" همایش ملـــی توانبخشی ریه (بازتـــوانی ریـــه)" آذرماه ۱۴۰۴

" همایش ملـــی توانبخشی ریه (بازتـــوانی ریـــه)" آذرماه ۱۴۰۴

پیام رییس کنگره

دکتر عاطفه فخاریان

فوق تخصص بیماری های ریه

با کمال مسرت و افتخار، برگزاری همایش ملی توانبخشی ریه (بازتوانی ریه) را که به همت مرکز تحقیقات بازتوانی ریه دانشگاه علوم پزشکی شهید بهشتی و انجمن ریه ایران در دستور کار قرار گرفته، خدمت جامعه علمی و متخصصین حوزه پزشکی و توانبخشی تبریک عرض می کنم. این همایش فرصتی ارزشمند برای بررسی و به اشتراک گذاری آخرین پیشرفت ها و دستاوردهای علمی و تجربیات بالینی و پژوهشی در زمینه توانبخشی ریه محسوب می شود. نقش توانبخشی ریه در ارتقای کیفیت زندگی و کاهش عوارض ناشی از بیماری های تنفسی، هر روز بیش از گذشته نمایان می گردد و همفکری و تبادل دانش متخصصین این حوزه می تواند به پیمودن هموارتر مسیر پیش رو کمک نماید.

ضمن تشکر از کلیه عزیزانی که در برگزاری این برنامه نهایت همکاری را داشته اند، از جمله دبیران محترم علمی و اجرایی و تیم پر تلاش علمی و اجرایی، مقدم اساتید ارجمند، مدعوین، همکاران و دانشجویان را به این همایش گرامی می داریم.

امید است برگزاری این رویداد علمی بتواند بستر لازم برای بهبود همکاری های بین رشته ای و توسعه دستورالعمل های بالینی در جهت ارتقای روند درمانی و ارائه مراقبت های جامع به بیماران را فراهم آورد.

پیام دبیر علمی کنگره

دکتر مریم السادات میرعنایت

فوق تخصص بیماری های ریه

با افتخار، جدیدترین دوره همایش بازتوانی ریه را پیش روی شما گشوده‌ایم؛ رویدادی که با هدف تبیین تازه‌ترین دستاوردهای علمی، ارتقای استانداردهای توانبخشی تنفسی و ایجاد بستری پویا برای تبادل تجربیات میان متخصصان حوزه سلامت برگزار می‌شود.

بازتوانی ریه امروز نه تنها به‌عنوان یک رویکرد درمانی مکمل، بلکه به‌عنوان بخشی جدایی ناپذیر از فرآیند مدیریت بیماری‌های مزمن ریوی شناخته می‌شود؛ رویکردی که می‌تواند کیفیت زندگی بیماران را به‌طور چشمگیری بهبود بخشد، ظرفیت عملکردی آنان را افزایش دهد و بار سیستم سلامت را کاهش دهد. تحقق این اهداف بزرگ، نیازمند همکاری نزدیک پزشکان، فیزیوتراپیست‌ها، پرستاران، متخصصان تنفسی و پژوهشگران این حوزه است.

این همایش با حضور استادان برجسته و تیم‌های بالینی خبره، فرصت ارزشمندی برای مرور تازه‌ترین مطالعات، معرفی راهکارهای نوین، ارائه تجربیات بالینی و ترسیم چشم‌اندازی روشن برای آینده بازتوانی ریوی فراهم می‌سازد. امید است این مجموعه علمی بتواند به‌عنوان مرجعی قابل‌استناد، گامی مؤثر در مسیر ارتقای خدمات توانبخشی تنفسی در کشور باشد.

از تمامی سخنرانان و شرکت‌کنندگان که با حضور و مشارکت خود به غنای علمی این رویداد کمک کرده‌اند صمیمانه سپاسگزارم. امید داریم این همایش گامی در مسیر توسعه درمان و ارتقای سلامت جامعه باشد.

پیام دبیر اجرایی کنگره

دکتر محسن عابدی

دکترای تخصصی فیزیوتراپی

همایش ملی توانبخشی ریه با هدف ارتقای دانش تخصصی، تبادل دستاوردهای پژوهشی و معرفی رویکردهای نوین در توانبخشی بیماران مبتلا به بیماری‌های ریوی برگزار می‌شود. این رویداد علمی فرصتی ارزشمند برای هم‌اندیشی اساتید، پژوهشگران، درمانگران و فعالان حوزه سلامت است تا با همکاری و هم‌افزایی، گام‌های مؤثری در بهبود کیفیت خدمات این حوزه در کشوربرداشته شود. برگزاری این همایش بدون تلاش‌های ارزشمند و پیگیرانه اعضای کمیته‌های علمی و اجرایی، انجمن‌های علمی مرتبط و نیز همراهی صمیمانه شرکت‌ها و مجموعه‌هایی که با حمایت‌های علمی، آموزشی و اجرایی خود ما را یاری کردند، ممکن نبود. همچنین لازم است بطور ویژه از همراهی و حمایت ریاست و مجموعه همکاران در دانشگاه علوم توانبخشی و سلامت اجتماعی قدردانی بعمل آورم. امید است این رخداد علمی، زمینه‌ساز توسعه دانش و بهبود خدمات توانبخشی ریه در کشور باشد و نتایج آن در ارتقای سلامت بیماران و جامعه تأثیرگذار واقع گردد.

