

KOAH'TA SANAL GERÇEKLIK UYGULAMALARI

Arş.Gör.Cihad ÖDEMiŞ

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AKIŞ

-COPD

-SANAL GERÇEKLİK

-ÇALIŞMALAR

COPD

COPD

BACKGROUND

- * TYPE of CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)
- * **DAMAGE to LUNG PARENCHYMA** (i.e. ALVEOLI)

CAUSES

- * **CIGARETTE SMOKING** (90% of all CASES)
 - ~ SECONDHAND SMOKE
- * **LONG-TERM EXPOSURE to TOXIC CHEMICALS**
- * **DISEASE, ABNORMALITIES, or DEFICIENCIES**
 - ~ α -1 ANTITRYPSIN DEFICIENCY



SIGNS & SYMPTOMS

- * **PROGRESSIVELY WORSENING:**
 - ~ SHORTNESS of BREATH
 - ~ PRODUCTIVE COUGH
 - ~ WHEEZING
 - ~ WEIGHT LOSS
- * **BARREL CHEST**
- * **LIMITED PHYSICAL ACTIVITY**



TREATMENT

- * **↓ RISK FACTORS**
- * **MEDICATIONS**
 - ~ BRONCHODILATORS
 - ~ INHALED STEROIDS
- * **OXYGEN THERAPY**
- * **PULMONARY REHAB**

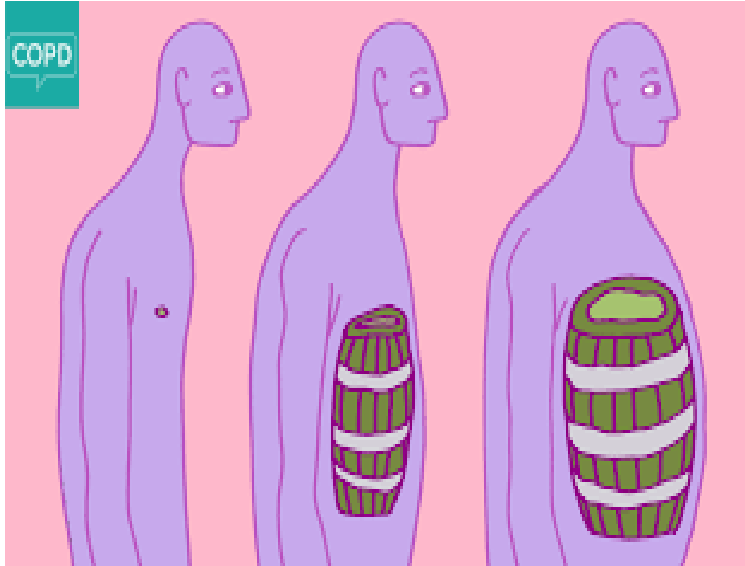


HEALTHY ALVEOLI

Dünya genelinde mortalite ve morbiditenin başlıca sebeplerindedir.

