"flow-limitation @ Tidal Volume" in Cystic Fibrosis – longitudinal effect

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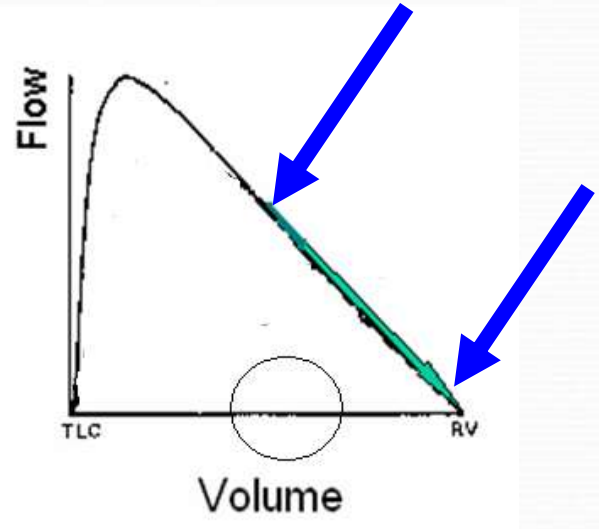
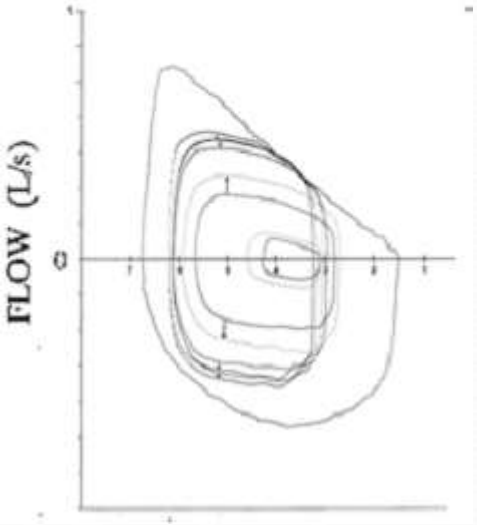
Flow limitation

Occurs at Maximal Expiratory Flow, at the effort independent zone (central and small airways)

