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Living and Breathing with COPD: The OT Role Recorded September 3, 2019

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- [Fawn] Today's course is Living and Breathing with COPD: The OT Role. Our presenter today is Dr. Camille Tovera-Magsombol. She is an OT clinical specialist at NYU Langone Health Rusk Rehabilitation Inpatient Unit. She has led quality improvement projects that aim to improve service delivery to patients with chronic diseases such as COPD, diabetes, and low vision. She advocates for increasing the familiarity, competency, and confidence of OTs in the field of cardiopulmonary rehabilitation. As part of this advocacy, she has presented on these topics both within the medical center and at AOTA Annual Conference. Welcome, Dr. Tovera-Magsombol.

- [Camille] Hello, everybody. Thank you for coming in this webinar. I'm so excited to present on this topic. So, COPD's a condition that all of us are familiar with, however, pulmonary rehab is traditionally a place where few OTs exist or practice. Currently, literature on best practice for COPD management has been clamoring for an individualized approach, as each COPD individual is unique in their needs. This is where we step in as OTs. To best serve the needs of this population, it will be very important for us to know the disease process itself, as well as the ways that we can help these individuals with COPD. So, at the end of this webinar, hopefully we should be able to state the pathophysiology and functional limitations from COPD, identify key areas to assess and address on individuals with COPD, and identify the self-management strategies to promote optimal living.

So, let's go ahead and discuss COPD. COPD, in the realm of pulmonary diseases, belongs in the category where individuals are able to get air in but they have difficulty with getting the air out of their lungs. It is a disease that is common, preventable, and treatable. It is a mixture of alveolar abnormalities, and small-airway diseases. As I've said earlier, it presents with difficulty getting the air out of the lungs. So there are different subtypes of COPD, as this is an umbrella term. An individual may present with primarily emphysema symptoms or chronic bronchitis symptoms and sometimes a

mixture of both. To help us visualize how all of these may be different from each other, let's look at our respiratory system up close. So, C, there's my green arrow. So, with emphysema, the airways will be chronically inflamed and it will be narrowed, and there will be a reduced number of tiny airways that are participating in air exchange. So the alveoli here will have wall destruction, so instead of them being small, they become bigger, reducing the surface area that participates in air exchange. In chronic bronchitis, there will be mucus hypersecretion that blocks the airways, so as you're able to inhale air in, it will block the ability of the air to flow out because of the mucus plugging.

So, what are the risk factors for developing COPD? Worldwide, it is mostly accepted that the main risk factor for COPD is tobacco smoking. However, non-smokers may also develop COPD. It can either result from over time exposure to noxious gases and particles, or it can be from an individual's genetics, airway hyper-responsiveness, or poor lung growth during childhood. You can also see here that indoor air pollution from burning wood or other fuels used for cooking and heating, and having poor ventilation, can also contribute as a risk factor for developing COPD, as well as outdoor pollution. Occupational exposure, if you work in an environment with organic and inorganic dusts, chemical agents, and fumes, are underappreciated risk factors as well. This may surprise everybody that the female gender is actually a risk factor for developing COPD. It is largely unknown why, but it could be a combination of different factors such as the airways of women being relatively smaller, so if they smoke cigarettes, there's more concentration of the cigarette smoke. It could also be from the different way that they metabolize cigarette smoke, or a different inflammatory response to cigarette smoke. Age is also a risk factor. As we age, there are age-related changes in our respiratory system, and this may increase our risk for developing COPD. Socioeconomic status is consistently associated with airflow obstruction and increased risk of developing COPD. This may be due to exposure to indoor and outdoor air pollutants, crowding, poor nutrition, infection, or other factors. Asthma and airway

hyper-activity has also been shown in studies to have a 12-fold higher risk of acquiring COPD. Chronic bronchitis may also contribute with the frequency of total severe exacerbations, and infections can also reduce the lung function and increase respiratory symptoms.