COPD

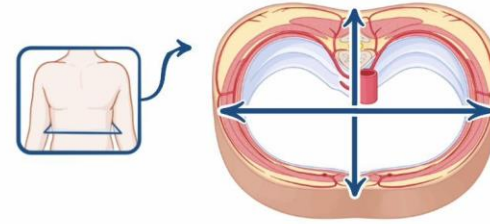
BARREL CHEST



- Horizontal rib
- Artmış rib aralığı

INSPECTION

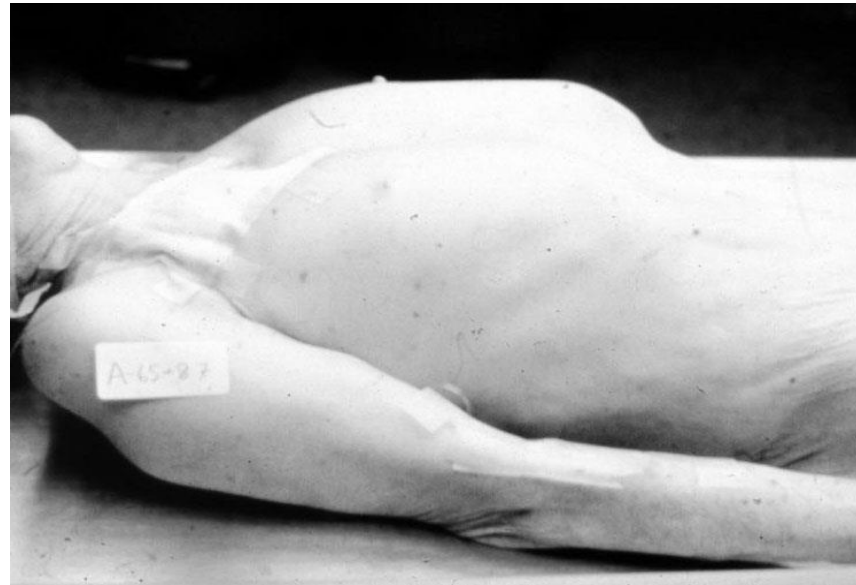

* VISUALIZE SYMMETRY & SHAPE of CHEST ANTERIORLY & POSTERIORLY



✓ ANTERIOR-POSTERIOR DIAMETER SHOULD be < LATERAL DIAMETER

! **BARREL CHEST**
~ SLOPE of RIBS more PARALLEL
~ COSTAL ANGLE > 90°

* can INDICATE CHRONIC RESPIRATORY CONDITION
↳ e.g. COPD



COPD

-Azalmış fiziksel kapasite ve fiziksel aktivite

-Depresyon x **4 (COPD)** riskli

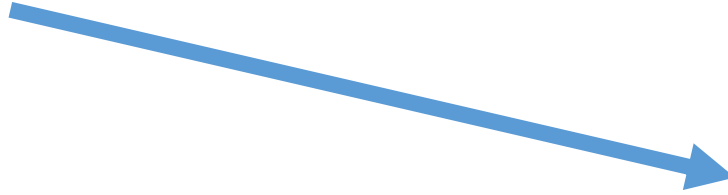


COPD



GLOBAL INITIATIVE
FOR CHRONIC OBSTRUCTIVE
LUNG DISEASE

- Rehabilitasyon
- Farmakolojik tedavi
- Psikoterapi
- Oksijen terapisi



- 6 ile 8 hafta
- Treadmill ya da bisiklet ergometresi
- Nefes egzersizleri
- Diyafram güçlendirme
- Üst ve alt vücut perifer kas kuvvetlendirme
- Motor koordinasyon ve denge
- Drenaj uygulamaları

Global Initiative for Chronic Obstructive Lung Disease (GOLD 2017) Global Strategy for the Diagnosis, Management and Prevention of COPD.

Casaburi R, Zuwallack R. Pulmonary rehabilitation for management of chronic obstructive pulmonary disease. *N Engl J Med.* 2009;360(13):1329-1335.

SANAL GERÇEKLİK(VR)

SANAL GERÇEKLİK(VR)

- Bilgisayar destekli donanım ve yazılımlar
- 3d ortam,dış dünya
- bütüncül,interaktif,multisensöriyel(vizüel,akustik,-taktil)



Head Mounted Display(HMDs)



SANAL GERÇEKLIK(VR)

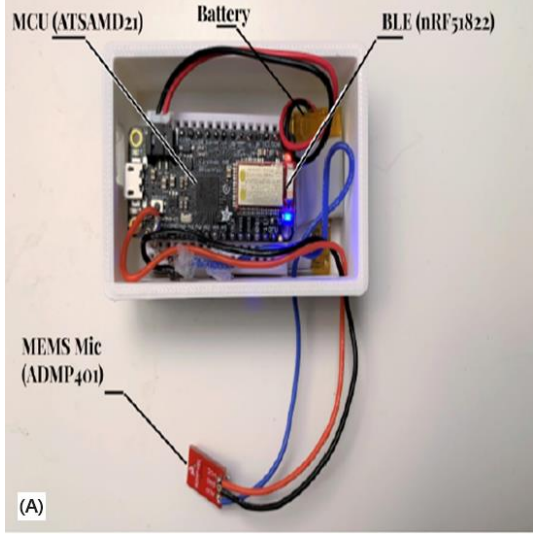
-Immersion(Kullanılan sensörler,ekranlar,gerçeklik temsiliyeti

-Interaction(El hareketleri,objeleri bulma



- VR Endurans egzersiz örneđi

SANAL GERÇEKLIK(VR)



A)Nefes vermeyi algılayan mikrofon

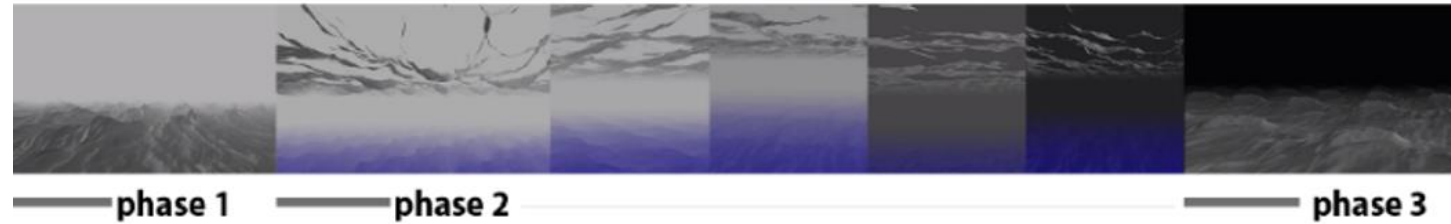
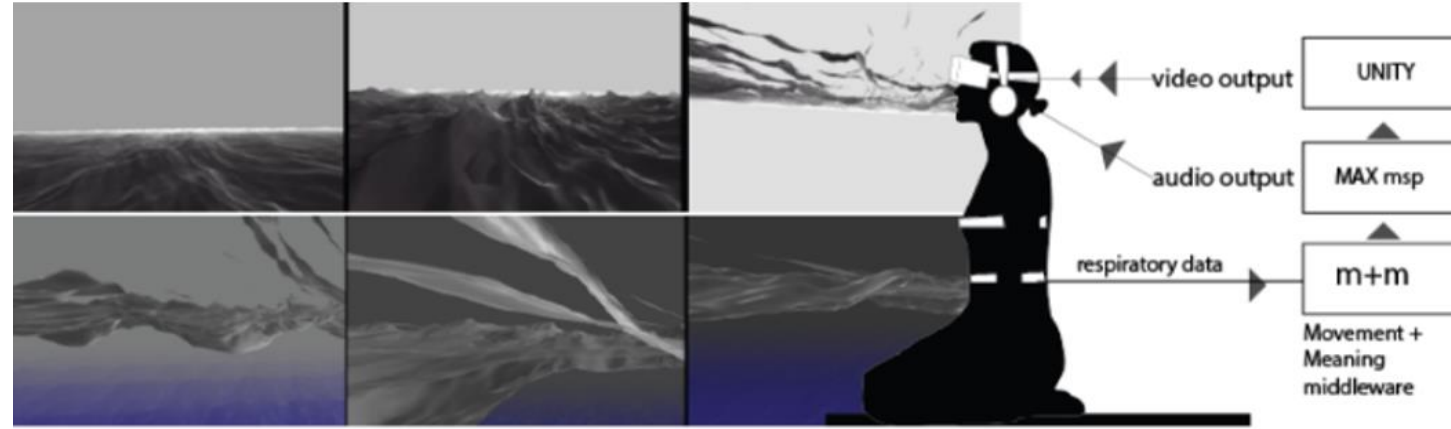


B)Nefes teknikleri ile VR oyunu arasındaki köprü



-Su altı sanal gerçeklik ve diyafram kuvvetlendirme egzersizleri

SANAL GERÇEKLIK(VR)



-Nefes alma paterni ve okyanus dalgaları kontrolü içeren sanal gerçeklik uygulaması

- Nonimmersive



- Nonimmersive



- Semi-immersive



- Fullyimmersive



- Fullyimmersive



NEDEN(VR)??