اعضای کمیته علمی

دکتر عاطفه فخاریان

دکتر مریم السادات میرعنایت

دکتر ابوذر مجیبیان

دکتر معصومه ذوقعلی

دکتر الهام قازانچایی

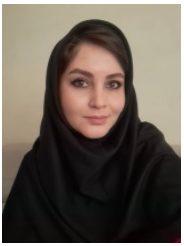
دکتر ملیکا ولی زاده

" همایش ملـــی توانبخشی ریه (بازتـــوانی ریـــه)" آذرماه ۱۴۰۴

اعضای کمیته اجرایی

دکتر محسن عابدی

دکتر بشیر میرتاجانی



ریحانه ظهیری

مهسان نوروز افجه

نرگس فریزهند نظر

مهسا فراهانی پور

" همایش ملـــی توانبخشی ریه (بازتـــوانی ریـــه)" آذرماه ۱۴۰۴

اسامی اعضای پنل و سخنرانان: (بر اساس حروف الفبا)	
دکتر اسماعیل ابراهیمی	دکتر محسن عابدی
دکتر محمدحسن آذرسا	دکتر امیرحسین عابدی یکتا
دکتر علیرضا اسلامی نژاد	دکتر اسماعیل علی بخشی
دکتر اسماعیل ایدنی	خانم ام البنین علیرضایی
دکتر محمدحسین پورغریب	دکتر علی عراقی
دکتر فرزانه ترکان	آقای محمد علیمحمدی
دکتر حمیدرضا جماعتی	دکتر عاطفه فخاریان
دکتر شیلا حقیقت	دکتر لیدا فدایی زاده
دکتر معصومه ذوقعلی	دکتر بهروز فرزانگان بیدگلی
دکتر سید منصور رایگانی	دکتر سمیه فتاحی
دکتر مجید روانبخش	دکتر اردا کیانی
دکتر منصور رضایی	دکتر زهرا مهربان
دکتر احمد رییس السادات	دکتر بهاره مهرگان فر
خانم فائزه روحانی	دکتر لعبت مجیدی
دکتر رامین سامی	دکتر ابوذر مجیبیان
دکتر ناصح سیگاری	دکتر مجید مختاری
دکتر محسن صادقی	دکتر مریم السادات میرعنایت
دکتر مریم السادات صبا	دکتر مرضیه هاشمی
دکتر عاطفه عابدینی	دکتر سید محمدرضا هاشمیان

" همایش ملـــی توانبخشی ریه (بازتـــوانی ریـــه)" آذرماه ۱۴۰۴

روز اول ۱۴۰۴/۰۹/۱۳		
پنل۱ : اصول کلی توانبخشی ریه (ساعت ۱۰:۳۰-۸:۳۰)		
اعضای محترم پنل: دکتر سید منصور رایگانی، دکتر مریم السادات میرعنایت، دکتر اسماعیل ابراهیمی، دکتر اسماعیل ایدنی		
زمان بندی	موضوع سخنرانی	سخنران
۰۸:۳۰-۰۸:۴۵	افتتاحیه	دکتر مصطفی قانعی
۰۸:۴۵-۰۹:۰۵	اصول کلی توانبخشی ریه در بیماران مبتلا به بیماران مزمن انسدادی ریه	دکتر مریم السادات میرعنایت
۰۹:۰۵-۰۹:۲۵	اصول توانبخشی ریه در بیماران CF	دکتر ابوذر مجیبیان
۰۹:۲۵-۰۹:۴۵	اصول توانبخشی ریه در بیماران نوروموسکولار	دکتر عاطفه فخاریان
۰۹:۴۵-۱۰:۰۵	بازتوانی و فیزیوتراپی تنفسی در اطفال	ام البنین علیرضائی
۱۰:۰۵-۱۰:۲۵	اصول توانبخشی ریوی قبل و بعد از جراحی ریوی و توراکس	دکتر لعبت مجیدی
۱۰:۲۵-۱۰:۳۰	پرسش و پاسخ	-
۱۰:۳۰-۱۱:۰۰	استراحت	-

روز اول ۱۴۰۴/۰۹/۱۳		
پنل ۲: ارزیابی و پروتکل های بازتوانی (سالن اصلی ساعت ۱۳:۰۰-۱۱:۰۰)		
اعضای محترم پنل: دکتر رامین سامی، دکتر عاطفه فخاریان، دکتر محسن عابدی، دکتر امیرحسین عابدی یکتا، دکتر فرزانه ترکان		
زمان بندی	موضوع سخنرانی	سخنران
۱۱:۰۰-۱۱:۲۰	راه اندازی مرکز بازتوانی ریه	دکتر رامین سامی
۱۱:۲۰-۱۱:۴۰	روش های ارزیابی (تست ها و پرسشنامه های مرتبط)	دکتر مرضیه هاشمی
۱۱:۴۰-۱۱:۵۵	پروتکل های ورزشی/ فیزیوتراپی تنفسی	دکتر محسن عابدی
۱۱:۵۵-۱۲:۱۵	IMT و EMT	دکتر محمدحسین پورغریب
۱۲:۱۵-۱۲:۳۵	توانبخشی ریه در بیماران مبتلا به بیماران غیر انسدادی(استئوپروز، کیفواسکولیوز)	دکتر مجید روانبخش
۱۲:۳۵-۱۲:۵۰	مدیریت Respiratory Deconditioning در بیماران با اختلالات نورولوژیک	دکتر محمد حسن آذرسا
۱۲:۵۰-۱۳:۰۰	پرسش و پاسخ	-
۱۳:۰۰-۱۴:۰۰	نهار و نماز	-

روز دوم ۱۴۰۴/۰۹/۱۴		
پنل ۱: توانبخشی ریه در بخش مراقبت های ویژه (سالن اصلی ساعت ۱۰:۳۰-۸:۳۰)		
اعضای محترم پنل: دکتر حمیدرضا جماعتی، دکتر سید محمدرضا هاشمیان، دکتر بهروز فرزانگان، دکتر مجید روانبخش، دکتر ناصح سیگاری		
زمان بندی	موضوع سخنرانی	سخنران
۰۸:۳۰-۰۸:۵۰	اهمیت بازتوانی در I.C.U	دکتر مجید مختاری
۰۸:۵۰-۰۹:۱۰	Approach to ICU Acquired Weakness	دکتر شیلا حقیقت
۰۹:۱۰-۰۹:۳۰	توانبخشی ریه در بیماران تحت Mechanical Ventilation	بهاره مهرگان فر
۰۹:۳۰-۰۹:۵۰	توانبخشی ریه در بیماران تحت جراحی پیوند	دکتر عاطفه عابدینی
۰۹:۵۰-۱۰:۱۰	اثر بازتوانی بر جدا سازی بیمار از Mechanical Ventilation	دکتر علی عراقی
۱۰:۱۰-۱۰:۳۰	پرسش و پاسخ	-
۱۰:۳۰-۱۱:۰۰	استراحت	-

