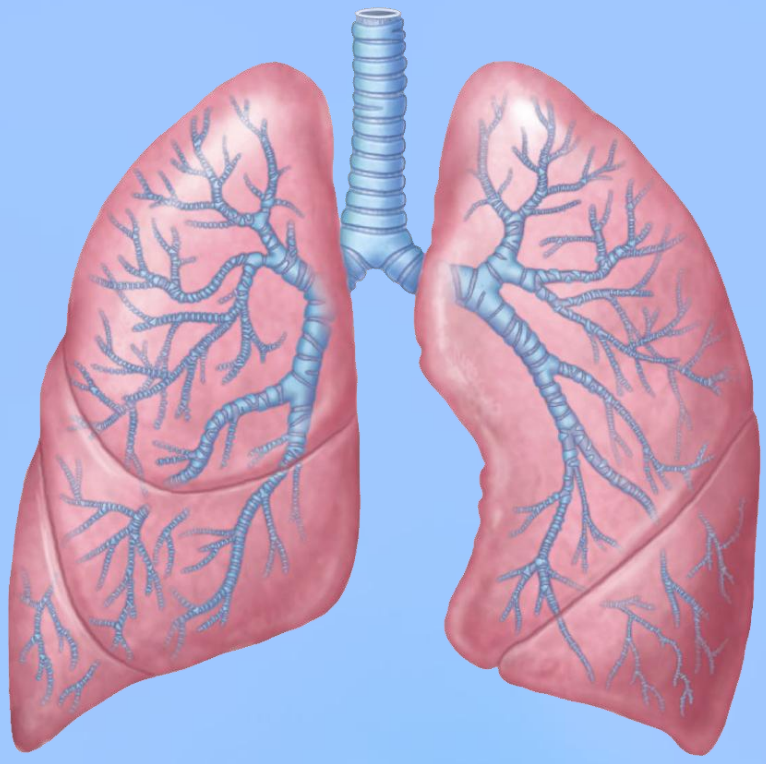
4 Lung Function in Health And Disease



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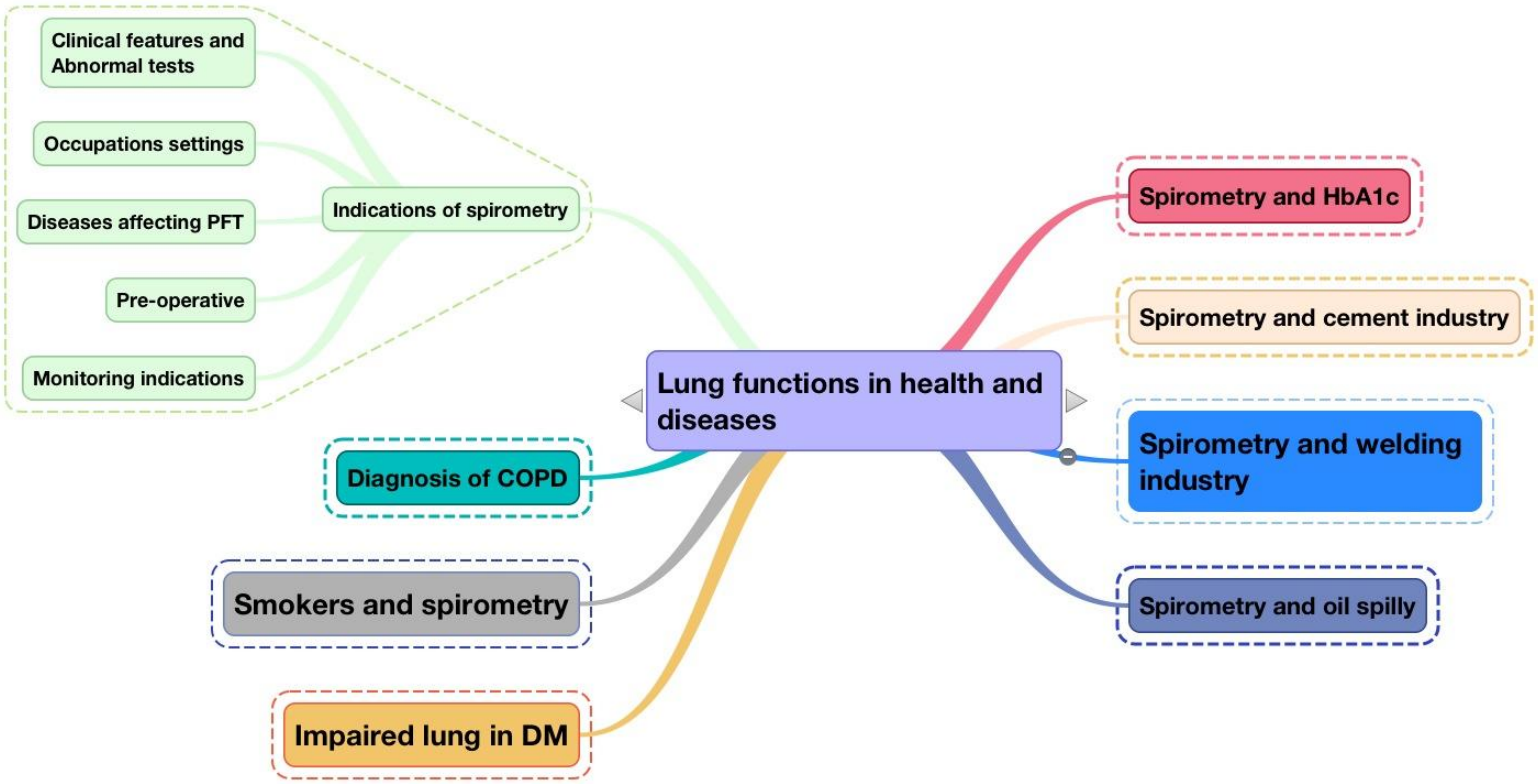
Respiratory Block