So, what happens when we have COPD? First of all, and I think this is something that we have all discussed earlier, is the airflow limitation and gas trapping, or air trapping. So, as our airways are inflamed, the fibrosis reduces the FEV₁, or the forced expiratory volume, in one second or the FEV₁ over FVC ratio, which is the forced vital capacity. So, forced vital capacity is the amount of air a person can exhale during a forced breath. When exhaling, limitations in the peripheral airway reduces the amount of air that can be exhaled and this leads to hyperinflation. There are two types of hyperinflation, which we will be discussing later, but hyperinflation develops early and is the main mechanism for exertional dyspnea. So bronchodilators reduce gas trapping and that's why it's very important for everybody to know how the bronchodilators affect their ability to breathe and function. COPD also results in gas exchange abnormalities. So, when you have COPD, it typically results in hypoxemia, or the abnormally low level of oxygen in the blood, and hypercapnia, which is carbon dioxide retention, CO₂ retention, or also abnormally elevated carbon dioxide levels in the blood. There are several mechanisms in the COPD that contribute to this, but primarily, as the disease progresses, the gas exchange, or the ability of your body to exchange oxygen for carbon dioxide, decreases. Not everybody will have mucus hypersecretion. Mucus hypersecretion is primarily a feature of a person with chronic bronchitis. Pulmonary hypertension may develop late in COPD, and this is due to the hypoxic vasoconstriction of small pulmonary arteries.

All right, so there are different tests that you will encounter as you're reading through a person's chart. The most common ones would be spirometry, and they will typically have results of their pulmonary function tests. So, spirometry is the gold standard for

COPD diagnosis. In spirometry, they measure the lung volumes and the diffusing capacity. So, the frequent terms or the frequent results that you will see will be the forced vital capacity, or the FVC, the forced expiratory volume in one second, or the FEV1, as well as the FEV1/FVC ratio. To have a diagnosis of COPD, the FEV1/FVC ratio should be less than 70% of the predicted for the population with the people that are matching your age and your gender. Chest imaging, such as chest X-rays, CTs, and MRIs are also used, as well as ABGs, and this is very helpful in determining if a person is hypercapnic, or a CO2 retainer.

So, different ways of classifying COPD. The classical way is through the use of the FEV/FVC ratio, which is something that the GOLD or the Global Initiative for Chronic Obstructive Lung Disease Organization has used. However, we know that participation or an individual's appearance or symptoms are more than their FEV/FVC1, so just to familiarize yourself, these are the different GOLD stages and what it means in terms of the FEV1 values. COPD can also be described in terms of symptoms. We will be discussing three commonly used assessments. So, since COPD is a disease characterized by breathlessness, the Modified British Medication Research Council, or the mMRC questionnaire grades the breathlessness a person experiences. So it's from zero to four, and these the different levels that you have. So it comes from breathless only with strenuous exercises to being breathless as they are leaving the house or when they're or dressing or undressing. The next one would be the CAT, or the COPD Assessment Test. This is a comprehensive assessment of symptoms. So, the patient reports the impact of COPD on their health status. They have eight question that asks about the quality of the cough, the phloem, chest tightness, breathlessness, when walking up a hill or a flight of stairs, activity limitations at home, their confidence in leaving their home, sleep and energy. So it's globally looking at the patient's day-to-day activities. It's a scale of one to five. So, you score it from zero to 40, with higher scores indicating more impact of COPD symptoms on their health status. The other questionnaire is the COPD, the Clinical COPD Questionnaire or what they call the

CCQ. This is a 10 item health quality of life questionnaire, and quantifies the clinical status of the airways. So, it also gives an understanding of the activity limitation and emotional dysfunction experienced by an individual. It has three domains: symptoms, functional state, and the mental state. So, it's graded from zero to six, zero being the least impaired and six is the worst impairment. It usually takes two minutes to complete, and there is a minimal clinical difference improvement of minus 0.4 points. So, to indicate that the person has improved, their score, or clinically important difference, their score must decrease by 0.4 points.

Now recently, as they've compiled research on COPD, they have realized that categorizing COPD, really is more than their ability to forcefully exhale, air out from their lungs, in one second. So they've developed this modified GOLD COPD assessment into categories from A to D. So, it involves the spirometry or the severity of their airway limitation, their dyspnea assessment with either the mMRC or the CAT, the history of moderate and severe exacerbations, and prior hospitalizations, the degree of airflow limitation, and then the symptom burden and risk of exacerbation. So, to make it easier for everybody to understand, I've plugged in all of these into each of the boxes. The way that they wanted us to look at this, is that for A and B which is over here they are the GOLD 1 to 2 categories, and the one here would be the individuals that are experiencing less symptoms either the dyspnea, or the less impact of COPD in their quality of life. Then over here, on the top level, will be somebody that have had experienced exacerbations for for two or more times in every year. So, the Bode Index is an assessment for COPD severity and prognosis. So, it calculates the individual's risk of hospitalization and death from COPD. The calculations are based on the FEV1, the six minute walk test, the mMRC, the dizziness scale and the BMI. The following is how they're predicting the survival in four years, based on the points that they scored. There is an online calculator, so you just go to the website and plug in points, and it will give you the result. The COPD Foundation has developed their own system. Because, again, they recognize that there are different ways of classifying COPD, but they also

