

## Relationship between Outcomes of 6-Minute Walk Test and DLCO in Patients with ILD

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### Abstract:

**Background:** Patients with ILD have a reduced exercise capacity due to a number of factors, such as impaired respiratory mechanics and circulatory problems. 6-minute walk test is a self-paced submaximal exercise test that reflects the exercise level of everyday activities. Whereas DLCO is a sophisticated lung function test that helps in diagnosing and interpreting the severity of ILD.

**Aims And Objectives:** In the present study, we aimed at establishing a relationship between the results of 6-minute walk test and DLCO in patients with radiologically confirmed ILD.

**Materials and Methods** A total of 32 patients who presented with chronic dyspnoea and who were clinically and radiologically suggestive of ILD were included in the study. All of them underwent the 6-minute walk test and DLCO which were later compared.

**Results:** Amongst the 32 patients, 25 could perform DLCO and results were suggestive of ILD. 6-minute walk test being more simpler to understand, 29 patients could perform it and there was a significant desaturation in all of them. Both the tests were successfully performed by 27 cases and the results in all of them were suggestive of ILD.

**Conclusion:** From the above results, we could come to a conclusion that 6 minute walk test and DLCO both correlated with the radiological picture in 27 out of 32 patients. But 6 minute walk test being more simpler, cost effective and comprehensible we suggest it as a preliminary investigation in centers where DLCO is not available or the patient is not able to perform it.

**Key Words:** 6-minute walk test, DLCO, ILD, desaturation

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### I. Introduction

Six-minute walk test is a sub-maximal exercise test, which also plays a role as a clinical indicator of the functional capacity in patients with cardiopulmonary diseases. Six-minute walk test is reproducible, simple and inexpensive. It can be used to measure exercise tolerance, monitor therapy and predict prognosis in patients with chronic respiratory diseases like ILD, COPD, pulmonary hypertension. Six minute walk test is safe, valid, reliable. In our study, we are comparing 6MWT with DLCO in patients with ILD

### Aims and objectives

To study the correlation between

1. Percent predicted six minute walk distance as per ENRIGHT et al. formula
2. DLCO

### II. Materials And Methods

**Study Design:** A prospective observational study was conducted on 32 patients who presented with chronic history of dyspnea to MIMS general hospital for a duration of 8 months.

**Study Location:** The study was done in a tertiary care teaching hospital in Department of Respiratory Medicine at Maharaja Institute Of Medical Sciences, Andhra Pradesh, India.

Sample size – 32

Males – 21

Females – 11

Patients detailed history was taken. Thorough clinical examination was done. Age, sex, height, weight and BMI of the patients were recorded

**Materials:**

1. Chest x-ray
2. HRCT chest
3. Six minute walk test
4. Pulmonary function tests including DLCO
5. ECG
6. 2D-ECHO
7. Percent predicted six minute walk distance was calculated using Indian reference equation

**Inclusion criteria**

1. Patients who could perform six minute walk test
2. Patients who can perform pulmonary function tests including DLCO
3. Patients who showed restrictive pattern in pulmonary function test
4. Patients with HRCT chest confirmatory for ILD
5. Patients previously diagnosed and are on treatment for ILD
6. Patients not on oxygen therapy

**Exclusion criteria:**

1. Patients who cannot perform six minute walk test
2. Patients with obstructive pattern on pulmonary function tests
3. Patients with diagnosis of COPD, pulmonary arterial hypertension and chronic heart failure
4. Patients who are on LTOT

**Six minute walk test:**

Patient’s vitals like heart rate, blood pressure, respiratory rate were measured. Oxygen saturation using pulse oximeter was also noted. 6MWT was performed according to ATS guidelines. Patient was asked to walk at their own pace, along a 30 m long and straight hospital corridor. The patient was asked to walk as much distance as possible in 6 minutes and was allowed to stop if he developed severe dyspnea, chest pain, dizziness, diaphoresis, or leg cramps. And the patient was asked to continue walking immediately, if he or she could. At the end of six minutes, the patient was asked to stop and vital signs like blood pressure, heart rate, respiratory rate and oxygen saturation were assessed again. The percent predicted 6MWD was calculated from the actual 6MWD using Enright et al., formula

1. predicted 6MWD (male) = (7.57 x height in cm) - (5.02 x age) - (1.76 x weight in kg) - 309m
2. predicted 6MWD (female) = (2.11 x height in cm) - (2.29 x weight in kg) - (5.78 x age) + 667 m
3. Percent predicted of 6MWD = actual 6MWD/ predicted 6MWD x100 .