- Daha uzun süreli gerçekleştirilebilen uygulanması kolay yeni metodlar arama ihtiyacı ortaya çıktı.
- Uzaktan gözlemlenerek yapılan VR rehabilitasyon programları geleneksel rehabilitasyon programlarını tamamlayıcı niteliktedir.

NEDEN(VR)??

- Tedavi ve ulaşım masraflarının önem arz ettiği durumlarda VR tabanlı reh programlarının tercih edilmesi ön plana çıkmaktadır.



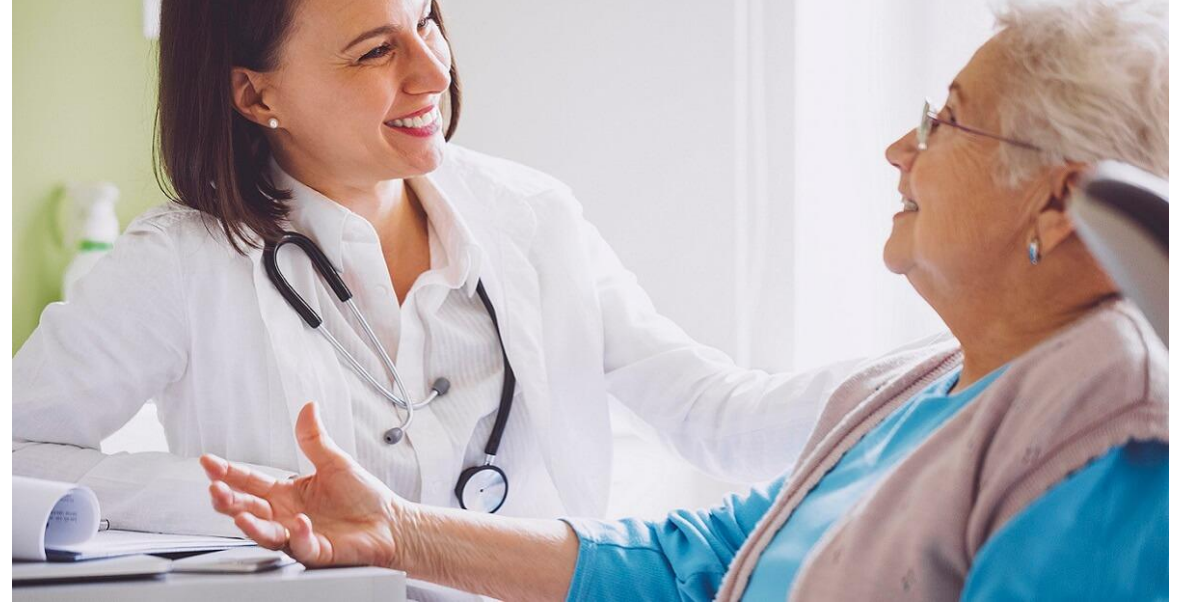
NEDEN(VR)??

- Yorgunluk, motivasyon eksikliği, günlük hayat aktivitelerindeki yetersizlik



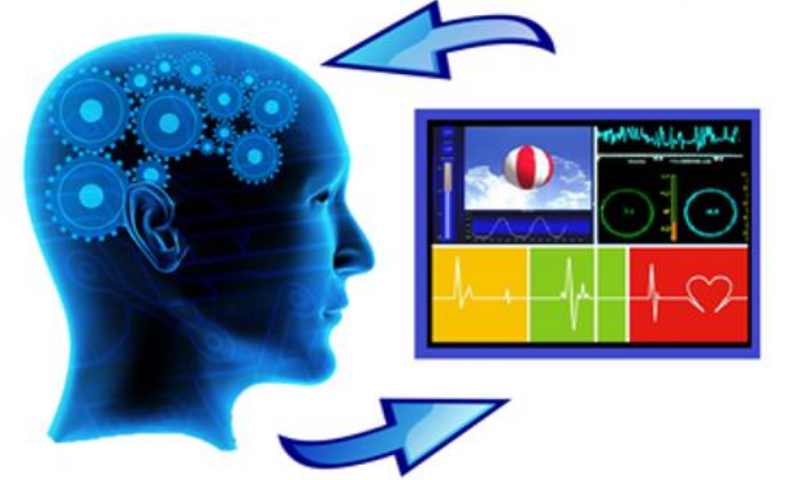
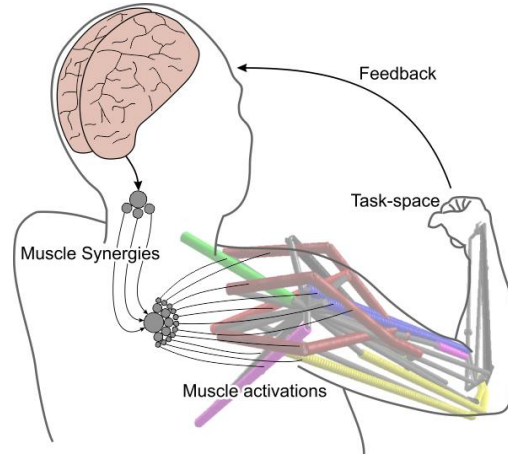
VR AVANTAJLARI

- Fully-immersive VR uygulamaları hastaların egzersiz esnasında motivasyonlarını ve uyumlarını artırarak program üzerinde pozitif etkiler sağlar.



