

# Advanced Scoliosis Impact on COPD: Worsened Outcomes Due to Lack of Motivational Interviewing and Shared Decision Making

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Submitted: 2024, Dec 03; Accepted: 2025, Jan 02; Published: 2025, Jan 10

**Citation:** Sahni, S., Fares, J. E., Jhaveri, D. M., Patel, K. (2025). Advanced Scoliosis Impact on COPD: Worsened Outcomes Due to Lack of Motivational Interviewing and Shared Decision Making. *J Surg Care*, 4(1), 01-05.

## Abstract

*Lack of meaningful patient communication and patient participation in the plan of care leads to preventable negative outcomes for advanced COPD in a patient with a history of progressive scoliotic curvature who presented multiple times with complaints of worsening respiratory symptoms. This case explores how applying a holistic combination of strategies including motivational interviewing, shared-decision making and proper communication can improve the level of patient care. Consistent and combinatory approach of these established and validated strategies could have prevented the patient's increased symptoms of anxiety, declining quality of life, and need for unnecessary medical testing.*

**Keywords:** Copd, Chronic Obstructive Pulmonary Disease, Syndromic Scoliosis, Motivational Interviewing, Su Shared-Decision Making, Proper Communication, Professional Communication, Patient Physician Collaboration, Doctor- Patient Relationship

**Categories:** Internal Medicine, Physical Medicine & Rehabilitation, Pulmonology

## 1. Introduction

Scoliosis is a common musculoskeletal deformity typically caused by lateral displacement and rotation of the vertebrae. The causes of scoliosis can be broadly grouped as congenital, neuromuscular, syndrome-related, idiopathic, and curvature changes via secondary reasons [1]. The presentation of scoliosis varies and the complications associated with it vary according to the severity of the lateral curvature. In more advanced lateral displacements, the respiratory function can be affected due to a combination of impedance in the movement of the ribs, mechanical disadvantages in respiratory muscle, and decreased chest wall and lung compliance. These respiratory symptoms can vary from mild inconveniences to severe respiratory failure [2].

Chronic obstructive pulmonary disease (COPD) is among the common respiratory diseases that can be exacerbated by scoliosis. The condition consists of a group of progressive inflammatory diseases that result in tissue destruction and airflow limitation and is typically associated with exposure to noxious environmental hazards, such as smoking [3]. Although COPD can be asymptomatic, it typically presents with coughing, dyspnea on exertion (DOE), increased sputum production, and respiratory failure [4]. In addition, generalized anxiety disorder has been found to affect up to 20% of adults and can overlap with chronic

diseases [5]. The condition is characterized by excessive fear and worries about everyday experiences and situations. The worries can be multifaceted and include issues such as health and finances. These persistent and overwhelming feelings can cause significant distress that dramatically affects the quality of life [6]. The case presented describes how shared decision-making and motivational interviewing can affect outcomes of advanced COPD in a patient with a history of progressive scoliotic curvature who arrived numerous times with complaints of deteriorating pulmonary symptoms. This paper focuses on how the lack of meaningful patient communication and patient participation in the plan of care can lead to increased symptoms of anxiety, declining quality of life, and unnecessary medical testing. In addition, the case explores how using a holistic approach and strategies based on shared decision-making can improve the level of patient care.

## 2. Case Presentation

A 62-year-old obese male patient presented to the outpatient clinic of Rowan Medicine's NeuroMusculoskeletal Institute (NMI) located in Stratford, NJ, USA in 2017 for complaints of DOE, low back pain (LBP), and left lower extremity (LLE) pain. His relevant past medical history (PMH) included COPD, use of CPAP for obstructive sleep apnea, thoracolumbar dextroscoliosis, chronic lumbar back pain with radiculopathy, osteoarthritis, chronic

regional pain syndrome (CRPS), and anxiety.

