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Integration of artificial ıntelligence in physical therapy: Decision-making, opportunities, and ethical challenges

Fizik tedavide yapay zekanın entegrasyonu: Karar verme, fırsatlar ve etik zorluklar

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Özet

Bu mektup, sağlık sektörünü hızla dönüştüren yapay zeka (YZ) nın fizik tedavi alanında kullanımı ile ilgilidir. Yapay zekanın verimlilik, bireyselleştirilmiş müdahaleler ve kanıta dayalı klinik değerlendirme açısından faydaları çok büyük olabilir. Gelişmelere rağmen, özerklik, veri gizliliği ve algoritmik önyargı riski sorunları hala devam etmektedir. Güçlü etik kullanım ve düzenleyici güvencelere ihtiyaç vardır. Otomatik makinelere aşırı güvenmenin terapötik ilişkiyi ve algılanan empatiyi azaltabileceğini gösteren kanıtlar nedeniyle, insan merkezli bir yaklaşım gereklidir. YZ'nin ilerlemesi, klinisyenler, mühendisler, veri bilimciler ve etikçiler arasında ortak bir işbirliği gerektirecektir.

Anahtar kelimeler: Yapay zeka, fizik tedavi, rehabilitasyon

Summary

This letter is about the use of artificial intelligence (AI) which is rapidly transforming the healthcare sector in the field of physical therapy. AI benefits could be enormous in terms of efficiency, individualized interventions, and clinical judgment based on evidence. In spite of the improvements, the problem of autonomy, data privacy, and the risk of algorithmic bias still remains alive. Strong ethical use and regulatory safeguards are needed. A human centered approach is necessary since the evidence shows that overreliance on automated machines may reduce the degree of therapeutic relationship, perceived empathy. The advances of AI will require joint collaboration among clinicians, engineers, data scientists, and ethicists.

Keywords: Artificial intelligence, physical therapy, rehabilitation

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Dear Editor,

The field of artificial intelligence (AI) is rapidly transforming the healthcare sector, and when applied to the field of physical therapy, the resulting benefits could be enormous in terms of efficiency, individualized interventions, and clinical judgment based on evidence[1]. It is also moving towards predictive analytics, movement analysis through computer-vision, and automated documentation systems, which are all becoming applications that are being adopted to perfect assessment and rehabilitation planning [2]. However, these same types of developments demand critical consideration on their clinical ethics, and the interactions on professional boundaries.

Opportunities for Enhanced Rehabilitation

Artificial intelligence has demonstrated a positive role in neurological and musculoskeletal rehabilitation. As a demonstration, camera-based motion tracking, wearable inertial sensors and machine-learning predictors can be applied to measure gait, enabling a more precise quantification of motor activity and prediction of its outcome[3]. Clinicians are helped via these technologies by offering an additional source of information that may inform clinical thinking and dosage of therapy, progression, and involvement of the patient. In spite of these improvements, the problem of clinical autonomy, data privacy, and the risk of algorithmic bias still remains alive[4]. Underrepresented populations as suggested by AI systems can be biased when non-representative datasets are used to train them[5]. Moreover, the over-dependency on algorithmic output, especially in the case of inexperienced therapists, can eliminate any kind of opportunity of forming their clinical judgment.

Ethical and Regulatory Considerations

Strong ethical use and regulatory safeguards are needed when it comes to the use of AI. Some of the key areas that have remained unmet in most scenarios are data possession, informed consent on AI-assisted care, and transparency in algorithmic decision-making[6]. AI should not replace the clinical judgment but be used as an assistant. As a result, digital literacy, data ethics, and general knowledge of AI systems will have to be introduced into rehabilitation programs to ensure that future practitioners are well trained[7].

Human-Centered Care and Risks

Human-Centered approach is necessary, since AI is beginning to find its way into the rehabilitation practice[8]. Considering that AI can facilitate the processes of assessment, provide remote monitoring, and assist in predicting the results, these benefits can be considered against the destructive effect of depersonalization and the rise of inequality in care access. The evidence shows that overreliance on automated machines may reduce the degree of therapeutic relationship, perceived empathy as well as over-represent patients with less digital literacy[9]. Such type of issues clearly highlight why empathy, importance of situation understanding, and professional presence should be maintained as the main aspects of rehabilitation

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Conclusion

The opportunities in AI are enormous which includes supporting clinical arguments, improving efficiency, and individualizing the results of rehabilitation. However, these advantages must need to be balanced with ethical, professional, and humanistic values. The advances of AI will require joint collaboration among clinicians, engineers, data scientists, and ethicists. Similarly, clinicians will have the chance to establish the clinical relevance, engineers can control technical reliability, data scientists can control the fairness of the algorithms as well as ethicists can protect the rights and values of patients and society. The overall multidisciplinary collaboration will lead to the implementation of AI in a way that does not compromise the humanistic basis of rehabilitation.

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