روز دوم ۱۴۰۴/۰۹/۱۴		
پنل ۲: فناوری های نوین و Telerehabilitation (سالن اصلی ساعت ۱۲:۳۰-۱۱:۰۰)		
اعضای محترم پنل: دکتر اردا کیانی، دکتر لیدا فدائی زاده، دکتر زهرا مهربان، دکتر احمد رئیس السادات، دکتر منصور رضائی، دکتر اسماعیل علی بخشی		
زمان بندی	موضوع سخنرانی	سخنران
۱۱:۰۰-۱۱:۲۰	نقش فن آوری های نوین در توانبخشی	دکتر اردا کیانی
۱۱:۲۰-۱۱:۴۰	Telerehabilitation در توانبخشی ریه	دکتر معصومه ذوقعلی
۱۱:۴۰-۱۲:۰۰	کاربرد Virtual Reality و هوش مصنوعی در توانبخشی ریه	دکتر مریم السادات صبا
۱۲:۰۰-۱۲:۲۰	نقش تغذیه در توانبخشی ریه	دکتر سمیه فتاحی
۱۲:۲۰ -۱۲:۳۰	پرسش و پاسخ	-
۱۲:۳۰ -۱۳:۳۰	نهار و نماز	-

" همایش ملـــی توانبخشی ریه (بازتـــوانی ریـــه)" آذرماه ۱۴۰۴

برنامـــه کارگـــاه ها

کارگاه های روز اول(۱۴۰۴/۰۹/۱۳): دکتر محسن عابدی
روش های ارزیابی بیماران (ساعت ۱۵-۱۴:۰۰) دکتر محسن عابدی
CPET (ساعت ۱۶-۱۵) دکتر محسن صادقی، دکتر علیرضا اسلامی نژاد

کارگاه های روز دوم(۱۴۰۴/۰۹/۱۴): دکتر محسن عابدی، دکتر معصومه ذوقعلی، دکتر محمدحسین پورغریب
طراحی برنامه ورزشی (راه اندازی بخش توانبخشی و تجویز) - ساعت ۱۵-۱۳:۳۰ دکتر محسن عابدی، دکتر معصومه ذوقعلی
ابزارهای مورد استفاده در توانبخشی ریه (ساعت ۱۶-۱۵) دکتر محسن عابدی، اقای علیمحمدی، خانم روحانی


خلاصه مقالات سخنرانی

Key Principles of Pulmonary Rehabilitation in Patients with Neuromuscular Disorders

Atefeh Fakharian
Associate Professor of pulmonary disease, Pulmonary Rehabilitation Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Neuromuscular disorders, through progressive respiratory muscle weakness, reduced vital capacity, and impaired airway clearance, represent one of the most challenging patient populations in terms of respiratory care. The consequences of these impairments—including hypoventilation, recurrent pulmonary infections, and respiratory failure—directly affect both quality of life and survival. The purpose of this presentation is to outline the fundamental principles of pulmonary rehabilitation in these patients and to review the most evidence-based interventions for their clinical management.

This presentation highlights essential components of rehabilitation, including patient and family education on respiratory care and early recognition of warning signs; respiratory muscle strengthening exercises aimed at enhancing diaphragmatic and intercostal muscle function; and effective airway-clearance techniques such as mechanical devices (e.g., Cough Assist), vibratory methods, and manual techniques. Additionally, optimization of nocturnal ventilation using non-invasive ventilation plays a critical role in reducing hypoventilation and improving sleep quality. Aerobic and resistance training with controlled intensity further contribute to maintaining functional capacity.

The central focus of this talk is the importance of a multidisciplinary approach, individualized program design, continuous monitoring of respiratory parameters, and appropriate use of assisted-ventilation devices. Implementing these principles can reduce the risk of pulmonary infections, recurrent hospitalizations, and progression to respiratory failure, while enhancing patients' participation in daily activities.

General Principles of Pulmonary Rehabilitation in Patients with Chronic Obstructive Pulmonary Disease

Maryam Sadat Mirenayat
Associate Professor of pulmonary disease, Pulmonary Rehabilitation Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Pulmonary rehabilitation is a broad therapeutic concept. It is defined by the American Thoracic Society and the European Respiratory Society as a "comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors."
Pulmonary rehabilitation improves symptoms, quality of life, pulmonary function, and health care utilization in patients with chronic respiratory disease.
PR provides improvements in dyspnea, exercise tolerance, and health status exceeding those of any other therapy for COPD, despite having no direct effect on pulmonary function .
PR can be used in any chronic lung disease except COPD. Benefits of pulmonary rehabilitation in Interstitial Lung Diseases were reported. Pulmonary rehabilitation had a positive impact on functional status and quality of life .Patients with bronchiectasis show similar completion rates and improvements in exercise capacity and, HRQoL, health status outcomes as patients with COPD .
Careful patient selection, appropriate setting, well-prepared multidisciplinary teams from PH and rehabilitation specialists, individualized and flexible exercise training protocols and close monitoring are very important in Pulmonary Hypertension disease. In neuromuscular patients, PR is very helpful too. It can help with better coughs, clearing secretions, and strengthening respiratory muscles.

Respiratory Physiotherapy and Exercise Protocols in Pulmonary Patients

Mohsen Abedi
Associate Professor, PhD in Physiotherapy Pulmonary Rehabilitation Research Center, National Research Institute of Tuberculosis and Lung Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Pulmonary rehabilitation is a comprehensive program crucial for patients with chronic lung diseases like COPD, asthma, and pulmonary fibrosis. Its core objective is to improve physical and psychological condition while promoting long-term health adherence. Two fundamental pillars of this program are respiratory physiotherapy and carefully structured exercise protocols.

Respiratory Physiotherapy Techniques focus on managing symptoms and improving lung mechanics. Key techniques include:

Breathing Exercises: Diaphragmatic breathing and pursed-lip breathing help reduce work of breathing, improve oxygenation, and decrease air trapping (dynamic hyperinflation).

Airway Clearance: Techniques like Active Cycle of Breathing Technique (ACBT), autogenic drainage, and using devices like flutter valves help mobilize and clear excess mucus from the airways, preventing infections.

Education: Patients learn energy conservation techniques and positions to manage shortness of breath (dyspnea) during daily activities.

Exercise Training Protocols are the other essential component. exercise is safe and highly beneficial. Programs are individualized but generally include:

Aerobic Training: Walking or cycling to improve cardiovascular fitness and endurance.