His LLE pain was caused by CRPS, for which he had been on long-term opioid therapy for symptom management. The patient had been previously misdiagnosed with emphysema, which was ruled out via normal spirometry volumes on pulmonary function test (PFT) studies and a non-diagnostic ventilation/perfusion (VQ) scan in 2013. However, he was subsequently diagnosed with

COPD in 2015 following hip replacement surgery. PFT studies done at that time found normal diffusing capacity with  $FVC = 2.27$ ,  $FEV1 = 1.57$ , and  $FEV1/FVC = 69\%$  with no improvement following bronchodilator administration. Furthermore, the chest x-rays in 2015, in comparison to 2013, noted no significant changes in lung interstitial and ruled out any active infiltrates, congestion, consolidation, or active disease processes. Additionally, his cardiac stress testing was negative.

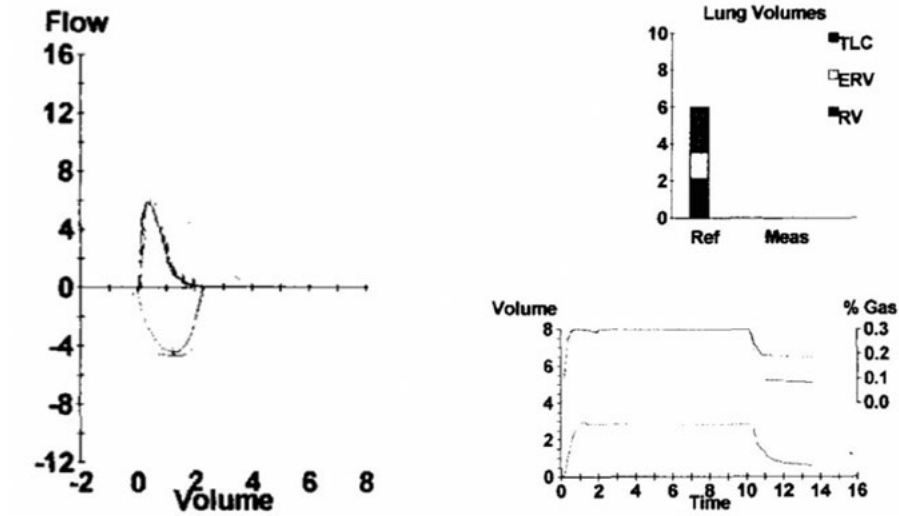


Figure 1: PFT

This patient continued to be followed at our clinic with monthly visits to manage his active pain symptoms. In December 2021, during a regular follow-up visit, the patient reported increased anxiety caused by his perceived declining physical endurance on his quality of life. He also reported a new onset of deep, achy, non-radiating pain that spread further down his left leg with associated paresthesia. The patient's social history included walking for 30 minutes or biking 45 minutes 2 to 5 days per week. He reported no current alcohol, tobacco, or illicit drug use. He is a former smoker with a pack-years smoking history who quit 10 years ago. He stated he has a healthy diet and consumes two caffeinated drinks daily.

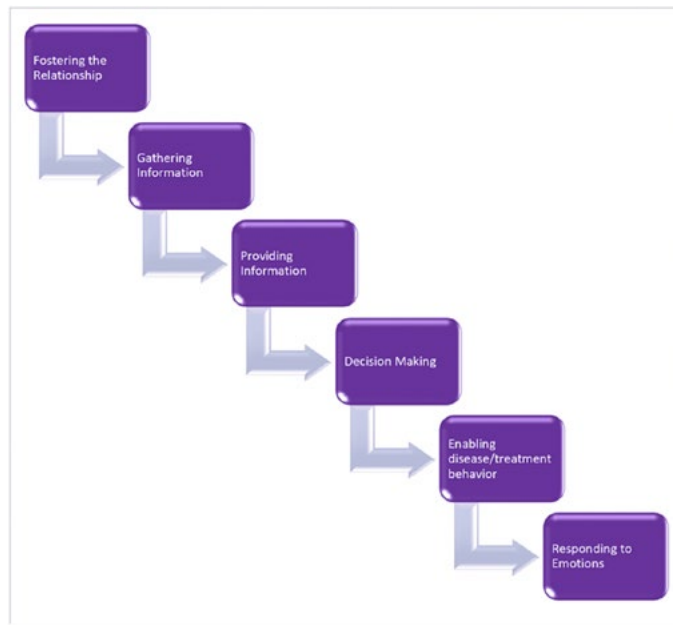
The patient's relevant medication list consisted of quetiapine 300 mg daily, oxycodone 15 mg thrice daily, diclofenac 75 mg twice daily, albuterol sulfate inhalation aerosol every 6 hours as needed, nebulizer albuterol INH twice daily, fluticasone/umeclidinium/vilanterol inhaler 100/62.5/25mcg once daily, and theophylline 300 mg daily. He denied any fevers, chills, chest pain, dizziness, gastrointestinal, or genitourinary issues. His blood pressure was 140/80 mmHg with oxygen saturation of 97% and ambulatory (less than 50 feet) pulse oximetry desaturation to mid-80s and complete oxygen recovery within less than 2 minutes of rest. His BMI on the date of visit was 41.