VR AVANTAJLARI

- Biyofeedback katkısı ve motor performans gelişimi




ÇALIŞMALAR

A virtual reality-based endurance training program for COPD patients: acceptability and user experience

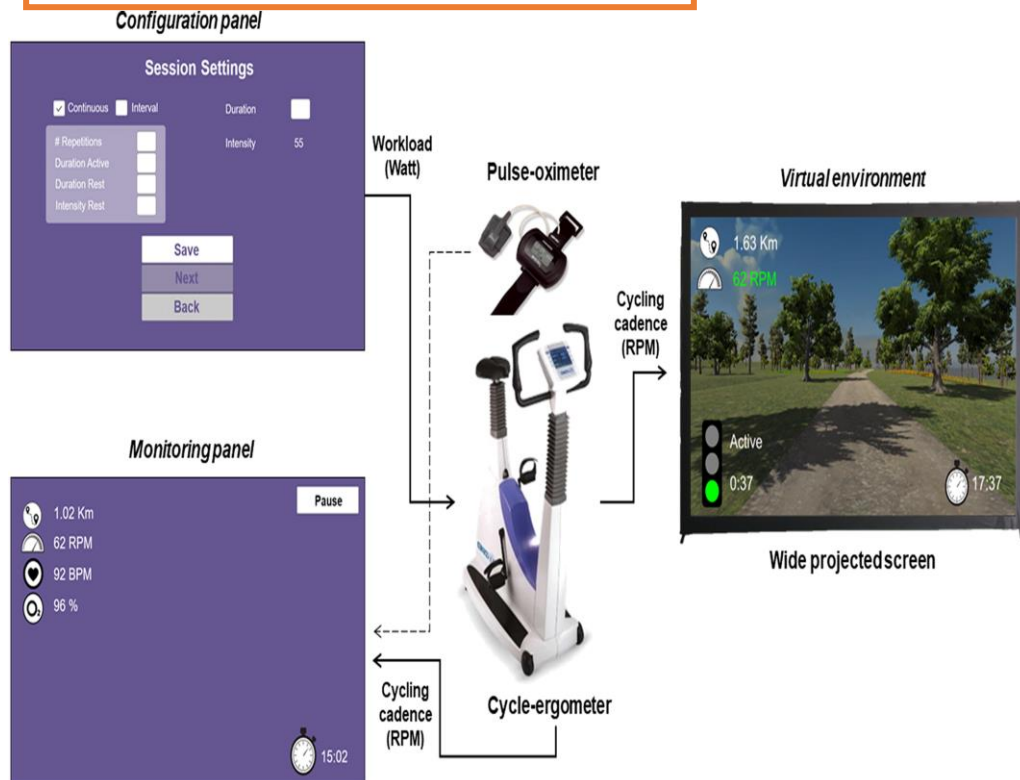
Vera Colombo  , Marta Mondellini, Alessia Fumagalli, Andrea Aliverti & Marco Sacco

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 Cite this article  <https://doi.org/10.1080/17483107.2023.2219699>

 Check for updates

VIRTUAL PARK



20dk/2 defa,10 GÜN

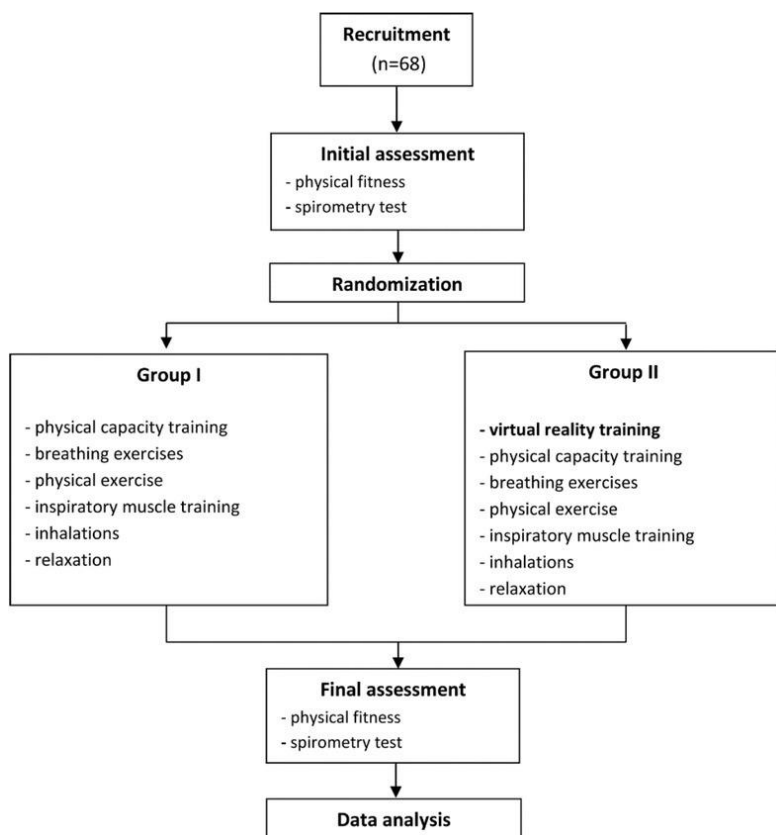
6MWT

User Experience Questionnaire
Short Flow State Scale

Effect of Virtual Reality-Based Rehabilitation on Physical Fitness in Patients with Chronic Obstructive Pulmonary Disease

