

Physiology lab:

Spirometry is a Lung function test

Importance: allow one to determine how much



and how fast air can be inhaled and exhaled

Before test

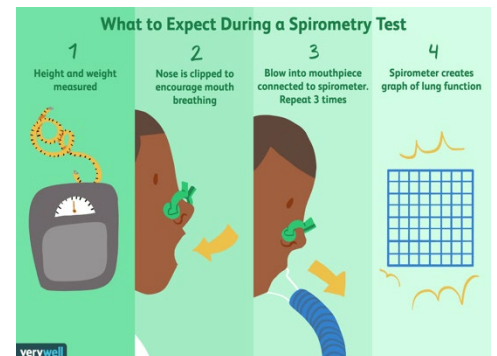
(The most important)

*record the patient's name, age, gender, weight and height

*make sure that the patient is sitting upright, no heavy meals before test, loose clothes

*teaching the patient how to make the test and how to deal with the mouth piece لازم يسكر بسنانه عليها ويغلق عليها بشفايفه

The spirometry will make the test 3 times and give us the best readings



After test

We should learn about two terms:

1. forced vital capacity: the volume of air that forcefully expired out after the maximum inspiration
2. forced expiratory volume in one second: volume of air forcefully expired out in the first second after the maximum inspiration

الأهم انه نطلع على ال ratio تبعتهم النورمال بتكون 80%

3. peak expiratory flow: maximum speed of air during forced expiration after maximum inspiration
4. forced expiratory flow: speed of air during forced expiration after maximum inspiration defined by fraction from FCV

Ex: average flow (speed) from 25% of FVC has been exhaled to 75% of FVC has been exhaled

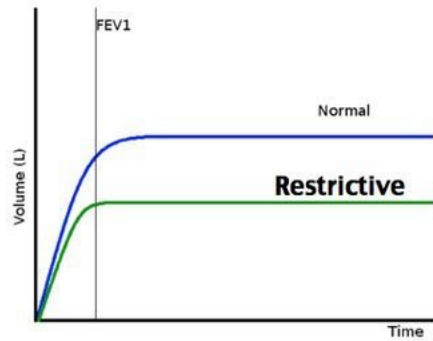
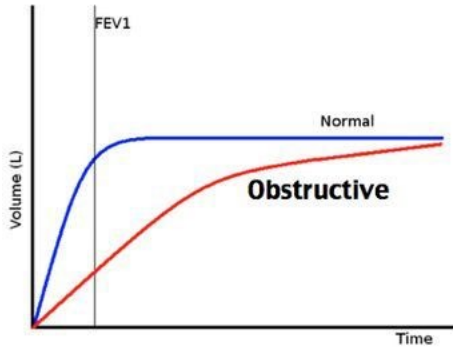
Normal Results:

FEV₁,FVC=80-120%of predicted value

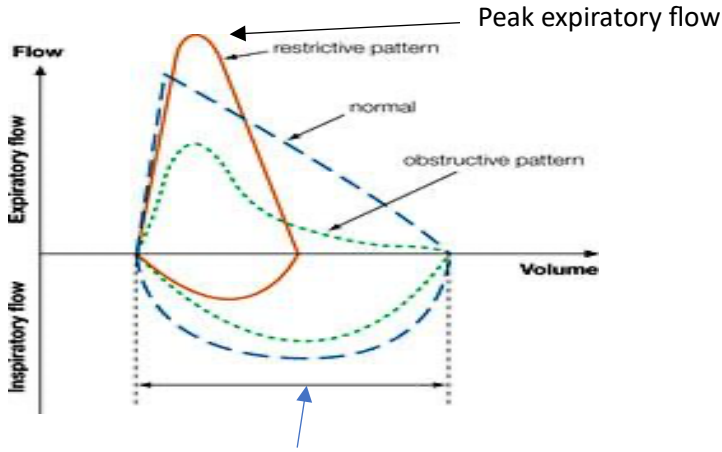
FEV₁/FVC= (>70%)

Abnormal results:obstructive(the problem in exhalation so FEV₁will decrease ,ratio will decrease or restrictive (the problem in inspiration فال الزفير كثير فـال FEV₁,FVC both will decrease ,ratio will be constant or increased

