PRISMA 2020 Checklist (Partial only)

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	n.a.
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	n.a.
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	The integration of AI with additive manufacturing (AM) is driving breakthroughs in personalized rehabilitation and physical therapy solutions, enabling precise customization to individual patient needs. Advanced AI algorithms analyze patient-specific data such as body scans, movement patterns, and medical history to design customized assistive devices, orthoses, and prosthetics. This synergy enables rapid prototyping and production of highly optimized solutions, improving comfort, functionality, and therapeutic outcomes. Machine learning (ML) models further streamline the process by anticipating biomechanical needs and adapting designs based on feedback, providing iterative refinement. Cutting-edge techniques leverage generative design and topology optimization to create lightweight yet durable structures that are ideally suited to the patient's anatomy and rehabilitation goals. AI-based AM also facilitates the production of multi-material devices that combine flexibility, strength, and sensory capabilities, enabling improved monitoring and support during physical therapy. New perspectives include integrating smart sensors with printed devices, enabling real-time data collection and feedback loops for adaptive therapy. Additionally, these solutions are becoming increasingly accessible as AM technology lowers costs and improves, democratizing personalized healthcare. Future advances could lead to the widespread use of digital twins for real-time simulation and customization of rehabilitation devices before production.
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	RQ1: evolution of research topics/problems over time, RQ2: geographical distribution of studies/publications, authors, scientific institutions and publications with the highest impact, and RQ3: topics that may shape future research programs.
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Criteria for inclusion of articles in the review: English-language original and review articles, also full-text conference articles and chapters in books, open source, indexed by major bibliometric databases: WOS, Scopus, dblp, PubMed. Criteria for exclusion from the review: languages other than English, other forms of publication (reports, abstracts, etc.),

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			no full text available Open Source.
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Web of Science, Scopus, dblp
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Article Table 2
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Article Table 2, Figure 1, Table 3
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	After analyzing the content of the main databases, we searched for research articles in three main databases: WoS, Scopus, dblp, and PubMed. This choice was dictated by the wide scope of research results contained in them and the detailed data and analytical tools enabling comprehensive analyses, which is especially beneficial when conducting interdisciplinary bibliometric analyses and assessing the impact of research results, as was the case in ours. When creating advanced queries tailored to our research goals, we applied filters to select relevant publications. In this way, we limited our search to articles in English. Later in the study, we manually reviewed the articles again, excluding some of them (including duplicate articles) to match our research goals, which resulted in the final sample size (Figure 1). The WoS search was performed using “Topic” (search using the set: title, abstract, keyword plus and other keywords), the Scopus search was performed using the set: article title, abstract, keywords, and the dblp. PubMed search was performed using manual keyword sets. Detail search query over databases: article Table 2. The obtained publications were subjected to further selection (Figure 2, Table 3).
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	n.a.
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	n.a.
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	n.a.
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	n.a.
Synthesis	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for	Article Table 1, Table 2, Figure 1



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methods		each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	n.a.
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	n.a.
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	n.a.
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	n.a.
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	n.a.
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	n.a.
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	n.a.
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	n.a.
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	n.a.
Study characteristics	17	Cite each included study and present its characteristics.	n.a.
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	n.a.
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	n.a.
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	n.a.
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Article, Results section e.g. Table 3, Figures 2a, 2b
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	n.a.
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	n.a.
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	n.a.
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	n.a.

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DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Article Discussion section, including Figure 5
	23b	Discuss any limitations of the evidence included in the review.	n.a.
	23c	Discuss any limitations of the review processes used.	n.a.
	23d	Discuss implications of the results for practice, policy, and future research.	n.a.
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	n.a.
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	n.a.
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	n.a.
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	n.a.
Competing interests	26	Declare any competing interests of review authors.	n.a.
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	n.a.

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