

SPIROMETRY: QUANTIFICATION OF THE SHAPE OF THE MAXIMAL EXPIRATORY FLOW - VOLUME CURVE

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Abstract:

The relationship between Forced Expiratory Volume in one second (FEV1) and the Forced Vital Capacity (FVC) is intensively used in diagnosing because of its quantitative description with the index FEV1/FVC. There is not such index for the relationship between airflows (Peak Expiratory Flow (PEF) and Maximal Expiratory Flow at xx% of FVC (MEFxx, where xx = 75, 50, 25%)). Our aim was to describe that relationship quantitatively with the angle α between the 4-dimensional vector $F = [PEF, MEF75, MEF50, MEF25]$ and the plane determined by two reference vectors: the mean of such vectors for the young and elderly. The reference vectors were found with data for 1,120 males and 1,625 females - Polish (white) population, healthy, never-smoking, aged 18 - 85 yrs, who performed a technically adequate spirometry maneuver. Upper Limit of Normal (ULN) was determined with the linear regression of the 5th percentiles of α on age ($0.074 \cdot \text{age} + 2.76$). Such an ULN seems to well indicate both improper examination and non-healthy persons.

Keywords: spirometry, forced expiration, flow-volume curve, maximal expiratory flow