The physical exam was negative for wheezing, rales, rhonchi, or signs of coughing. He had diminished patellar deep tendon reflexes and paresthesia that worsened with movement in the left L5 dermatome. Because the patient experienced increased shortness

of breath (SOB), ambulatory desaturation, and lacked consistent follow-up with his pulmonologist, a structural component leading to the DOE was suspected. A scoliosis series x-ray was ordered to gain an accurate assessment of the progression of thoracolumbar dextroscoliosis. At follow-up visits to the NMI in January and February of 2022, the patient reported no improvement in his symptoms. He stated that he is "in the process" of scheduling an appointment with his pulmonologist. The scoliosis x-ray series is also currently pending.

### 3. Discussion

COPD, morbid obesity, and severe scoliosis are major contributing factors to decreased respiratory function. Although this patient had concerns about his worsening SOB and DOE, he had inconsistent follow-ups with his pulmonologist and failed to complete ordered imaging in a timely manner. We believe that proper communication and patient education play a crucial role in ensuring patient understanding and appropriate follow-up. These aspects of care clearly need greater emphasis in future encounters with this patient. Typically, proper communication follows the 6-function model of de Haes and Bensing, which describes the goals for communication in medical encounters [7]. The model consists of skills in the following: fostering the relationship, gathering information, providing information, decision making, enabling disease- and treatment related behavior, and responding to emotions as shown in Figure 1. However, efforts to teach patient centered communication to medical students and residents remain underdeveloped [7,8].



**Figure 2:** 6-Function Model of De Haes and Bensing

Several communication techniques are available to physicians that can help to ensure this form of ‘proper communication’ is achieved. Two noteworthy techniques that offer sustainable methods for improving communication include shared-decision making (SDM) and motivational interviewing (MI). The fundamental feature of SDM is a meaningful conversation with patients that includes emphasizing and describing available options, comparing risks and benefits, and eliciting patient preferences regarding their options [9]. This typically takes place using a three-step model: 1)

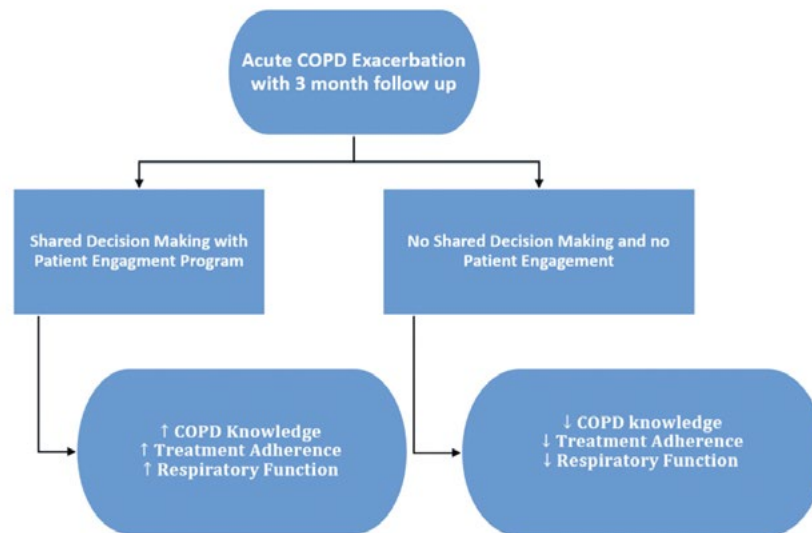
choice talk, 2) options talk, and 3) decision talk as demonstrated in Figure 2. In practice, clinicians usually apply this during the ‘goal setting’ and ‘action planning’ stages. Notably, this model encourages the patient to collaborate actively in their healthcare [10]. It has been demonstrated that patients who participated in treatment decisions subsequently had fewer symptoms, more self-esteem, higher satisfaction, and better adherence to therapy [11]. Additionally, SDM has proven to be a central part of addressing mental health and promoting recovery.