At rest

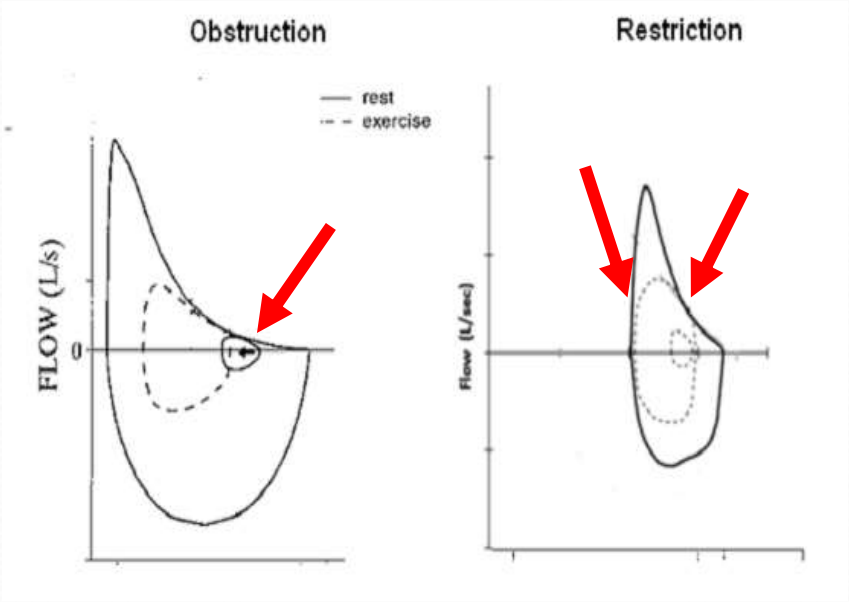


During Effort



Hyatt RE et al. J Appl. Phyiol , 1973

Flow-limitation @ tidal volume in airway disease, during Exercise



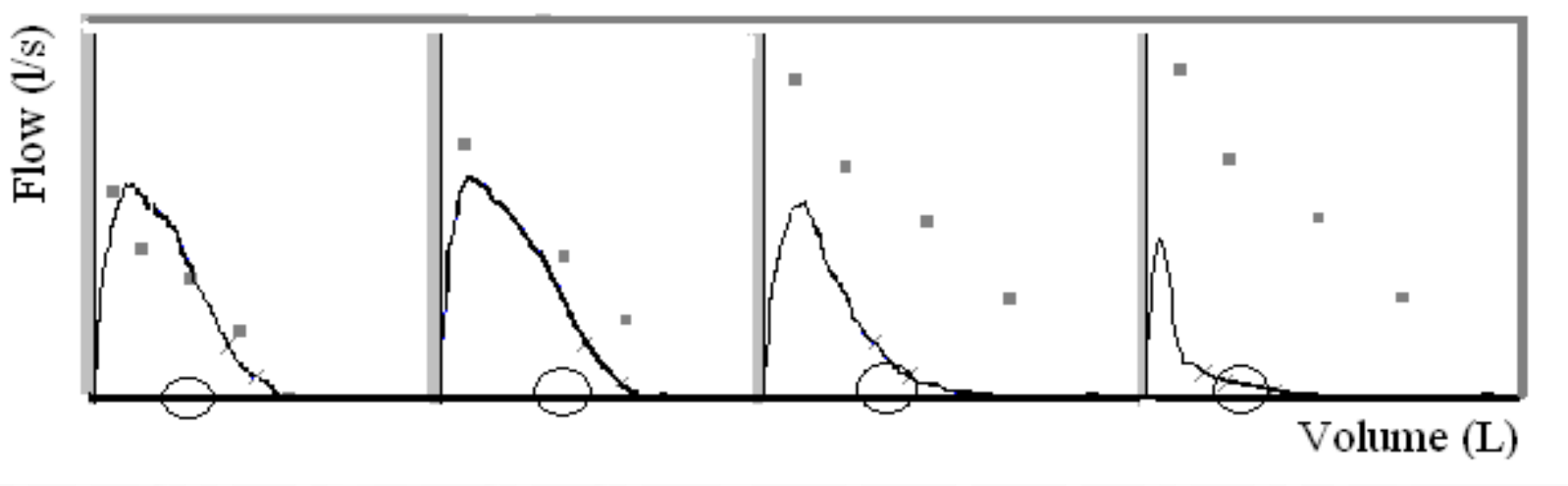
Effect:

- **Feeling of breathlessness At low effort**
- **Decrease in O2-sat @ minimal effort**
- **Hyperinflation if possible**
  (increase in TLC and RV/TLC)
- **Impairs gas exchange (low DLCO/Va)**

Lung function deterioration in CF

Flow limitation @ TV zone

Normal **Mild** **Obstructed** **Obstructed / Restricted**



Study questions

The presence of EFLTV in CF:

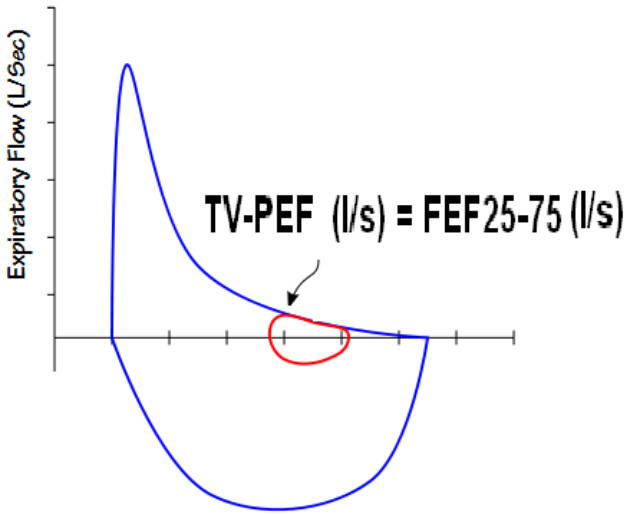
- **Prevalence**
- **Gender differences**
- **Spirometry deterioration rate**
- **Hyperinflation**
- **O2-Saturiona**
- **No of hospitalizations**