**III. Results**

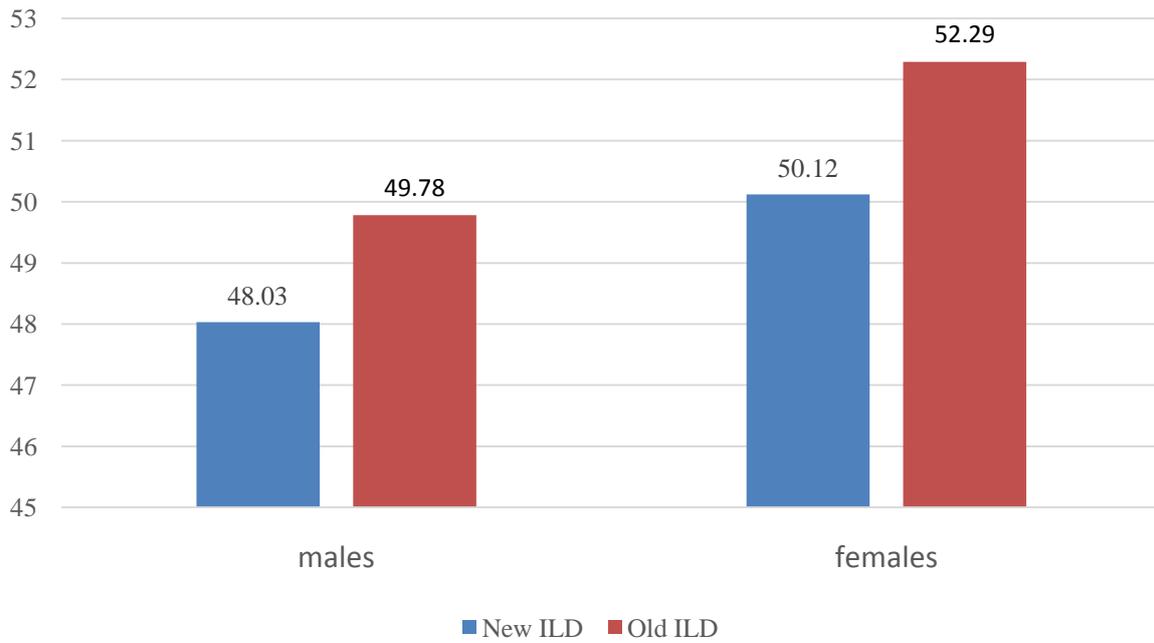
Among 32 patients, 25 could perform DLCO and showed results suggestive of ILD. 6 minute walk test, being more simpler to understand and to perform, 31 out of 32 patients could perform it and there was significant post exercise desaturation in all of them

	Male	Female
Known case of ILD	9	7
New cases of ILD	12	4
Total number of cases	21	11

**6-minute walk distance and percent predicted 6-MWD**

	Male	Female
Mean predicted 6 minute walk distance as per Enright et al formula	564.26 mts	557.17 mts
Mean actual 6 minute walk distance measured after test	273.11 mts	281.61 mts
Percent predicted 6-minute walk distance	48.03%	49.78%
Mean actual 6-minute walk distance measured after test in patients treated for ILD	303.18 mts	294.37 mts
Percent predicted 6-minute walk distance post therapy	50.12%	52.29%