[Sebastian Rutkowski](#),^{*,1} [Anna Rutkowska](#),¹ [Dariusz Jastrzębski](#),² [Henryk Racheniuł](#),¹ [Witold Pawełczyk](#),¹ and [Jan Szczegieliński](#)¹

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Senior Fitness Test

Effect of therapies on the Senior Fitness Test

	Mean (SD) group I		Mean (SD) group II	
	pre	post	pre	post
Arm Curl (rep.)	19 (2.7)	20.6 (2.9)*	18.6 (3.1)	21.8 (3.3)*
Chair Stand (rep.)	14.8 (3.2)	15.6 (2.9)*	14.3 (3.1)	16.6 (3.7)*
Back Scratch (cm)	-7.6 (7.8)	-6.8 (7.5)*	-6.1 (10.8)	-4.0 (10.2)*
Sit and Reach (cm)	0.1 (4.3)	1.3 (4.2)*	0.7 (10.1)	3.4 (9.7)*†
Up and Go (s)	6.3 (1.4)	6.0 (1.1)*	6.0 (0.8)	5.3 (0.5)*†
6MWT (m)	494.9 (38.7)	514.7 (33)*	469.9 (34.3)	508.4 (44.3)*

Int J Chron Obstruct Pulmon Dis. 2020; 15: 117–124.

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PMCID: PMC6968810

PMID: 32021150

Virtual Reality Rehabilitation in Patients with Chronic Obstructive Pulmonary Disease: A Randomized Controlled Trial

Sebastian Rutkowski,¹ Anna Rutkowska,¹ Paweł Kiper,² Dariusz Jastrzebski,³ Henryk Rachenik,¹ Andrea Turolla,² Jan Szczegielniak,¹ and Richard Casaburi⁴

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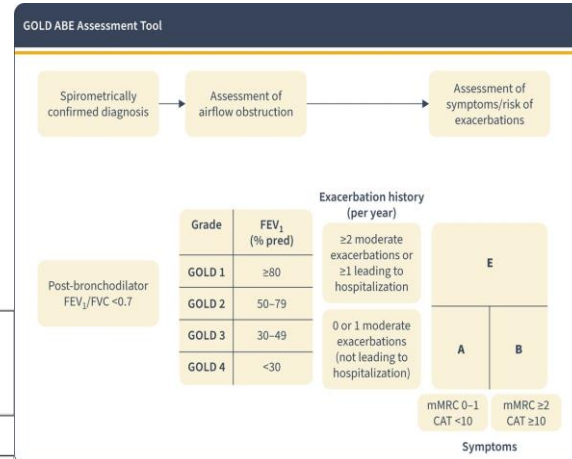
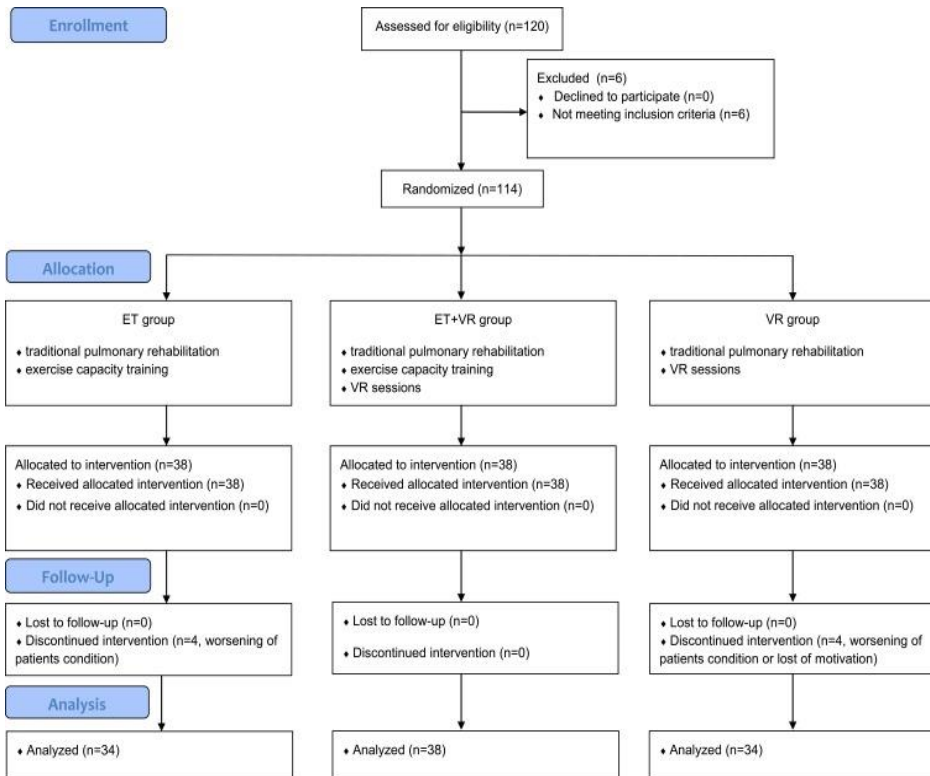