Strength Training: Targeting major muscle groups to combat muscle wasting and reduce the metabolic cost of daily tasks.

Interval Training: Alternating periods of high and low intensity can be better tolerated than continuous exercise for severely breathless patients.

The exercise intensity is prescribed based on initial assessments, often using a percentage of peak capacity or tailored to the patient's dyspnea and oxygen saturation levels. Supplemental oxygen may be required during sessions.

Pulmonary Rehabilitation in Cystic Fibrosis Patients

Abouzar Mojibian
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Patients with cystic fibrosis (CF) face numerous complex clinical challenges that distinguish them from other individuals with chronic respiratory diseases. Consequently, pulmonary rehabilitation in this population requires protocols specifically tailored to their unique pathophysiological and clinical characteristics.

Most available evidence in the field of pulmonary rehabilitation originates from studies on patients with chronic obstructive pulmonary disease (COPD). Although many components of COPD-based rehabilitation programs can be adapted for other respiratory disorders, the distinct clinical and functional profiles of CF patients highlight the necessity for protocol revision and the development of CF-specific rehabilitation strategies.

In this lecture, I will first outline the fundamental principles of pulmonary rehabilitation across respiratory diseases. Subsequently, I will discuss the unique challenges encountered by individuals with cystic fibrosis and finally present the core components of evidence-based rehabilitation programs for CF, with an emphasis on recent clinical studies.

Tele-Rehabilitation in Chronic Respiratory Diseases

Masoumeh ZoghAli
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In this lecture, I will explain about Tele-rehabilitation in Chronic Respiratory Diseases

Pulmonary rehabilitation has been shown to improve physical function, overall well-being, and reduce symptoms in people with chronic lung diseases. Traditionally, pulmonary rehabilitation consists of supervised exercise training and education provided in person at a healthcare facility, such as a hospital or outpatient clinic. Patients attend scheduled sessions but are not admitted overnight.

To expand access to pulmonary rehabilitation, researchers have explored new technology-based delivery methods. When rehabilitation is provided through technology, it is referred to as *telerehabilitation*. Telerehabilitation approaches may include phone consultations with healthcare professionals, communication with peers or clinicians through mobile applications or websites, or participation in virtual group sessions via video conferencing. In some cases, patients must have access to their own device—such as a smartphone, tablet, computer, or telephone—to take part.

The technological approaches used to deliver pulmonary rehabilitation include telephone-based programs, mobile applications, video-conferenced virtual group sessions, and web-based platforms.

Across multiple studies employing different technologies, telerehabilitation likely provides similar benefits to conventional outpatient pulmonary rehabilitation. Compared with no rehabilitation, telerehabilitation may help participants improve their walking distance, although the certainty of this evidence is low.

Participants were also more likely to complete a telerehabilitation program than a traditional in-person program (93% vs 70% completion). However, few studies assessed outcomes after the intervention ended, making it difficult to determine the long-term effects of telerehabilitation.

Rehabilitation in Lung and Heart Transplant Candidates: Pre- and Post-operative

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1. Introduction

Rehabilitation is a core component of management in patients with end-stage lung or heart failure undergoing transplantation. It improves physical conditioning, decreases complications, shortens hospital stay, and enhances long-term survival.

2. Pre-operative Rehabilitation (Prehab)

Goals

Improve exercise tolerance and muscle strength
Optimize respiratory and cardiac function
Reduce dyspnea, fatigue, anxiety
Correct nutritional deficits
Prepare the patient physically and psychologically for surgery

Key Components

1. Exercise Training

Aerobic training (cycling/walking): 20–40 min, 3–5 sessions/week
Strength training: major muscle groups 2–3 times/week
Respiratory muscle training in lung disease patients: IMT, incentive spirometry
Circulatory training in heart failure: interval training, low-intensity endurance

2. Education

Breathing techniques, pacing, energy conservation
Medication adherence (HF meds, oxygen, diuretics)
Expectations regarding ECMO, ICU course, and temporary LVAD/RVAD if

needed
3. Nutrition
Prevent sarcopenia/cachexia (common in HF and ILD)
Protein 1.2–1.5 g/kg/day
Sodium and fluid management in heart failure patients
4. Psychosocial Support
Depression, anxiety, caregiver support
Smoking and alcohol cessation programs

Benefits of Prehab
Better functional capacity (6MWD)
Lower mechanical ventilation duration
Fewer infections and ICU complications
Increased likelihood of survival to transplant
Improved post-transplant outcomes

3. Post-operative Rehabilitation
A. Immediate Post-Operative Phase (ICU)
Common to Both Heart and Lung Transplant:
Early mobilization within 24–48 hours
Breathing exercises & lung expansion maneuvers
Airway clearance (especially lung transplant due to denervation)
Monitoring: graft dysfunction (PGD in lung, primary graft failure in heart), rejection, and infection
Sternal precautions after heart transplant

B. Early Recovery Phase (Hospital)
Heart Transplant:
Gradual aerobic conditioning
Address steroid-induced myopathy
Monitor for arrhythmias, graft vasculopathy, volume overload

Education about HR response after denervation (delayed chronotropic response)

Lung Transplant:
Intensive airway clearance
Bronchial hygiene therapies
Progressive endurance and strength rehabilitation
Monitor for BOS/CLAD risk factors

C. Outpatient / Long-term Phase (3–12 months)
150 min/week moderate aerobic exercise
Long-term strengthening of proximal muscles
Manage osteoporosis, steroid myopathy
Spirometry monitoring (lung) & echocardiography (heart)
Return to daily activities, work, and sports as tolerated

4. Clinical Outcomes of Rehabilitation
Improved exercise capacity and VO_2 peak
Reduction in hospital readmissions
Shorter ICU and ward stay
Enhanced quality of life
Lower risk of chronic graft dysfunction (CLAD, cardiac vasculopathy)
Improved overall survival

Artificial Intelligence in Pulmonary Rehabilitation

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Traditional pulmonary rehabilitation, despite being one of the most effective interventions for patients with chronic respiratory diseases, faces several well-recognized limitations. These include restricted accessibility to rehabilitation centers, variable patient engagement and adherence, limited integration with long-term follow-up, and the high cost and resource burden associated with multidisciplinary care. As demand for chronic respiratory disease management increases, these shortcomings have become more evident.