wanted to recognize that sometimes the results of the tests, itself, do not indicate whether a person has COPD or not. So their staging system provides recommendations on who would benefit from spirometry tests, and also they provided therapeutic recommendations. So the domains are based on the assessment of spirometry, the regular symptoms that the person experiences, the number of exacerbations in the past year, their level of oxygenation, the degree of emphysema that they've seen on the CAT scan, the presence of chronic bronchitis and comorbidities. So within all of these domains, they have developed five grades. So, zero, the spirometry grade zero, or SU zero means that their spirometry values are normal, but they have symptoms that require treatment. The spirometry grade U are undefined. They have their FEV1/FVC ratio as more than 0.7, which normally you wouldn't classify these people as having COPD, and classically have also been categorized under a restrictive lung diseases, but they've seen that some of these people do need treatments for symptoms. They have symptoms and they need treatment that is relevant for people with COPD.

Then the other grades, one, two, and three, they've used the FEV1/FVC ratio. So, if everybody's good and nobody has questions, we're gonna go talk about the COPD patient, and the assessment and treatment of a COPD patient. So typically, a COPD patient will present with the following persistent symptoms: they will have cough, they will have dyspnea and they will have sputum production. Coughing is the most frequent symptom reported by individuals with COPD. It is initially intermittent, but as the disease progresses, it becomes more frequent. Individuals start seeking attention or medical attention when they begin to experience dyspnea. So we will define dyspnea as the increased effort to breathe, any heaviness when they're trying to breathe, air hunger or gasping. So this is first noticed during strenuous activities or exercises, when they're climbing up stairs or inclines, when they're walking fast, or they're walking a distance. So with a decreased progression, the dyspnea is triggered, even by normal walking or functional activities involving raising both upper extremities

above shoulder level, like in grooming, when you're reaching for items, with bathing and with grooming. Sputum production is described as candy, or less than several tablespoons of mucoid, thin watery secretions for a day. If they have pure thin secretions, then they should go seek medical attention as this is a sign of an infection. With COPD, you will notice that the patients will have increased use or frequent use of their accessory breathing muscles, mainly the scalenes, the upper trapz, and the SCM. You will also notice that they will have barrel chest. Some to them will have barrel chest, especially if their COPD is more in the chronic stages of the disease. They will also have a kyphotic posture, with protracted and/or elevated shoulders. Some people describe them as being pink puffers, or blue bloaters. These are terms that you will hear more often, but most of them will have dyspnea, anxiety, and fatigue, that it acts as barriers for them to reengage in occupation, or even do anything.

So when we're seeing a COPD patient, we really want to start with a thorough chart review. As we've discussed earlier, the COPD staging will help us in terms of treatment planning, and judging what sort of activities and treatment activities that will be helpful for this patient, as well as what types of assessment would best describe their symptoms. The symptoms on admission, what are their past medical history, what are their current medications, any risk factors for cardiovascular and pulmonary disease, the trends of their lab values, and the available radiological studies, and then oxygen therapy and other respiratory treatment. You will also want to check for any surgical history, if they have any EKG results, pulmonary function tests or AVGs, which we've mentioned earlier, other diagnostic tests, their vitals and their trends, any hospital course, how many readmissions they have had, their diet and their intake, social history, and the home environment. Then we try to make an occupational profile for this patient. So, considering everything else that you've gathered from the chart review, asking them also, and identifying occupations that were successful, unsuccessful at any desired occupations. What is valuable for them? What are their interests, any changes in their roles? Are the changes in their roles contributing factors to their

anxiety and depression? Any symptoms, and what are the medical management for the symptoms? And again, identifying the barriers and the facilitators to occupational engagement, as well as their goals. So, are they needing any assistance for any of these functional activities that they want to do? What are their vitals, as they're trying to these activities? You will want to assess the oxygen saturation, their heart rate, the blood pressure, RPE scale if they feel more fatigued, or their dyspnea scale if they feel they're more breathless as they're completing an activity. You should also try to assess the breathing pattern during activity participation. Are they holding their breath? Are they trying to inhale, or inhale forcefully, or are they having this sort of panic attack where they're trying to inhale a lot before they're trying to engage into an activity?