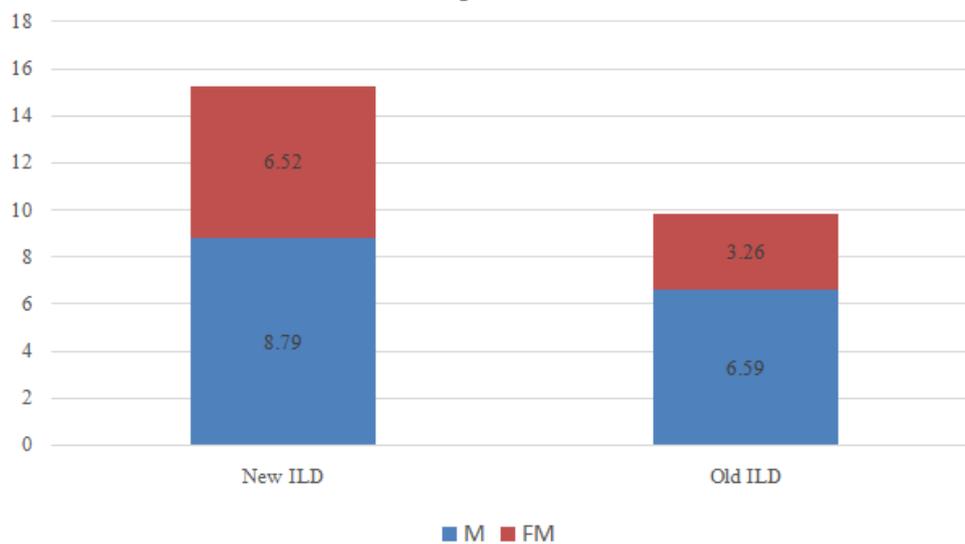
Comparison of PP6MWd



Exercise desaturation

	Male	Female
Mean pre 6-MWT saturation	91%	92%
Mean post 6-MWT saturation	83%	86%
Percentage desaturation	8.79%	6.52%
Mean post 6-MWT saturation in patients treated for ILD	85%	89%
Percentage desaturation	6.59%	3.26%

Percentage Desaturation



**DLCO**

	Male	Female
Mean DLCO in new cases of ILD	69.3%	64.9%
Mean DLCO In previously diagnosed cases of ILD prior to treatment	52.6%	58.7%
Mean DLCO in previously diagnosed cases of ILD and took treatment	55.3%	62.4%

In our study we observed that :

1. There was significant correlation between basal , post exercise saturation and 6- minute walk distance and percent predicted 6-MWD
2. Significant correlation found between 6-minute walk distance, percent predicted 6-MWD and DLCO

**IV. Discussion**

In patients with interstitial lung disease (ILD), the six-minute walk test (6MWT) has been rarely used, and up till now, the relationship between outcome measures of the test and baseline lung function has not yet been examined. Therefore, we assessed walk distance, oxygen desaturation, and breathlessness perception during 6MWT, and their relationships to baseline lung function in patients with ILD(3). In our study we noted, actual and percent predicted 6-MWD, both are positively correlated with DLCO even after removing the confounding factors like age, sex, height, weight and BMI.(12) This positive correlation indicates any decrease in DLCO causes decrease in 6-MWD.Both actual and percent predicted 6-MWD are positively correlated with pre and post exercise saturation which indicates that any decrease in pre and post exercise saturation is also associated with decrease in 6-MWD(7) .Positive correlation of 6-MWT with DLCO makes this test easy and simple tool in assessing lung function.6-MWT can play a important role in assessing the functional status of patients with severe respiratory disability where lung function tests may be an insensitive tool.(5) Furthermore, some differences were observed among predictors for 3 outcomes of 6MWT. As for walk distance, % predicted FVC and % predicted DLco were independent predictors. In contrast, as for SpO<sub>2</sub> at the end of the test, % predicted DLco and PVR were independent predictors. As for dyspnea at the end of the test, % predicted DLco was only one predictor.

**V. Conclusion**

6-minute walk test is a safe, simple and cost affective tool in measuring the disease status in conditions where DLCO is not available.It can be used in assessing the response to therapy and in follow up of patients with ILD.Our study supports the use of 6-MWT as an additive tool along with other physiological parameters in assessing the lung function and disease status.

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