Artificial intelligence (AI) has emerged as a promising set of tools to help address these gaps. AI-enabled remote monitoring and telehealth platforms now allow clinicians to track symptoms, vital signs, and activity levels in real time, extending pulmonary rehabilitation beyond hospital walls. Virtual rehabilitation environments can deliver personalized exercise training and coaching, while natural language processing (NLP) technologies enhance patient education by simplifying complex medical information and improving communication. In addition, data-driven analytics can identify early signs of deterioration, stratify risk, and support clinical decision-making through predictive modeling.

AI refers to the simulation of human intelligence in machines, enabling systems to perform tasks that typically require human cognitive abilities, such as perception, reasoning, learning, planning, and prediction. These technologies allow software and devices to act intelligently and respond adaptively to new information, without the need for explicit, rule-based

programming.
Overall, the integration of AI into pulmonary rehabilitation holds the potential to improve access, personalize care, and strengthen long-term disease management—ultimately enhancing outcomes for patients with chronic respiratory diseases.

Diaphragmatic Rehabilitation in Mechanically Ventilated Adults: Accelerating Liberation from the Ventilator

Ali Araghi

American board diplomate in Internal, Pulmonary, Critical Care, Sleep and Obesity Medicine

Ventilator-induced diaphragmatic dysfunction (VIDD) develops rapidly during controlled mechanical ventilation and contributes substantially to weaning failure and prolonged intensive care unit (ICU) stay. Growing evidence suggests that targeted diaphragmatic rehabilitation— through inspiratory muscle training (IMT), neuromuscular stimulation, and early mobilization— can preserve contractile function and facilitate earlier liberation from mechanical ventilation.

To synthesize recent evidence 2025 regarding the effectiveness of diaphragmatic rehabilitation strategies in expediting weaning from mechanical ventilation and to propose a structured, multidisciplinary protocol for clinical implementation.

A focused review of systematic reviews and meta -analyses published between January 2025 and November 2025 was performed, including recent works by Xingyu et al. (BMC Pulm Med), Tong et al. (BMJ Open), Fu et al. (Eur Respir Rev), and Parada- Gereda et al. (Aust Crit Care). Data were summarized to compare physiologic outcomes (maximal inspiratory pressure, diaphragm thickness, endurance) and clinical outcomes (weaning success, duration of mechanical ventilation, ICU length of stay).

Across 20 trials synthesized in the 2025 reviews, IMT consistently improved inspiratory muscle strength and endurance, with modest but favorable trends toward shorter weaning times. Diaphragmatic stimulation and pacing demonstrated improved diaphragm performance and a potential reduction in ventilator dependence, though evidence remains device-specific and limited by sample size. Early mobilization protocols complemented respiratory training, reducing overall ICU stay without increasing adverse events.

Diaphragm-targeted rehabilitation represents a promising, evidence-supported strategy to shorten mechanical ventilation and improve weaning success. Integrating IMT, early mobilization, and selective diaphragmatic

stimulation within a “diaphragm-forward weaning bundle” may optimize outcomes while maintaining patient safety. Ongoing research should refine standardized dosing, identify optimal patient selection, and evaluate cost-effectiveness for broad implementation.

“Designing the Future of Respiratory Health: A Comprehensive Framework for Launching a Pulmonary Rehabilitation Center”

Ramin Sami
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Pulmonary rehabilitation is one of the most effective interventions in the management of patients with chronic respiratory diseases such as COPD, bronchiectasis, pulmonary fibrosis, asthma, etc. Numerous international evidence shows that implementing a standard rehabilitation program can significantly improve quality of life, exercise capacity, reduce shortness of breath, reduce repeated hospitalizations, and even reduce mortality. In Iran, with the increasing burden of chronic pulmonary diseases and treatment costs, the establishment and expansion of pulmonary rehabilitation departments is an undeniable necessity.

The pulmonary rehabilitation department is a multidisciplinary team that consists of a pulmonologist, a sports and rehabilitation medicine specialist, physiotherapist, trained nurse, and if possible, an occupational therapist, a nutritionist, and a psychologist. The standards of a rehabilitation center include space and minimal equipment for initial and final evaluations such as the 6MWD test, aerobic and strength training, a structured exercise program, safety protocols, and patient education. The important point is that setting up a rehabilitation department does not necessarily require a large and complex facility; it can start from a small unit with minimal equipment (such as a room equipped with a stationary bike, pulse oximeter, and training equipment) and gradually expand to a comprehensive center with a full team and advanced equipment. The purpose of this lecture is to emphasize that pulmonary rehabilitation is a scalable process: from a small service in respiratory clinics to a complete department in general hospitals. The most important part of the work is adhering to scientific standards, training the

treatment team, and designing a clear patient pathway. The expansion of these services not only improves the quality of life of patients, but also reduces the medical and economic burden on the health system.

The Importance of Rehabilitation in the ICU Patients

Majid Mokhtari, MD, FCCP

The science, art, and technology that are involved in management of these severely ill patients in the ICU are growing quite rapidly, a fascinating multidisciplinary task which has in turn created a huge competitive and lucrative market around the world. A race that we are way behind which will take us quite a while to catch up with it, if at all so.

Critically ill patients, particularly those who may stay in the ICU longer than 7-10 days, form a unique phenotype with multi organ and system changes which leads to a relatively new entity of chronically critically ill state (CCI). The hallmarks of CCI state are nutritional deficiencies, severe reduction in muscle mass, immune paralysis, and predisposition to variety of opportunistic infections, cardiopulmonary and renal failure, mobility issues, and cognitive dysfunctions.

In our country, we need to go a long way to deliver appropriate, evidence-base ICU general care including skin care, oral care, musculoskeletal care, gastrointestinal care, nutritional care, psychological care, social care, and most importantly ICU pre-habilitation and rehabilitation. Without such vital measure not only, we induce pain and suffering to our patients but we let our care effort to go wasted for better long-term patient outcome.

Pulmonary Rehabilitation Before and After Pulmonary & Thorax Surgery

Lobat.Majidi MD
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Head of the cardiac rehabilitation department, Farshchian Heart Hospital.

Pulmonary rehabilitation (PR) is a critical component of care for patients undergoing major thoracic surgery, significantly improving outcomes both before and after the procedure. It is a comprehensive program encompassing exercise training, education, breathing techniques, and psychological support.