Table 1

Characteristics of the Patients

	ET n=34	ET+VR n=38	VR n=38	Between-Group Comparison p-value*
Men, n	18	19	10	p > 0.05
Women, n	16	19	28	p > 0.05
Age, years (SD)	62.1 ± 2.9	60.6 ± 4.3	60.4 ± 4.2	p > 0.05
BMI, kg/m ²	25.3 ± 4	24.2 ± 4	23.5 ± 3	p > 0.05
Group B/C	17/17	19/19	19/19	p > 0.05
Spirometry parameters				
FVC, (% pred)	79.5 ± 23.8	73.2 ± 13.9	82.6 ± 17.5	p > 0.05
FEV ₁ , (% pred)	65.4 ± 24.0	60.5 ± 16.2	69.2 ± 23.6	p > 0.05
FEV ₁ , % FVC	66.1 ± 13.6	65.8 ± 16.2	66.9 ± 16.0	p > 0.05

2 hafta/5 kez

ET

-Fitness

-Solunum kas güçlendirme ve gevşeme teknikleri

VR

Kinect Adventures Software-X box 360

-Dayanıklılık
-Gövde Kontrolü
-Üst ve alt eks k.
-Dinamik Denge

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VR



ET

Arm Curl
Chair Stand
6MWT

ET+VR



ET

Arm Curl
Chair Stand
Back Stretch
Chair Sit and Reach
Up and Go
6MWT

Evaluation of the Efficacy of Immersive Virtual Reality Therapy as a Method Supporting Pulmonary Rehabilitation: A Randomized Controlled Trial

Sebastian Rutkowski,^{1,*} Jan Szczegielniak,¹ and Joanna Szczepańska-Gieracha²

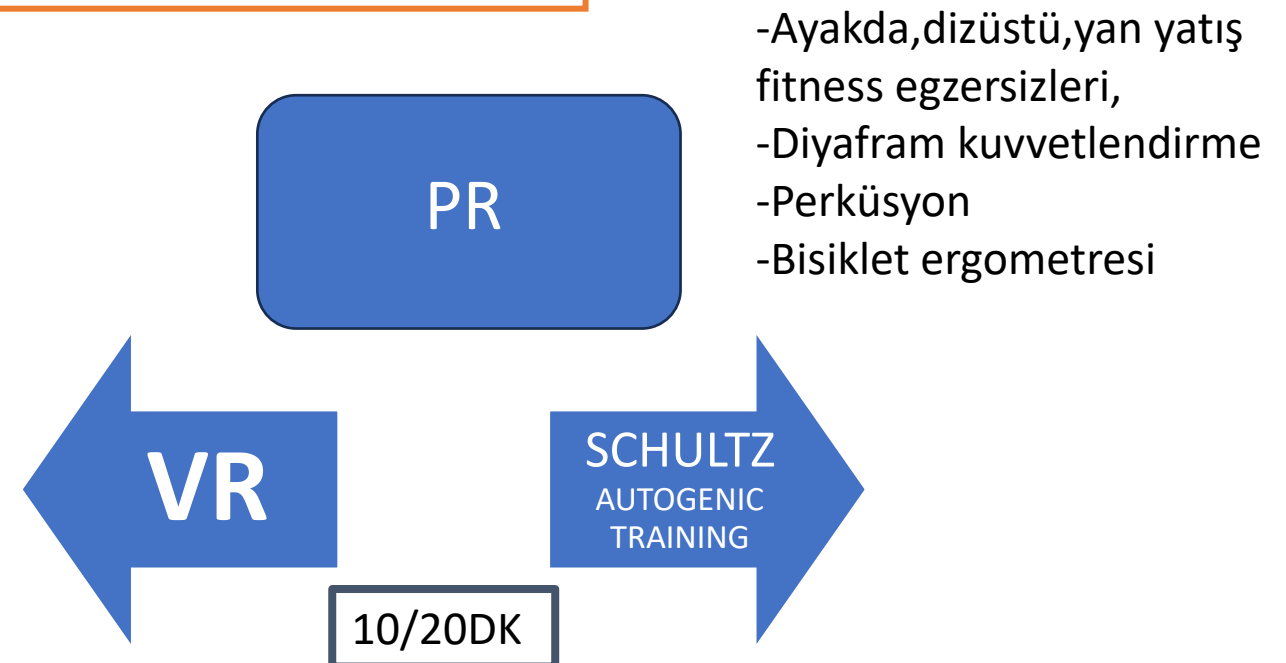
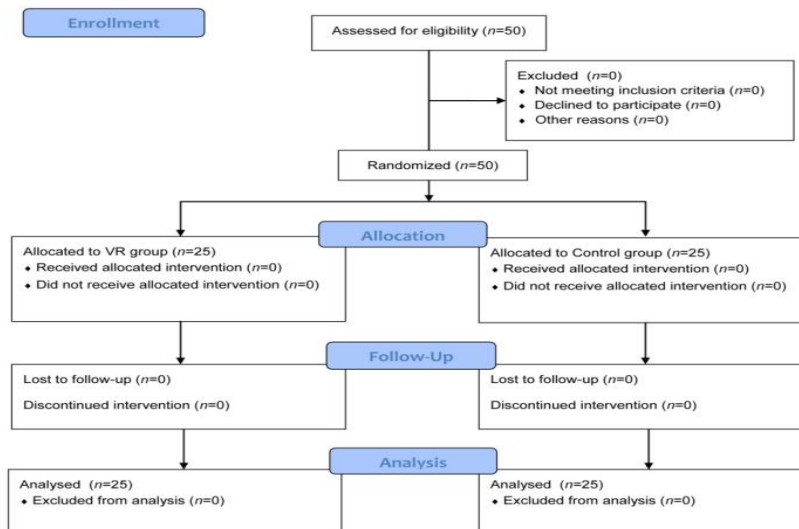
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The Perception of Stress Questionnaire(PSQ)

Hospital Anxiety and Depression Scale(HADS)

Exercise Capacity-6MWT, Lung Function(FEV1)