So let's talk about hyperinflation. Hyperinflation is an elevation above normal functional residual capacity. So functional residual capacity is the volume of air in the lungs, after a normal passive exhalation. So normally, when we inhale and we exhale, we don't really think about it. So the amount of air that stays within our lungs, after we exhale, is what we call the normal functional residual capacity. Now in hyperinflation, there is more than the normal functional residual capacity for your age, and for your gender. If you have that, or if you have a higher than normal, and expiratory lung volume, this decreases your expiratory muscle length, increases the work and oxygen cost of breathing, and decreases the expiratory muscle endurance over time. So static hyperinflation happens with the disease process, because of the changes that happened in the lungs. So, remember how we talked about the changes in the alveoli and how from here having more sacks that participate in air exchange, they become this big alveoli that also has less elastic recoil to push air out. Now, because of this decreased ability to push air out, they don't have enough pressure to counter the recoil pressure by the chest wall, so the chest wall pushes air in, and then the alveoli then pushes the air out for us to exhale. So, this destruction of the alveoli walls, causes the innate elasticity that requires a greater volume to balance the chest wall recoil, and this increases the FRC artificial residual capacity. Dynamic hyperinflation happens during

exercise or increased activity. So, the patient has a decreased ability to exhale fully that leads to air trapping. This occurs when the patients start to inhale, before full exhalation has been achieved. So, the air trapping builds up with each successive breath, and the degree of hyperinflation at any moment in time varies depending on the degree of airflow limitation, and the rate of breathing. So, the more they try to breathe in and gasp for air, the more air that gets trapped inside. So, patients can be more hyperinflated during exacerbations of COPD. Since there's more air trapping that happens or there's more dyspnea that leads them to keep inhaling air, they're trying to gasp for air, or it can also happen during exercise. So, they can also become less hyperinflated, and this happens when the rate of breathing is reduced, such as during periods of rest between activity. So this is an important concept, because this is one concept that we could all employ and use, and keep in mind as we are treating patients with COPD.

Hypercapnia: hypercapnia is also known as CO₂ retention, or carbon dioxide retention, and is characterized by an elevated carbon dioxide in the arterial blood. So there are different causes. Some of them will be from hypoventilation which is, again, recalling back to what we discussed in the previous slides, there will be alveoli destruction and there will be less of these that participate in gas exchange. Because of this, there will also be increased dead space where the alveoli are ventilated, so the air can go to alveoli, but not perfused, meaning they don't exchange oxygen for carbon dioxide. Clinically, it could also be defined, if their arterial blood gases, the partial pressure of their carbon dioxide is more than 42 millimeters mercury. So clinicians must use caution in providing supplemental oxygen. If patients are used to having a high concentration of carbon dioxide, or if they're O₂ retainers, if you increase the supplementary oxygen, it decreases the drive to breathe. So we have to have an understanding of the factors that precipitates hypercapnia. You will also notice that the patients with COPD will have this, what we call inactivity cycle. Some people will call this the downward spiral of inactivity, or a downward spiral of breathlessness, but

basically because of their dyspnea, because of their dyspnea with daily activities, they will tend to decrease physical activities. Now if we decrease physical activities, we all know that this will decrease our muscle strength, and of course our heart function, which leads to decreased physical fitness and isolation, then developing more dyspnea, and more anxiety, more depression, and it leads to the loss of independence. So, our role here is to really break the cycle and to address hopefully earlier in the disease process, so they don't go down this route where they just become over time more inactive, because of their dyspnea.

So talking about supplemental oxygen. Each patient using oxygen should have an oxygen prescription. If you're seeing a patient at home, you should ask them what their oxygen parameters are, oxygen prescription. It comes easier at the hospital 'cause we have a direct access to their healthcare providers, and we can ask them immediately, but it will really be very important for you and the patient to know what their oxygen prescription or parameters are. What should be their supplemental oxygen addressed with activity. Generally, 88% to 92% is a good goal for patients to avoid hypoxemia and decrease their risk for oxygen-induced hypercapnia. Oxygen flow, or oxygen supplement could be continuous or intermittent, and then some of them will also be using an oxygen conserving device. When they have this device oxygen is only released on inhalation. We have to note that the numbers on the oxygen conserving device does not correspond to the oxygen liter flow. So that's two different concepts.