Data Collection

- ✓ Retrospective; Longitudinal, 12.5±5y;
- ✓ N=108 (male 60; female 48) (1176 tests)
- ✓ Anthropometric data
- ✓ Hospitalizations (days/year)
- ✓ Spirometry and O2-Sat at visit
- ✓ TLC and DLCO
- ✓ Last 2 yrs measurements of Tidal flow/Volume curve

Data analysis

- Best FVC curve per calendar year
- Spirometry values related to GLI reference values.
- Calculation of EFLTV



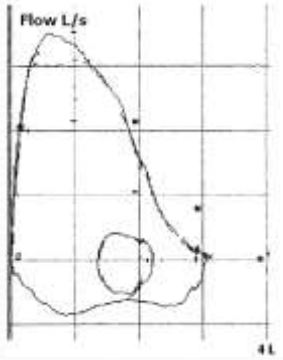
- Data was divided in: Pre-EFL**TV** Vs. Post-FEL**TV**.

  Male Vs. Female

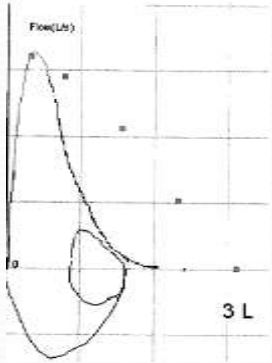
Examples of FVC and TV maneuvers

Pre EFLTV

Post EFLTV

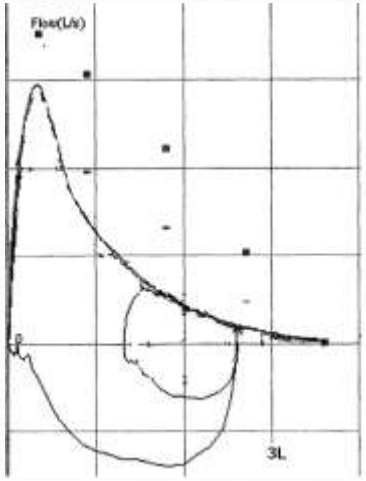


Normal

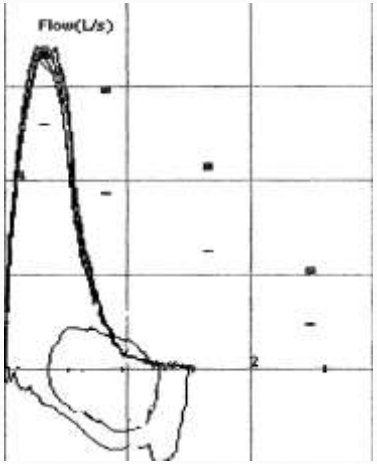


Close to flow limitation

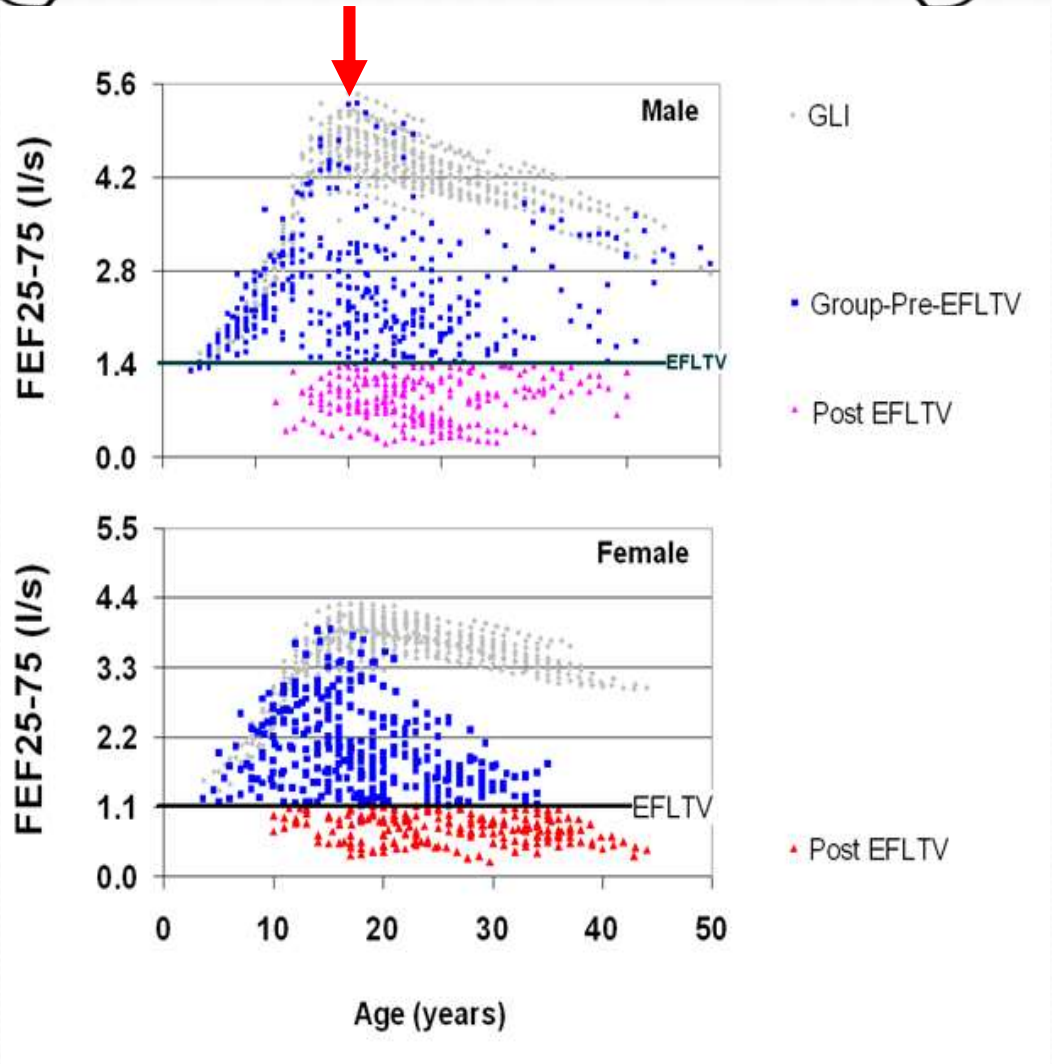