Mind Map:


Lung functions in health and diseases
Indications of spirometry
Clinical features and Abnormal tests
Occupations settings
Diseases affecting PFT
Pre-operative
Monitoring indications
Diagnosis of COPD
Smokers and spirometry
Impaired lung in DM
Spirometry and HbA1c
Spirometry and cement industry
Spirometry and welding industry
Spirometry and oil spilly

LUNG FUNCTIONS INHEALTH AND DISEASE

SPIROMETRY

- Spirometry is a widely used, effort depended basic lung function test
- Assess the lung performance
- Assess physiological parameters; lung volumes, capacities & flow rate
- Differentiate between the obstructive and restrictive lung conditions
- Play a critical role in the diagnosis, differentiation and management of respiratory illness.

NOTE

Ethnic group = Race

INDICATIONS OF SPIROMETRY

Symptoms:
- Dyspnea "diffuclty in breating"
- cough
- sputem production
- chest pain

Signs
- Cyanosis "due to hypoxia"
- Clubbing, chest deformity,crackles.
- diminished chest expansion
- diminished breath sounds

Arterial blood gas analysis
- Hypoxemia,
- hypercapnia "abnormally elevated carbon dioxide"

Abnormal chest X Ray

Describe the course of diseases affecting Pulmonary functions tests:

Neuromuscular diseases

- Gullian Barre Syndrome "An acute polyneuropathy"
- Myasthenia gravis

Pulmonary diseases

- Obstructive airway diseases
- Interstitial lung diseases

Adverse reactions

- Drugs with known pulmonary toxicity [Pulmonary fibrosis]

Occupations settings:

- Pre-employment
- periodic lung function examination for workers **exposed to toxic substances including dust and fumes in industrial sectors such as:**
  - **Cement**
  - **Asbestoses**
  - **Welding**
  - **Wood**
  - **Steel**
  - **Flour**
  - **Coal mine**
  - **Oil**

Pre-Operative Indications:

1- **To determine the suitability for and management during and after anesthesia**
2- **To assess the risk for surgical procedures known to affect lung function**

Monitoring indications:

To assess the therapeutic interventions:

- **Bronchodilator therapy**
- **Steroid treatment for asthma**
- **Chronic obstructive lung disease**
- **Interstitial lung disease**

Diagnosis of Chronic Obstructive Pulmonary Disease (COPD):

SYMPTOMS:

- Cough
- Sputum
- dyspnea

EXPOSURE TO RISK FACTORS:

- Tobacco
- Occupation
- indoor/outdoor

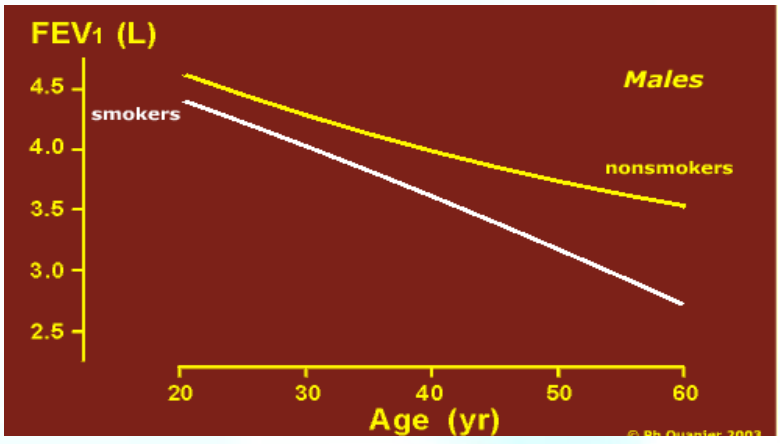
→ **SPIROMETRY**

SMOKERS AND SPIROMETRY

Smoker & Non Smoker:

Non Smoker: In normal healthy nonsmoker subject after the age of 30 the expected decline in Lung function parameter [FEV1] is **25–30 ml/ annum***

Smoker: The average rate of decline of lung function in smokers as measured by Forced Expiratory Volume in 1 sec [FEV1] is**60-70 ml / annum**

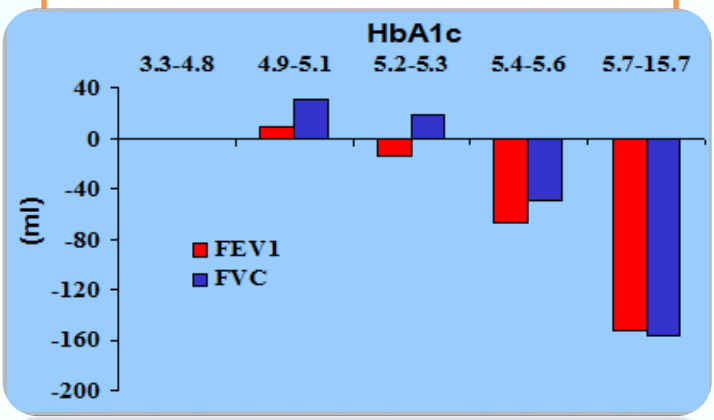


NOTE

Annum = year

HbA1c

Increase in mean HbA1c is associated with decrease in lung function parameters FVC& FEV1



IMPAIRED LUNG FUNCTION IN Diabetes mellitus

Type 1 and type 2 diabetic patients showed a significant reduction in the:

1- Forced Vital Capacity [FVC]
2- Forced Expiratory Volume in one Second [FEV1]
3- Peak Expiratory Flow [PEF]
4- Forced Expiratory Flow [FEF25-75%]

SIROMETRY AND CEMENT INDUSTRY

Lung Function Parameters:

- FVC
- FEV1
- FEF 25-75 % and PEF were significantly decreased in cement mill workers compared to their matched controls.

SIROMETRY AND WELDING INDUSTRY

Lung Function Parameters:

- FVC
- FEV1
- PEF were significantly impaired in welding workers compared to their matched controls.

SIROMETRY AND OIL SPILL Y

Lung Function Parameters:

- FVC
- FEV1
- FEF 25-75% were impaired in subjects exposed to crude oil spill in sea water

Q1: 1-Which one of these uses to Differentiate between the obstructive and restrictive lung conditions:

- A- Thermometer
- B- Physical therapy
- C- Spirometry
- D- None of them

Q2: What is the physiological condition For SPIROMETRY?

- A- Age
- B- Gas
- C- Gender
- D- All of them

Q3: Which of the following is a symptom of COPD?

- A- Dyspnea
- B- Chest deformity
- C- Cirrhosis
- D- Atherosclerosis

Q4: Which one is the course of diseases affecting PFTs?

- A- Interstitial lung diseases
- B- Myasthenia gravis
- C- Osteoporosis
- D- Both A & B

Q5: FEV1 reading in smokers will be?

- A- 40-70 ml / annum
- B- 60-90 ml / annum
- C- 70-80 ml / annum
- D- 60-70 ml / annum

Q6: Type 1 and type 2 diabetic showed a significant reduction in the:

- A- Peak Expiratory Flow [PEF]
- B- Peak Inspiratory Flow [PIF]
- C- None of them
- D- Both A & B

Q7: Increase in mean HbA1c is associated with:

- A- Increase in lung Function.
- B- Decrease in lung function
- C- No effect of lung function
- D- Normal lung function

Q8: Which one impaired in welding workers:

- A- Peak Inspiratory flow
- B- Residual Volume
- C- Peak expiratory Flow
- D- Total lung capacity

Answers: 1-C 2-D 3-A 4-D 5-D 6-A 7-B 8-C

summary

- Spirometry is a widely used, effort depended basic lung function test
- Physiology conditions:
  Age, Gender, Height, Weight, Ethnic group Exercise, Posture, Pregnancy
- Diseases affecting pulmonary functions tests : Nerumuscular diseases , pulmonary diseases and adverse reactions.
- Pulmonary functions has a wide differences between smokers and non-smokers
- Increase in mean HbA1c is associated with decrease in lung function parameters FVC & FEV1

You have to watch these 5 videos about PFT. Really helpful ☺ :
http://www.youtube.com/playlist?list=PLQ_IRFkDInv8A99vA70UQRB3Z2kNQ02_V