All right, functional status measures. So, if you look up outcomes for ADL measures, there will be multiple measures that has come up, and this is the reason why there are multiple measures is they're starting to realize that it is difficult to define how one COPD patient functions, in their daily activities. Some of them will be limited by their breathlessness. Some of them will be limited by they're fatigue. Some of them are limited by their depression, or some of them are limited by anxiety. So there are multiple measures that look at different things. To help us with guiding selecting

functional status measure, we have to define what the goal of our interventions are. So again, if we did a good thorough chart review, and if we really made an occupational profile, this will help us select the most appropriate measure. Is the paper and pencil test appropriate? We also have to realize that people with COPD most often overestimate their physical capabilities. Sometimes they recall their previous level of function versus what their current level of function are, and this is best observed, if you give them a paper pencil test, you would want to also observe them perform these tasks to one, identify what limits them, and two, see how accurate they were able to score themselves. Will a performance-based test be more effective? We also have to realize that some activities identified with the original development of the instruments may not be relevant for some countries. So, It's primarily an English language based and European-based culture, and this may result in significant data which may lead to inaccurate interpretation of the tests. Also, health literacy can impact the accuracy of the instrument results. So, a lot of the self-report ADL scales will have this breathlessness terms, terms that may seem to make sense for us but may not make sense for a lot of people that answer these tests. We'll come back to this slide later.

There you go. So, functional status measures could be categorized five different ways, and I will invite you to look at the article that I've cited here at the bottom of the slide, if you want to get to know about all of these measures, but primarily they are activity measures, impact measures, surrogate measures, performance-based measures, or disability based measures. Each of them aim to describe how each individual performs their activity, either by their ability to participate, or how symptoms affect their ability to participate, or their health-related quality of life, their potential to engage in activities, or their self-report of independence with activities. So, at the end of the day, the best outcome measure will be an individualized measure, noting that each individual experiences or lives their COPD differently. The COPM will best serve that purpose. Now COPD individuals can identify activities that are most important for them, which can be a great starting point to motivate them in increasing their physical activity. So, it

is a semi-structured interview, and the success, or the accuracy of the COPM will really depend on the clinician's ability to engage in a patient and their rapport. So, the beauty of this one is that, aside from specify activities that are difficult, you can also explore activities that they want to do, they need to do, or they're expected to do in terms of their roles, and then you ask them to rate them on their importance, and also the perception of how well the task is done. This gives us an idea on how individuals functional performance is based on their perception, as well as your objective measure and you can help them bridge that gap if there is any difference.

All right, so for activity tolerance, you would want to gauge their vital response to an activity participation. What is their heart rate? What's their oxygen saturation? What's their respiratory rate, and the accessory muscle use, the RPE scale and the Borg dyspnea scale. So, we will go back, a couple slides back, there we go. So, this is an example of how you can objectively document their activity performance. So, let's say you performed a grooming activity with them. You gave them supervision throughout this task, and the supervision is because you needed to give them verbal cues to pace themselves, and to cue them to sit down, so that they could conserve their energy. You can also list down their vitals, what their supplemental oxygen levels were, what was their saturation? What was their heart rate? What was their dyspnea scale? Then, based on these things, you could summarize what you've observed, and then plan accordingly. Fatigue is also one of the symptoms that are most commonly reported by patients with COPD, and one of the factors that limit them from participating in their preferred occupational activities. So, it is a subjective feeling of being tired and drained of energy. It happens with 50% to 70% of COPD patients, and is associated with frustration, depression, and concentration issues. So exacerbations are important factors that precipitate moderate to severe fatigue. It affects societal participation, and fatigue is experienced more in the afternoon than in the morning, so if you're trying to help them plan for their activities during the day, it would be helpful to have the activities that cost more energy to do it in the morning versus in the afternoon.

So let's go to energy conservation techniques, which is our commonly used treatment technique with patients with COPD. So, the way that we want to frame this with your patients is that each activity have energy costs, and each energy cost may be different for each individual. Some of them will find bathing more difficult, than lower body dressing, or some of them will find lower body dressing more difficult than bathing. So, you will really have to dive deeper and ask them about their experiences when performing each task. Now, we typically encourage patients to exercise when they have COPD, and then sometimes people will think that making them exercise is contradictory to what we talk about when we're talking about energy conservation techniques, so we have to reframe their thinking and tell them that exercise is an important activity to help them maintain their muscle strength and endurance, and they assess a significant energy cost. So, on the days that they will exercise, they will have to factor this in with their activities and realize that they can't do a lot of things on these days when they either have pulmonary rehab, or at home. That is their day that they've designated to exercise. So, energy conservation techniques, we teach them about the four Ps, which is planning and organizing their daily routine, prioritizing, positioning activities, and pacing.