Flow limitation



Flow limitation



Prevalence
in relation to predicted GLI



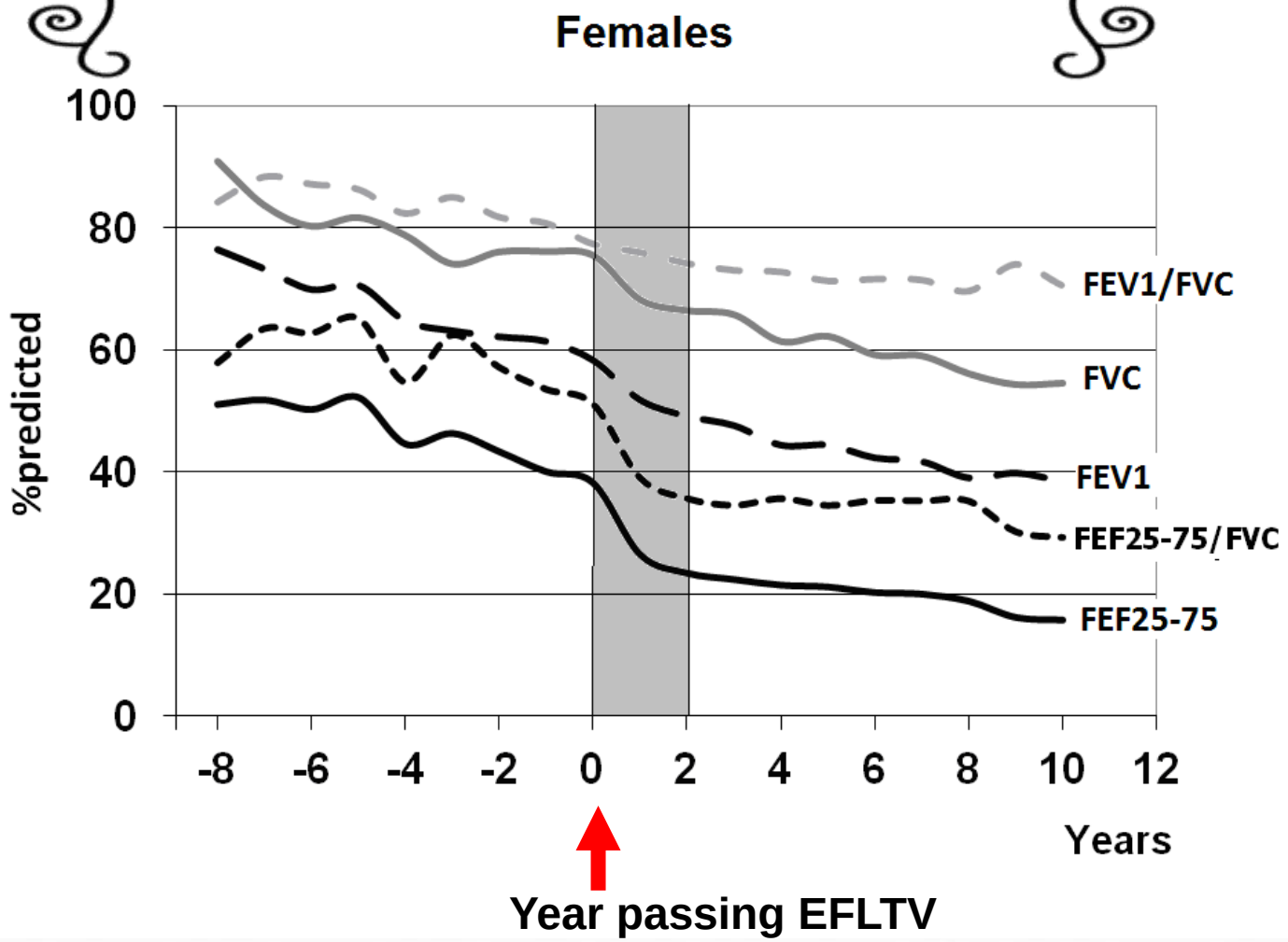
Results

Passed EFLTV	Male	Female	
(n)	28 (47%)	28 (58%)	NS
Age of EFLTV (y)	27 ± 8	23 ±7	NS
FEV1 (%p) @ EFLTV	**63±12**	**60±14**	**NS**
transplanted/died (n)	12 (43%)	17 (63%)	0.0007
Survival time (y) in those transplanted	9.1 ±8.2	5.6 ±3.0	0.0239