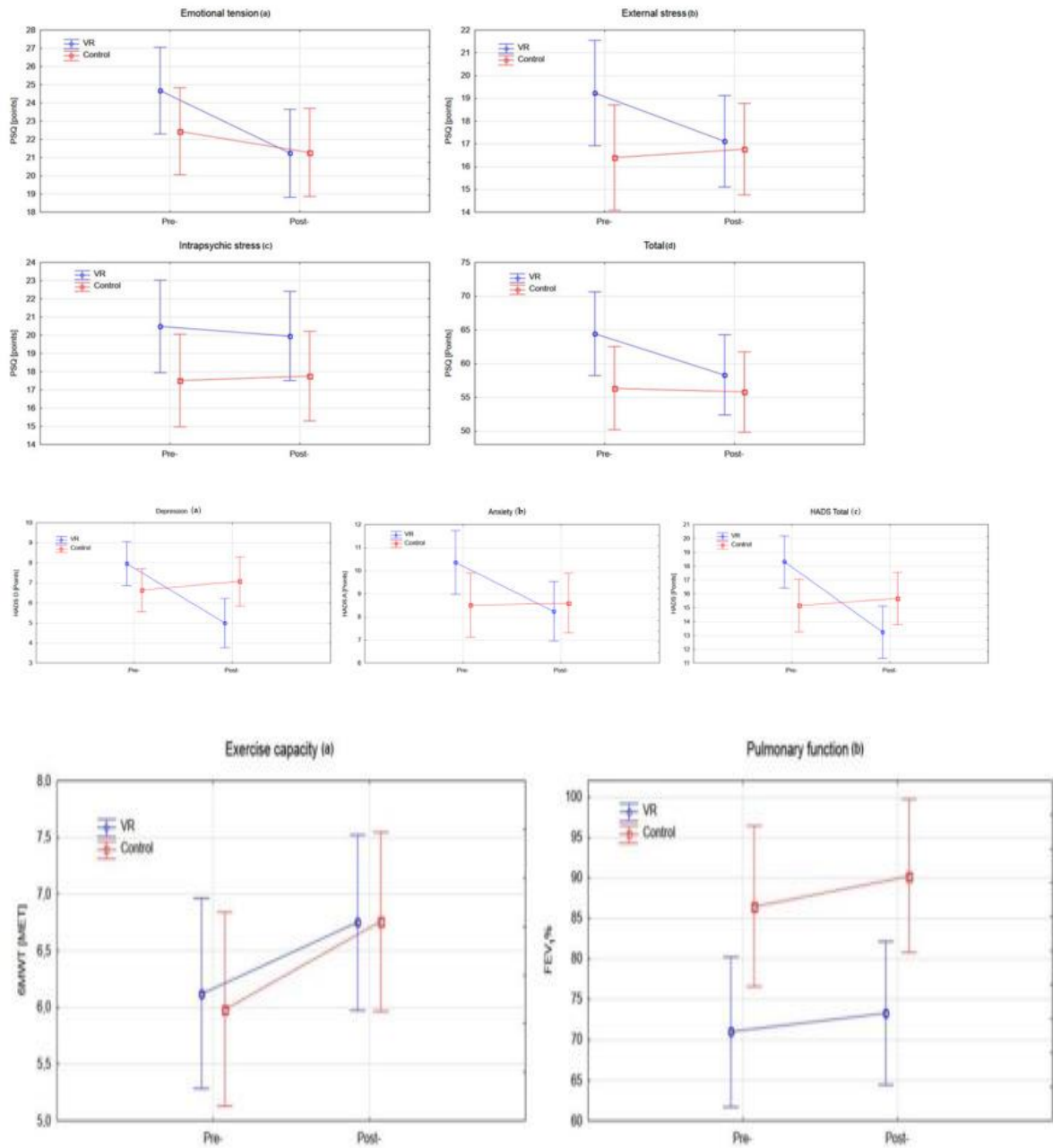
CONSORT 2010 Flow Diagram





VR

- Daha yüksek stress kaybı
- Daha yüksek HADS skor kaybı
- Akciğer fonksiyonu ve egzersiz kapasitesi seviyelerde fark yok



Benefits from Incorporating Virtual Reality in Pulmonary Rehabilitation of COPD Patients: A Systematic Review and Meta-Analysis

Irini Patsaki,* Vasiliki Avgeri, Theodora Rigoulia, Theodoros Zekis, George A. Koumantakis, and Eirini Grammatopoulou