These are the different positions to relieve dyspnea. So, we'll go through a standing and a sitting position. First is they can lean back, oh sorry, lean forward with their back supported, or they could do this position where they can lean forward where their hands are resting on their on their thighs. They could also use their elbow, put their elbow on the wall, put their head on their forearm and then relax their neck and shoulders, or they could also put their hands on furniture and lean slightly forward. If they prefer to do this in sitting, they could do it this way, feet on the ground, lean forward, elbows to the knees, or they could also rest their chin on their hands. They could also use a table, and put their arms on the table with feet on the ground, and again leaning slightly. Pursed lip breathing, so, I want to take you back to that slide

where we discussed about static and dynamic hyperinflation. This is one technique to help them decrease the dynamic hyperinflation teaching them about pursed lip breathing. So, you would want them to exhale for longer than they inhale. Instruct them to inhale for one to two seconds and inhale from one to four seconds. So, note that at the start, when you're trying to teach this technique, they will become very anxious about doing this, because they relate inhaling with providing oxygen to their body, which is true at the start, but will not be very helpful for them when they have COPD, the later parts of their disease. So, this takes a lot of counseling and biofeedback to just let them see the results. Sometimes, you would also notice that at the start, they will not be able to exhale for one to four seconds. Some of them will be able to exhale until three, and then they'll become very anxious and try to inhale successive breaths again, and then you will have to pace them and tell them to review this pursed lip breathing technique. So, you instruct them to relax their shoulder muscles and their neck, to breathe in slowly through their nose, to pucker their lips as if they're whistling, and to breathe out slowly through the lips to four counts, or more. So the more the better. Some common instructions that you would often hear will be smell the roses, and breathe out a birthday candle or breathe out a warm, a hot soup.

So, Dyspnea Management. There's this concept of controlled breathing between rest and activity. So, we've talked about the pursed lip breathing and how it slows down your respiratory rate, and decreases the air collapse during expiration. You will want them to try to begin with active expiration, that is longer than inspiration by two to three times, or two to four times. Active expiration is that forceful expiration. So activist, consciously try to think about exhaling, and consciously trying to exhale more than you're trying to inhale. This also avoids breath holds, and facilitates efficient energy expenditure. Typically, we'll ask them to inhale when they're trying to do movements against gravity, and exhale, either during the hardest part of an activity, where they're trying to move towards gravity, and with pushing and lowering arms. So, at the end of the day, when the COPD patients are more in the severe part of disease,

and where their dyspnea is really getting the best of them, sometimes the inhalation movements against gravity and exhalation towards gravity, they get confused with that. As long as they're trying to inhale at one part of the activity, and exhale at the other part of the activity, that's fine, because you're just trying to reduce their respiratory rate. You don't want them to have that dynamic hyperinflation, 'cause if they do, then they'll get more dyspneic, and then they won't be able to do the activities anymore. This also can help with anxiety.

So, to facilitate learning. Again, you would have the characteristic of your COPD patients would be anxious, and if they are on supplemental oxygen, they may not even allow you to touch their supplemental oxygen, because of the degree of their anxiety. You can use biofeedback. You could use breathing with auditory cues. You can adjust according to the patient's breathing pattern, and then you can alternate biofeedback with no biofeedback. This is how I typically teach diaphragmatic breathing, 'cause it's best to do it in supine, but they wouldn't be able to tolerate it in a supine position. So, you could do it in this position. Make sure that they have one hand on their chest the other hand on their stomach, and then when they try to inhale, they have to see the stomach going up, and just this hand they would want to see little to no movements at all there, so you see that's how they should look like. All right, so desensitization, repeated exposure to dyspnea, and letting a patient see that they will not suffocate or die from doing this new way of breathing. So, when you do your practice, it should be in an environment that's safe and non-threatening. Upper extremity is something that we need to also take a look out for. So, deconditioning, could be due to a sedentary lifestyle. Also, upper extremity strength has been proven to influence their walking distance, and is associated with decreased tolerance, quality of life, and endurance. So, there will be changes in their shoulder girdle kinematics, so there will be increased thoracic kyphosis, implementing less upward rotation, posterior tilting of the scapula, external rotation of the shoulder girdle, decreased shoulder flexion, and they could also be predisposed to upper extremity pain syndrome. You would want to try to assess

their strength, and grip strength, also their endurance. It has been documented that there will be worse dyspnea and hyperinflation during peak arm exercises. Your instruments should include any of these three things. Frailty is an independent risk factor for exacerbation and COPD progression. So, you would want to try to identify frailty at an early stage, and the FFP or the Fried Frailty Phenotype, is the most often used tool, but it is very limited for advanced and critical lung disease patients.

