل قبول است . ولی هر زمانیکه بیمار بیهوش شد حداقل در ابتدا وضعیت خوابیده قرار داد و پاهایش را کمی بالا برد
- در حملات مغزی عروقی با افزایش شدید فشارخون ؛ وضعیت غیر درازکش اهمیت دارد (non supine). فشار خون مغزی در حالت قایم تا حدی در اثر نیروی جاذبه کاهش می یابد

- مرحله چهارم: (CAB) گردش خون , راه هوایی, تنفس- کمک های اولیه حیاتی در صورت نیاز

- مرحله پنجم : درمان قطعی
- 1-کنترل علایم حیاتی
- 2- درمان علایم ونشانه ها: پتو در صورتیکه بیمار دچار لرز شده و یا لباسهای تنگ باید شل یا خارج شوند تا بیمار راحتر تنفس کند
- 3- فعال کردن سیستم پزشکی اورژانس در صورت لزوم
- 4- درمان قطعی : در داخل مطب از انجام کمک های اولیه حیاتی در حمله مغزی عروقی تا تجویز داروها برای خاتمه دادن به حمله در هیپوگلیسمی متفاوت است