Preoperative PR aims to optimize the patient's condition for the stress of surgery. The core goal is to build physiological reserve. This involves structured exercise including aerobic, strength, and inspiratory muscle training to enhance cardiovascular fitness and strengthen the diaphragm. Crucially, patients learn essential techniques like diaphragmatic breathing and effective coughing, which will be vital post-surgery. Education on pain management and the procedure itself reduces anxiety. Evidence shows prehab leads to shorter hospital stays, fewer complications like pneumonia, and better-preserved physical function.

Postoperative PR (inpatient): begins immediately after surgery, focusing on recovery and restoring function. The early inpatient phase emphasizes preventing complications: early mobilization, using an incentive spirometer, and practicing supported coughing while splinting the incision to manage pain. The primary goals are to re-expand the lung, clear secretions, and prevent muscle stiffness.

After discharge, outpatient rehab involves supervised, gradually intensified exercise to rebuild endurance and strength, often tailored to daily tasks. Ongoing support manages persistent shortness of breath and fatigue.

The most effective approach views PR as a continuous. (Continuum of care) Prehabilitation primes the patient by building strength and teaching skills, while postoperative rehab capitalizes on that foundation to guide a faster, smoother recovery. Together, they form an evidence-based standard that empowers patients, reduces risks, and significantly enhances the return to an active life after thoracic surgery.

How to Assess a Pulmonary Rehabilitation Candidate

Marzieh Hashemi
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Pulmonary rehabilitation (PR) is a core, evidence-based intervention for chronic respiratory diseases. Optimizing patient selection and individualized program design requires a structured, multidisciplinary assessment led by the pulmonologist.

To outline a guideline-based approach for evaluating patients who are candidates for PR and to highlight key clinical domains that influence safety, prognosis, and program effectiveness .

Contemporary recommendations from ATS/ERS, GOLD, and AACVPR were synthesized into a practical assessment framework relevant to routine pulmonology practice. The evaluation includes confirmation of respiratory diagnosis, assessment of disease severity (spirometry, lung volumes, DLCO, and arterial blood gases when indicated), and review of symptom burden using validated tools such as the mMRC, CAT, and SGRQ. Functional status is quantified with standardized field tests (6-minute walk test, incremental/endurance shuttle walk tests) or cardiopulmonary exercise testing. Comorbidity screening focuses on cardiovascular stability, musculoskeletal limitations, nutritional disorders, cognitive impairment, frailty, and mental health conditions. Additional domains include exacerbation history, inhaler technique, medication adherence, oxygen requirement evaluation, and psychosocial readiness .

A comprehensive, multidimensional assessment allows accurate risk stratification and individualized exercise prescription, enhances patient engagement, and improves prediction of PR outcomes. Early identification of modifiable barriers, such as poor inhaler technique, anxiety, or exertional desaturation, improves safety and program adherence .

A structured, pulmonologist-directed assessment is essential for safe and effective pulmonary rehabilitation. Integration of physiologic, functional, and psychosocial domains ensures optimal candidate selection and maximizes the impact of PR within modern respiratory care.

Approached to ICU Acquired Weakness

Shila Haghighat
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CIW arises as diffuse, symmetrical weakness after ICU admission, which is an important differentiating factor from other diseases causing non-symmetrical muscle weakness or paralysis.

In patients with adequate cognitive function, CIW can be easily diagnosed at the bedside using manual muscle testing, which should be routinely conducted until ICU discharge. In patients with delirium or coma or those with prolonged, severe weakness, specific neurophysiological investigations and, in selected cases, muscle biopsy is recommended. With these exams, CIW can be differentiated into critical illness polyneuropathy or myopathy, which often coexists.

CIW is associated with long-term physical, cognitive and mental impairments, which emphasizes the need for a multidisciplinary model of care. Interventions should include an assessment of the activities of daily living, mood, and functional mobility. Finally, nutritional status should be longitudinally assessed in all ICU survivors and incorporated into a patient-centered nutritional approach guided by a dietician.

Early ICU mobilization combined with the best evidence-based ICU practices can effectively reduce short-term weakness. Multi-professional collaborations are needed to guarantee a multi-dimensional evaluation and unitary community care programs for survivors of critical illnesses.

Muscle weakness, Neuropathy, Myopathy, Mobilization, Rehabilitation, Nutrition, Follow-up, Continuum of care

Pulmonary Rehabilitation in Patients with Musculoskeletal Spinal Deformities (Kyphosis, Scoliosis, and Kyphoscoliosis)

Majid Ravanbakhsh
Associate professor in Ahvaz Joundishpour University of Medical Sciences

Today, the importance of the spinal column and the role of its various curves in providing both stability and mobility are widely recognized. The spine, as the body's central axis, plays a fundamental role in supporting bodily alignment and possesses cervical, thoracic, and lumbar curves. The significance of the direction, structure, physics, and biomechanics of these curves is clear and evident. The function of the spine as a dynamic axis—capable of controlling diverse, combined, and multi-directional movements while properly maintaining stability—further highlights the critical importance of this structure in the human body.

Furthermore, the relationship between respiratory patterns, spinal curves, the rib cage, and the shoulder and pelvic girdles has garnered significant attention. Among these, the thoracic vertebrae are of particular importance. Consequently, among all spinal deformities, thoracic kyphosis has become a focal point for many researchers in the respiratory field.

It is believed that addressing the issues and deformities of the spine while simultaneously considering the respiratory system can pave the way for more comprehensive and effective treatments for thoracic spine disorders and reduce the number of individuals who will face such problems in the future. Moreover, respiratory abnormalities resulting from spinal curve disorders are also a topic of great interest in scientific communities worldwide today.

Undoubtedly, managing an abnormality in one system can play a crucial role in preventing secondary abnormalities in the other, thus contributing significantly to public health. To prevent the progression of such issues, individuals at high risk for developing spinal deformities and respiratory pattern disorders can be identified and treated concurrently. Alternatively, by eliminating the abnormal conditions

imposed on the body, the development of such complex and treatment-resistant conditions in both systems can be prevented.
In this program, we aim to address the various ways these two interconnected abnormalities impact each other and explore potential treatments for their simultaneous management, irrespective of the cause-and-effect relationship between them.