So, exercise program. What is their perception of exercise? How should they exercise? Do they have a written exercise plan? So, balance and risk falls are common for people with COPD. So the deficits in balance are lead factors for falls in older adults, so we should try to assess their home environments, the oxygen, are they able to see the oxygen lines? Can they hear? Do they have any assistive devices that they use or should use but are not using? So decluttering their environment, creating a straight pathway is best. So, if they're using oxygen we have to make sure that the wires of the oxygen tubing is not a trip hazard, and again, recommending modifications that are necessary to decrease the energy costs of moving around. Task modification, with the same goal. We want to try to perform tasks seated versus standing, increasing the contrast of the environment to decrease tripping hazards, and then encourage them to use assistive devices. Cognition is something that's commonly seen in patients with COPD. So, you would also want to try to assess their executive function, attention, verbal memory, and learning, and their health literacy. Are they able to identify appropriate actions for an exacerbation? Are they able to remember and use their medications correctly, or do they know their self-management techniques?

So, these are some common assessments, but I would suggest assessing their functional cognition, such as use of their inhaler, problem solving during exacerbation and oxygen titration, med management, setting follow-up appointments. Anxiety and depression are common. So, you would want to try to also assess how it interferes with their daily function. Sleep is most often affected, so you should screen them if

they get sufficient sleep. Do they feel refreshed after sleeping, and if they have regular sleeping times, and refer if they are not. Dysphagia and aspiration are also seen. A silent aspiration is seen in 33.3% of COPD patients, and you would want to screen them if they're having difficulty swallowing, or are they coughing after a swallow. 17% of patients with COPD are also malnourished. So, you would want to try to assess if they know what is helpful for them, or what do they need to eat. So protein is most often recommended for patients with COPD, as it helps fight infection. Then, do they know how to prepare their meals? Are they able to grocery shop? Are they able to select appropriate type of food for them? Sexuality and intimacy. There are also misconceptions. Many think their lungs will be affected with any sexual activity. So, if they're using supplemental oxygen, they should use the same amount as when performing other tasks, or their most difficult tasks, if their supplemental oxygen values vary for each different ADL.

So, we should talk about the action plan. The action plan is very helpful to empower the patient to independently manager their disease. So, it really helps with problem solving, and it provides the language for the patient to better communicate with their health care professionals. This should be used daily, and when they meet up with their healthcare professional, should be updated every six months. You would want them to monitor their breathing, cough and mucus, sleep, eating, and activity level. This is how it looks like. So, you can download this from the COPD Foundation, and they actually have a lot of materials for you to download for your COPD patients. It also helps you identify the signs of exacerbation, which are all these things, and you would want the patients to know about this, and to help them identify the appropriate plan of action. So in here, I've put together the most commonly used medications. We should just frame them, and these three things. They are either rescue medications, maintenance medications, or flare up medications. So, the maintenance medications would be the ones that they should be using daily, and the rescue medication should just be used for quick relief from dyspnea. Patients will have difficulty recognizing one from the

other, so we should help them categorize all these medications. I've talked about them here, together with their side effects. I want to leave time for questions, so we're not, can't see any slides. All right, there you go. So, I've typed up links for how to use their medication. Mostly the difficulty with medication use, or inhaler use. Hold on, slow down. I was clicking too fast, there we go. So, the challenges with using their medications are one, their manual dexterity; two, arthritis; and three, the patients themselves. So, it is very important for us to assess how they use their medications. You would ask them to take their medications out, categorize them if they're their maintenance or their rescue medications, and then ask them to use it. You would not believe how many different ways a person uses their inhalers, and every time I've asked them, I've always seen a new one. I've put in YouTube videos for you to look at, to help you teach your patients how to use their medications and their nebulizers. All right, here we go. So hopefully, we were able to discuss and explore different areas that as an OT we can help our COPD patients with. If you have any questions, I can take them now.

- [Fawn] Hi Camille, we might have to wait a few seconds for people to type in questions. So in the meantime, do you have any frequently asked questions that you get from caregivers or patients that you want to go over.