Significant changes Pre vs. Post EFLTV

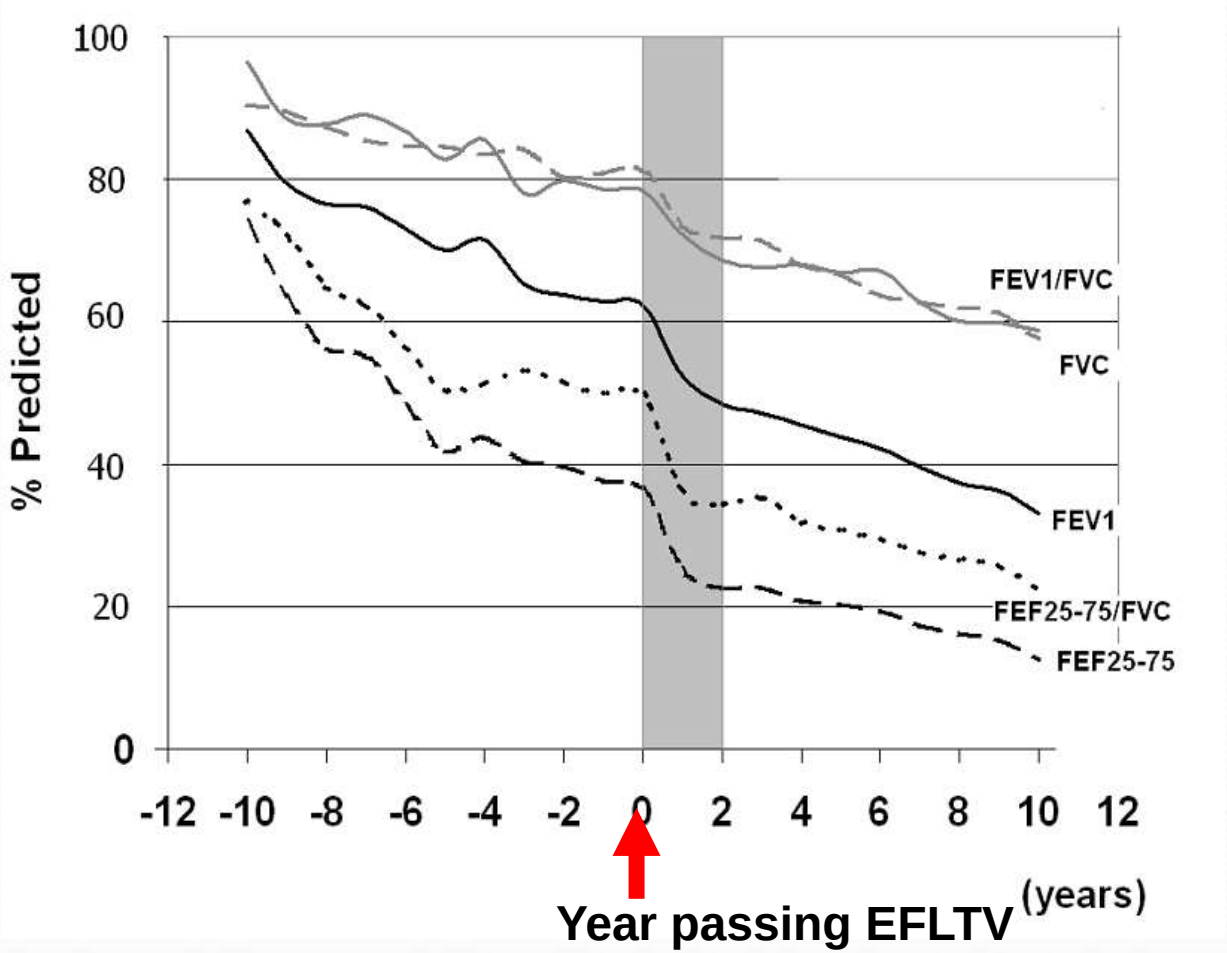
	Male		Female	
Spirometry %predicted before and after Passed EFLTV				
	Pre	Post	Pre	Post
FVC	80 ±14	64 ±16	75 ±15	64 ±14
FEV1	**63 ±12**	41 ±12	**60 ±14**	48 ±15
FEF25-75	38 ±12	19 ±7	41 ±14	25 ±16
TLC	96 ± 22	112 ±22	114 ± 26	123 ± 26
DLCO/VA	91 ± 12	65 ±17	85 ± 15	76 ± 17
Hospitalization and O2-Sat				
Hosp. (d/y)	6 ±24	23 ±20	5 ± 9	26 ± 26
O2-sat. (%)	97 ± 1	95 ± 2	97 ± 1	95 ± 2