Virtual Reality in Pulmonary Rehabilitation: Current Evidence and Clinical Potential

Maryam Saba
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Background: Pulmonary rehabilitation (PR) is a cornerstone in the management of chronic respiratory diseases; however, access barriers, low adherence, and limited patient motivation often reduce its effectiveness. Virtual reality (VR) has recently emerged as an interactive and customizable tool that may enhance engagement, exercise tolerance, and symptom management. Several systematic reviews and clinical trials published in recent years suggest that VR-based or VR-enhanced PR could be a feasible and beneficial modality for selected patient groups.

Objective: To provide an updated overview of evidence on VR applications in pulmonary rehabilitation, highlight potential mechanisms of clinical benefit, and offer practical recommendations for integrating VR into existing PR programs.

Methods: This presentation synthesizes findings from recent systematic reviews, meta-analyses, and randomized controlled trials. Evidence was evaluated regarding feasibility, safety, clinical outcomes, and patient-reported measures. Practical considerations for implementation including technology requirements, programed design, session structure, and outcome monitoring are also summarized.

Nutritional Strategies to Enhance Respiratory Recovery and Rehabilitation

Somaye Fatahi
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Pulmonary rehabilitation (PR) is a key component in managing chronic respiratory diseases such as COPD and interstitial lung diseases. Nutritional status strongly influences respiratory muscle function, immune response, and inflammation levels, all of which impact PR outcomes.

This lecture aims to highlight the role of targeted nutritional strategies in enhancing the effectiveness of pulmonary rehabilitation, identifying key nutrients involved in respiratory recovery, and providing recommendations for individualized dietary interventions.

A comprehensive review of clinical studies and guidelines was conducted focusing on the effects of macro- and micronutrient optimization, protein-energy supplementation, anti-inflammatory nutrients (omega-3 fatty acids), and antioxidant intake on pulmonary function, exercise capacity, muscle strength, and patient recovery.

Evidence demonstrates that:

Adequate protein intake preserves respiratory muscle mass and improves exercise tolerance.

Omega-3 fatty acids and antioxidants (vitamins C and E) reduce systemic inflammation and oxidative stress.

Micronutrients such as vitamin D, magnesium, and zinc support immune regulation and pulmonary mechanics.

Malnutrition and obesity negatively impact rehabilitation outcomes, whereas tailored nutrition improves functional capacity, reduces exacerbations, and enhances quality of life.

Nutrition should be integrated as a core therapeutic element within

pulmonary rehabilitation programs. Individualized nutritional assessments and targeted dietary interventions, combined with exercise training and respiratory therapies, significantly improve rehabilitation efficiency and recovery in patients with chronic lung diseases.

Management of Respiratory Deconditioning in Neurological Disorders

Mohammad Hassan Azarsa
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Faculty Member of Neuromusculoskeletal Rehabilitation Research Center, University of Social Welfare and Rehabilitation Sciences.

Poor cardiopulmonary condition is an impairment which commonly prevents patients with neurologic disorders from ambulating the limbs, pushing a wheelchair up a slope; and also, is physically strenuous associated with a greater oxygen cost. These patients may be untrained from extended periods of sedentary status in a respiratory deconditioning. The importance of respiratory deconditioning is obvious and the patients may experience difficulties when they participate in real and functional activities, while may be able to walk or propel their wheelchairs quite easily in the physiotherapy ward.

One of the most important and common respiratory deconditioning in the patients with neurological disorders is a restrictive pattern of breathing with marked reductions in all lung volumes and capacities and hypoventilation (except residual volume) due to lung and rib cage stiffness and their resistance to movement during respiration, and changes in the elasticity of lung tissue. It becomes more difficult to inflate the lungs and increases the surface tension of alveoli that leads to a reduction in surfactant and the distensibility of alveoli in patients with poor rib cage expansion and physically inactive. Also, rib cage expansion may also be limited by spasticity although the link between spasticity and rib cage compliance is disputed, that in severe conditions it leads to hypoventilation characterized by carbon dioxide retention and hypoxemia and atelectasis. Atelectasis can cause bacterial overgrowth leading to pneumonia, pleural effusion and empyema. The resulting alveolar hypoventilation and impaired breathing

mechanics lead to an increase in arterial partial PaCO2 and a respiratory acidosis in the patients with neurological disorders.
Therefore, management of the respiratory deconditioning focuses on ensuring adequate ventilation support and facilitation, mechanical airway clearance to help clear secretions and prevent pneumonia, diaphragmatic and segmental respiratory muscles training and rib cage mobilization.

The Role of Inspiratory and Expiratory Muscle Training in Enhancing Pulmonary Rehabilitation Outcomes

Mohammad Hossein Pourgharib Shahi M.D, Maryam Ganjalikhani M. D
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Respiratory muscle dysfunction is a critical contributor to morbidity in chronic respiratory diseases, significantly impairing ventilatory efficiency and exercise tolerance. Inspiratory muscle training (IMT) and expiratory muscle training (EMT) have emerged as targeted, evidence-based interventions aimed at selectively enhancing the strength and endurance of inspiratory and expiratory musculature, respectively. IMT predominantly enhances diaphragmatic function and accessory inspiratory muscles, thereby alleviating dyspnea and optimizing respiratory mechanics, while EMT reinforces expiratory muscles essential for effective airway clearance and cough efficacy.

Pulmonary rehabilitation (PR) constitutes a cornerstone of chronic respiratory disease management, integrating exercise physiology, patient education, and psychosocial support to improve functional capacity and quality of life. Incorporation of respiratory muscle training within PR paradigms has been consistently demonstrated to yield significant improvements in respiratory muscle performance, reduce symptom burden, and enhance exercise tolerance. These benefits translate into reduced healthcare utilization and improved long-term prognosis.

Clinical evidence substantiates that the adjunctive application of IMT and EMT leads to measurable enhancements in respiratory muscle strength, reduced ventilatory workload, and reduction of exercise-induced respiratory fatigue. Importantly, respiratory muscle training extends its usefulness beyond diseased populations, demonstrating efficacy in athletic performance optimization and healthy individuals seeking to maximize respiratory efficiency.