Monika Franczuk, Academic Editor

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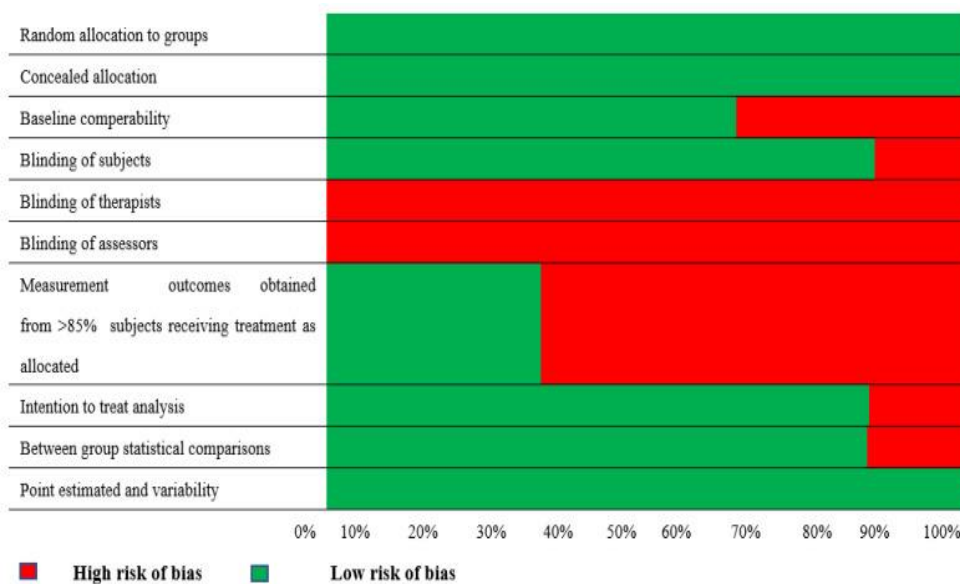
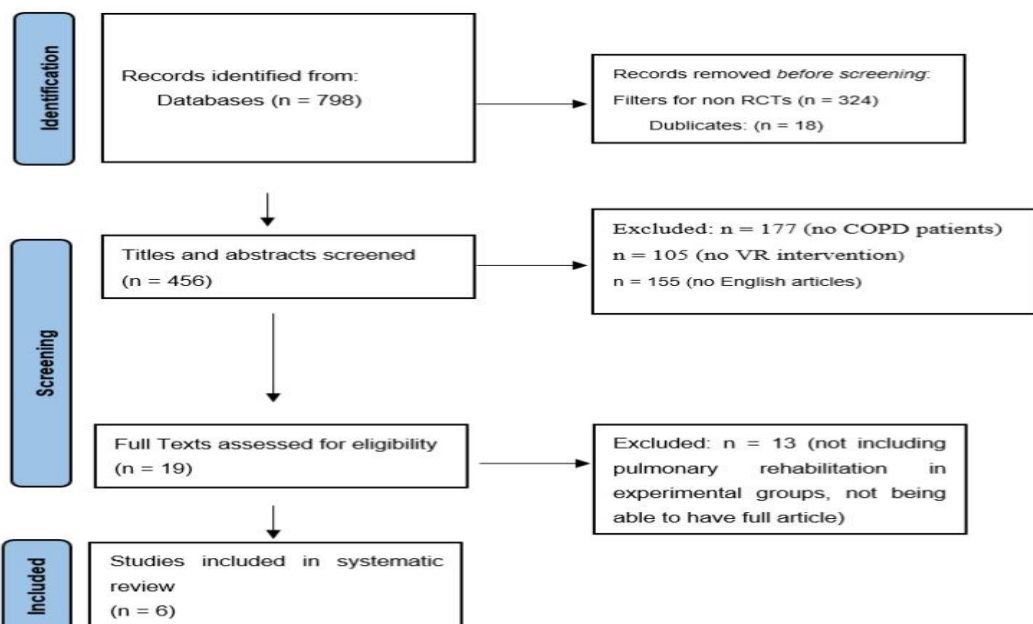


Table 1

Rating of the included studies according to the PEDro scale.

Criteria Studies	1	2	3	4	5	6	7	8	9	10	11	Score	Quality
Mazzoleni et al. (2014) [24]	1	1	0	1	0	0	0	1	1	1	1	6/10	Good
Sutanto et al. (2019) [25]	1	1	0	1	0	0	0	0	0	1	1	4/10	Fair
Xie et al. (2021) [26]	1	1	1	0	0	0	0	1	1	1	1	6/10	Good
Rutkowski et al. (2019) [27]	1	1	1	1	0	0	0	1	1	1	1	7/10	Good
Rutkowski et al. (2020) [28]	1	1	1	1	0	0	1	1	1	1	1	8/10	Good
Rutkowski et al. (2021) [15]	1	1	1	1	0	0	1	1	1	1	1	8/10	Good

Table 2

Characteristics of the studies included in the systematic review.

Studies	Sample	Interventions	Control Group	Results
Mazzoleni et al. (2014) [24]	39 CG: 19 EG: 20	Wii Fit Plus System + PR	PR	6MWT: EG vs. CG ($p = 0.028$) MRC dyspnea: EG vs. CG ($p = 0.488$) SGRQ: EG vs. CG ($p = 0.657$) BDEI: EG vs. CG ($p = 0.724$) STAI: EG vs. CG ($p = 0.788$)
Rutkowski et al. (2019) [27]	68 CG: 34 EG: 34	Kinect training + PR	PR	6MWT: CG vs. EG ($p > 0.05$)
Rutkowski et al. (2020) [28]	106 CG: 34 EG1: 38 EG2: 34	EG1: Kinect training + PR + Stationary cycle ergometer EG2: Kinect training + PR	PR + Static cycle ergometer	6MWT: EG1 vs. CG ($p = 0.011$) EG2 vs. CG ($p = 0.031$)
Rutkowski et al. (2021) [15]	50 CG: 25 EG: 25	Immersive VR + PR	PR + Schultz autogenic training	6MWT: EG vs. CG ($d = -0.074$) FEV ₁ % pred: EG vs. CG ($d = -0.066$) HADS: EG vs. CG ($d = -1.175$)
Sutanto et al. (2019) [25]	23 CG: 11 EG: 12	Wii Fit System + Cycle Ergometer	Cycle Ergometer	6MWT: EG vs. CG ($p = 0.226$) SGRQ: EG vs. CG ($p = 0.523$) MRC dyspnea: EG vs. CG ($p = 0.036$)
Xie et al. (2021) [26]	60 CG: 30 EG: 30	VR + PR	PR	Self efficacy score ($p < 0.05$) mMRC ($p > 0.05$) FEV ₁ %pred ($p > 0.05$)

SON SÖZ

- Geleneksel programları destekleyici
- Motivasyon, uyum
- Egzersiz kapasitesi pozitif

TEŐEKKÜRLER