Spirometry deterioration from the year passing EFLTV

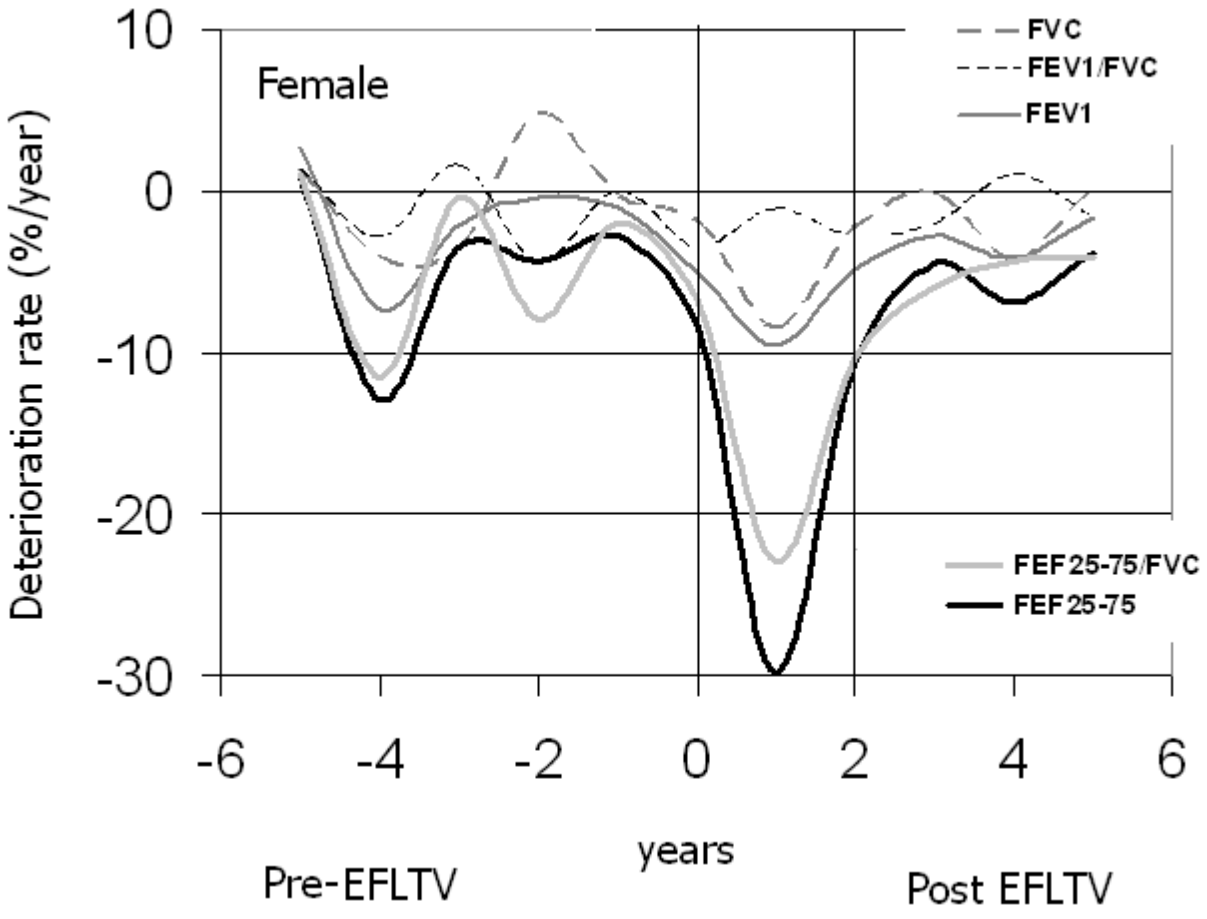


Spirometry deterioration from the year passing EFLTV

Male

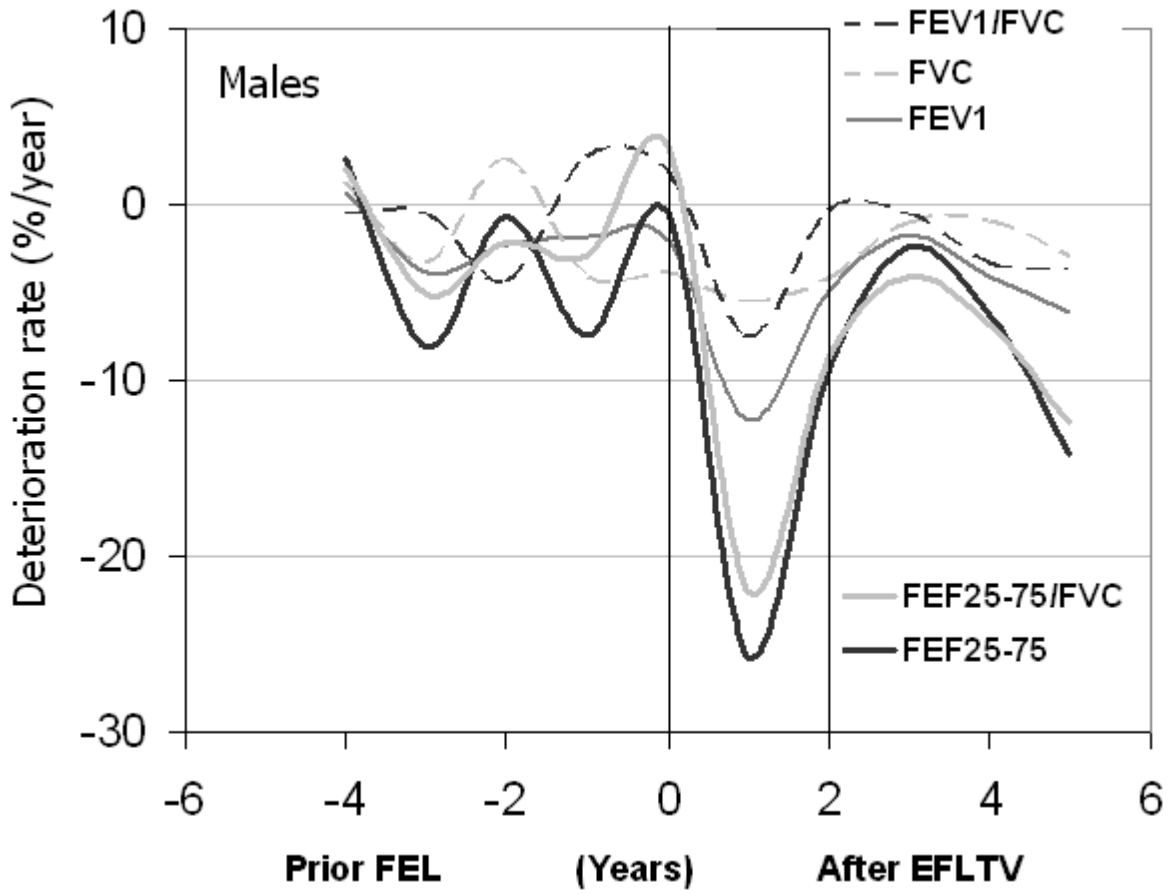


The EFLTV effect: A fall during 2-years



The EFLTV effect: A fall during 2-years

Male



Summary

- ☹ EFLTV begins during the early adulthood when FEV1 is ~60%predicted

- ☹ Within 1-2 years EFLTV causes:
  A significant fall in Spirometry values (%predicted)
  hyper inflation, decreases DLCO/VA

- ☹ According to the clinical records
  Post EFLTV there is an increase in hospitalizations,
  patients complain of anxiety and shortness of breath during rest or minor effort.

Conclusion

- Measuring tidal flow/volume curve prior to forced expiration may be vital.
- EFLTV may be used as a marker for future rapid deterioration.
- Awareness of patients sudden subjective feeling of anxiety may be important
- Earlier Interventions needed? BIPAP, physiotherapy, antibiotic treatment etc.
- EFLTV in CF patients may need further exploration.


Thank you