In conclusion, inspiratory and expiratory muscle training represent non-invasive therapeutic modalities within comprehensive pulmonary rehabilitation frameworks. Their personalized application is imperative to address respiratory muscle weakness, thereby improving patient-centered

outcomes and advancing respiratory health across diverse clinical and athletic populations.

Physiotherapy in Patients Undergoing Mechanical Ventilation in the ICU

Bahareh Mehregan Far, PT, PhD.

Physiotherapy is an essential component of multidisciplinary ICU care. In patients requiring mechanical ventilation, physiotherapy aims to maintain respiratory function, prevent secondary complications, preserve physical function, and facilitate weaning from ventilator. Mechanically ventilated patients often have impaired cough and Mucociliary clearance due to sedation, endotracheal tube presence, and reduced mobility. Cardiorespiratory modalities include:

Airway clearance and secretion management: with chest physiotherapy techniques, positioning and postural drainage, assisted cough, suctioning support and ventilator hyperinflation or manual hyperinflation, to reduce risk of ventilator-associated pneumonia (VAP), improved lung expansion and better oxygenation,

Optimization of ventilation and gas exchange: by therapeutic positioning, chest wall mobility exercises and lung expansion techniques to improve V/Q matching, reduced atelectasis and enhanced ventilation efficiency ,

Respiratory muscle training with IMT, strengthening diaphragm and accessory muscles, to faster progression toward weaning from mechanical ventilation, 4. Support during weaning from mechanical ventilation to shorter weaning time and fewer extubation failures. This presentation provides an update of cardiorespiratory physiotherapy for patients receiving mechanical ventilation in ICU. Common and some more novel assessment tools and treatment options are described, along with the mechanisms of action of the treatment options and the evidence and physiology underpinning them. The aim is not only to summarize the current state of cardiorespiratory physiotherapy but also to provide information that will also hopefully help support clinicians to deliver personalized and optimal patient care, based on the patient's unique needs and guided by accurate interpretation of assessment findings and the current evidence.

Physiotherapy Approach to Respiratory Problems in Children

Omolbanin Alirezaie
Pediatric physiotherapist, Head of the Pediatric Branch of the Iranian Physiotherapy Association Tehran University of Medical Sciences, Children's Medical Center

In the small and innocent world of children, every breath carries hope, dreams, and an innate drive to explore their surroundings. However, when respiratory diseases cast their shadow over this delicate world, breathing becomes a profound challenge. In such moments, respiratory physiotherapy emerges not merely as a treatment modality but as the art of restoring life. Pediatric respiratory physiotherapy is more than a collection of techniques and maneuvers; it represents a compassionate touch that opens the airways, a drop of hope flowing through the lungs, and a narrative of resilience written softly with each cough. Within this process, the physiotherapist is not only a clinician but also a mentor who guides the child to become the hero of their own breaths .

As parents observe the transformation of their child's interrupted breathing and exhausting coughs into calmer respiration under the skilled hands of the physiotherapist, the heavy burden of anxiety on their shoulders begins to lift. Respiratory diseases remain among the leading causes of morbidity and mortality in pediatric populations worldwide, and respiratory physiotherapy constitutes a fundamental component in managing these conditions. This presentation aims to explore the effectiveness of novel protocols, current challenges, and their impact on vital signs and pulmonary function .

Robust evidence indicates that targeted respiratory physiotherapy interventions significantly enhance airway secretion clearance, reduce associated complications, shorten hospital length of stay, and diminish the need for invasive procedures. These interventions are both cost-effective and highly efficient in managing respiratory diseases in children. This presentation underscores the irreplaceable role of the physiotherapist as a key member of the multidisciplinary pulmonary rehab

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MIP/S-index (CmH2O)
PIF(L/s)
Volume(L)
شاخص تمرین
Pressure(CmH2O)
Power(Watt)
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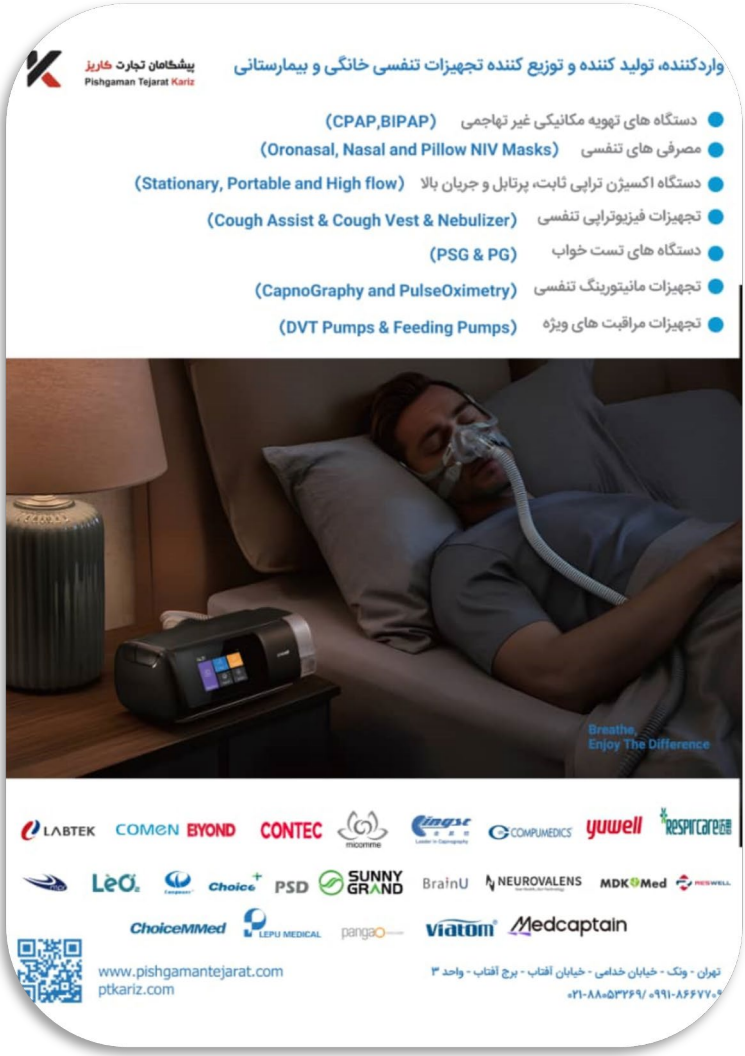

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