Obstructive vs. Restrictive Lung Disease		
	Obstructive	Restrictive
Characteristics	Limitation of airflow due to partial or complete obstruction	Reduced expansion of lung parenchyma accompanied by decreased total lung capacity
Examples	<ul style="list-style-type: none">• Emphysema• Chronic bronchitis• Bronchiectasis• Asthma	<ul style="list-style-type: none">• Interstitial lung disease• Idiopathic pulmonary fibrosis• Pneumoconiosis• Sarcoidosis• Chest wall neuromuscular diseases
Total lung capacity	Normal	Decreased
Forced vital capacity (FVC)	Normal	Reduced
Forced Expiratory Volume at 1 sec (FEV₁)	Decreased	Normal or reduced
FEV₁ / FVC ratio	< 0.8	Normal



هاد الكيرف اسمه (Flow-volume) دائما ال restrictive يشبهه النورمال لكن اصغر منه وال obstructive شكله غير عن النورمال



*طبيب اخر اشي مس حكيانا ال ratio ال restrictive بتكون نومان كيف تميزها عن الطبيعي بعمل فحص ال total lung capacity اذا قليل فان restrictive

*طبيب لما يطلع obstructive كيف اعرف اذا reversible ولا irreversible بعطيه bronchodilator اذا ال ratio زادت اكثر من 12% يكون اه reversible والتشخيص asthma واذا قلت يكون irreversible والتشخيص copd

*طبيب وبلكي شكيت انه معه asthma وهمة بحالة ال rest ما يكونو عندهم اعراض يكونو مناح شو اعمل عشان اكتشف بعطيه methylcholine هو bronchoconstrictor بعطيه جرعة 4-16 بضل ازيد فيها لحد ماتشوف ال ratio قلت بنسبة 20% فاه asthma ما قلت معناته مش asthma

*طبيب الفحص لازم يكون فيه شرطين acceptable و reproducible
 Acceptable شغلتن الزفير لازم يكون مدته 6seconds ويكون بالبداية rapid increase
 Reproducible لازم الفرق بين قيمتين FEV1 وقيمتين FVC ضمن (200ml مهو حكيانا الجهاز بعمل الفحص 3مرات)

1) You did a spirometry test to a patient. The test was reproducible and acceptable and it is done 3 times. A table of results show that $FEV_1/FVC=90\%$, FVC of predicted = 72% . What to do next?

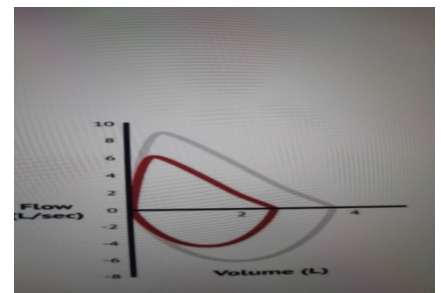
- a. Repeat the test again
- b. It is normal
- c. Give bronchodilator and repeat
- d. Do methacholine challenge test
- e. Complete pulmonary function test is needed

Answer: E

2) This flow volume loop represents:

- a. COPD
- b. Restrictive lung disease
- c. Asthma

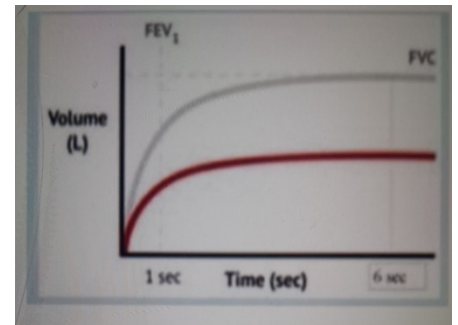
Answer: B



3) What pattern is suggested by the following volume-time graph (red curve)?

- a. Chronic obstructive pulmonary disease (COPD)
- b. The patient stopped exhaling too early
- c. Asthma
- d. Restrictive disease

e. The patient re-inhaled some air during the test. Answer: D



4) have a 15-year-old thin and tall male patient who presents with a three-month history of dyspnea and wheezes. You perform spirometry, what is the most probable diagnosis based on the spirometry report?

- a. Interstitial lung disease
- b. Pulmonary hypertension
- c. A restrictive pattern due to obesity
- d. Normal lung mechanics
- e. Asthma

Answer: E

	Predicted	Actual (Measured)
FVC (L)	4.04	3.5
FEV1 (L)	3.55	2.36
FEV1/FVC	88%	67%