- [Camille] So the frequent questions would be one, how to use their nebulizers, and probably the amount of oxygen that they should use with each type of activity. So typically, patients would need more oxygen as they're showering or bathing. One of my frequently recommended technique will be leaving the door open, so it wouldn't be as humid inside. Also, I've encouraged them to try to increase their oxygen, their supplemental oxygen, and it's not infrequent for me to bring a pulse oximeter inside the bathroom so that they could see for themselves that they're not desaturating to dangerously low levels where they're trying to shower or bathe. The other question will be with their activity levels. Some of them are really scared that when they try to

engage in any activity and they experience dyspnea, that it actually makes their COPD worse. So, we've told them that actually activity is best for them to engage in because it makes them stronger, it increases their muscle endurance, it prevents them from really deteriorating further. So, I guess putting it in perspective and discussing with them the nature of disease are very helpful.

- [Fawn] Great, we do have some questions coming in. The first one is, I've heard that in severe COPD the diaphragm becomes deintegrated. Do you know if that is true?

- [Camille] Yes, so there are actually ways where the conditions assess the ability of the diaphragm to work. However, that's why you know diaphragmatic breathing is very helpful, but then as they become hyperinflated, the lungs become bigger, and then the diaphragm is not at that capacity to make an effective breath or inhalation. However, that's why some of the patients don't like diaphragmatic breathing. So, we tend to educate them more on pursed lip breathing, and if diaphragmatic breathing is something that they can tolerate, then we teach them to do diaphragmatic breathing.

- [Fawn] The next question is, does increasing activity level and exercise negate progression of COPD in any way? Which I think you just answered, but if you could just say that one more time.

- [Camille] Yes, yes. Actually, and that's why we are very important, and counseling is very important, if you make them increase their activity level, it leads to increased muscle strength. Effective breathing strategy will be very helpful in pushing them and motivating them to engage in this activity. COPD, it's a progressive disease, but the more active they become, if they eat right, if they take care of themselves, it will limit the amount of exacerbations. Exacerbations are actually the ones that are making them spiral into worse and worse levels of COPD, because as you have exacerbations and infections, this makes your pulmonary system worse and worse. You have more

alveoli, that are destructed, you have more inflamed airways, and that leads to like the more diseased state of the COPD. So, putting that in perspective and telling them, you need to take better care for yourself, you need to know the size of exacerbation, so you don't go to the hospital. Engaging in daily activities will help you prevent or prevent you from getting to the worst stages of the disease.

- [Fawn] The next question is, what do you recommend for patients who have a lot of anxiety regarding breathing and shortness of breath?

- [Camille] So, this is something where the biofeedback really helps with. This is where you take out your pulse oximeter, put them in their fingers, and then tell them to practice breathing with you. So, this may take more than one session, with just like desensitizing them, and having them trust you. So trust, I think, is one of the very important components of doing these treatment strategies, because the patient needs to know that you're not gonna make them die from from using these anxiety management techniques. So, sometimes and again I'll try to use the patient that didn't want me to touch their oxygen tanks. When I put the pulse ox on their finger and I asked them to do one simple activity, which is something that they feel like they can do, and they were able to maintain the saturation level that's okay for them and for me, and then I ask them to progressively do activities that are more demanding. So, as soon as they see that their numbers are, that their oxygen saturation maintains the same way or if they use the pursed lip breathing techniques, it brings their oxygen saturation higher, they trust you more and more, and they develop more confidence in performing these tasks.

- [Fawn] And then we have one last question coming in. Do you have any good resources regarding energy conservation strategies during each ADL?

- [Camille] I've used many energy conservation techniques. The one that I frequently use is something from OT Tilt kit, if everybody's familiar with it. The other one is also from the COPD Foundation. They have this skinny slim guy for COPD patients, and they have their daily activity section with energy conservation techniques. Also, you should ask your patient what works for them. More often than not, they already know these techniques, but they're just not conscious about them. So, you ask them what's your preferred way of doing this? How have you typically performed an activity, and then based on how they're performing it, you can tweak or modify, based on where they experience their dyspnea, or where they experience difficulties while performing these tasks. That's it.

- [Fawn] Very good, thank you. I don't see any more questions coming in, so thank you very much for a great talk today.

- [Camille] Thank you, everybody.

- [Fawn] I hope everybody enjoys the rest of their day. I hope you join us again on Continued and occupationaltherapy.com, and she is going to come back with us soon to do a talk on cardiac function. So I hope everyone can join us then. Thanks everyone, I hope everyone has a great day.