

# Physiological effects of exergaming on muscle strength, balance and cancer-related fatigue in children with cancer.

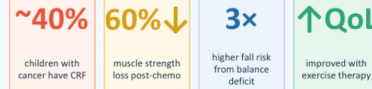
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## BACKGROUND & AIM

**Children with cancer & survivors frequently experience:** muscle atrophy, impaired neuromuscular control & deconditioning from chemotherapy & radiotherapy.  
**Exergaming** combines interactive video games with functional physical exercise—offering a motivating, child-friendly rehabilitation alternative.  
**Aim:** To explore how exergaming physiologically improves muscle strength, balance & cancer-related fatigue in pediatric oncology.

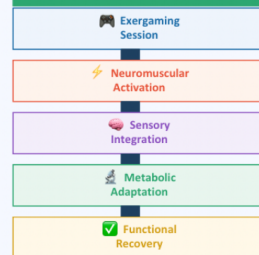
## KEY STATISTICS



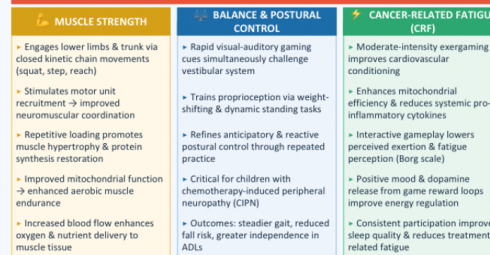
## EXERGAMING vs TRADITIONAL PHYSIOTHERAPY

DOMAIN	EXERGAMING	TRADITIONAL PT
Engagement	High — interactive, game-based, motivating for children	Low-moderate; repetitive, often monotonous & tiring
Muscle Strength	Motor unit recruitment via squat/step/reach; promotes hypertrophy & protein synthesis	Isolated progressive exercises; effective but low novelty
Balance Training	Multi-sensory: visual, vestibular & proprioceptive integration simultaneously	Manual exercises with therapist; less multi-sensory variety
Fatigue (CRF)	Psychological engagement reduces perceived fatigue; moderate intensity improves conditioning	Physically effective; limited psychological motivation component
Adherence	High — enjoyable format sustains long-term participation	Moderate — fatigue & boredom reduce completion rates
Setting	Clinic & home (telerehabilitation-ready via AI platforms)	Primarily clinic-based; limited home transfer
Neuroplasticity	Dual-task cognitive + motor challenges promote neuroplasticity	Motor focus only; cognitive engagement is minimal

## PHYSIOLOGICAL PATHWAY



## MECHANISMS OF ACTION



## KEY MOVEMENTS IN EXERGAMING



## BALANCE SYSTEM DIAGRAM



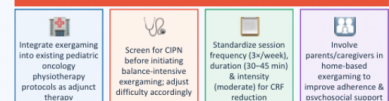
## CRF MANAGEMENT MODEL



## FUTURE DIRECTIONS



## CLINICAL IMPLICATIONS



## CONCLUSION

Exergaming is a physiologically sound, child-friendly rehabilitation approach that promotes neuromuscular activation, multi-sensory balance retraining, cardiovascular fitness & psychological engagement. Its enjoyable format sustains long-term participation—key to achieving meaningful clinical outcomes. Combined with AI personalization & telerehabilitation, exergaming has the potential to transform pediatric oncology rehabilitation into precision, adaptive, home-accessible therapy that meaningfully improves strength, balance, fatigue & quality of life in children with cancer.