**Figure 3:** Shared Decision Making: 3-Step Model for Patient Outcomes

SDM, in conjunction with patient engagement programs, has been successfully employed in hospital stays for acute COPD exacerbations. This program showed a significant increase in COPD knowledge, treatment adherence, and general function in patients at 3-month follow-up when compared to a control group [12]. Other programs utilizing respiratory therapists have focused on effectiveness in decreasing hospital readmissions for COPD patients [13]. Additionally, a prototype for scoliosis SDM has been

developed to explore the risks and benefits of spinal fusion vs. observation in adolescent scoliosis patients and improve quality measures in patient-parent-surgeon communication [14]. Although studies that incorporate SDM focus primarily on improving physical therapy outcomes, these findings can be extrapolated to support the necessity of incorporating SDM in treating patients in any age as demonstrated in the form of a template in Figure 3.



**Figure 4:** Shared Decision Making and Patient Engagement programs in Acute COPD Exacerbations

Likewise, MI is a patient-centered, counseling method that expresses empathy and reflective listening to understand patients' points of view and underlying drives [15,16]. A core assumption of MI is that the patient, not the practitioner, articulates the benefits and costs involved as the result of a gentle negotiation process, thereby increasing the patient's motivation to change. Studies demonstrate that treatment initiation is more likely when motivational tactics are implemented in the short-term and reinforced long-term through continual counseling that can further increase and sustain patient engagement [17].

A pilot study by Benzo et al. describes a self-management action plan with an 86% retention rate that includes MI to guide patients with severe COPD into feasible behavior changes [18]. Randomized controlled trials (RCT) show increased treatment adherence with MI [19]. MI has also been employed in a telephone-delivered health-coaching environment as a novel alternative to pulmonary rehabilitation. This study has shown significant improvement in subjects' quality of life, dyspnea, fatigue, and emotional function [20]. However, there is a lack of data focusing on utilizing SDM and MI techniques in combination with 'proper communication' to address the needs of our patients, whose progressive scoliosis and worsening COPD resulted in increased symptoms of anxiety and declining quality of life. We propose that it would be advantageous to develop a new holistic approach that combines these techniques to address mental health issues related to chronic conditions and aid in implementing strategies to increase long-term adherence to treatment plans.

#### 4. Conclusions

This report describes one patient's perspective and experience with navigating an increasingly complicated healthcare system that requires juggling multiple medical appointments, imaging, and tests under scrutinizing insurance restrictions. However, the patient's major concerns and behaviors could be significantly altered by consistent and effective use of SDM and MI combined

with the principles of proper communication. SDM can help guide the patient to a better understanding of his amalgam of disease processes that exacerbate his DOE, eventually leading to increased wellness and better treatment outcomes. His anxiety can be reduced by incorporating hope, empowerment, and connectedness through proper communication. Subsequently, MI can help motivate him to follow up with his pulmonologist and complete the tests necessary for his current treatment plan. Together, these holistic techniques can help relieve some of this patient's already worsening anxiety, improve his understanding of his diagnoses and lead him to take the steps necessary to improve his overall health and wellbeing. Subsequently, further research is warranted to establish better treatment plans that encompass obesity, COPD, severe scoliosis, and interstitial lung disease as a combination that affects respiratory function as well as the role of proper communication, SDM, and MI in achieving long-term treatment goals.

#### Additional Information

##### Disclosures

**Human subjects:** All authors have confirmed that this study did not involve human participants or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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